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Yoon, Taeseop; Jang, Sungkyu; Lee, Junki

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Key Determinants of Budget Execution with the Political Market Approach: A Case Study of Korean Local Government

Taeseop Yoon^{a†}, Sungkyu Jang^b, Junki Lee^c

^aAssistant Professor, Department of Public Administration, Chungbuk National University ^bAssociate Professor, Department of Political Science, Indiana University-South Bend ^cLecturer, Department of Public Administration, Gongju National University

ABSTRACT

Purpose: This study is aims to analyze relationships among population, resident income, fiscal characteristics, and operating expenses in Korean local governments through investigating factors that affect operating expenses for managing local governments.

Design/methodology/approach: To examine the factors affecting operating expenses, this study utilizes research framework using key determinants of budget execution in terms of operating expenses with the political market approach. For doing so, this study conducts panel regression analysis using 226 Korean local governments' empirical data during FY2016-FY2020.

Findings: Analytical results show that population and fiscal factors of local governments do not explain a size of operating expenses; moreover, it reveals that local governments with a small population and fiscal size tend to spend more operating expenses.

Research limitations/implications: Tis study is initiated based on the hypothesis that decrease of population would lead to decline demands for public goods and public services, which reduce the number of public goods and public services, and it would finally cause the reduction of local governments' operating expenses. However, this study has a limitation regarding to restricting the period of data since FY2016.

Originality/value: Despite the above limitation, this study reveals that population variables and fiscal variables do not explain a size of operating expenses of Korean local governments. Rather, the analytical result shows that local governments with a small population and fiscal size spend more operating expenses. Therefore, this study suggests that it pays more attention to improving efficiency of organizational operation of local governments in the future.

Keywords: Budget execution, Operating expenses, Panel data analysis, Political market approach

I. Introduction

The government is an organization formed to exercise power over the actions of members of society, to provide essential services, and to finance them (Ha, 2008). Essential services mean the provision of public goods and services, and the procurement of financial resources for the provision of essential services means the collection of taxes.

Local governments are also governments whose purpose is to provide public goods and services to residents, for this purpose, they perform functions

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E-mail: tsyoon@chungbuk.ac.kr

such as general administration, public order and safety, education, culture and tourism, environment, social welfare, and health (Local government budgeting and operating standards, 2021). In addition, to perform these functions, local governments must have human resources and organizations, and financial resources to operate them are also required. In other words, a local government is an organization whose purpose is to provide public goods and services to residents and requires human resources and financial resources to operate organization.

In the case of organizations including local governments, basic operating expenses require for the organization's operation. In general, public organizations that cannot obtain the necessary financial resources to operate the organization through for-profit activities, especially the government, such as local governments, cover the necessary financial resources through taxation. Local governments also cover the necessary financial resources for the organization's operation with local taxes, which are taxes. In other words, in the case of local governments, to produce and supply public goods and services for residents, human resources and organization are required to operate, and local taxes cover the necessary financial resources.

The size of the basic operating expenses for the operation of the local government should be linked to the scale of public goods and services produced and supplied to residents by the local government. Also, with the size of local taxes, which serve as the necessary financial resources should be linked. In addition, the scale of public goods and services to be produced and supplied by local governments should be linked to the number of target residents, that is, the population size of local governments.

In the case of local governments in Korea, the amount of basic operating expenses used for organizational operation is determined by the size of the public goods and public services that the local government must produce and supply. Because private organizations reduce the production of goods, that is, goods and services, when the market demand decreases, and the scale of basic operating costs is used by the organization for this purpose. Similarly, in the case of local governments, if the population decreases and the demand for public goods and services decreases, the scale of public goods and services supplied by the local governments will decrease, and the scale of basic operating costs will need to reduce. Of course, unlike private organizations, public organizations are not based on for-profit activities, so the correlation between basic operating costs, sales volume, and demand for goods and services may be relatively low compared to private organizations. Nevertheless, the direction of the correlation between them should be the same.

In this context, it is obvious that a decrease in population will lead to a decrease in basic operating costs meaning that the demand for public services falls off. However, government's recent statistics reveal that the scale of basic operating expenses have increased continuously contrary to the decline in population in local areas. In other words, even though the population size in local governments shrinks due to low birth rates and aging people, the scale of basic operating costs has continued to increase indicating that the demand for public services is expanding, so that this is the opposite of what was expected.

Therefore, this study examines the relationship between population factor and financial factor by analyzing the factors affecting the size of basic operating expenses for organizational operation of Korean local governments. For doing so, this study conducts empirical analysis using the financial data disclosed through Local Financial information system by focusing on city, county, and municipality.

II. Overview of Budget Execution of Operating Expenses

A. Operating Expenses in Local Government

The financial data showing the amount of spent by local governments for organizational operation are expressed as operating expenses in local financial statements. Operating expenses consist of personnel expense for human resources and administration expense for organization operation. In other words, the expenses spent by local governments to operate the personnel and organizations necessary to supply public goods and services to the residents are called operating expenses.

Specifically, personnel expense refers to the amount spent on human resources necessary for the operation of local governments. Personnel expense includes public officials' personnel expense, job performance expenses, rewards, and pension contributions. Among these, public officials' personnel expense includes public officials' remuneration, other positions' remuneration, and unlimited contract workers' remuneration. Remuneration consists of basic salary, allowances, flat-meal expenses, holidays and vacation expenses, and annual leave compensation.

Administration expenses exclude personnel expenses among operating expenses and refer to expenses necessary for the operation of departments of local governments. Administration expenses are related to the purchase of various office supplies, utility bills, purchases of goods, and promotion of the work of institutions and departments. Administration expenses consist of general operating expenses, travel expenses, business operating expenses, job performance expe nses and so on.

Above Table 1 shows trends in operating expenses in Korean local governments. Table 1 shows that personnel expenses keep increasing during FY2016 -FY2020; On the other hand, administrative expenses keep decreasing during same period. As a result, total operating expenses have increased. Nevertheless, rate of increase in operating expenses is lower than rate of increase in total expenditures.

B. Factors Affecting Budget Execution of Operating Expenses

The theoretical background to explain the amount of local government spending is divided mainly into determinant theory and incrementalism (Shin, 2007; Bokhari & Oh, 2022). The determinant theory asserts that socioeconomic factors determine the amount of government expenditures as a representative example of a comparative approach. As a representative example of the intra-system approach, incrementalism is the theory that the amount of spending is determined by participants in the budget decision process within local governments (Namkoong, 1994; Shin, 2007; Jun & Kim & Yoo, 2022).

The core of determination factor theory is that the amount of local government spending is determined mainly in the same way as policy decision theory. It is because that decision on the amount of expenditure is the product of the policy-making process (Son, 1999; Kim & Choo & Hong, 2021; Choi, 2022). There are two theories of determinants of government spending such as socioeconomic approach and fiscal capacity approach.

Economists and financial scholar have mainly advocated socioeconomic approach (Son, 1999; Hlaing & Oh & Park, 2021). According to the socioeconomic approach, the amount of government spending is determined by environmental factors surrounding the

	Operating expenses (C=A+B) Year	Personnel expense (A)	Administration expense (B)	Total expenditure (D)
2016	24,124,268	1,319,259	22,805,009	247,488,088
2017	25,734,466	1,364,610	24,369,857	264,781,193
2018	27,460,031	26,045,375	1,414,655	280,331,808
2019	28,964,838	27,520,499	1,444,339	328,405,037
2020	30,483,475	29,137,631	1,345,845	392,531,042

Table 1. Trends in operating expenses in Korean local government

Data source: Local fiscal yearbook (2016-2020)

(unit: million won)

government. Therefore, socioeconomic approach sets socioeconomic variables and population variables as major factors. For this reason, socioeconomic decision theory is also called a demographic model (Son, 1999). The socioeconomic deterministic approach to the amount of government spending began with the study of S. Fabricant in 1952. Fabricant (1952) argued that per capita income, urbanization, and population density determine the amount of government spending in state and local government. Since then, various scholars have added local tax sources, pensions, debt repayment capacity, crime rate, inflation, and legal regulations as factors determining the amount of government spending (Son, 1999; Hlaing & Oh & Park, 2021). Nevertheless, it was confirmed through later research that resident income, degree of urbanization, and population density were the most decisive factors among these major variables (Hwang, 1987; Hlaing & Oh & Park, 2021).

Fiscal capacity approach, which is emphasized by Hofferbert and Sharkansky (1969), states that the amount of government spending is determined by fiscal capacities such as its ability to cover revenues. Accordingly, the most important variable in fiscal capacity approach is fiscal abilities of government sector.

According to fiscal capacity approach, an increase of the amount of own fiscal resources leads to an increase of the amount of total government spending. However, in the case of Korean local governments, there is an argument that the more resources depended on the state leads to the more local social overhead capital in hence; it is expanded and the level of local governments' expenditure (Cha, 1984; Winarna & Widagdo & Setiawan, 2017; Shin & Kim, 2022). Accordingly, fiscal capacity approach includes the amount of its own fiscal resources as well as the amount of its dependent fiscal resources, which means its dependence on the state, as major variables.

Incremental theory holds that the amount of local government spending is determined by decision makers who participate in the budget process such as the parliament and executive agencies (Shin, 2007). In the viewpoint of incremental theory, negotiation and compromise are made in the decision-making process due to the limitations of cost, time, and ability of the decision makers participating in the budget process. Therefore, it is difficult to see a sudden change in the government's expenditure scale, and the current year's expenditure level is determined based on the previous year's expenditure level.

However, it has been pointed out that incremental theory has many methodological problems (LeLoup, 1978). In hence, incremental theory is supplemented by political determination theory such as the new politics of budgetary process Political determination theory emphasizes the importance of political variables in determining the level of government spending (Shin, 2007). Political determination theory is called political party effect model because political variables are mainly related to parties. Political determination theory was advocated by V.O. Key and set competition between parties, voter turnout, partisanship, and conscientious appointment as major variables (Hwang, 1987). According to political determination theory, the amount of government spending, especially in the social welfare sector, is said to be a major determinant of political participation and competition among candidates (Namkoong, 1994).

III. Literature Review

A. Related Research

Most of prior research related to the factors affecting the amount of local government spending has been conducted in social welfare sector. A few studies (Han & Jeong, 1994; Kim, 1993; Hwang, 1987; Shin, 2007; Yang & Choi & Chung, 2021) have conducted empirical analysis on determinants of the amount of local government spending in other sectors.

First, the studies on the determinants of the amount of expenditure in the social welfare sector are as follows. In the case of a study on the determinants of expenditure size in the social welfare field, the results of the independent variable on the dependent variable were very diverse and inconsistent (Choi, 2005). This is because the study on the determinants of expenditure in the social welfare field has the following characteristics. First, the research topic of studies on the determinants of the amount of expenditure in the social welfare field did not target the single topic of welfare policy (Choi, 2005), but the entire redistribution policy of local governments classified as welfare policy according to the policy type (Lee & Kim, 1992; Namkoong, 1994; Son, 1999; Bae, 2000). Second, the types of local governments to be analyzed are different (Lee & Kim, 1992; Han & Jeong, 1994; Kang, 2000; Kim, 2001; Choi, 2022).

Second, studies on the determinants of expenditure size other than social welfare field are followings. Han & Jeong (1994) empirically analyzed factors affecting the amount of expenditure of each Korean local government focusing on the composition of local councils. For doing so, Han & Jeong conducted regression analysis by utilizing the ratio of general administrative expenditure, the ratio of redistribution expenditure, and the ratio of economic sector expenditure as dependent variables, and population density, ruling party, fiscal independence, and the ratio of previous year's expenditure as independent variables. The result shows that local governments including metropolitan city and province had a high ratio of redistribution expenditure and low ratio of regional development expenditures, and that there was no meaningful analysis result in the case of city, county and municipality.

Kim (1993) attempted an empirical analysis using the incremental theory, and it was confirmed that the incremental variable had a more meaningful effect than other environmental variables under the assumption that the previous year's spending amount determines the government's spending scale.

Hwang (1993) conducted a study to derive factors that determine the amount of government spending by using various variables such as income, population, population density, urbanization, education level, and number of civil servants, focusing on socioeconomic factors.

Shin (2007) analyzed the factors determining the level of expenditure by using the settlement date of the general accounting appropriation budget for the local governments. Shin revealed that the expenditure level of the previous year, the population, the number of civil servants, and the grant tax determine the expenditure level.

B. Significance of this Study

This study intends to identify the determinants of local government spending from a deterministic standpoint based on socioeconomic approach based on previous research. On the other hand, this study focuses on the amount of operating expenses in Korean local governments in considering that most prior research has focused on influencing factors to the amount of social welfare expenditures. As mentioned above, it is because that a decrease in the level of public goods and services are related to population growth rate and the size of administrative organization in local governments.

In addition, this study conducts empirical analysis using data from city, county, and municipality. In other words, this study excludes metropolitan city and province as a unit of analysis to prevent errors caused by differences in types of Korean local governments.

IV. Research Hypotheses

A. Political Market Approach

Political market approach is an approach that the amount of expenditure such as operating expenses of local governments is fundamentally determined by market factors such as consumers and suppliers as if market prices are determined by supply and demand in the market (Yoon, 2017).

Political market approach is based on public choice theory. Public choice theory has been defined as "the economic study of non-market decisions, or simply the application of economic methodologies to the study of political phenomena" (Mueller, 2008). Public choice theory is an academic field that economically studies the self-centered economists assumed by rational choice theory to non-market collective decision-making in the public sector.

The political market approach based on public choice appeals that government's action to supply public services is the result of the interaction between consumers and suppliers according to the market principle (Muller, 2008). In other words, the political market approach explains the decision-making process by dividing it into a consumer who is willing to pay and a supplier who determines the quantity supplied in response to the demand of the consumer (Jeong, 2013).

In the viewpoint of political market approach, government plays the role of a major supplier of public goods and services among many types of goods and services (Muller, 2008). Political market approach pays attention to public goods and studies problems related to their production, supply, and consumption. It argues that different organizational or decision-making structures of the government affect the output and consumption of public goods (Jeong, 2013). Therefore, the main purpose of political market approach is to evaluate the various decision-making methods that a decision-making structure can adopt, and to find alternatives that can most effectively reflect the preferences of consumers who are consumers (Yoon, 2017).

In addition, political market approach explores ways to rationalize policy decisions so that the best possible resource allocation alternatives that can improve the interests of consumers, who are consumers, can be selected (Yoon, 2017). The optimal resource allocation decision here is to determine the policy to reach the Pareto optimum, a state in which no one can increase his or her interests without reducing the interests of others (Jeong, 2013). However, rational policy making in political market theory does not rely solely on pure economic theory (Muller, 2008). It uses a political economy approach that emphasizes political and institutional factors influencing the policy-making process (Muller, 2008).

B. Political Market and Budget Execution of Operating Expenses

For a political market approach to the amount of operating expenses in local governments, it is necessary to first look at the factors that affect the amount of operating expenses in local governments (Yoon, 2017). Next, it is necessary to classify the influencing factors into role factors, consuming factors and suppling factors.

As discussed in above political market approach, factors affecting the expenditure size of local governments basically follows the policy determinant theory (Son, 1999). This is because the budget, including the amount of expenditure of local governments is the result of the policy-making process and is a financial statement of the policy direction of local governments (Yoo, 1990; Son, 1999).

Studies on factors affecting local government policy decisions have been conducted in four major aspects (Son, 1999). First is an approach in terms of socioeconomic decision focusing on the environmental factors surrounding local governments (Yoo, 1990). Socioeconomic factor approach has been mainly argued by economists, claiming that the policy decisions of the government, including local governments, are affected by various socioeconomic variables and population variables (Son, 1999). Socioeconomic factor approach began with a study by Fabricant in 1952 (Fabricant, 1952) argued that it is determined by three factors: urbanization, per capita income, and population density (Fabricant, 1952). Since then, much research has been conducted by many scholars, and as a result, various socioeconomic factors such as the size of local tax sources, debt repayment capacity, crime rate, and inflation have been added to the factors determining the size of government fiscal expenditure including local governments (Hwang, 1987; Son, 1999).

Second is that the fiscal capacity of the government sector determines the size of the government's fiscal expenditure. This argument was put forward by Hofferbert and Sharkansky in 1969, and states that the most important factor in determining the size of the fiscal expenditure of the government sector, including local governments, is the fiscal capacity of the government (Hofferbert & Sharkansky, 1969). Fiscal capacity includes fiscal status, fiscal condition, and fiscal structure in local government.

As mentioned above, this study reviews factors affecting the size of the government sector's fiscal expenditure. Next this study is to classify socioeconomic factor and fiscal factors with respect to political market approach for examining influencing factors to the amount of local expenditure, and then this study derives analytical model and research hypothesis for conducting empirical analysis (Yoon, 2017; Hofferbert & Sharkansky, 1969).

C. Demanding Factor

Operating expenses in local governments have the characteristics of operating expenses for organizational operations necessary for local governments to supply public goods and services for residents. It can be said that the use of operating expenses necessary for the supply of public goods and services by local governments is to meet the needs of residents to supply public goods and services. Considering that local governments are using operating expenses to supply public goods and services for residents, consuming factors in operating expenses would be residents.

With respect to political market approach, residents can be characterized by environmental factors surrounding policy-making, that is, socioeconomic factors (Yoon, 2017; Feiock and West, 1993). Previous empirical research has utilized demographic characteristics of residents as main variables (Bahl and Duncombe, 1993; Feiock and West, 1993; Feiock, 2006).

According to previous studies, demographic factors such as resident income, population size and population density, and the proportion of the elderly population affect the amount of local government's fiscal expenditure (Bahl and Duncombe, 1993; Feiock and West, 1993; Feiock, 2006). Some studies show that per capita resident income have a positive (+) relationship with total government expenditures among demographic factors (Bahl and Duncombe, 1993; Eberts and Fox, 1992; Jeong, 2013). In particularly, Jeong (2013) deduces per capita residence tax as an influencing factor to total government expenditure size.

In the case of population size and population density, since economies of scale affect the supply of public goods and services in local governments, the influence on the size of local governments' fiscal expenditures may not be clear (Fabricant, 1952). Nevertheless, there are empirical studies that show that the larger the population, the higher the population density, the larger the local government's fiscal expenditure (Jeong, 2013). In the viewpoint of population size and population density, it is difficult to generalize the results of these studies, because Jeong (2013) showed that only a specific unit of local government had a significant effect on the fiscal expenditure of local governments. Nevertheless, it is meaningful as a study that revealed that the population variable is a significant variable in the size of the fiscal expenditure of local governments.

Unlike population size and population density, there are relatively many empirical studies using the elderly population ratio as a variable. Yoon (2009) found that the higher the proportion of the elderly population, the more the local government's fiscal expenditure continued to increase. Huh (2003) found a statistically significant relationship between the proportion of the elderly population and the size of fiscal spending in a study on local governments in the United States. This significant relationship between the proportion of the elderly population and the size of fiscal expenditure was also proved through empirical studies in the studies of Feiock & Clingermayor (2001) and Ha and Lim (2007). According to Jeong (2003), the relationship between the proportion of the elderly population and the size of fiscal expenditure is highly likely to decrease as the proportion of the elderly population increases as the proportion of the elderly population decreases. In this case, research results show that the local subsidy tax system, which is a local fiscal adjustment system, compensates for insufficient revenue, and does not lead to a decrease in the amount of fiscal expenditure but rather increases the amount of fiscal expenditure (Jeong, 2013).

D. Supplying Factor

Local governments' characteristics that act as suppliers in local governments' expenditure affect the amount of local government's operating expenses. Studies on the determinants of the amount of local government's fiscal expenditure have been mainly focused on the local government's fiscal capacity (Son, 1999).

The study on the relationship between the fiscal capacity in government sector and the size of fiscal expenditure, initiated by Hofferbert and Sharkansky (1969), was also conducted by many scholars. Previous research reveals that fiscal factors of local government mainly affect local governments' expenditure size. (Han and Jeong, 1994; Son, 1999).

In general, fiscal factors of local government include followings. First fiscal factor is fiscal status with respect to how much expenditure is made compared to income. Second fiscal factor is fiscal condition with respect to how much income can be generated and in what way. Third fiscal factor is fiscal structure in terms of expenditure structure. When applied to Korean local governments, it refers to consolidated fiscal balance and current income in terms of fiscal status, the proportion of own and dependent financial resources in terms of fiscal condition, and expenditure structure in terms of fiscal structure. According to Hofferbert and Sharkansky (1969), the most important factor in determining the size of the governments' expenditure is the fiscal condition, which means the size of own financial resources. However, in the case of Korean local governments, as much of their financial resources depend on the state's dependent financial resources, the dependent financial resources should be included (Cha, 1984; Jeong, 2013). In addition to financial condition, as mentioned above, fiscal status and financial structure are also important fiscal factors.

Regarding to discuss fiscal factors of Korean local governments, it is important to consider all fiscal status, fiscal conditions, and fiscal structure (Son, 1999). Therefore, research framework (Figure 1) should include variables which are related to fiscal status, fiscal condition, and fiscal structure to discuss the relationship between fiscal factors and local governments' expenditure size.

Based on the relationship between the demanding side factors, supplying factors and the size of fiscal expenditure such as the operating cost in local governments, research hypotheses operating expenses are followings.

Hypothesis 1-1: Demanding factor (population factor) in local governments would affect the size of local governments' operating expenses.



Figure 1. Research framework

- Hypothesis 1-2: Demanding factor (resident income factor) in local governments would affect the size of local governments' operating expenses.
- **Hypothesis 2-1:** Supplying factors (fiscal status) in local governments would affect the size of local government's operating expenses.
- **Hypothesis 2-2:** Supplying factors (fiscal condition) in local governments would affect the size of local government's operating expenses.
- **Hypothesis 2-3:** Supplying factors (fiscal structure) in local governments would affect the size of local government's operating expenses.

V. Methodology

A. Variables and Measurements

<Table 2> shows variables and measurements of this study. To investigate the factors influencing the spending of operating expenses in local governments, a measure of the size of operating expense is employed as a dependent variable. The size of operating expenses is measured using a ratio of operating expenses to total expenditure and per capita operating expenses. The data are collected from balancing accounts of local governments, specifically focusing on City, County, and Municipality, during FY2016 ~ FY2020.

To examine the factors affecting the size of operating expenses in local government, demanding factor and supplying factor are employed as independent variable. Demanding factor includes population variable and income variable of resident. Supplying factor consists of fiscal status, fiscal condition, and fiscal structure of each local government.

Population variable is measured using population size, population growth rate (average 3-years), and a ratio of elderly population (over 65 old). Population variable data are collected form Statistics Korea. Resident income variable in demanding factor is measured using per capita local tax. In the case of resident income variable, it is appropriate to use per capita income or GRDP (regional gross domestic product). However, per capita income and GRDP do not produced in Korea local governments. In hence, this study employs per capita local tax as a proxy measurement of income variable. Per capita local tax data are collected from local financial information system.

Fiscal status among supplying factors is measured using a ratio of consolidate fiscal balance and a ratio of current income. Consolidate fiscal balance means an index that measures the financial performant and stability of local governments. It indicates a ratio of expenditure to revenue for each year that determines whether fiscal activity results in a surplus. Current income is an index that identifies the current balance and cost structure of local governments. Fiscal condition is measured using a ratio of own financial resources and a ratio of dependent financial resources. A ratio of own source income is an index that measures the ability to procure own income and the stable growth of the finances. A ratio of dependent source income is an index that measures the fiscal dependence of local government finances on the state. Fiscal structure is measured using a ratio of obligatory expenditure and a ratio of business investment. A ratio of obligatory expenditure is calculated by obligatory expenditures to total expenditures of local government. A ratio of business investment is calculated by investment expenditures to total expenditures of local governments. Below tables show variables, measurements, and data sources and descriptive statistics for dependent and independent variables. <Table 3> shows descriptive statistics of variables in this study.

B. Statistical Method

Based on research hypotheses and data structure, time-series cross-section (TSCS) data analysis is used to detect the statistical relationship between the size of local government's operating expenses and local government's characteristics. Analytical model is following,

 $\begin{array}{l} \textit{Operating exepenses}_{ti} \\ &= a + \beta_1 \textit{Demanding factors}_{ti} \\ &+ \beta_2 \textit{Supplying factors}_{ti} \\ &+ \textit{SD}_t + \textit{TDi} + \epsilon_{ti} \end{array}$

Variables		Measurements	Data sources	
Dependent variable				
Ratio of operating expenses		(personnel expense + administration expense) / total expenditures	Local fiscal yearbook (2016-2020)	
Per capita operating expenses		(personnel expense + administration expense) / population	Local fiscal analysis (2016-2020)	
Independent variables				
	Population	Population		
Daman din a		Population growth rate (3-year average)	Statistics Korea	
factor		Over 65 year		
<u>j</u>	Income	Per capita income	Local financial information system	
	Fiscal status	A ratio of consolidate fiscal balance	– Local fiscal analysis (2016-2020) –	
		A ratio of current income		
Supplying	Fiscal condition	A ratio of own source income		
factor		A ratio of dependent source income		
	Fiscal structure	A ratio of obligatory expenditure		
		A ratio of business investment		

Table 2. Variables, measurements, and data sources

Table 3. Descriptive statistics

(unit: won, %) Variables SD Minimum Maximum Mean Dependent variable A ratio of operating expenses (%) 13.69 3.86 6.26 30.84 Per capita operating expenses (won) 714.15 530.48 92.59 3,834,62 Independent variables Population 224,929 221.15 9,077 1,202,628 Population growth rate (%) -0.20 2.07 -6.28 15.40 Demanding factor Over 65 year (%) 20.43 8.12 6.97 41.50 Per capita local tax (won) 550,635 296,985 57,020 2,750,345 A ratio of consolidate fiscal balance (%) 4.99 6.65 39.74 -16.29 A ratio of current income (%) 75.65 20.23 40.14 305.56 A ratio of own source income (%) 11.79 8.45 1.21 45.20 Supplying factor A ratio of dependent source income (%) 29.76 11.91 1.48 72.21 A ratio of obligatory expenditure (%) 63.83 16.02 8.63 148.06 A ratio of business investment (%) 37.27 17.05 0.00 74.27

Above mathematical model, α means fixed effects and demanding and supplying factors indicate independent variables. SD / TD means cross-sectional fixed effect and time proxy variable.

Although there are several analytical options for

TSCS data analysis, this study employs a robust standard error model of a fixed-effect model. A robust standard error model of a fixed effect model is required when the variance of the disturbance is unique to each case, each pair of cases has its own covariance, and the variance has an autocorrelation problem. Ignoring cross-sectional correlation, heteroscedasticity, and autocorrelation in the estimation of the panel model can lead to severely biased statistical results. A robust standard error model of a fixed-effects model corrects for heteroscedasticity, correlated disturbance, and autocorrelations. This study conducted several tests to select the appropriate statistical method of TSCS data analysis. <Table 4> shows the results of testing for the appropriate statistical method.

First, a panel regression model was chosen to explore these variables over time. To determine whether a panel regression model was appropriate, this study included a test for appropriateness of the panel approach using the 'testparm' feature in STATA. The Breusch-Pagan Lagrange multiplier (LM) test was used to judge whether to use the random effects model approach in STATA. The result of the testing for time-fixed effects shows Model 1: F=19.30 Model 2: F=29.12, and these values are statistically significant. The result of the LM test shows Model 1: chi-square = 347.14 Model 2: chi-square = 966.34 and these values are statistically significant. The statistically significant values of testing for fixed effects and the LM test indicate that TSCS data are appropriate for both the fixed effects model and the random effects model in the panel data analysis.

Second, whether the fixed time effect model or random effects model is appropriate was studied using the Hausman test. The Hausman test shows that Model 1: chi-square = 155.58 Model 2: chi-square = 263.96, and these values are statistically significant. The statistically significant value indicates that the model of this study is appropriate for studying as a fixedeffects model.

Third, three panel assumption tests were conducted

Assum	ptions	Re	Decisions			
Model 1 (A ratio of operating expenses)						
Donal magnession on	testparm	F=19.30 (p=0.00)	Fixed effect (0)	Panel regression model		
Panel regression or Pooled OLS	Breusch-Pagan LM	Chi-square = 347.14 (p = $0.00 < 0.05$)	Random effect (0)			
Fixed effect or random effect	Hausman test	Chi-square = 155.58 (p = $0.00 < 0.05$)	Fixed effect (0)	Fixed effect (FE) Model		
	Pesaran CD	-3.41 (p = 0.24 > 0.05)	Cross-sectional independency			
Panel assumptions	Modified Wald	Chi-square = 906.41 (p = $0.00 < 0.05$)	Heteroscedasticity	A robust standard error model		
	Wooldridge test	F = 77.52 (p = 0.00 < 0.05)	First order autocorrelation			
Model 2 (Per capita operating expenses)						
Donal magnession on	testparm	F = 29.12 (p = 0.00)	Fixed effect (0)	Danal magnagian		
Pooled OLS	Breusch-Pagan LM	Chi-square = 966.34 (p = $0.00 < 0.05$)	Random effect (0)	model		
Fixed effect or random effect	Hausman test	Chi-square = 263.96 (p = $0.00 < 0.05$)	Fixed effect (0)	Fixed effect (FE) Model		
	Pesaran CD	-3.25 (p = 0.17 > 0.05)	Cross-sectional independency	A robust standard error model		
Panel assumptions	Modified Wald	Chi-square = 285.34 (p = $0.00 < 0.05$)	Heteroscedasticity			
	Wooldridge test	F = 97.21 (p = 0.00 < 0.05)	First order autocorrelation			

Table 4. Results of panel assumption tests

to detect whether this study's panel data set satisfies the assumptions regarding panel data. If a panel data set violates these assumptions, the panel data set should be analyzed using a robust standard error model approach. The assumptions included homoscedasticity, cross-sectional independence, and no-autocorrelation. This study tested for cross-sectional independence, homoscedasticity, and autocorrelation using the Pesaran CD (Cross-sectional Dependence) test, the Modified Wald test, and Wooldridge test for autocorrelation. The Pesaran CD test shows that Model 1: the Pesaran CD = -3.41 Model 2: the Pesaran CD = -3.25, and these values are not statically significant. This means that there is cross-sectional independence in the panel data set. The Modified Wald test shows that Model 1: chi-square = 906.41 Model 2: chi-square = 285.34, and these values are statistically significant. The statistically significant value means that there is a heteroscedasticity problem. The Wooldridge test shows that Model 1: F =77.52 Model 2: F = 97.21, and these values are statistically significant. The statistically significant value means that there is autocorrelation in the panel data. In short, the model of this study did not satisfy the three assumptions and needed to be studied using a robust standard error model.

C. Statistical Results

<Table 5> presents the result of a robust standard error model of a fixed-effects model in a TSCS data analysis using population, income, fiscal status, fiscal condition, and fiscal structure of local governments.

In Model 1, the R^2 in the panel regression model is 0.82 and significant at the 99% level. As the R^2 statistic shows, the explained variance of the panel regression model of affecting factors the size of operating expenses using a ratio of operating expenses to total expenditures as a dependent variable and population, income, fiscal status, fiscal condition, and fiscal structure as independent variables is 82%. In Model 2, the R^2 in the panel regression model is 0.99 and significant at the 99% level. As the R^2 statistic shows, the explained variance of the panel regression model of affecting factors the size of operating expenses using per capita operating expenses as a dependent variable and population, income, fiscal status, fiscal condition, and fiscal structure as independent

Variables		Model 1 (a ratio of operating expenses)		Model 2 (per capita operating expenses)			
		coef.	std. error	z	coef.	std. error	z
Demanding factors	ln pop	-3.89	0.44	-8.87***	-0.46	0.04	-10.99***
	Pop growth (%)	-0.14	0.04	-3.26***	-0.01	0.00	-2.12**
	Over 65 year (%)	-0.03	0.03	-0.89	0.01	0.00	2.59**
	In local tax (won)	-4.21	0.61	-6.85***	0.37	0.04	8.92**
	consolidate fiscal balance (%)	0.03	0.01	2.58**	0.00	0.00	-1.89
	current income (%)	0.01	0.01	1.64	0.00	0.00	0.32
Supplying	own source income (%)	0.49	0.06	8.43***	-0.01	0.00	-2.74**
factors	dependent source income (%)	0.14	0.03	4.28***	0.01	0.00	4.01***
	obligatory expenditure (%)	0.03	0.01	4.26***	0.00	0.00	-0.51
	business investment (%)	-0.13	0.03	-5.12***	0.00	0.00	-3.80***
		Number of observations = 1130 Number of groups = 226 $B^2 = 0.82$		Number of observations = 1130 Number of groups = 226 $R^2 = 0.99$			

Table 5. A robust panel regression analysis result

Note: Population and per capita local tax are transformed by natural logarithm *p<0.10, **p<0.05, ***p<0.01

Analytical results are follows. With respect to demanding factor, the result shows that population size, population growth rate, a ratio of elderly population, and per capita local tax has Impacts on the size of operating expenses of local governments. In detail, population size, population growth rate, and per capita local tax influence a ratio of operating expenses to total expenditures, on the other hand; population size, population growth rate, and per capita local tax influence per capita operating expenses.

In specific, first, population size has a negative (-) impact on a ratio of operating expenses to total expenditures. It means that an increase in population size of local governments lead to a decrease on a ratio of operating expenses to total expenditures. Also, statistical result shows that an increase on population size leads to a decrease in per capita operating expenses of local governments. Second, population growth rate has a negative (-) impact on the ratio of operating expenses to total expenditures and per capita operating expenses. It means that an increase in population growth rate leads to a decrease in a ratio of operating expenses to total expenditures and per capita operating expenses. Third, a ratio of elderly population has a positive impact (+) on per capita operating expenses. This result means that an increase in a ratio of elderly population leads to an increase in per capita operating expenses of local governments. Fourth, per capita local tax of local governments has a negative impact (-) on a ratio of operating expenses to total expenditures of local governments. It means that an increase in per capita local tax leads to a decrease in the ratio of operating expenses to total expenditures. On the other hand, per capita local tax of local governments has a positive impact (+) on per capita operating expenses. It indicates that an increase in per capita local tax leads to an increase in per capita operating expenses of local governments.

With respect to supplying factor, the result shows that a ratio of consolidate fiscal balance, a ratio of own source income, a ratio of dependent source income, a ratio of obligatory expenditures, and business investment expenditures influence the size of operating expenses of local governments. In detail, a ratio of own source income, a ratio of dependent source income, and a ratio of business investment expenditure have impacts on both a ratio of operating expenses to total expenditures and per capita operating expenses. On the other hand, a ratio of consolidate fiscal balance and a ratio of obligatory expenditures have impacts on a ratio of operating expenses to total expenditures of local governments.

Specifically, first, a ratio of consolidate fiscal balance has a positive influence (+) on a ratio of operating expenses to total expenditures of local governments. It indicates that an increase in a ratio of consolidate fiscal balance leads to an increase in a ratio of operating expenses to total expenditures. Second, a ratio of own source income has a positive impact (+) on a ratio of operating expenses to total expenditures, which means increasing a ratio of own source income of local governments leads to increasing a ratio of operating expenses to total expenditures. On the other hand, a ratio of own source income has a negative impact (-) per capita operating expenses. It means that an increase in a ratio of own source income leads to a decrease in per capita operating expenses of local governments. Third, a ratio of dependent source income has a positive impact (+) on both a ratio of operating expenses to total expenditures and per capita operating expenses. It means that an increase in a ratio of own source income leads to both an increase in a ratio of own source income to total expenditures and per capita operating expenses of local governments. Fourth, a ratio of obligatory expenditures to total expenditures has a positive impact (+) on a ratio of operating expenses to total expenditures which means increasing a ratio of obligatory expenditures to total expenditures leads to a ratio of operating expenses to total expenditures of local governments. Fifth, a ratio of business investment expenditures to total expenditures has a negative impact (-) on per capita operating expenses. It indicates that an increase in a ratio of business investment expenditures to total expenditures leads to a decrease in a ratio of operating expenses to total expenditures of local governments.

VI. Conclusion

A. Discussion

With respect to factors affecting a size of operating expenses in Korean local governments, this study revealed that demanding factor and supplying factor have impacts on the size of operating expenses measured by a ratio of operating expenses to total expenditures and per capita operating expenses in Korean local governments.

Not surprisingly, a major finding of this study shows that the size of operating expenses in local governments is influenced by local characteristics such as population, income, and fiscal characteristics. However, the result of the study shows that demanding factor and supplying factor have same impacts on both a ratio of operating expenses to total expenditures and per capita operating expenses. Some variables influence both a ratio of operating expenses to total expenditures and per capita operating expenses; on the other hand, others influence a ratio operating expenses to total expenditure or per capita operating expenses.

First of all, results regarding demanding factor are followings. First, population size and population growth rate have negative impacts on a ratio of operating expenses to total expenditures in local governments. It indicates that increases in population size and population growth rate lead to decreases in a ratio of operating expenses to total expenditures. This is apparently because local governments with large population size and high population growth rate tend to expanding total expenditure size; in hence, a large size of total expenditures result in decreasing a ratio of operating expenses to total expenditures. Also, population size and population growth rate influence negatively per capita operating expenses, which means local governments with large population size and high population growth rate have a large size of per capita operating expenses. Above results regarding population variables indicate that a size of operating expense does not related to population size of local governments, moreover, it is because that even local governments with small population

size have operating expenses above a certain level.

Second, a ratio of elderly population influences negatively per capita operating expenses. It indicates that local governments with a high ratio of elderly population spend relatively more operating expenses. It is because that local governments with a high ratio of elderly population tend to demand for more administrative and welfare services.

Third, per capita local tax which means income level of local governments influences negatively a ratio of operating expenses to total expenditures; on the other hand, per capita local tax has a positive impact on per capita operating expenses. It means that the more income level of local governments the less a ratio of operating expenses to total expenditures in contrast the more per capita operating expenses. In general, local governments with a high-income level would have a large total expenditure size; in hence, a large total expenditure size leads to a relatively low ratio of operating expenses to total expenditures. On the other hand, local governments with a highincome level spend more operating expenses because of a high demand for organizational operations.

Next, results regarding supplying factor are followings. First, a ratio of consolidate fiscal balance influences positively a ratio of operating expenses to total expenditures. This result means that a higher ratio of consolidate fiscal balance leads to a large size of operating expenses in local governments. It is because that a financial resource for operating expenses comes from local tax and local subsidy tax which consist of consolidate financial income.

Second, a ratio of own source income has a positive impact on a ratio of operating expenses to total expenditures and has a negative impact on per capita operating expenses. In contrast, a ratio of dependent source income has positive impacts on both a ratio of operating expenses to total expenditures and per capita operating expenses. It seems to be due to local subsidy tax. Local subsidy tax is the system that makes up for insufficient resources of local governments using standard financial income comparing to standard financial demand. In other words, local subsidy tax makes up insufficient resources especially operating size of operating expenses. As a result, local governments with relatively sufficient financial resources due to a high ratio of own source income have a small size of operating expenses; on the other hand, local government with a high ratio of dependent source income tends to more spend operating expenses.

Third, a ratio of obligatory expenditures influences positively a ratio of operating expenses to total expenditures; on the other hands, a ratio of business investment has a negative impact on a ratio of operating expense to total expenditures and per capita operating expenses. It seems that operating expenses of local governments classify to obligatory expenditures in terms of Local government budgeting and operating standards. Also, an increase in a ratio of business investment in local governments leads to decreases in a ratio of operating expenses such as administration operating expense.

B. Implications

The findings of this study have implications for both theoretical and practical implications. The research findings from empirical analysis contribute to the theory related to local decisions about budget execution in operating expenses with respect to political market approach, as well as fiscal implications of budget execution rates in operating expenses. The research findings also have implications for financial officials in making fiscal policy.

The findings of this study have the following theoretical implications. With respect to factors affecting budget execution rate in local governments, this study reveals that population variables are negatively related to a size of operating expenses in local governments. In general, private sectors with a small size spend little operating expenses; in contrast, private sectors with a large size have large size of operating expenses. In case of public sector, specifically local government; however, local governments with a small population size and low population growth rate spend more operating expenses rather than local governments with a large population size and high population growth rate.

It seems that operating expenses in Korean local government do not associated with a local government's size measuring population size and population growth rate. It is supported to the analytical results such as a negative relationship between a ratio of own source income and per capita operating expenses and a positive relationship between a ratio of dependent source income and a size of operating expenses.

In other words, Korean local governments do not cover operating expenses from own source income such as local tax revenue but dependent source income such as local subsidy tax. Moreover, a dependent source income calculation process does not properly reflect population variables such as population size and population growth rate.

This study provides practical implications for local financial officials. First, the finding of this study indicates that demands for public goods and services would be associated with demanding size such as population, local government's organization size, and operating expense size. Also, as seen above analytical results, this study reveals that population variables and fiscal variables do not explain a size of operating expenses of Korean local governments. Rather, the analytical result shows that local governments with a small population and fiscal size spend more operating expenses. Therefore, this study suggests that local financial officials should pay more attention to improving efficiency of organizational operation of local governments.

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