THE IMPACT OF THE PROPERTY TAX SHARING SYSTEM

ON FISCAL EQUITIES AMONG LOCAL GOVERNMENTS

IN THE SEOUL METROPOLITAN AREA

by

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ABSTRACT

Local governments are primarily concerned with the well-being of the population within their jurisdictions. The unequal spatial distribution of property tax, which is a main source of local revenues, can result in differences in the quality of public services provided across localities in the metropolitan area. Like other metro areas, Seoul has problems caused by fiscal inequities among localities. Since the self-governing local system was established in 1995 in Korea, it has been suggested that some steps should be taken in order to alleviate these inequities. Property tax sharing is currently under consideration. Therefore, this study examines what kind of sharing model would be most effective so as to reduce fiscal disparities among localities in the Seoul metropolitan area, in terms of lowest administrative effort and cost of implementation, greatest public support, and maximum equalization. To better understand property tax sharing policy approaches, this paper evaluates the effectiveness and limitations of the existing property tax-base sharing program adopted in the Twin Cities metropolitan area of Minnesota in the U.S. After considering the costs and benefits of the Twin Cities program, this study recommends a property tax sharing system for Seoul where 50 percent of each locality's entire property tax revenue be contributed to a pool, and the money redistributed to each locality, based on its share of the area's population and its relative property tax wealth.

TABLE OF CONTENTS

LIST OF TABLES

Ⅰ. Introduction

Background and the Status of Regional Disparities in Seoul

Seoul had been the nerve center and engine for the nationally led economic

development drive in Korea since the 1950's. Rapid development had resulted in severe

population growth in Seoul. During the 1960's, the old historic city ran out of land to

develop, so the city government began to develop the south region of the Han River,

which is currently called the "Gangnam" areas[1]. The city imposed severe planning

controls on the historic region, forced relocation of schools, and encouraged citizens to

move southward (Kang, 2004). The social, economic, and cultural functions of the

historic city moved to the Gangnam areas with the assistance of the city government as

well. As a result, the value of the Gangnam areas have grown rapidly, and this imbalanced

development has brought about economic gaps between the Gangnam areas and other

areas, in terms of housing prices and the quality of public services. Now, regional

disparity among 25 local governments in the Seoul metropolitan area is a challenging

problem the Seoul Government needs to solve.

Of all the reasons causing regional disparity, the fiscal gap among localities is the

most serious. Since the self-governing local system was established in Seoul in 1995[2], the

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[1] When we say "the Gangnam areas," this generally includes Gangnam District Local
Government, Seocho, and Songpa. Also, when I refer to "Gangnam" later in this paper, I
am only referring to Gangnam District Local Government (See Appendix 1)

[2] In theory, local autonomy has been guaranteed since 1949 by the Korean Constitution
and the Local Autonomy Act. In reality, however, an independent local government
structure was not initially established because Korea maintained a strong centralized
governing authority. As public demand for decentralizing power increased in the late
1980's, the central government amended Local Autonomy Act. In accordance with the
new revisions, local councils were constituted by direct elections, and the heads of local
governments were elected by popular vote in 1995, thus ensuring an effective local

severe difference in property tax that forms a large portion of a local government's tax revenues has made the fiscal gap wider, in terms of governmental spending[3]. The property tax revenue of Gangnam government, the highest, is about 13 times that of Kangbuk, the lowest (SMG, 2006). This is not the only difference that shows the fiscal disparity. The Standard Financial Needs Satisfaction Index (SFNSI)[4], which represents a local government's ability to pay for the necessary expense of fulfilling basic administration from its own revenue, is also noticeably unequal. The SFNSI of Gangnam is 196.6%, while that of Junrang is only 26.3% (ibid). This different fiscal capacity among local governments results in different level of services to local residents. For examples, serious expenditure differences can be seen in the subsidies that each locality uses to support their schools; Gangnam gave $5.7 million to its school district, for an average of $67 per pupil, while Kumcheon, at $16 per pupil, and Sungbuk, at $10 per pupil, gave only $0.6 million (ibid)[5]; for more information, see Appendix 2.

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autonomy system in Korea. Before 1995, important functions of localities were assigned to the central government. The mayors were appointed by the central government as well.

[3] For reference, the property tax accounts for 81.6% of total tax revenues of localities in Seoul (the total tax is $1,285 million, and the property tax is $1,048 million).

[4] The Seoul Government uses this index in distributing subsidies to local governments. This index is calculated by dividing financial resources available by governmental expenditures required as presented in the Seoul Metropolitan Government Ordinance on Adjustment of Local Governments' Financial Resources. The standard governmental financial requirements are calculated based on population, jurisdiction area, road size, the number of civil servants and low-income families, and so on, which are also described in the ordinance.

[5] In Korea, the educational services are controlled by the central government and financed by both the central government and upper-level local governments. Lower-level local governments and give subsidies to schools in order to provide for the installation of kitchen equipment and other facilities for school lunch and to otherwise improve the educational environment. Because these school subsidies are not necessary expenses for localities, each locality tends to give money to schools within its fiscal capacity. For example, localities with a low fiscal capacity cannot afford to support schools as much as

Possible Mechanisms for Addressing the Fiscal Disparities Problem

To alleviate fiscal inequities among localities in Seoul, several studies have discussed the tax exchanges between Seoul City and local governments. The main approach is that the property tax, whose revenue currently belongs to local governments, would become the city's revenue, while a few of the city's tax sources - automobile tax, motor fuel tax, and tobacco consumption tax , whose total amount of tax revenues is similar to that of local property tax revenue, would belong to local governments. (Won 1996; Kim 2000; Park 2003). However, the new mayor of Seoul, Sehoon Oh, elected in 2006, suggests adopting property tax sharing among local governments in order to reduce their fiscal disparities. Although Myoungsoon Hur (2004, 2005), a research fellow of Seoul Development Institute[6], had argued in his paper that the tax sharing system could be an effective way to increase fiscal equities among local governments in the Seoul metropolitan area, little has been understood about its implementation, possible weaknesses that policy makers should consider, or how well it would achieve the fiscal equities among localities.

Seoul is not the only metropolitan city that has problems caused by fiscal inequity.   Many metropolitan areas in the U.S. are experiencing similar fiscal disparities as Seoul, between rapidly developing new suburbs or urban areas and old suburbs. U.S. state governments are experimenting with new forms of metropolitan governance to

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the schools would hope, while wealthy localities, such as Gangnam and Secho, sometimes give more money than the schools need. Though these subsidies serve a supplementary function in school finances, they do improve school circumstances. A disparity in comparative subsidies per pupil can result in a disparity in comparative educational conditions across jurisdictions.

[6] The Seoul Development Institute is a comprehensive urban policy research institute established and supported by Seoul Metropolitan Government (SMG).

address issues that naturally cross jurisdictional lines, such as infrastructure and transportation (Katz, 1998). There had been a move to bring counties and cities together within a consolidated regional government structure. By expanding city boundaries to include more affluent neighboring communities, such a decision could eliminate some intergovernmental fiscal disparities (Bahl, 1994). Another method involves the creation of a special district, which is a unit of government that provides a specified public service only to those who live in the area. Creating a special district for fire protection, sewer service, or transit service could help eliminate service-level and tax burden disparities by basing financing on something other than traditional jurisdiction boundaries (Bahl and Vogt, 1975). Some special-purpose regional governing bodies, such as Portland's Metro and the Twin Cities Metropolitan Council, have been successful in advancing equity reforms at a regional scale as well as performing transportation planning functions (Orfield, 2002; Katz 1998). Another possible way to enhance fiscal equities would be to increase the amount of state or federal aid provided to distressed areas (Bahl, 1994). Introducing regional tax sharing would be effective as well. Minnesota, for example, has maintained tax base sharing for the Twin Cities metropolitan area (Minneapolis and St. Paul) since 1971. Tax base sharing is a plan where the revenue from increases in the property tax base is put into an area-wide pool. The money is then redistributed among all the communities in the area, with jurisdictions below an average getting more dollars while the above average jurisdictions receive less revenue (Fisher 1982; Martin 1983). Although the Minnesota plan faces some problems, it has been evaluated as a good mechanism for equally distributing fiscal resources among local governments while maintaining their autonomy (Reschovsky 1980; Orfield 1998; Conte et el. 2001).

Research Questions

  The purpose of this study is to examine what kind of property tax sharing scheme would be most effective in order to reduce fiscal disparities among local governments in the Seoul metropolitan area, in terms of demanding lower administrative effort and cost of implementation, obtaining more political support, and achieving greater equalization. To better understand property tax sharing policy approaches, this study seeks to evaluate the effectiveness and limitations of the property tax base sharing system employed in Minnesota in the U.S. In addition, this study will compare the potential differences, before and after, if property tax sharing is introduced in the Seoul metropolitan area. The study will be based on the following research questions:

- In Minnesota, what impact does the property tax base sharing have on regional fiscal disparities among localities within the Twin Cities region? What are the advantages and limitations of the Minnesota plan?

- What kind of property tax sharing scheme is appropriate for introduction in Seoul? What aspects should the Seoul Metropolitan Government consider when employing the above policy?

- How much can the above policy be expected to equalize property revenue across Seoul's local governments? For example, how much would localities' revenue increase or decrease, and how much would the per capita property tax change?

Ⅱ. Methodology

  The study is divided into two sections: a comprehensive analysis of the Minnesota plan for sharing of the property tax base in the Twin Cities metropolitan area,

and a simulation analysis of property tax sharing among local governments in the Seoul metropolitan area. To perform the former analysis, data on the background of the plan, the related state law, and the number of participants is collected here from Twin Cities Metropolitan Council's policy manuals and reference articles. In addition, the per capita property tax base of jurisdictions in Twin Cities region is used to evaluate the effectiveness of the plan. A distribution formula that takes into account each community population and its fiscal capacity is examined closely as well.

The second section includes the simulation analysis of property tax sharing in Seoul city, considering the Minnesota's Fiscal Disparities Program discussed above. Information on Seoul city's local tax system and the related laws is considered here, in contrast with that of the U.S., because the property tax sharing adopted in Seoul could be different from the Minnesota plan, due to the particular characteristics of each nation's tax scheme. In this part, the model to be implemented in Seoul is also explained.

Next, a property tax sharing policy is recommended, where 50% of the localities' property tax revenues is contributed into a pool, and the money is redistributed by one or another method: in one, revenues are equally redistributed to each local government, and in another, revenues are redistributed through a formula similar to the one used in Minnesota. These two redistribution methods are compared here, by estimating the change of localities' SFNSI and per capita property tax before and after the policy's implementation. A recommendation is also presented as to which distributive scheme would be more effective in Seoul.

In sum, the aim of this study is to make recommendations to Seoul city, as to the introduction of property tax sharing in order to equalize fiscal capacity among local

governments. A better understanding of the existing tax base sharing policy in

Minnesota's Twin Cities could help policy makers reduce economic disparities in Seoul.

Ⅲ. Analysis of Twin Cities Fiscal Disparities

Background of Property Tax Base Sharing

In the U.S., the main sources of local tax revenues are property, sales, and income

tax. Among these, the property tax is the most fundamental and dominates the largest

share of local tax revenues: an average of 73 percent in 2003-2004 fiscal year.[7]

Consequently, a principal cause of fiscal disparities among local governments is the

unequal spatial distribution of property tax base within most metropolitan areas like Seoul.

Financing largely through property tax, local governments provide critical public

services while, at the same time, they have the authority to regulate land uses within their

jurisdiction boundaries to decide the location and the extent of residential, commercial,

and industrial development (Orfield, 2002). This means that the property tax policy and

land-use planning powers are closely related because local governments have direct

incentives to develop a land-use plan to maximize the value of the property (ibid) and

thereby have a stronger property tax base. As a result, the unequal distribution of the

property tax base across jurisdictions often results in their competition to create new tax

bases (Orfield 1996), which tends to deepen urban sprawl and promote the degradation of

metropolitan area environments (Reschovsky, 1980).

The Minneapolis-Saint Paul (Twin Cities) metropolitan region of Minnesota

faced the same kinds of economical difficulties. When the Twin Cities Metropolitan

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[7] According to "State and Local Government Finances by Level of Government and by
State" by the U.S. Bureau of the Census, the total tax amount of local governments is
$419,863,497 and the property tax amount is $307,528,431.

Council attempted to pass legislation for metropolitan land use planning in the early

1970's, low fiscal capacity developing suburbs made a vigorous protest against the plan at

first, because they were told that an urban service line would be drawn through the middle

of their cities and that the land outside that boundary would be zoned at agricultural

densities (Orfield, 2002). They argued that they would lose land that could potentially

develop their tax base and they would not be financially able to relieve school

overcrowding (ibid). In the end, they were persuaded by the potential benefits of a tax-

base sharing system[8], in which they would have access to a different tax base and would

gain fiscal capacity per capita faster than they would through development of low-valued

residential property. Namely, tax-base sharing was used as a quid pro quo for low tax base

cities to accept metropolitan land use planning (ibid). Tax-base sharing provides one of

the best examples of how to avoid growth-related problems generated by urban sprawl, by

means of regional coordination and rationalization of local land use planning (Downs,

1998). In order "to establish incentives for all parts of the area to work for the growth of

the area as a whole,"[9] the Metropolitan Fiscal Disparities Act (Minn. Statute, Ch473F)

was enacted in Minnesota in 1971 and first implemented in 1975 after legal challenges

failed. In this case, tax base sharing is intended to discourage municipalities from

competing against one another for development and encourage them to accept certain

types of development that generate less tax base but serve regional purposes, such as

providing parks, nature reserves or affordable housing (DeBoer, 2005). In addition to

diminishing intra-metropolitan competition for tax base and making land-use planning

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[8] The fiscal disparities bill was supported by state legislators from central-city and less wealthy suburbs – essentially two-thirds of the region that received new tax base from the act (Orfield, 1998).

[9] Minn, Stat. 2005, Ch473F.01. subdivision 1. Purpose. (3). The Fiscal Disparities Program has 6 objectives, and this is one of them.

easier politically, this statue basically seeks to create equity in tax rates and in the ability

of local governments to provide public services (Orfield, 1999).

How the Fiscal Disparities Program Works

Today, the Twin Cities program directly affects about 2.8 million people, nearly

3,000 square miles, seven counties, two central cities, and over 200 local jurisdictions,

and it involves $333 million in tax proceeds. The law requires each jurisdiction in the

seven-county metropolitan region to contribute 40 percent of any commercial-industrial

(C/I) property tax base revenue that exceeds the 1971 assessment baseline to an area-wide

fiscal disparities pool, or $\sum C_i$. This pool is then redistributed to participating

communities based on a formula that not only takes into account that city or town's per

capita fiscal capacity, but also considers the per capita fiscal capacity of the entire metro

area. Fiscal capacity is defined as its *equalized market value per capita.* In order to

determine a municipal i 's share, the city or town's distribution index, or D_i, must first be

calculated. To find a city or town's D_i, the per capita equalized market value of all

property in the metro area, otherwise known as the area-wide average fiscal capacity, is

divided by the per capita equalized market value of all property in the city or town,

otherwise known as the city/town fiscal capacity. Then, this quotient is multiplied by the

population of that city or town. The equation for finding the distribution index of a city or

town is as follows:

$$\text{Distribution index } (D_i) = \text{population of city/town} \times \frac{\text{Areawide Avg. Fiscal Capacity}^{10}}{\text{City/Town Fiscal Capacity}^{11}}$$

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[10] Avg. Fiscal Capacity = $\dfrac{\text{Total equalized market value of all property in all municipalities}}{\text{Total population of the metropolitan area}}$

In the Twin Cities' tax-base sharing plan, if a city or town's fiscal capacity is above the metro average, it receives less from the pool than it contributes. If its fiscal capacity is below the metro average, its share is larger. Specifically, a municipality i's share is determined by multiplying its distribution index (Di) by $\sum Ci$, the area-wide fiscal disparities pool, and then dividing this product by the sum of all distribution indices of all cities and towns in the metro area. The equation to determine a town i' s share is as follows:

$$\text{A Municipality } i\text{'s share} = \frac{Di}{\sum Di} \times \sum Ci$$

For example, if a municipality's distribution index is 20,000, the sum of distribution indices for all municipalities is 2,000,000, and the area-wide fiscal disparities pool tax base is 300,000,000, then the proportion of the municipality-to-metro area distribution indices (20,000/2,000,000) is 1%, so its i share amounts to 3,000,000. The equation for this scenario follows.

$$\textit{A Municipality } i\text{'s share} = \frac{20,000}{2,000,000} \times 300,000,000 = 3,000,000$$

Effects of the Fiscal Disparities Program

This program has been successful in reducing the disparities between communities' fiscal resources, as the pooled tax base, which each municipality enjoys, has grown steadily. The percentage of commercial/industrial property taxes going into the shared pool has significantly increased over the past three decades. In the first year of implementation (1975), the area-wide tax base pool totaled 6.7 percent of the total metro

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[11] Fiscal Capacity $= \dfrac{\text{Equalized market value of all property in the City/Town}}{\text{Population of City/Town}}$

C/I tax base and 2.1 percent of the total metro tax base in the Twin Cities. For 2006, the

shared tax base pool totaled $273 million, which represented 31 percent of the total metro

C/I base and 9 percent of the total metro tax base (Metropolitan Council, 2006).

Overall, the sharing of the C/I tax base promotes greater regional equity across

jurisdictions in the metro area by reducing the gap of per capita I/C tax base between

poorer areas and wealthier areas. Table 1, which lists the five municipalities with the

highest and lowest C/I tax base, indicates that the fiscal disparities program is achieving

its goal to increase the tax base of the poorer communities and to decrease the tax base of

the richer communities. It shows that the municipalities with the highest C/I tax bases are

all net contributors, while the municipalities with the lowest C/I tax bases are all net

gainers, excluding two central cities (Minneapolis and St. Paul).

Table 1.   Per Capita C/I Tax Base Comparison under Fiscal Disparities (Taxes Payable in 2006)

	C/I Tax Base Per Capita Before Sharing	C/I Tax Base Per Capita After Sharing	Gain / Loss
Municipalities with highest C/I Tax Base without fiscal disparities			
1. Bloomington	$704	$549	-$155
2. Eden Prairie	$531	$409	-$122
3. Plymouth	$439	$360	-$79
4. Minnetonka	$563	$429	-$133
5. Eagan	$423	$359	-$64
Municipalities with Lowest C/I Tax Base without fiscal disparities			
1. New Trier	$49	$205	$156
2. Hancock T	$17	$58	$41
3. Pine Springs	$31	$90	$59
4. Sciota T	$46	$70	$25
5. Hanover	$34	$107	$73

Note: The average C/I tax base per capita of the Twin Cities area amounts $315.

SOURCE: Metropolitan Council, 2006

As a result, per capita property tax base of jurisdictions in the metro area, which

is an indicator showing a municipal's ability to afford services, has grown more similar.

One study, conducted in 2006, reported that the differential between the highest and lowest property tax base per capita for municipalities with population less than 1,000 had been reduced to 6 to 1, while that ratio would have been 26 to 1 without fiscal disparities program (DeBoer, 2006). For cities with a population at least 5,000, the difference reduced from 5 to 1 to 4 to 1.

Table 2. Property Tax Base per Capita Comparison under Fiscal Disparities (Taxes Payable in 2006)

		Before Sharing		After Sharing	
Under 1,000 pop.	Highest	Minnetonka Beach	$3,990	Minnetonka Beach	$3,976
	Lowest	Landfall	$152	Hilltop	$649
	Disparity	26 to 1		**6 to 1**	
1,000 to 5,000 pop.	Highest	Wayzata	$3,938	Wayzata	$3,553
	Lowest	Lexington	$632	Lexington	$745
	Disparity	6 to 1		**5 to 1**	
Over 5,000 pop..	Highest	Orono	$3,238	Orono	$3,218
	Lowest	St. Paul Park	$708	St. Paul Park	$810
	Disparity	5 to 1		**4 to 1**	

Note: The average property tax base per capita of the Twin Cities area amounts $1,157.

SOURCE: The Citizens League (Deboer, 2006)

Moreover, the data on coefficient of variation support these results. This program proved to mitigate horizontal inequity by reducing an average of 4.3 percent variations in levels of per capita property tax base among communities. Sharing also produced an 8.4 percent reduction in the standard deviation of per capita property tax base.

Table 3.   Variation and Standard Deviation in Property Tax Base

	Mean [1]	Standard Deviation	Coefficient of Variation
Property tax base per capita Without Fiscal Disparities	$1,286	564.6	43.9%
Property tax base per capita With Fiscal Disparities	$1,305	516.9	39.6%

1) *The 'mean' is calculated by dividing the sum of each locality's per capita property tax base by the number of all localities, different from average per capita property tax divided the total amount of localities' property tax by the total population.*

In addition, the fiscal disparities program produces more net recipients than net contributors, with 71.3 percent of the 181 participating jurisdictions benefiting from the shared pool – 63.8 percent of the area population. According to the Metropolitan Council in 2006, a total of 129 municipalities received more tax base than they contributed, whereas 52 municipalities contributed more than they received back. As such, creating more winners than losers works as one political advantage (Bollens, 2002). With the support of recipient municipalities, two years after the tax base sharing bill was proposed by Metropolitan Council, the bill did become law could become law despite the objections of net contributors. Today, the recipients still play a critical role in keeping this program running, even though the opposing cities are still trying to limit their contribution to the pool or abrogate this system entirely.

Moreover, tax base sharing narrows the tax rate disparities among jurisdictions while maintaining local autonomy. This plan shares the tax base, not revenue. Thus, if a municipality raises its tax rate, it will keep the whole benefit of the rate increase. In this way, the program does not conflict with jurisdictions' natural incentives to set tax rates (Krouk, 2004). Besides, Hinze and Baker (2005) illustrate that the fiscal disparities program causes tax rates to be lower, although the differences are fairly modest. Seven of the eight high tax rate cities over a population of 10,000 have a lower tax rate under fiscal disparities than they would without this program (Hinze and Baker, 2005). It indicates that sharing tax base helps municipalities to increase their capacity to generate revenue without increasing tax rates. Without this program, municipalities with lower tax bases are forced to impose a higher tax rate on their property owners in order to deliver a basic level of public services.

Limitations of the Fiscal Disparities Program

The Twin Cities' property tax base sharing has been appraised as a good system for equally distributing fiscal resources among localities. The program, however, produces unintended results.

A community obtaining new industrial and commercial property enjoys raising revenues while facing public costs caused by new development; some businesses may impose a heavy investment in infrastructure, and some may generate externalities, such as air pollution, traffic congestion, and noise. Fiscal surplus from a new property tax base, therefore, can be viewed as compensation for a community to internalize the negative effects of the industry (Fisher, 1981). The regional sharing, however, takes away from local residents' opportunity in a contributing community to enjoy higher quality of services or lower tax rates. According to Tiebout's theory that local residents may move to a community where their preference is more efficiently aligned with the taxes and services provided (1956), those unsatisfied residents - higher-income residents in most cases - can migrate in pursuit of individual fiscal advantages. On the service-demand side, firms whose needs are not met might move to another location because of insufficient local finance, a product of tax sharing.

On average, according to government data, it is true that the fiscal disparities program has contributed to redistributing tax base from higher per capita municipalities to lower ones within the seven county metro areas. However, the program also continues to have its detractors. It has been argued that the contribution of tax base to the pool should be based on the total property tax base, including residential tax base as well as commercial and industrial tax base, not only increases in the non-residential tax base

14

(Fisher 1981; Orfield 1999). Positively speaking, the program provides a rationale for the policy of sharing industrial and commercial development. Business and industry can be attracted by regional facilities such as large shopping centers, airports, and freeway interchanges (Hinze and Baker, 2005). Recreational facilities such as sports stadiums and arenas are attractive to business as well. Actually, however, the residential tax base constitutes more than half of the total tax base in metropolitan areas, which also results in some inequities. But the program does not take the residential tax base into account. Therefore, it could sometimes produce unintended anomalies. Orfield (1999), one of the leading proponents of tax base sharing, acknowledges that cities with a higher commercial and industrial tax base than the average, but with low-valued homes, contribute to the regional pool, while cities with high-valued homes that have discouraged commercial and industrial development receive money from the pool because there is little or no growth in development.

At the same time, there is a problem, in that the contributions of tax base to the pool are targeting only increases in C/I tax base after the base year. Cities which will acquire commercial or industrial property after 1971 have all of this development as part of the tax base sharing. On the other hand, wealthy cities that obtained a large utility or a regional property such as a big shopping mall contribute little to nothing because their business property developed before the base year (Fisher, 1981). Hence it does not affect local residential tax bases or the original, non-residential tax bases, of the communities involved.

Another problem is that the fiscal disparities program requires that all distributions be positive. As this program is meant to narrow disparities in fiscal capacity,

measured as total C/I property tax base per capita, municipalities above the average property tax base per capita do not have to receive money from the pool. However, some wealthy cities gained tax base when they should have had a net loss, since the distribution formula is based on the proportion of the difference between the actual and the mean per capita tax base. Thus, the ratio can never be negative, and the distributions to the poorer communities are not substantial (Fisher, 1981). Fisher argues that 19 cities with per capita tax base at or below the average were net contributors in 1975, while 57 cities with above average base were net recipients (ibid). Similarly, in 2006 six cities below the average base were net contributors, while 46 cities above the average were net gainers.

Moreover, this program has an inherent problem that the distribution formula is based wholly on fiscal capacity, and there is no measure of spending needs in the formula other than population. Critics note that certain population groups, the elderly and the poor in particular, produce more public service needs than general population (Fisher, 1981). Some physical factors, such as land area, population density, urbanization, and age of housing stocks, may lead to greater costs of service provision as well. Therefore, it is suggested that the formula should consider disparities in the costs faced by the municipalities in providing services, which are caused by external changes in economic and demographic conditions (BBC, 2001).

IV. Property Tax Sharing System in Seoul Metropolitan Area

Overview of Local Governments in Korea

Even though Korea introduced a self-governing local system, the power of local governments has increased little, and thus their functional bases are relatively weak.

Local governments must not perform their functions in violation of acts, subordinate

statutes, or ordinance of upper-level local governments. Under the provisions in Article

10 and 11 of the Local Autonomy Act, the central government takes charge of affairs

regarding the existence and preservation of the nation and affairs at a national scale, while

the upper-level local governments are responsible for large-scale affairs and arbitration,

which are related to more than two lower-level governments, letting lower-level local

governments deal with the affairs related to the welfare improvement and daily lives of

residents. Table 4 illustrates major functions that each level of government performs.

Table 4.   Major Functions of Each Local Government in Korea

By Governments		Major Functions
Central Government		Diplomacy, National defense (military), International trade, Police, Education, Postal service, Food regulation, Highways, Railways, Prisons, Social insurance and security, Legal system
Local Govern -ments	Upper-level (Metropolitan Cities or Provinces)	Roads, Rivers, Transportation, Subways, Public medical centers, Fire, Adjustment of development planning
	Lower-level (Autonomous Districts, Cities or "Gun"s)	Water supply and Sewage system [1], City roads, Local streets, Parks, Land use regulation, Housing, Markets, Sanitation

1) Among upper-level governments, Metropolitan Cities perform this service.

As such, because substantial governmental functions are carried out by the

central government, local public finance is relatively small. In 2005, for example, the

combined budgets for all Korea's local governments, including intergovernmental

transfers, comprised only 63.7% of the national budget. Table 5 shows how much each

level of government in aggregate spends in a year against Gross Domestic Product (GDP)

in Korea in 2005.

Table 5. Local Governmental Expenditures against GDP in 2005

(in billions of dollars)

	Number of governments	Total Expenditures (Budget)	Ratio to GDP [1]
Central Government [2]	1	1,805.7	19.8%
Local Governments	250	1,151.2	12.6%
Upper-level Governments	16	680.7	7.5%
Lower-level Governments	234	470.5	5.1%
Total	251	2,956.9	32.4%

1) *GDP amounts to $9,116.9 billion, which is obtained from "GDP major indicators," Korea National Statistical Office.*

2) *The data do not take into account intergovernmental transfers. Regarding these transfers, the ratio of GDP to the total governmental expenditures is 28.1%, according to MPB.*

3) *The exchange rate is 930 Korean Won to 1 US Dollar as of April 1, 2007*

SOURCE: Ministry of Government Administration and Home Affairs (2006), except "2) expenditures of the central government (MPB,2006)"

The Local Tax System and Related Law in Korea

Local taxes play an important role in the revenue side of Korean local public finance; however, the revenue base, or government income due to taxation, is very weak compared to national tax base, the collective value of taxable assets. The Korean tax system is comprised of both national and local taxes and is structured to be heavily dependent on nationally collected taxes. The tax revenues levied by local governments in 2005 were only 22.3% of the nation's total tax revenues (MOGAHA, 2006); the relative share ratio between national taxes and local taxes turned out to be 71.7% versus 28.8%. The local taxes are classified in terms of local tax-levying authorities by the Local Tax Law; namely, Metropolitan City Taxes, Provincial Taxes, City Taxes, and Autonomous District Taxes. Appropriate tax-levying government authorities are responsible for

administering each program. The major taxes and tax-levying authorities are displayed in

Table 6. National taxes are heavily reliant on consumption taxes and income taxes, while

local taxes are greatly reliant on property taxes. Property taxes, which belong to

autonomous district local governments, are levied based on the assessed value of the land,

buildings, residential houses, vessels, and aircrafts.

Table 6.   Major Taxes of Each Local Government in Korea

By Tax-Levying Authorities			Major Taxes
National Taxes			Income tax, Corporate tax, Inheritance tax, Value-added tax, Liquor tax, Transportation tax, Education tax, Customs duty
Local Taxes	Upper-level Governments	Metropolitan City Taxes	Acquisition tax, Registration tax, Resident tax, Automobile tax, Motor fuel tax, Tobacco consumption tax, Urban planning tax
		Provincial Taxes	Acquisition tax, Registration tax, License tax, Community facility tax, Regional development tax
	Lower-level Governments	Autonomous District Taxes	Property tax, License tax, Business place tax.
		City Taxes	Residence tax, Property tax, Automobile tax, Motor fuel tax, Tobacco consumption tax, Farmland tax, Butchery tax, Urban planning tax, Business place tax

The Korean Constitution provides local governments with the right to assess and

collect local taxes; however, the Constitution also clearly states that tax items and tax

rates must be set by the law (§59). The local tax items and tax rates are set by the Local

Tax Law and local governments cannot introduce any new taxes by their ordinances.

The Local Tax Law allows local governments to apply only a flexible tax rate within the

standard tax rate set by the law. For example, the mayor of each local government can

change its property tax rate within 50% of the standard presented in the law only for cases

that are required to adjust the property tax rate caused by special financial demands or

disasters (The Local Tax Law §188③). If the property tax sharing system is introduced in

Seoul, the Local Tax Law should be amended by the National Assembly so that each local

government in the Seoul metropolitan area can share the property tax revenues.

A Possible Property Tax Sharing Model

When introducing any equity mechanism, the equating model should consider the

legal, social, and political situation and reflect the balance of political power in the place

where the system is adopted (Orfield, 1999). As for legal considerations, the introduced

model does not have to share only the property tax-base. One advantage of tax-base

sharing is that a municipality can keep the whole benefit of the tax rate increase if it raises

its tax rate. There is little, however, that a flexible property tax rate can be used for in the

city of Seoul because local governments are allowed to change their property tax rate only

for the very limited cases.[12] Therefore, the model in this paper will be designed to share

property tax revenues across 25 localities in Seoul.

Another factor to be considered is that most major development has been

completed in the city of Seoul. Further development would primarily be concentrated on

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[12] The present central government has a strong will to increase taxes on property
possession and revise tax bases for land and residential houses in order to be more in line
with market prices. On the basis of this policy, in 2004, the central government raised the
assessed value of property substantially, asking local governments not to lower the tax
rate beneath the standard presented. However, five local governments in Seoul lowered
their flexible tax rate for the purpose of lightening the tax burden for the public. As a
result, in 2006, twenty localities joined these favorable flexible tax rates, cutting their
rates from 50% to 10%. Thus, in order to prohibit any imposition of a favorable flexible
tax rate, the central government revised the Local Tax Law in 2006. With this revision,
local governments are allowed to apply a flexible tax rate only for cases that are needed to
adjust the property tax rate caused by special financial demands or disasters.

projects to redevelop existing towns in the "Gangbuk" area, the relatively underdeveloped northern part of Seoul with a weaker fiscal capacity. Moreover, wealthy localities have already obtained high property values, such as big department stores and head offices of large enterprises. If the model shares only the growth of property tax revenues, most contributors would probably be poorer localities. Thus, the model does not have to include only the property tax increments.

The Seoul model should share the entire property tax, including residential property tax. According to a government report, the residential property tax consists of almost half of the total property tax in Seoul in 2005 (MOGAHA, 2007).[13] Without the share of residential property tax, the pool to be contributed would be significantly smaller and would diminish the effect of the new system. Nevertheless, some opponents may say that the property tax is a benefit tax, which is defined as a tax that is associated by the taxpayers with a direct benefit to their interest (Spelman & Spelman, 2003). In fact, elected mayors in the Gangnam areas are opposed to the idea of property tax sharing because the local governments in those areas would be the largest contributors to the pool. From the historical point of view, however, in the early development of Gangnam areas, the expenses of building roads and other infrastructures were appropriated by the Seoul Metropolitan city's tax revenue as a part of city planning. Therefore, the present high property values in the Gangnam areas owe much to the city government's intensive administration power and finance. In this light, it is not unfair that they should share the Gangnam areas' property revenue with Seoul residents.

Most of all, the percentage of property tax being contributed is the most

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[13] The total property tax amount of local governments in Seoul is $1,006 million and the residential property tax is $480 million.

controversial issue in determining this sharing system. Before making a detailed analysis, scenarios were first considered for sharing 20 percent of the property tax, and then 30%, 40%, 50%, and 60% respectively. The scenarios showed that number of recipient local governments would not change, and the amount received would increase as the sharing percent increases. The scenarios produced positive results for at least 65 percent of the Seoul population. It is quite evident that a system sharing a larger percent of the property tax would be much more effective in reducing fiscal disparities among localities, but would provoke considerable political protest from the contributors. A hypothetical property tax sharing policy is outlined here, where each local government contributes 50 percent of its property tax revenue to the pool as presented in the Local Tax Law bill now. Two different redistributing methods are compared: distributing the shared money equally to each locality, and distributing through a formula based on its share of the area's population and its relative property tax wealth, mirroring the Minnesota plan.

Under this model, the city of Seoul would collect the shared portion of property tax revenues from each local government and then distribute these funds back to the local governments determined by a specific distribution method. All tax revenues would be redistributed within the year they are paid into the pool. Therefore, no accumulation of monies would occur as in Minnesota (Schmidt, 1983). This plan would not need the formation of any new administrative organization because of its operational simplicity.

A Simulation Analysis of Two Distribution Methods

When contributing 50 percent of localities' property tax revenues, the largest contributor would be the Gangnam local government, and the sum contribution amount of the six localities with the highest property taxes would add up to $315 million, accounting

for 60% of the total. These are the governments whose Standard Financial Needs

Satisfaction Index (SFNSI) is above 80 percent (see Appendix 3).

In the equal distribution model, the same amount would be redistributed to each

local government, dividing the total contribution tax by 25 localities. For example, if a

locality A's property revenue were $50 million, it would have to contribute $25 million, or

50% of its entire property revenue. If the sum of all cities' contributions to an area-wide

pool amounted to $500 million, the locality "A" would receive $20 million - the quotient

obtained by dividing $500 million by 25, the number of the total local governments in the

Seoul area. Thus, A's share would be $5 million less than it contributed. (See Appendix 3).

In this way, this model would provide additional tax for 18 of 25 localities – 73.2 percent

of the Seoul population. Table 7 shows that the greatest recipients would be Kangbuk

($14 million), Kemcheon ($13 million), and Dobong ($12 million). Conversely, Gangnam

would receive $76 million ($141 per capita) less, Secho $33 million ($82 per capita) less,

and Songpa $23 million ($38 per capita) less than they contribute.

In the formula-distribution model, the pool is redistributed based on a formula

that gives preference to those places with a low per capita property tax and a large

population (See Appendix 4). This model is similar to the one presently used in

Minnesota. The equation for the distribution index and a locality's share are as follows.

$$\text{Distribution index} = \text{population of a locality} \times \frac{\text{Areawide Avg. per capita property tax}}{\text{A locality's per capita property tax}}$$

$$\text{A locality's share} = \frac{\text{A locality's Distribution index}}{\text{Sum of all distribution indices}} \times \text{Sum of the areawide pool}$$

Step-by-step calculations used in this model, for a hypothetical locality "A," are shown in

the box below.

1. Data for hypothetical locality A
    A's property tax revenue: $50 million
    A's population: 400,000 persons
    ► sum of property tax revenue of 25 localities: $1,000 million
    ► total population of 25 localities: 10,000,000 persons
    ► sum of distribution indices of all localities: 15,000,000

2. Calculate A's contribution to area-wide pool
    $50,000,000 × 50% (contribution rate) $25,000,000

    ► Total area-wide pool: $1,000,000,000 × 50% $500,000,000

3. Calculate A's per capita property tax
    $50,000,000 / 400,000 persons $125

    ► Area-wide average per capita property tax:
       $1,000,000,000 / 10,000,000 persons $100

4. Calculate Distribution index for A
    400,000 persons × $100 / $125   320,000

5. Calculate Distribution amount to A (A's Share)
    (320,000 / 15,000,000) × $500,000,000 $10,666,667

Suppose there is another locality "B," with the same amount of property tax as a locality "A," but a larger population of 600,000. In this case, B's per capita property tax of $83, is calculated by dividing the property revenue of $50,000,000 by 600,000 persons. Its distribution index of 720,000 is calculated by dividing average per capita property tax by its per capita property tax, and then multiplying the quotient by its population (600,000 persons × $100 / $88). Thus, B's share is found to be $24,000,000, by dividing its distribution index by the sum of all distribution indices of all localities, and then multiplying the quotient by the total areawide pool (720,000 / 15,000,000 × $500,000,000). After comparing two such localities with the same property revenue, but different populations, it becomes clear that the localities with relatively larger populations

and lower per capita property taxes will end up with a large share. Should this model be applied to Seoul, 16 of 25 local governments, or 67.2 percent of the area's population, would receive additional tax revenue. Some of the biggest recipients would be Nowon ($34.2 million), Eunpyoung ($34.1 million), and Junrnag ($27.1 million). From the per capita terms, Eunpyoung would be the largest recipient ($72 per capita), Kangbuk the second largest ($66), and Junrang the third ($63). The largest three contributors would be the same as the first model, but their receiving amount would decrease; Gangnam would receive $15.5 million less than the first model, Secho $15.6 million, and Songpa $3 million.

Table 7.   Gain or Loss of Property Tax under Tax Sharing

| | Before Sharing | | After Sharing | | | |
| | Property Tax ($1,000) | Per Capita ($) | First Model | | Second Model | |
			Tax Gain/Loss ($1,000)	Per Capita Gain/Loss ($)	Tax Gain/Loss ($1,000)	Per Capita Gain/Loss ($)
<Largest Recipients with Sharing>						
Kangbuk	14,613	41	13,655	39	23,330	66
Kumcheon	15,689	61	13,116	51	7,246	28
Dobong	17,342	46	12,290	32	21,441	56
Nowon	28,619	46	6,651	11	34,187	55
Eunpyoung	18,371	39	11,776	25	34,089	72
Junrang	18,123	42	11,900	28	27,095	63
<Largest Contributors with Sharing>						
Gnagnam	194,102	359	-76,090	-141	-91,644	-169
Secho	107,862	269	-32,970	-82	-48,563	-121
Songpa	87,988	145	-23,033	-38	-29,029	-48

Both of the two models demonstrate clearly that tax-poor jurisdictions would be net recipients of shared money, while tax-rich jurisdictions would be net contributors. The largest recipients of the each model would be localities with the lowest SFNSI as well as with the lowest per capita property tax. But the first model could produce undesirable

results because it does not take into account basic spending needs such as population. For example, Yongsan with the fifth highest per capita property tax would gain money even though it would have $46 more above the average, while Kangdong would contribute money though its property tax per capita is below the average. Thus, in terms of reducing fiscal disparities, the second model is proved to be more effective in the extent of reducing fiscal disparities. The second model would redistribute an average of $7.3 million more and $14 per capita to each recipient government than the first model ($15.3 million vs. 8.0, $35 per capita vs. 21). Table 8 lends supports to this view. The differential between the highest and lowest SFNSI reduces to 3.8 to 1 in the second model, while that ratio is 4.3 to 1 in the first. In addition, the disparity of the per capita property tax reduces to 2.6 to 1 more dramatically in the second model, while the ratio is 6.6 to 1 in the first.

Table 8. Disparities Comparison by SFNSI and per Capita Property Tax

		Before Sharing		After Sharing			
				First Model		Second Model	
SFNSI	Highest	Gangnam	196.6%	Gangnam	151.1%	Gangnam	141.8%
	Lowest	Junrang	26.3%	Junrang	35.0%	Kuncheon	36.9%
	Disparity	7.5		**4.3**		**3.8**	
Per Capita Property Tax	Highest	Jung	$425	Jung	$374	Jung	$221
	Lowest	Eunpyoung	$39	Nowon	$57	Yangcheon	$85
	Disparity	10.9		**6.6**		**2.6**	

As a means of summarizing the equalizing impacts of tax sharing, Table 9 presents data on the mean, standard deviation and coefficient of variation for per capita property tax. The second model would result in a 52.9 percent reduction in the standard deviation of per capita property tax as compared with the first. In fact, the first model exhibits 31 percent more variation than the second.

Table 9.   Per Capita Property Tax Comparison by Standard Deviation

	Mean [1]	Standard Deviation	Coefficient of Variation
Without Sharing	$114	103.1	90.7%
The First Sharing Model	$116	72.6	62.7%
The Second Sharing Model	$106	34.2	32.3%

1) The 'mean' is calculated by dividing the sum of each locality's per capita property tax by the number (25) of all localities, as opposed to using the average per capita property tax dividing the total amount of localities' property tax by the total population.

On the other hand, in terms of gaining political support, the first model is more effective than the second. The first model has two more net recipient localities than the second (18 vs. 16) and seven percent more recipient population (73% vs. 67%). Moreover, in the second model, 14 localities receive less money than in the first. Though five of them are net gainers, there is a strong probability that they would give preference to the first model of the two. Gaining more political support is important in making this policy feasible; however, it does not always make it good. Policy makers should consider, thus, that paying too much attention to political gaining can distract the original objective to alleviate fiscal inequities.

Ⅴ. Conclusion and Recommendations

Ideally, all residents should have access to reasonably comparable levels of public services regardless of their residence. However, the uneven spatial distribution of the property tax, which makes up the main tax revenues of local governments, produces fiscal disparities among local governments, creating unequal public services offered. To alleviate the fiscal disparities, the property tax base sharing system has been adopted in

the Twin Cities metropolitan area in Minnesota. It has been appraised as a good system for equally distributing fiscal resources among localities, has removed some horizontal inequities by redistributing additional tax bases for 71.3 percent of the 181 participating communities, and has narrowed tax rates differentials. The program, however, produces weak redistribution results as well as unintended anomalies because the program shares only the growth of non-residential properties created after the date at which it was first adopted.

Therefore, the Seoul system simulated in this paper would share 50% of all property taxes, including the residential property tax, and could redistribute the pool back to each local government via two different methods: redistributing the same amount of money, or redistributing the fund by a formula using relative fiscal capacity and population. Results of the simulation run suggest that either of the two methods would be effective in equalizing fiscal capacity across 25 local governments in Seoul.

Regarding administrative cost and efforts, neither model would require an additional administrative organization, because the collection and allocation of the fund would be quite simple. Although the first equal distribution model would require less effort and would be easier to understand than the second, the second method would not be so complicated as to require a new organization for the management of the system. In terms of political support, the first model would probably garner more support from local residents and legislators by providing more localities with greater revenues than they contribute. On the other hand, the second model would prove more effective in reducing fiscal capacity among localities. In this second model, the three largest recipients would gain an average of $31.8 million in revenue, while the three largest contributors would

lose an average of $53.4 million. The second model would reduce per capita property tax disparities on a regional level from 10.9-to-1, to 2.6-to-1, as well.

I recommend that the Seoul Government introduce the formula-distribution model so as to equalize the per capita tax across the entire region. The aim of adopting a sharing system is to equalize fiscal resources and therefore to have all local citizens enjoy a similar quality of services regardless of their residence. Increasing localities' own resources without constraints not only enables governments to spend more to the residents' preference, but also helps local decision-makers to have more policy options. This would produce more certainty in local budgeting and fiscal planning (Bahl, 2000). To this end, the system should be aimed to provide more money to those jurisdictions who have a weaker capacity to raise taxes, and should take into account population, i.e. the most common straight per capita distribution factor, in order to reflect such regional differences in expenditure needs (ibid).

Legislative debate surrounding this system cannot be avoided, and what is worse, it is sure to be more controversial because this would take away resources that some governments currently enjoy; in the Minnesota plan, governments were not giving up resources that they were receiving at present by sharing a percentage of future or new revenues (Miller, 2000). By showing the benefit of how this program might actually work with computer simulations, the Seoul Government can gain support of legislators, local citizens, and community-based political or philanthropic organizations, as well as members of the media, who have a broad, far-reaching vision for the region (Orfield, 1999). The government should build coalitions with these organizations in order to weather potential intense opposition and controversy.

This research is focused on the effect of the policy tailored to alleviate horizontal fiscal disparity among local governments. Though this policy produces positive effects on inter-jurisdictional revenue equalization, this work is not concerned with how much the increased/decreased expenditures of each government can affect individual income redistribution both among families in different income classes and between similar income families in different jurisdictions. If this policy turns out to be effective in terms of interpersonal income distribution, then this will lend more validity to arguments for making these changes. In addition, in this paper, in order to retain administrative effectiveness and simplicity, I performed an analysis of the distribution formula based on fiscal capacity and population, which is similar to the formula used in Minnesota, although the Minnesota formula has been criticized for not considering public service needs. A further study might examine other possible formulas that could be used in a tax sharing system, considering other demographic and economic factors.

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Appendix 1.   The Map of Local Governments in Seoul Metropolitan Area

Appendix 2. Demographic and Economic Characteristics of Localities in Seoul

	Area (km²)	Popula-tion (person)	Recipients of National Basic Livelihood Security	Number of Establish-ments	Monthly Income per House-hold	Local Tax Burden per Capita	Subsidies for School Expenses (per pupil)
Gangnam	39.55	540,909	8,417	51,414	$3,823	$2,887	$67
Seocho	47.14	401,736	2,916	35,229	$4,098	$2,191	$47
Songpa	33.89	605,840	5,037	40,144	$3,532	$1,229	$17
Jung	9.97	130,027	3,444	69,748	$2,699	$5,919	$166
Yongdungpo	24.56	408,386	7,453	39,955	$3,142	$1,530	$39
Jongro	23.91	169,315	3,938	39,115	$2,730	$2,788	$18
Kangdong	24.58	464,059	5,552	27,604	$3,048	$596	$14
Yangcheon	17.41	499,755	6,353	24,700	$3,074	$598	$20
Kangseo	41.39	553,660	19,591	28,749	$3,009	$600	$16
Mapo	23.87	388,164	5,849	25,777	$2,774	$814	$36
Yongsan	21.87	230,260	3,511	21,263	$2,991	$1,386	$51
Kwangjin	17.05	375,613	4,094	23,923	$3,078	$518	$14
Nowon	35.45	622,003	21,350	24,668	$2,847	$405	$16
Seongbuk	24.55	462,879	6,938	24,268	$2,517	$549	$10
Kuro	20.11	416,405	6,395	30,301	$3,024	$599	$40
Kwanak	29.56	530,020	9,088	27,406	$2,758	$398	$16
Dongdaemun	14.21	381,110	7,099	32,546	$2,801	$565	$22
Seongdong	16.84	337,744	6,458	24,466	$2,712	$660	$27
Dongjak	16.35	410,481	5,870	20,153	$2,883	$530	$15
Seodaemun	17.60	349,163	4,904	21,179	$2,852	$525	$33
Eunpyoung	29.72	470,751	11,746	23,218	$2,787	$396	$12
Junrang	18.51	427,373	9,667	26,767	$2,542	$373	$28
Dobong	20.82	381,529	4,075	17,421	$2,809	$416	$16
Kumcheon	13.00	256,902	6,159	20,576	$2,788	$649	$16
Kangbuk	23.61	353,260	9,032	20,189	$2,598	$392	$15
Total (Avg.)	605.52	10,167,344	184,936	740,779	($3,006)	($1,059)	($27)

SOURCE: 2005 Annual Report of Seoul Statistics (2006), except for Subsidies for School Expenses, which are based on 2006 Budget Summary

Appendix 3.   The Equal Distribution Model under Property Tax Sharing in Seoul

	Before Sharing			After Sharing						
	Property Tax (A) ($1,000)	Per Capita Property Tax (1) ($)	SFNSI	Contribution Tax (B) ($1,000)	Distribution Tax (C) ($1,000)	Property tax (D=A-B+C) ($1,000)	Tax Gain/Loss (D – A) ($1,000)	Per Capita Property Tax (2) ($)	Per Capita Property Tax Gain/Loss (2-1) ($)	SFNSI
Gangnam	194,102	359	196.6%	97,051	20,961	118,022	-76,090	218	-141	151.1%
Seocho	107,862	269	126.5%	53,931	20,961	74,892	-32,970	187	-82	104.6%
Songpa	87,988	145	93.9%	44,994	20,961	64,955	-23,033	107	-38	79.8%
Jung	55,277	425	140.6%	27,639	20,961	48,600	-6,678	374	-51	135.4%
Yongdungpo	49,502	121	81.1%	24,751	20,961	45,712	-379	112	-9	78.6%
Jongro	43,114	255	88.4%	21,557	20,961	42,518	-596	251	-4	88.0%
Kangdong	42,588	92	52.9%	21,294	20,961	42,255	-333	91	-1	52.6%
Yangcheon	39,975	80	57.2%	19,988	20,961	40,949	973	82	2	58.0%
Kangseo	39,824	72	49.9%	19,912	20,961	40,873	1,049	74	2	50.5%
Mapo	36,133	93	48.8%	18,067	20,961	39,028	2,894	101	8	50.8%
Yongsan	34,357	149	53.3%	17,178	20,961	38,140	3,783	166	17	44.6%
Kwangjin	28,828	77	40.5%	14,414	20,961	35,375	6,547	94	17	45.8%
Nowon	28,619	46	31.3%	14,310	20,961	35,271	6,651	57	11	35.4%
Seongbuk	27,218	59	42.2%	13,609	20,961	34,570	7,352	75	16	47.0%
Kuro	27,200	65	44.3%	13,600	20,961	34,561	7,361	83	18	49.7%

| | Before Sharing | | | After Sharing | | | | | | |
	Property Tax (A) ($1,000)	Per Capita Property Tax (1) ($)	SFNSI	Contribution Tax (B) ($1,000)	Distribution Tax (C) ($1,000)	Property Tax (D=A-B+C) ($1,000)	Tax Gain/Loss (D – A) ($1,000)	Per Capita Property Tax (2) ($)	Per Capita Property Tax Gain/Loss (2-1) ($)	SFNSI
Kwanak	26,278	50	34.5%	13,139	20,961	34,100	7,832	65	15	39.8%
Dongdaemun	25,397	67	37.4%	12,698	20,961	33,659	8,263	89	22	43.2%
Seongdong	24,870	74	40.1%	12,435	20,961	33,396	8,526	99	25	46.5%
Dongjak	23,333	57	41.0%	11,667	20,961	32,628	9,294	80	27	47.9%
Seodaemun	21,445	61	32.2%	10,238	20,961	31,684	10,238	91	30	40.2%
Eunpyoung	18,371	39	30.3%	9,185	20,961	30,146	11,776	64	25	38.9%
Junrang	18,123	42	26.3%	9,061	20,961	30,022	11,900	70	28	35.0%
Dobong	17,342	46	34.2%	8,671	20,961	29,632	12,290	78	32	44.9%
Kumcheon	15,689	61	30.7%	7,845	20,961	28,806	13,116	112	51	41.9%
Kangbuk	14,613	41	31.4%	7,306	20,961	28,267	13,655	80	39	42.1%
Total (Avg.)	1,048,051	(103)	(61.1%)	[1] 524,025	524,025	1,048,051		(103)		(61.1%)

1) SOURCE: Property tax and Per Capita Property Tax data before sharing: 2006 Budget Summary (SMG)
   SFNSI before sharing: The Woori Party's policy explanation materials (Woo, 2006)
2) The exchange rate is 930 Korean Won to 1 US Dollar as of April 1, 2007.
3) Contribution Tax (B) = 50% of each local government' property tax revenue.= Property Tax Before Sharing (A) × 50%
4) Distribution Tax (C) = the quotient found by dividing total contribution tax (area-wide pool) by the number of local governments.
   = the Sum of Contribution Tax [1] / 25

Appendix 4. The Formula-Distribution Model under Property Tax Sharing in Seoul

	Population (person)	Before Sharing		After Sharing							SFNSI
		Property Tax (A) ($1,000)	Per Capita Property Tax (1) ($)	Distribution Index (B)	Contribution Tax (C) ($1,000)	Distribution Tax (D) ($1,000)	Property Tax (E=A-C+D) ($1,000)	Tax Gain/Loss (E – A) ($1,000)	Per Capita Property Tax (2)($)	Per Capita Property Tax Gain/Loss (2-1) ($)	
Gangnam	540,909	194,102	359	155,379	97,051	5,408	102,459	-91,644	189	-169	141.8%
Secho	401,736	107,862	269	154,236	53,931	5,368	59,299	-48,563	148	-121	94.2%
Songpa	605,840	87,988	145	429,998	43,994	14,965	58,959	-29,029	97	-48	76.1%
Jung	130,027	55,277	425	31,528	27,639	1,097	28,736	-26,541	221	-204	119.8%
Yongdungpo	408,386	49,502	121	347,290	24,751	12,087	36,838	-12,665	90	-31	72.9%
Jongro	169,315	43,114	255	68,541	21,557	2,385	23,942	-19,172	141	-114	74.1%
Kangdong	464,059	42,588	92	521,233	21,294	18,140	39,434	-3,154	85	-7	50.5%
Yangcheon	499,755	39,975	80	644,017	19,988	22,413	42,401	2,426	85	5	59.1%
Kangseo	553,660	39,824	72	793,451	19,912	27,614	47,526	7,702	86	14	54.8%
Mopo	388,164	36,133	93	429,830	18,067	14,959	33,026	-3,108	85	-8	46.7%
Yongsan	230,260	34,357	149	159,073	17,178	5,536	22,715	-11,642	98	-51	44.6%
Kwangjin	375,613	28,828	77	504,478	14,414	17,557	31,971	3,143	85	8	43.0%
Nowon	622,003	28,619	46	1,393,477	14,310	48,496	62,806	34,187	101	55	52.4%
Seongbuk	462,879	27,218	59	811,426	13,609	28,240	41,849	14,630	91	32	51.9%
Kuro	416,405	27,200	65	657,109	13,600	22,869	36,469	9,269	87	22	51.1%

	Population (person)	Before Sharing		After Sharing							SFNSI
		Property Tax (A) ($1,000)	Per Capita Property Tax (1) ($)	Distribution Index (B)	Contribution Tax (C) ($1,000)	Distribution Tax (D) ($1,000)	Property Tax (E=A-C+D) ($1,000)	Tax Gain/Loss (E – A) ($1,000)	Per Capita Property Tax (2)($)	Per Capita Property Tax Gain/Loss (2-1) ($)	
Kwanak	530,020	26,278	50	1,101,942	13,139	38,350	51,489	25,211	97	47	51.7%
Dongdaemun	381,110	25,397	67	589,518	12,698	20,517	33,215	7,818	87	20	42.9%
Seongdong	337,744	24,870	74	472,798	12,435	16,455	28,889	4,020	86	12	43.1%
Donjak	410,481	23,333	57	744,362	11,667	25,906	37,572	14,239	92	35	51.6%
Seodaemun	349,163	21,445	61	586,006	10,723	20,394	31,117	9,672	89	28	39.8%
Eunpyoung	470,751	18,371	39	1,243,441	9,185	43,275	52,460	34,089	111	72	55.0%
Junrang	427,373	18,123	42	1,038,888	9,061	36,156	45,217	27,095	106	64	46.2%
Dobong	381,529	17,342	46	865,231	8,671	30,112	38,783	21,441	102	56	52.8%
Kumcheon	256,902	15,689	61	433,618	7,845	15,091	22,936	7,246	89	28	36.9%
Kangbuk	353,260	14,613	41	880,293	7,306	30,636	37,943	23,330	107	66	49.7%
Total (Avg.)	10,167,344	1,048,051	[1] (103)	[2] 15,057,164	[3] 524,025	524,025	1,048,051		(103)		(61.1%)

1) Population data is obtained from Seoul Metropolitan Government Statistics, as of Dec. 31, 2005.

2) Distribution Index (B) = A Locality's population × (Areawide Avg. per Capita Property Tax [1] / A Locality's per Capita Property Tax)

3) Contribution Tax (C) = 50% of each local government' property tax revenue = Property Tax Before Sharing (A) × 50%

4) Distribution Tax (D) = (A Locality's Distribution Index / Sum of All Distribution indices [2]) × Total Contribution Tax [3]