

Does Local Autonomy Enhance the Autonomy in Local Public Finance?: Evidence from the Case of Korea*

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Since Korea began political local autonomy in 1995, it has not enhanced fiscal local autonomy. For example, while Korea has increased intergovernmental transfers such as local allocation tax and national subsidies, the share of its own revenues such as local taxes did not rise. There is a particular mechanism that the carry-over includes large amounts of grants-in-aid as one item of non-tax revenue. Even though central government tries to let local governments take efforts to increase the share of their own revenues *ex ante*, once the local governments increased their expenditure excessively, central government could not but bail out local governments *ex post*. This mechanism has caused a soft budget constraint problem in Korea. This paper specifies significant factors on the local public finance in Korea by estimating the demand function for local public services.

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1. INTRODUCTION

In the middle of the 1970's, local tax revenues accounted for at best 10% of the total of central and local tax revenues in Korea. When the local autonomy started in 1995 the local tax's share was at 20% or so in the total tax revenues. Even now it stays at about 20%, which shows that tax revenues are still concentrated on central government. In other words, the transfers from central government or higher-level local governments play a significant role in the local public finance in Korea. Since the beginning of local autonomy in 1995, politicians or bureaucrats have sought the ways to increase the transfer revenues from central government rather than to raise their own taxes or user charges.

Before 2000, local allocation tax, a main intergovernmental grant-in-aid in Korea, was composed of 13.27% of national tax revenues excluding the revenues from earmarked taxes and customs tax. The allocation rate of the local allocation tax, however, has frequently risen after the local autonomy: to 15% in 2000, to 19.13% in 2005, and to 19.24% in 2006. Note that the local education finance is independently operated as a special account in Korea, separate from the ordinary local public finance. The special account heavily relies on central government. The allocation rate for the special account of local education finance has also risen from 11.8% of national tax revenue to 13.0% in 2001, to 19.4% in 2006, and to 20.27% in 2010. The frequent changes of allocation rate and the increase of national subsidies for local governments brought about the soft budget problem in Korea. Ihori and Itaya (2004) also point out the problems caused by soft budget constraints in fiscal federalism in Japan. They argue that the fiscal irresponsibility of local governments is a key issue in the field of public finance.¹⁾

Korea experienced an economic crisis in late 1997 and received financial

¹⁾ The existence of soft budget constraints causes local expenditure to increase. The 'flypaper effect', or the effect that money hits where it hits, also shows the increase of local expenditure. Gennari and Messina (2014) point out the stickiness of local expenditures at municipal level in Italy related to the 'flypaper effect'.

bailouts from International Monetary Fund to overcome the crisis. Though Korea recovered from the economic crisis, the bankruptcy of local governments can occur if Korea does not take efforts to solve the soft budget constraint problem or to promote fiscal responsibility of central and local governments. While political decentralization has proceeded in Korea, fiscal decentralization has not been strengthened. Once the local governments increase their expenditures excessively it is efficient to bail out them, *ex post*. In Korea national politicians could not sanction the local jurisdictions that operated a soft budget constraint because the bailout to them was advantageous to their (re)election. As DelRossi and Inman (1999) argue, national legislators also demanded locally beneficial projects.

Lots of countries, including Korea, have a difficulty in solving the problem of fiscal instability of local governments. Wildasin (2004) discusses a framework within which interjurisdictional spillovers can create incentive for higher-level governments to intervene in the control and bailing out lower-level governments.²⁾ Also Qian and Roland (1998) develop a model in central government transfer decisions or fiscal federation. They build the model concerning the hard and soft budget constraints in the case of centralization and decentralization, and lay emphasis on the implications of decentralization relating to state and nonstate enterprises in China.³⁾ They summarize that the government's incentives to bailout inefficient projects are determined by the trade-off between political benefits and economic costs.

Goodspeed (2002) develops a model of a federation in which regional governments act as Nash competitors with each other but are first-movers in a Stackelberg game with the central government. In the model the central government maximizes its expected votes by increasing transfers as regions borrow. According to the model, the bailout of regional governments

²⁾ On the other hand, Solé-Ollé (2006) measures spillover effects from expenditure policies in Spain. Solé-Ollé (2006) identifies two different types of expenditure spillovers: 'benefit spillovers' by the provision of local public goods and 'crowding spillovers' by residents in neighboring jurisdictions.

³⁾ Qian and Roland (1998)'s model of the soft budget constraint is under a three-tier hierarchy composed of a central government at the top, local governments in the middle, and enterprises at the bottom.

creates a regional soft budget constraint and results in two incentive effects: a common pool effect on tax payments and an opportunity cost effect. The soft budget constraint lowers the opportunity cost of borrowing for the region, but also increases the tax-cost since a portion of the borrowing must be paid for through increased taxes. The common property problem associated with tax payments implies that the increased tax-cost must be less than the decrease in the opportunity cost, which can lead to excessive borrowing.

In Korea, local governments have requested central government to increase intergovernmental transfers for financing their expenditures. Also the carry-over includes huge amounts of grants or transfers from central government. The carry-over is put into the one item of non-tax revenue next year at the name of temporary non-tax revenue. Local governments can control their budgets throughout the use of the part of carry-over for next-periods. Even though central government can appeal to reduce the excessive expenditures of local governments *ex ante*, once they spend excessively this year, it is optimal for central government to help them *ex post*. This paper constructs a model for the demand function of local public services and estimates significant factors on local expenditure in order to discuss how central and local governments in Korea have behaved in operating local public finance. Central government has responded to the request of the local governments.

The paper is organized as follows. Section two presents the model regarding the demand function of public services at the level of local governments. Section three glances at the features of local public finance, and qualifies its configuration in Korea. Section four offers the estimation of the demand function for public services of city and county governments, and discusses what the significant factors on local public finance are, and compare the both governments in Korea. The final section is concluding remarks.

2. MODEL

Rubinfeld (1987) builds a model for the empirical estimation of the determination concerning the local public services. The topic on the demand for public services is quite important in the area of local public finance. I derive the demand function of local public services referring to Rubinfeld (1987)'s model. In the optimizing framework the representative individual receives the benefits from the local public services.⁴⁾ The approach is the application of the optimizing behavior of consumers in microeconomics, focusing on the demand function of local public services that include the appropriate variables such as tax price, regional income, grants-in-aid from the central or higher-level governments.

As is well known, the local public goods or services have different characteristics from the private goods, because public goods have the characteristics of non-rivalry and non-exclusion. These characteristics cause the problem in aggregating individual preferences. Owing to the non-rivalry or joint consumption, the individual can demand the public goods at the same level demanded by all individuals. In order to reflect the preferences of the individuals in the jurisdiction, I assume that the preference of the representative resident stands for that of the median voter. That is, the model implicitly assumes that the local public services are provided considering the median voter's preference by a majority rule, and its preference is single-peaked.

The representative individual's utility function, or U , conditioned on Z can be written by,

$$U = U(X, B, G; Z). \quad (1)$$

⁴⁾ Goodspeed (2002) constructs a framework with a two-period inter-temporal relations between central government and local governments. The paper discusses the issue concerning the behavior of the local governments. A key part of the model is the interaction between central government and local governments. Goodspeed (2002) offers the model that local governments' incentives are dependent on expectations of central government behavior.

Assume that the utility function (1) is quasi-concave, where X is a private good, B is a property such as housing, G is the level of local public services, and Z denotes control variables such as the size of regional area etc. Then the representative individual's maximization problem is:

$$\begin{aligned} & \text{maximize } U(X, B, G; Z), \\ & \text{subject to } Y = P_x X + P_B B + P_G G, \end{aligned} \tag{2}$$

where P_x denotes the price of the private good, P_B the price of the property, and P_G the tax price of the public service. Though the local public good may not be a pure public good, all individuals in a community can obtain the same benefit of local public service, or G .

The jurisdiction has to finance the budget to provide public services, which means that the demand function relies on the individual budget as well as the budget constraint of the local government. In financing the budget for providing the public services, local governments receive the grants-in-aid from central government or higher-level governments. Cullis and Jones (2009) classify the intergovernmental grants as various types, among which the classification by non-matching grant and matching grant is general.

The budget constraint in which the local government reflects the non-matching grant can be formulated by

$$cG = T + L + A, \tag{3}$$

where c is the marginal cost of production of local public service or G , T is the tax revenue raised by the locality, L is the local bond, and A is the transfer revenues from central or upper-level governments. In equation (3), the A , or grant-in-aid, is shown as the type of non-matching grant, which is not related to the tax effort of the local government. On the other hand, the budget constraint in which the local government takes the matching grant into account can be expressed by

$$cG = (1 + s)T + L + A, \quad (4)$$

where s is the matching rate, which is proportional to local taxes, or T .

The representative individual maximizes the utility function (1) subject to the budget constraint (2) of the individual and the budget constraint of the local government (3) and (4). As a result, we can get the demand function for the local public service. Then the demand function of the desired public service, or G^* :

$$G^* = G(P_x, P_B, P_G, Y; Z). \quad (5)$$

As Rubinfeld (1987) mentions, the most popular approach to estimate the demand function of public goods or services uses aggregate data on local expenditure at each jurisdiction. When the individuals benefit, or consume, public services, then we might use the logarithm type of the demand function concerning the local public services.⁵⁾

$$\log G_u = b_1 + b_2 \log Y + b_3 \log P_G + b_4 \log Z + \varepsilon, \quad (6)$$

where G_u is a uniform quality of local public services. In equation (6), the demand function assumes that individuals benefit from the local public services at a uniform quality, or G_u . However, the local public goods have the crowding congestion, which means that G_u is a function of the population of the jurisdiction, or N . Here we can capture the degree of the congestion by the construction of the following.

$$G_u = G / N^v. \quad (7)$$

In equation (7), G is the actual level of local public service and v has the range between 0 and 1. If the value of v is equal to 0 then G has the characteristic of pure public good, and if $v=1$ then G has the characteristic of

⁵⁾ In equation (6), P_G should be considered as a relative price.

pure private good. When ν lies between 0 and 1, G has the characteristic of partly public good and partly private good. Taking logarithm to the equation (7), we get equation (8).

$$\log G_u = \log G - \nu \log N. \quad (8)$$

By inserting equation (8) into (6), we can derive the equation for estimating the demand function of local public services as follows.

$$\log G = b_1 + b_2 \log Y + b_3 \log P_G + b_4 \log Z + \nu \log N + \varepsilon. \quad (9)$$

At Section four we try to estimate what factors mainly influence local expenditure or local public services. We can formulate the demand function reflecting the variables that affect public services as follows.

$$G = G(\text{income, tax, transfers, carry-over, population; area}). \quad (10)$$

To estimate the function of (10) for local public services we make use of the following equation.

$$\begin{aligned} \log G = & \beta_1 + \beta_2 \log Y + \beta_3 \log T + \beta_4 \log(CO) \\ & + \beta_5 \log(Tr) + \beta_6 \log(Pop) + \beta_7 \log(Area) + \varepsilon, \end{aligned} \quad (11)$$

where G denotes public services, Y individual income, T local taxes, CO carry-over, Tr transfers, Pop population, ε error term. The variable of Area at the equation (11) is included as a control variable because the size of locality can be thought of as a relevant factor in determining the level of public services. We qualify the main factors that influence local public services by estimating equation (11) at Section four. Before offering the estimation results of (11), let us take a glance at some characteristic features of local public finance in Korea at next section.

3. CHARACTERISTIC FEATURES OF LOCAL PUBLIC FINANCE IN KOREA

Local governments' revenue in Korea consists of not only their own revenues such as local taxes but also the transfer revenues from central government or higher-level governments. Local tax law that prescribes the tax rates and the tax bases of localities is enacted not by local councils but by National Assembly in Korea. It means that the local taxes are levied based on the local tax act controlled by central government. Local governments are allowed to set their own tax rates within given ranges with respect to some local taxes such as the acquisition tax and the automobile tax etc. However, local governments are not inclined to change the standard tax rate in order to raise their own tax revenues except in a few restricted cases because the change of standard tax rate has little influence on their revenues. Local governments have taken more efforts to increase transfer revenues from central government or higher-level governments than to magnify their own taxes.

Let us qualify the configuration of the local public finance in Korea by calculating the relative shares of revenue items in general account.⁶⁾ Table 1 and 2 calculate the shares of revenue items at the level of municipal governments and county governments, respectively. Municipalities (or cities) and counties are the representative jurisdictions among the types of lower-level local governments in Korea.⁷⁾ The revenue items of local governments in Korea consist of local taxes, non-tax revenue, transfer revenues from central government or higher-level governments, and local bonds.

⁶⁾ Table 1 and 2 exclude special accounts for local education, local public enterprises, and other special accounts. In Korea the local education finance is operated as a special account, separate from the ordinary local public finance. The local education finance is more highly reliant on the grant-in-aid from central government than the ordinary local public finance. Transfers from the central government accounts for about two-thirds in the revenues of the local education finance.

⁷⁾ There are also autonomous districts under the metropolitan cities, which are another type of lower-level local governments in Korea.

Table 1 Revenue Structure of Municipal (or City) Governments in Korea

(unit: %)

	Local Tax	Non-Tax Revenue	Local Allocation Tax	National Subsidies	Local Transfer Tax	Local Bonds	Total	
							%	Trillion Won
2002	17.1	31.6	21.6	24.6	4.2	0.8	100	28.4
2003	16.3	37.0	20.3	21.7	3.4	1.2	100	34.0
2004	18.7	39.4	20.6	16.8	2.9	1.5	100	34.5
2005	19.6	33.7	27.0	18.2		1.4	100	35.5
2006	21.3	31.4	27.3	18.7		1.3	100	36.9
2007	22.2	29.7	27.2	19.7		1.2	100	40.5
2008	21.3	29.7	27.3	19.9		1.8	100	46.1
2009	20.4	31.5	22.3	22.1		3.7	100	49.9
2010	23.2	23.3	26.7	25.1		1.7	100	46.0
2011	23.6	22.0	28.1	25.1		1.1	100	47.9
2012	22.4	23.0	27.7	25.1		1.9	100	53.2

Source: Ministry of Government Administration and Home Affairs (MOGAHA), *Financial Yearbook of Local Government*, each year.

Table 2 Revenue Structure of County Governments in Korea

(unit: %)

	Local Tax	Non-Tax Revenue	Local Allocation Tax	National Subsidies	Local Transfer Tax	Local Bonds	Total	
							%	Trillion Won
2002	5.7	27.2	27.8	32.9	6.1	0.3	100	28.4
2003	5.1	35.3	26.4	28.0	4.8	0.4	100	34.0
2004	6.1	38.4	29.2	21.5	4.5	0.4	100	34.5
2005	6.4	30.5	37.7	25.2		0.2	100	35.5
2006	6.4	28.9	34.9	29.4		0.3	100	36.9
2007	7.0	31.3	37.6	23.8		0.3	100	40.5
2008	6.6	28.1	39.9	24.7		0.7	100	46.1
2009	6.5	32.1	31.7	27.9		1.8	100	49.9
2010	7.3	24.1	37.5	30.4		0.7	100	46.0
2011	7.3	22.4	40.1	29.7		0.5	100	47.9
2012	6.8	22.2	40.8	29.9		0.3	100	53.2

Source: Ministry of Government Administration and Home Affairs (MOGAHA), *Financial Yearbook of Local Government*, each year.

Table 1 and 2 show the characteristic features of municipalities and counties, respectively. From table 1, the revenue compositions of municipal or city governments are 22.4% at local taxes, 23.0% at non-tax revenues, 52.8% at transfer revenues (the sum of the both shares of local allocation tax, 27.7%, and national subsidies, 25.1%), and 1.9% at local bonds in 2012. Also from table 2, the revenue shares of county governments are composed of just 6.8% at local taxes, 22.2% at non-tax revenues, 70.7% at transfer revenues (the sum of the both shares of local allocation tax, 40.8%, and national subsidies, 29.9%), and 0.3% at local bonds in 2012.⁸⁾ These figures indicate that local governments highly depend on transfer revenues from central government or higher-level governments. In particular, the fiscal dependency on central government or higher-level governments (i.e., provinces) is greatly high at county governments relative to city governments because city jurisdictions are more developed than county jurisdictions.

We can observe that the share of local allocation tax has risen in recent years. For instance, its share has gone up from 27.8% in 2002 to 40.8% in 2012 at county governments. See the column of local allocation tax of table 2. The reason that the portion of local allocation tax, or LAT, has risen is partly because Korea abolished local transfer tax and merged it into local allocation tax in 2004. We can see that the share of LAT goes up to 37.7% in 2005 from 29.2% in 2004 due to the abolishment of the local transfer tax. In addition, the shares of national subsidies keep relatively high. Why have the shares of transfer revenues kept up so high even if Korea has emphasized on the enhancement of local autonomy? We will discuss significant factors by estimating the demand function of public services of equation (11) at Section four.

From table 1 and 2 we can find out that non-tax revenue is comparatively high. Here it is needed to be cautious about the composition of the non-tax revenue in Korea. According to *Financial Yearbook of Local Government*

⁸⁾ In reference, the shares in provincial governments are 29.5% at local taxes, 10.8% at non-tax revenues, 58.0% at transfer revenues (the sum of local allocation tax and national subsidies), and 1.7% at local bonds in 2012. Provinces are representative jurisdictions of higher-level local governments in Korea.

published by Ministry of Government Administration and Home Affairs in Korea, non-tax revenue is composed of not only current non-tax revenue but also temporary non-tax revenue. The current non-tax revenue includes user charges, fees, and interest revenues etc., which can be classified as ‘almost real’ non-tax revenue. However, its share is very low: e.g., user charges and fees account for just 1.3% of local revenue in 2012.⁹⁾ The rest of non-tax revenue comes from the temporary non-tax revenue, among which the share of carry-over is greatly high. The carry-over indicates the portion of local revenue that was not expended that year.

Note that the carry-over includes a large amount of transfers from central government or higher-level governments because all the rest of the revenue that was not spent in present year goes to next year. The carry-over is put into one item of temporary non-tax revenue next year. This process of the non-tax revenue demonstrates a distinguishing feature in Korea. Mainly due to the existence of the huge amounts of carry-over, there appears a big difference between the revenue and the expenditure of local governments. Table 3 shows the difference between the revenue and the expenditure, the amount of non-tax revenue, and the carry-over in general account of total local governments after the periods of local autonomy in 1995.

Table 3 shows that there are big differences between local revenue and its expenditure, e.g., 31.8 trillion won in 2012, and the size of differences has increased from 13.7 trillion won in 1996. From table 3 we can observe that the huge amounts of carry-over are included in the non-tax revenue of local governments every year. For instance, the share of carry-over is 70.6% of non-tax revenue in 1996, 81.4% in 2004, and 65.3% in 2012. The size of the carry-over in non-tax revenue has risen from 9.8 trillion won in 1996 to 20.9 trillion won in 2012.

The reason why the portion of carry-over is so high can be thought of. There occurs a situation that local governments cannot make all the outlay of transfers from central government or higher-level governments at that year.

⁹⁾ Calculated based on Ministry of Government Administration and Home Affairs (MOGAHA), *Financial Yearbook of Local Government*, 2012.

Table 3 Difference between Revenue and Expenditure and Size of Carry-over

(unit: trillion won)

	1996	1998	2000	2002	2004	2006	2008	2010	2012
Revenue (<i>R</i>)	45.0	51.0	57.7	84.5	97.2	109.1	133.0	135.0	151.3
Expenditure (<i>E</i>)	31.2	38.1	42.0	54.8	71.8	79.7	98.4	110.1	119.5
Difference <i>b/n</i> <i>R</i> and <i>E</i>	13.7	12.9	15.7	29.7	25.4	29.4	34.6	24.9	31.8
Non-tax Rev. (NTR)	13.9	15.4	16.7	22.1	33.5	28.3	34.7	28.0	32.0
Carry-over in NTR	9.8	11.3	12.4	17.0	27.3	21.1	26.7	20.0	20.9
% of Carry-over in NTR	70.6	73.1	74.6	77.1	81.4	74.6	76.9	71.4	65.3

Source: Ministry of Government Administration and Home Affairs (MOGAHA), *Financial Yearbook of Local Government*, each year.

It is because the central government or higher-level governments give a big amount of grants in the middle of or near the end of the year. The large fractions of transfers are carried over to next year. The ‘carry-over’ is composed of the amount for investment expenditures related to multi-year projects. The massive amounts of the carry-over are incorporated into one item of the temporary non-tax revenue. As a result, the temporary non-tax revenue includes the remainders of the national categorical grants (or residuals), the provincial subsidies, the carry-over of the previous year.¹⁰⁾ Judging from this, we know that non-tax revenue actually includes transfer revenues of past years, and that the ‘real’ non-tax revenue such as fees and user charges is very low. In other words, the true share of transfer revenues could be a lot higher if we consider the carry-over. Hence it should be cautious that we handle the fiscal data of local governments in Korea.

¹⁰⁾ The amount of carry-over of the previous year accounts for a great share among total carry-over. Another reason why non-tax revenue is so big is that bureaucrats have not inclined to estimate concretely the increase of local revenue induced by policy changes such as local tax reform in Korea. Central government usually has made decisions to increase local tax revenue uniformly, which has caused the bureaucrats not to have an incentive to positively estimate the effect of the policy changes on the local revenues. This brought out the result that the settled account appeared much larger than the budget account. The difference between the settled account and the budget account is called as ‘net annual surpluses’ in Korea.

4. ESTIMATION RESULTS

Let us describe the data set concerning the estimation in brief. We use the expenditure data of the general account at municipal (or city) and county governments as a dependent variable representing local public services, shown as G at equation (11). Korea mainly provides the data for gross regional domestic product (GRDP) at the upper-level governments. Though National Statistical Office in Korea offers individual income data at the lower-level governments, lots of local governments among them do not provide the individual income data. Since we want to obtain panel data observations as many as possible, we do not use individual income at the estimation. Instead, we make use of the data of inhabitant tax at city and county governments as a proxy of individual income because the inhabitant tax is mainly imposed on individual income of the residents. That is, the inhabitant tax is a kind of local income tax at city and county governments. Korea introduced local income tax by renaming and reforming the inhabitant tax in 2010. With this background we use the inhabitant tax or local income tax as a proxy of individual income, or Y , when we estimate the equation (11).

On the other hand, in general, the local taxes are thought to be collected on the basis of benefit principle. Hence we utilize the local tax as a variable that reflects a tax price of public services. In other words, we regard the total local tax of city and county governments as a tax price or T at equation (11). Though all the city and county taxes are not based on benefit principle, for instance, take tobacco consumption tax, we want to test whether the local tax plays a role as a tax price of level public services or not. We can also obtain the data of the local allocation tax as a type of non-matching unconditional grant and the national subsidies as a type of matching conditional grants-in-aid in Korea. Finally, the carry-over can be thought of as another factor in deciding the level of local public services at city and county governments as described at Section three. Hence we included the carry-over in the estimation of (11).

As derived and implicated at the model of Section two, the significant

factors that influence the consumption/provision of public services can be the variables of income, local tax, transfers, carry-over, population, and the size of area. We got the fiscal data related to city and county governments from *Financial Yearbook of Local Government* published by Ministry of Government Administration and Home Affairs (MOGAHA) in Korea. Those variables are: individual income (inhabitant tax or local income tax as a proxy), local tax, carry-over, local allocation tax, national subsidies, and local transfer tax.¹¹⁾ We make use of the data concerning the general account of city and county governments relating to their general role. Also we can pick up the data of population and area at city and county level from the *Korea Statistical Information System* (KOSIS).

Korea sometimes merged adjacent regions into one administrative jurisdiction and changed them to city government, and promoted some county governments to city governments. It means that the data concerning city as well as county governments are unbalanced panel data. Here we try to evaluate whether the political operation of local autonomy in Korea has enhanced the fiscal autonomy of local governments. Table 4 and 5 are the estimation results at city governments and county governments from 2002 to 2012 by the method of ordinary least squares each year, respectively. Sample sizes are written below the each year at the first column. Also table 6 tabulates the estimation results by using the unbalanced panel data from 2005 to 2012, based on the method of setting dummy variables. In panel estimation, we used the data periods from 2005 to 2012. The reason is that we wanted to see the consistent periods after the abolishment of local transfer tax in 2004.

The estimation results of table 4 to 6 indicate that individual income (Y : per capita inhabitant tax or local income tax as a proxy) is not a significant factor that influences the demand function of local public services, except 2006 and 2011 at table 5. The estimation also shows that local tax does not operate well as a variable that plays a role of tax price with respect to local public services when we estimate the regression equation at each year (see

¹¹⁾ Local transfer tax was abolished from 2005, so its data were only used in 2002 to 2004.

Table 4 Estimation Results at City Governments

Dependent Variable: Logarithm of Expenditure of City Governments									
	Const.	log(<i>Y</i>)	log(<i>LT</i>)	log(<i>CO</i>)	log(<i>LAT</i>)	log(<i>Sub</i>)	log(<i>LTT</i>)	log(<i>Pop</i>)	log(<i>Area</i>)
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.
2002	1.043	0.059	-0.003	0.015	0.488***	0.102***	0.000	0.371**	0.026
<i>N</i> =74	1.925	0.660	-0.020	0.334	8.128	3.213	0.002	2.119	1.081
2003	0.874	0.033	0.131	0.212***	0.387***	0.197***	0.036	0.037	0.008
<i>N</i> =76	1.466	0.376	0.759	5.761	5.878	4.682	1.180	0.336	0.300
2004	0.448	0.000	0.162	0.329***	0.264***	0.274***	-0.011	0.034	0.026
<i>N</i> =77	0.927	-0.004	1.092	10.106	5.306	5.282	-0.891	0.219	1.100
2005	1.892	0.059	0.040	0.193***	0.201***	0.252***		0.243*	0.014
<i>N</i> =77	4.113	1.029	0.341	5.529	3.889	6.389		1.910	0.736
2006	1.465	0.032	0.169	0.184***	0.297***	0.236***		0.102	-0.010
<i>N</i> =75	2.961	0.592	1.610	4.523	4.700	5.570		0.881	-0.490
2007	1.171	0.044	0.171	0.111***	0.315***	0.276***		0.125	0.016
<i>N</i> =75	2.418	0.721	1.514	2.746	4.975	5.154		1.024	0.749
2008	1.913	-0.001	0.218**	0.087*	0.262***	0.205***		0.144	0.041*
<i>N</i> =75	4.168	-0.027	2.105	1.959	4.874	4.348		1.280	1.923
2009	2.224	0.009	0.116	0.146***	0.188***	0.167***		0.270**	0.067***
<i>N</i> =75	4.268	0.186	1.177	3.694	3.234	3.127		2.533	2.798
2010	2.296	0.057	0.099	0.062**	0.229***	0.257***		0.241**	0.051**
<i>N</i> =73	5.966	1.378	1.154	2.170	4.750	5.640		2.519	2.620
2011	1.702	0.016	0.134	0.135***	0.316***	0.143***		0.205*	0.052*
<i>N</i> =73	3.903	0.327	1.332	4.355	5.491	3.584		1.865	2.527
2012	1.577	-0.029	0.230*	0.147***	0.326***	0.131***		0.113	0.046**
<i>N</i> =74	3.070	-0.455	1.784	3.357	4.847	2.788		0.804	2.067

Notes: *t*-statistics are below each estimator. Estimation method is ordinary least squares. ***, **, and * show statistically significant levels at the 1%, 5%, and 10% level or lower, respectively.

Sources: Ministry of Government Administration and Home Affairs (MOGAHA), *Financial Yearbook of Local Government*, each year. Korea Statistical Information System (<http://kosis.nso.go.kr>).

Table 5 Estimation Results at County Governments

Dependent Variable: Logarithm of Expenditure of County Governments									
	Const.	log(<i>Y</i>)	log(<i>LT</i>)	log(<i>CO</i>)	log(<i>LAT</i>)	log(<i>Sub</i>)	log(<i>LTT</i>)	log(<i>Pop</i>)	log(<i>Area</i>)
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.	<i>t</i> -stat.
2002	-1.190	-0.052	0.211***	0.213***	0.709***	0.073***	0.083	-0.044	-0.050
<i>N</i> =89	-1.431	-1.431	2.772	5.608	5.638	3.510	1.660	-0.482	-1.562
2003	-0.757	-0.039	0.154	0.426***	0.540**	0.034	0.059	-0.026	-0.028
<i>N</i> =88	-0.908	-0.787	1.533	12.928	4.120	1.124	1.166	-0.220	-0.743
2004	0.658	-0.021	0.117*	0.366***	0.356**	0.154***	0.044	-0.001	0.019
<i>N</i> =87	0.651	-0.685	1.873	17.739	2.294	3.854	1.181	-0.007	0.651
2005	0.979	0.015	0.118**	0.162***	0.498***	0.182***		0.035	0.026
<i>N</i> =88	1.518	0.573	2.476	5.734	5.037	6.097		0.530	1.117
2006	0.808	0.090***	-0.057	0.276***	0.501***	0.130***		0.184***	-0.015
<i>N</i> =86	1.036	2.728	-1.211	9.569	4.694	4.560		2.943	-0.534
2007	1.043	0.026	0.044	0.350***	0.284***	0.221***		0.076	0.053*
<i>N</i> =86	1.443	0.820	0.958	12.583	3.055	4.185		1.188	1.804
2008	3.740	-0.020	0.058	0.189***	-0.019	0.354***		0.111**	0.143***
<i>N</i> =86	6.117	-0.826	1.500	6.139	-0.224	8.245		2.136	5.319
2009	3.334	-0.002	0.028	0.212***	0.046	0.370***		0.116***	0.081***
<i>N</i> =86	8.065	-0.151	1.078	7.462	0.692	10.072		3.358	4.094
2010	2.641	0.012	0.049**	0.129***	0.200***	0.338***		0.125***	0.063***
<i>N</i> =86	7.088	0.769	2.528	6.630	3.821	12.693		4.640	3.843
2011	1.580	0.046**	0.077***	0.096***	0.440***	0.279***		0.053	0.038**
<i>N</i> =86	4.440	2.408	2.689	4.447	9.893	10.043		1.620	2.334
2012	2.313	0.013	0.135***	0.145***	0.386***	0.255***		-0.034	0.025
<i>N</i> =85	5.289	0.728	5.125	5.327	6.607	8.265		-1.077	1.086

Notes: *t*-statistics are below each estimator. Estimation method is ordinary least squares. ***, **, and * show statistically significant levels at the 1%, 5%, and 10% level or lower, respectively.

Sources: Ministry of Government Administration and Home Affairs (MOGAHA), *Financial Yearbook of Local Government*, each year. Korea Statistical Information System (<http://kosis.nso.go.kr/>).

Table 6 Estimation Results Using Panel Data from 2005 to 2012

Year 2005 to 2012	City ($N=597$)		County ($N=689$)	
	Coefficient	t -statistic	Coefficient	t -statistic
Constant	1.774	11.307	1.845	9.504
$\log(\text{Income})$	0.025	1.354	0.016	1.841
$\log(\text{Local Tax})$	0.137***	3.768	0.075***	5.753
$\log(\text{Carry-over})$	0.136***	10.524	0.223***	22.066
$\log(\text{Local Allocation Tax})$	0.256***	13.248	0.331***	12.701
$\log(\text{Subsidies})$	0.199***	12.745	0.212***	17.457
$\log(\text{Population})$	0.196***	4.945	0.068***	4.122
$\log(\text{Area})$	0.039***	5.327	0.040***	4.762
Year2006dummy	0.027	1.602	0.012	0.986
Year2007dummy	0.013	0.686	0.021	1.566
Year2008dummy	0.068***	3.366	0.029*	1.776
Year2009dummy	0.237***	11.110	0.215***	13.978
Year2010dummy	0.164***	7.173	0.177***	11.458
Year2011dummy	0.152***	6.318	0.172***	10.204
Year2012dummy	0.164***	6.568	0.158***	8.463
Adjusted R^2	0.959		0.927	

Notes: Dependent variable at each estimation is logarithm of the expenditure of city and county governments. *** and * show statistically significant levels at the 1% and 10% level or lower, respectively.

Sources: Ministry of Government Administration and Home Affairs (MOGAHA), *Financial Yearbook of Local Government*, each year. Korea Statistical Information System (<http://kosis.nso.go.kr/>).

the column of $\log(LT)$ at table 4 and 5). Though the local tax is not a significant factor that affects the demand function of local public services in almost years, it has recently become one of the factors that satisfy more than 5% significance level after 2010 at county governments. The effort that Korean government has strengthened the property tax in 2010's can be thought of as its background.

Different from the variables of income and local tax described above, the

estimation results show that the transfers from central or higher-level governments are substantially important factors in deciding the local public services. Those grants-in-aid or transfers are local allocation tax and national subsidies. In particular, local allocation tax (*LAT*) plays a key role for the local public services, and the coefficients of which are much larger than those of other variables including local tax. Local governments in Korea have pursued to obtain transfers rather than to take efforts for enhancing local taxes. The coefficients of each estimation indicate the elasticities because the estimation equation (11) takes the form of logarithm. The elasticities measure what percentage of local expenditure the 1% increase of each explaining variable raises. For example, the 1% increase of *LAT* raises 0.326% at city governments in 2012. In addition that the coefficient of *LAT* is 0.326 at city governments in 2012 (see table 4), the coefficient of *LAT* is 0.256 in their panel data (see table 6). Also the coefficients of *LAT* show 0.386 at county governments in 2012 (see table 5) and 0.331 in their panel data (see table 6). The effects of *LAT* on the increase of local expenditure are the largest among explaining variables, satisfying 1% significance level in almost cases. We can observe that the contributions of *LAT* to the local expenditure are greater than those of local tax each year from table 4 and 5.

How about the effects of the population and area on local public services? The estimation results that used the panel data show that the two variables satisfy 1% significance level (see table 6). According to Kook (2010), the local expenditure is not so related to local tax, but it is quite closely related to total transfers. The correlation coefficient between the total transfers and the local expenditure is 0.896. The high value of correlation coefficient supports the estimation results that a significant factor is not the local tax but the transfer or the carry-over. The coefficients of the carry-over are 0.147 at city governments in 2012 (see table 4) and 0.136 in their panel data (see table 6); those of the carry-over are 0.145 at county governments in 2012 (see table 5) and 0.223 in their panel data (see table 6), satisfying the 1% significance level.

Estimation results imply that a soft budget constraint problem could be caused through the intergovernmental transfers and the carry-over mechanism realizing bailouts from central government. We can interpret that while the central government in Korea has interfered with the process of the issuance of local bonds it has admitted the increase of grants-in-aid and the operation of carry-over mechanism. In other words, we can judge that local governments in Korea have more taken efforts to obtain transfers rather than to collect their own revenues such as local tax. Heavy dependency of the local public finance on the transfer revenues signifies that the transfers are the critical factor on local public services rather than the local tax.

Even though central government refuses to increase the transfers for the local governments *ex ante*, once they outlay excessively it is optimal for central government to bailout the local governments *ex post*. It causes a soft budget constraint to occur. In reality, Korea has raised the allocation rate of local allocation tax for local governments with a high speed after the local autonomy. For example, the allocation rate has been raised from 13.27% of national tax revenue to 15% in 2000, to 19.13% in 2005, and to 19.24% in 2006. Also the allocation rate for the special account of local education finance was raised from 11.8% of national tax revenue to 13% in 2001, to 19.4% in 2006, and to 20.27% in 2010.¹²⁾ In addition, the national subsidies have increased after the financial crisis in 2008.

Almost the same tendency occurs at both city and county governments. However, the average per capita values are much different between city and county governments. The county governments are more highly dependent on the transfer revenues compared to city governments. The large amounts of the transfers to county governments make their average per capita expenditure become greatly higher than that of city governments. Let us compare the per capita amount of local tax, transfers from central or higher-level governments, and local expenditure between city and county governments. Table 7 provides their comparison in 2012, and offers as the test for equality of means of local tax between the both governments.

¹²⁾ In calculating local allocation tax, customs tax and earmarked taxes are excluded.

Table 7 Comparison of per Capita Local Tax, Total Transfers, and Local Expenditures between Cities and Counties

(unit: thousand won)

2012	Local Tax			Total Transfers			Local Expenditure		
	City (a)	County (b)	b/a times	City (c)	County (d)	d/c times	City (e)	County (f)	f/e times
Mean	496	428	0.86	1,883	5,859	3.11	2,560	6,340	2.48
Median	446	369	0.83	1,531	5,939	3.88	2,350	6,382	2.72
Maximum	956	2,040	2.13	5,099	11,144	2.19	5,399	13,960	2.59
Minimum	280	134	0.48	466	1,187	2.55	1,033	1,649	1.60
Std. Dev.	157	275		1,257	2,191		1,190	2,270	
CV	0.316	0.641		0.667	0.374		0.465	0.358	

Test for Equality of Means of Local Tax:

Means are 495,848 won in cities, 428,289 won in counties, and 459,731 won in total.

Degree of Freedom: 157, *t*-Statistic or *F*-value: 1.867, Probability: 0.0638

Note: Observations are 74 at city governments and 85 at county governments.

Sources: Ministry of Government Administration and Home Affairs (MOGAHA), *Financial Yearbook of Local Government*, each year. Korea Statistical Information System (<http://kosis.nso.go.kr/>).

As shown at the below of table 7, the amount of per capita local tax of municipal (or city) governments is not so different from that of county governments. The mean values are 495,848 won in cities, 428,289 won in counties, and 459,731 won in total in 2012. The bottom of table 7 provides the test for equality of means with respect to the local tax between city and county governments. According to the test, the two means are not statistically different at the 10% significance level: *t*-statistic or *F*-value is 1.867, and the probability is 0.0638. Contrary to the amount of per capita local tax, the size of per capita total transfers from central government or higher-level (i.e., provincial) governments at the county governments is a lot, or 3.11 times, larger than that at the city governments: 5,859 thousand won at the county governments, and 1,883 thousand won at the city governments. Higher dependency on transfers from central government or higher-level governments results in larger amount of per capita local expenditure at county governments than that at city governments. Table 7 shows that the

size of per capita local expenditure at county governments is 2.48 times larger than that at the city governments: 6,340 thousand won at the county governments, and 2,350 thousand won at the city governments. In sum, though per capita local tax is not so different between city and county governments, per capita transfers and expenditure of county governments are much larger than those of city governments.

5. CONCLUDING REMARKS

This paper constructed the model to derive the demand function of local public services referring to Rubinfeld (1987), and estimated the main determinants on local expenditure in Korea. The most significant factor that influences the demand function of local public services is not local tax but transfer revenues from central government or higher-level governments. According to the estimation, the local tax has not played a key role as a tax price of local public services at both city and county governments.

Goodspeed (2002) suggests a soft budget constraint problem that the local government faces a lower price for borrowing. The paper deals with inter-temporal spending decisions when the central government gives the grants-in-aid to local governments. Since the representatives of central government have an objective to maximize their expected votes, intergovernmental grants such as the local allocation tax and national subsidies can be made for the use of political gains. The political incentive of the central government may coincide with the motive that local governments are inclined to increase transfer revenues rather than to take an effort to increase their own tax revenues. Korea was not an exception to this tendency or behavior.

DelRossi and Inman (1999) examine an empirical study about the cost sharing and investigate the inefficiency of cost-shared local public goods under the assumption that national legislators demand more of the locally beneficial project, as the local price for projects declines. Many local

governments including the city and the county governments have little room for increasing their own revenue such as local taxes in Korea. Furthermore, the central government enacts the local tax law that prescribes local tax bases and tax rates. Though local governments can change their tax rates within a certain ranges in some local taxes, they have not been inclined to make use of changing the local tax rates clinging to their political perspectives. As a result, Korea has followed the practice that the grants-in-aid from central governments have been a key factor in the field of the local public finance.¹³⁾

Transfer revenues in Korea consist of both the local allocation tax as a type of non-matching unconditioned grants and the national subsidies as a type of matching conditioned grants. These two types of grants have increased in recent years. Even since the local autonomy in 1995, the jurisdictions' own tax revenue did not increase so much relative to the increase of transfer revenues from central or higher-level governments. Korean government coped with the economic crisis in 1997 by increasing the national subsidies for local governments. After overcoming the crisis, the allocation rate of local allocation tax has been raised frequently. Also there has been a large size of carry-over that was not used that year, which can be regarded as a particular mechanism in Korea. The carry-over is put into one category of temporary non-tax revenue, and goes to the next year's budget. This mechanism is different from the case of other countries. In general, the soft budget problems are figured out by the strategic action of issuing local bonds for their expenditure *ex post*.

The carry-over has been important in the local public finance in Korea. The share of non-tax revenue appears very high in formal statistics such as *Financial Yearbook of Local Government* published by Ministry of Government Administration and Home Affairs in Korea. For example, non-tax revenue reaches at 23.0% of city governments' revenue and 22.2% of county governments' revenue in 2012 (see table 1 and 2). When we see

¹³⁾ Furthermore, the local education finance, which runs separately as special account in Korea, is much higher dependent on the transfers from central government than the ordinary local finance.

these figures we may be apt to interpret that local governments in Korea contain high amounts of their own user charges and fees in non-tax revenue. It should be remarked, however, that it is not true in reality. The fact that the share of non-tax revenue gets high does not mean that non-tax revenues such as user fees and charges are high. For instance, users' fees and charges stay at only 1.3% of local revenue in 2012. Korea has had a practice that central government makes a large amount of transfers in the middle of or near the end of the year.¹⁴⁾ Owing to the practice, the non-tax revenue includes a large amount of transfers in reality.

A soft budget constraint problem arises when central government bails out local governments *ex post* as they borrow *ex ante*. Since the issuance of bonds or the borrowing has been strictly constrained in local governments, the dependency on bond issuance is very low. The issuance of local bonds accounts for only 1.9% at city governments, and 0.3% at county governments in 2012. It seems like that Korea has no soft budget problem when we see the size of local bonds. Local governments can exert pressure on central government or higher governments by requesting to raise the allocation rate of local allocation tax or by controlling the part of carry-over for next periods *ex ante*. While the central government has interfered with the issuance of local bonds it has admitted this practice of carry-over and bailed out local governments through the increase of grants-in-aid, which created the soft budget problem in Korea.¹⁵⁾

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¹⁴⁾ In addition, a surplus budget has been more highly evaluated than a deficit budget in a traditional bureaucratic thought in Korea.

¹⁵⁾ The net operating profit of local public enterprises shows a large amount of deficits in Korea. However, national and local subsidies compensate for their operating deficits. See Qian and Roland (1998) on a soft budget problem of state-owned enterprises in China. Also Jin *et al.* (2005) investigate the relationship between provincial government's fiscal incentives and provincial development using a panel data set from China.

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