Policy Report 2019-12

Analysis of the Effects of Financing Methods on Social Expenditures

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【Publications】
The policy directions for appropriate health expenditure through health care supply redesign, Korea institute for Health and Social Affairs (KIHASA), 2015(co-author)

The lifestyle-related diseases reduction strategy: Pathway analysis of health perception-health behavior-health status, Korea institute for Health and Social Affairs (KIHASA), 2014(co-author)

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http://www.kihasa.re.kr
ISBN: 978-89-6827-599-9 93330

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Abstract

According to OECD statistics, South Korea has the highest old-age poverty rate among OECD countries. This is the result of population's unprecedentedly rapid aging, caused by low fertility and increasing longevity. And this situation is expected to persist for the foreseeable future.

In an effort to eradicate poverty, the government of South Korea is rapidly increasing social expenditures, while giving little consideration to how it will finance such increases. From policy-makers' perspective, the method of financing a given social expenditure must be considered in the planning stage of social policy.

We analyzed the simultaneous effects of social expenditures and financing method based on a single computable general equilibrium (CGE) modeling framework. The advantage of employing this analysis tool is that it can consider intermediate inputs in the production process, inter-relationships among economic institutions, and heterogeneity of households. If our main concern is growth and distribution, household heterogeneity is especially important.

The findings of this study can be summarized as follows. First, for a given amount of social expenditures, collecting corporate taxes is less damaging to the economy as a whole, especially in terms of growth, employment, and income redistribution. On

the contrary, taxing the household sector directly causes a relatively severe loss of economic efficiency. The decrease in disposable income caused by this tax increase negatively affects household consumption and savings, although the increase in social expenditures shows no significant positive effects on the national economy. Between these two approaches, there is an alternative financing scheme that combines corporate and household income tax increases. It should be emphasized that careful attention should be given to increasing the efficiency of social expenditures. Furthermore, the target of social expenditure policy must be investigated carefully in order to avoid ineffectiveness in social policy.

Establishing a link between the macroeconomics of the CGE model and the micro-simulation part of individual household behavior should prove useful for future research, because we have so far failed to find a close link between micro and macro behavioral relationships.

I Introduction

1. Research Background and Purpose
2. Research Content and Method

I Introduction

1. Research Background and Purpose

(1) Research Background

Along with low birth rates and population aging, old-age income security is one of the most pressing policy issues in South Korea today. Nevertheless, the question of how the Korean government might most efficiently finance the dramatic increases in social expenditures required to address the issue has not garnered much attention from researchers. Now that the birth rates are plummeting and the population of Korea is aging rapidly, old-age income insecurity presents by far the greatest threat to societal stability.

This study was inspired by the need to address this pressing social problem by presenting a single framework analysis for examining both social expenditures and the financing thereof.

Governments finance their spending programs mainly in two ways: by increasing tax revenue, on the one hand, and by increasing borrowing (public debt), on the other. The choice of one over the other can exert profoundly different impacts on the national economy. policy-makers who choose increasing tax revenue are also faced with the question of which types of taxes are to be raised, such as direct or indirect taxes and in-

come or corporate taxes. Even if policy-makers decide to raise one particular type of tax, say, income tax, they must still decide whose income tax—that of the wealthiest class or that of all income classes—are to be raised in light of the interests at stake and foreseeable socioeconomic ripple effects.

How social security benefits, such as the National Pension and National Health Insurance, are to be financed also matters significantly to the national economy. There is thus a broad consensus on the need for research on how to properly finance these programs. Yet there is a conspicuous dearth of studies that attempt to examine the structure of financing and social expenditures together.

(2) Research Purpose

Although the rapid aging of the Korean population is bound to lead to continuous increases in governmental spending on welfare, no study has been attempted so far to analyze the best ways of financing such expenditures in light of the possible effects of diverse available means of financing. The transformation of the Korean industrial structure continues to decrease the demand for labor, while the changing income structure of Korean households will eventually change how welfare and social programs are financed, exerting different effects on income inequality and polarization.

The main objective of this study is to compare and analyze the possible effects of different methods of financing given levels of social expenditures. A computable general equilibrium (CGE) model is employed to seek out policy financing methods capable of minimizing likely losses to social welfare and also render a comparative analysis of the long- and short-run socioeconomic effects.

2. Research Content and Method

(1) Research Content

This study is in a continuum with earlier studies in a similar vein, such as the analysis of the effects of introducing a basic old-age pension and analysis of the effects of raising the retirement age. This study, however, departs from these earlier studies in that it explicitly considers the methods of financing government programs in its model of analysis, along with government revenue and spending, so as to produce more applicable policy implications. To this end, I first survey the existing literature on the theories and empirical analyses of policy financing methods and their effects. I summarize the existing findings to set up new scenarios necessary for the simulated analysis attempted herein. After identifying the implications and shortcomings of the methods employed in earlier studies, I highlight the uniqueness of the model of analysis used in this study.

I then compare the socioeconomic effects of welfare programs based on the differences in the financing methods, with a view to examining the short- and long-run effects of social expenditures. Financing options are analyzed in terms of the possible effects they might have on the Korean economy and society so as to identify options or combinations thereof capable of minimizing losses to social welfare.

(2) Research Methodology

A CGE model is used to analyze the socioeconomic effects of different financing methods for given levels of social expenditures. The rate of population aging is also included in the model to allow for the comparative analysis of the long-run socioeconomic effects of demographic factors, such as the birth rates. The possible effects of different financing methods are subjected to dynamic simulated analyses, with a focus on the short- and long-run effects on economic growth, employment, and income distribution.

The rest of this study is structured as follows. Section 2 provides a review of the existing literature and summarizes how this study distinguishes itself, while Section 3 introduces the model and database used in the analysis. Section 4 presents the findings of the empirical analysis, and Section 5 provides a summary of the research findings and policy implications.

II

Theoretical Background

1. Literature Review
2. Points of Departure

II Theoretical Background

1. Literature Review

Kim and Kim (2010) analyzes the economic ripple effects of lowering corporate taxes. The authors specifically introduce three possible policy scenarios into their analysis of data from 2008 using a dynamic CGE model. Scenario 1 envisions lowering all tax rates by five percentage points; Scenario 2, lowering tax rates by the same margin but phase by phase over a two-year period; and Scenario 3, lowering tax rates by one percentage point per year over a five-year period. The authors demonstrate that Scenario 1 would have the greatest effect on promoting investment in the short term, while all three scenarios are found to increase investment in the long term. The authors also confirm that Scenario 1 would have the greatest effect on capital. They conclude that lowering corporate taxes would improve income distribution and also better adhere to other key economic principles, such as efficiency and equity. They stress that reducing government spending is a key precondition for maximizing the beneficial effect of corporate tax cuts.

Kim (2010) employs a general equilibrium model of a Harberger-Shoven-Whalley type to analyze how raising different types of taxes in Korea would affect the tax incidence and welfare of different types of economic actors. The author finds

that raising value-added tax (VAT) rates is relatively more regressive in effect than raising either income taxes or corporate taxes, but the presence of tax exemptions for daily essentials and so forth minimizes the negative effects, particularly on income redistribution. To strengthen protection for the poor and improve income redistribution, however, the author recommends expanding direct and selective financial supports for low-income groups as a more effective and less regressive alternative than adjusting tax rates. Strictly in terms of the effects of adjusting tax rates, the author nonetheless concludes that raising the VAT and lowering corporate taxes are the two most cost-effective options. The author also emphasizes that, where social equity and income redistribution are the main policy objectives, adjusting income tax rates across the board without considering the need for tax progressivity requires greater caution than adjusting other types of taxes, such as corporate taxes and VATs.

Cho and Oh (2012) explore whether the distribution-prioritizing tax policy would slow the pace of economic growth and reduce available jobs, thus contributing to the deterioration of income inequality. Assuming that the best form of welfare is creating jobs, the authors examine decisive factors of employment and how corporate taxes affect employment and search for policy alternatives through which more jobs can be created. Their analysis shows that the wage elasticity of employment is

-0.159; the elasticity of substitution is 0.398; and the output elasticity is 1.130. They thus confirm that economic growth exerts an overwhelming effect on job creation than other factors. The authors also find that lowering corporate taxes promotes economic growth, and economic growth promotes job creation. Specifically, they find that a one-percent decrease in corporate taxes increases employment by 0.18 percent. Raising corporate taxes, on the other hand, is shown to hamper investment and slow down production, ultimately reducing employment. Decreases in jobs, in turn, affects low-wage workers most adversely and undermines income distribution.

Cho (2015) uses a CGE model to examine the distribution of tax burdens under higher corporate tax rates. The author concludes that consumers, workers, and capital owners are responsible for 30 percent, 20 percent, and 50 percent, respectively, of corporate taxes. Raising corporate taxes also affects the market income (earned income plus property income) of different income classes differently. Whereas it reduces income for the poorest (Decile 1) by 0.93 percent, it also reduces income for the richest (Decile 10) by 0.5 percent. Raising corporate taxes, moreover, raises the Gini coefficient by 0.01 to 0.047 percent, worsening income distribution. An examination of the corporate tax burden on small and large shareholders also shows that the latter's tax burden is 1.4 to 1.8 percentage points lower than the former's. In other words, financing social

welfare programs by raising corporate taxes even more is shown to increase the relative burden on the working class.

Ahn, et al. (2009) found that lowering corporate taxes by five percent leads to the generation of KRW 7.8 trillion in consumer and producer surpluses. Specifically, 75 percent of the surpluses is accrued in capital and 25 percent in labor. Increases in operating surpluses are also shown to increase reinvestment. As for whether corporate tax cuts compromise the principle of equity, the authors conclude that the adverse effect of lower corporate taxes on income distribution is not proportional to the extent of the tax cuts, and that such effect could be offset by increasing direct fiscal support for the poor. Lowering corporate taxes is shown to raise the Gini coefficient by 0.192 percent, which the authors believe can be corrected through additional fiscal spending. They agree with earlier studies that lowering corporate taxes would ultimately promote capital accumulation and economic growth by increasing investment.

Kim (2006) also uses a CGE model to analyze the effects of corporate tax reforms on tax incidence. Specifically, Kim looks at the distribution of corporate tax burdens by industry and sector. His is one of the few studies in Korea that examines the effect of corporate taxes on tax incidence. The greater the elasticity of the substitution of labor and capital, the more favorable the corporate tax cuts to capital. Given an elasticity of 0.8, labor takes KRW 0.22 trillion, while capital takes KRW 1.93

trillion. The benefits of lower corporate taxes are thus concentrated in higher-income groups that generate more of their income from capital than from labor.

2. Points of Departure

The purpose of this study is to compare and analyze the effects of different methods of financing social expenditures by establishing a dynamic CGE model based on the latest data available.

To that end, a database has been established using the most recent data based on the 2008 System of National Accounts, an international standard recently adopted in Korea. The resulting dynamic CGE model is used to compare and analyze the likely ripple effects of different financing methods for the given levels of social expenditure. In setting up the database, a number of problems particular to Korean data emerged. It was thus critical to build the database using a method that minimizes distortion. The model of analysis itself has been designed with wider applications in mind, meaning that it can be expanded and improved to support the analysis of other diverse policy effects.

This study departs from the existing literature in that it compares and analyzes the effects of raising different types of taxes —indirect, personal income, and corporate—to finance given

levels of social expenditure. Another distinctive feature is that this study breaks the household sector down into more refined categories. The resulting CGE-MS model supports systematic analysis of the micro-level effects of macroeconomic policy.

III Methodology

1. Input-Output Tables and Social Account Matrix
2. ORANI Database

III Methodology

1. Input-Output Tables and Social Account Matrix

The macroeconomic social account matrices (SAM) in Korea have, so far, largely been based upon two sources of data, i.e., the input-output tables and the National Accounts. The input-output tables provide information on the processes by which productive activities generate income, while the National Accounts provide information on how income is distributed among labor- and capital-providing economic actors. In this study, supply-use tables are used in place of input-output tables to create a SAM. Input-output tables assume that each industry produces only one type of commodity, and therefore do not adequately reflect the complex economic reality. On the other hand, supply-use tables distinguish between commodities and productive activities and are therefore better suited to ensuring the coherence of National Account statistics. Moreover, combining supply and use tables can generate input coefficients provided by input-output tables. How the specific SAM used for this study was created is explained below, in relation to each source of data and according to the SAM guideline provided by Roh and Nam (2006).

2. ORANI Database

(1) ORANI Database and Macro-Level SAM

An economic analysis using a CGE model must be preceded by the creation of an appropriate database. An ORANI database must include the items of transaction, profit margins, and taxes applied to the basic prices indicated in the input-output tables, and distinguish them in terms of domestic goods and imported goods. Moreover, the basic price table must include matrices on compensation for production factors as well as domestic and international demands for the output. Figure 3-4 provides such information, with Figure 3-1 listing all their components.

The first three matrices in the database are absorption matrices; the next five, production matrices; and the remaining two, satellite matrices, i.e., the joint production matrix and the tariff matrix.

The columns of the absorption matrices are indicated with numbers from zero to six, as follows:

1. Domestic producers divided into an i-number of industries;
2. Investors divided into an i-number of industries;
3. Household consumption (representative consumer);

4. International buyers (exports);
5. Government consumption;
6. Stock change;
0. Sum of columns 1 to 6.

The first row of columns V1BAS to V6BAS indicate the direct flows of all goods, whether domestic or imported, that are distributed to users in terms of basic prices. V1BAS represents the size of commodity "c" (domestic and imported combined) that is entered into industry "i" through the production process in the current year. V2BAS represents the size of commodity c (domestic and imported combined) that is entered into industry i for capital formation. V3BAS indicates the composition of domestic and imported goods purchased for household consumption.

V4BAS represents the vector of exports by commodity type. Korean input-output (inter-industry relation) tables indicate only the exports of domestic commodities. In other words, imported commodities are not re-exported unless they are further processed into other commodities in Korea. Accordingly, among the sources of Korean exports, imports are always marked with zero. V5BAS represents government spending. V6BAS represents the vector of change in inventory stocks by source or commodity.

A basic price is the buyer's price that the user paid to pur-

chase a commodity, with the profit margin and VAT subtracted. It refers to the portion of the buyer's price that the producer actually receives. Basic prices of imported goods include tariffs, which are paid at the port of entry so that they can be indicated as "prices at the point of import." Basic prices do not include the sales tax and profit margins. Let us assume that the same basic price applies to all users. The sum of the columns along a row represents the total direct use of the given commodity. The direct flow of all basic prices, except for stock changes, must never be negative (-).

Columns V1MAR to V5MAR on the second row indicate profit margins that facilitate the distribution of commodities from V1BAS to V5BAS. V1MAR and V2MAR are matrices with four dimensions each, and represent the margin service "m" that facilitates the distribution of commodity "c" from source "s" to industry "i". V3MAR and V5MAR indicate flows in the three-dimension matrices of households and government that facilitate the flow of commodity c from source s to industry i. V4MAR is a two-dimensional matrix representing margin service facilitating the exports of commodity c. There are commodities that do not require such margin services; such commodities either lack margin indications or are marked with zero for margins. Examples include services and inventories. Inventories (stocks) refer to commodities that have been produced but not sold.

Columns V1TAX to V5TAX on the third row are tax matrices.

They represent the taxes that are levied when the commodities from each source reach each user. Positive values indicate taxation, while negative values indicate subsidization. V1TAX and V2TAX, for example, represent the taxes levied on domestic and imported commodities that are entered, respectively, into the production process and capital formation. V3TAX and V5TAX represent the taxes levied on domestic and imported commodities that are distributed to households and the government for consumption, while V4TAX represents taxes levied on exported goods. V6TAX represents taxes on stocks, but are either zero in relation to all commodities or even omitted because it is uncustomary for the state to tax inventories.

The fourth and fifth rows indicate original factors that are used in productive activities. The three factors included are compensation for employees for the labor they provide, operating surpluses as compensation for capital, and depreciation. Labor is represented by a two-dimensional matrix because it includes information on not only industries, but also occupations (skill levels). V1CAP and V1LND represent rents on capital and compensation for land, respectively, in each industry. Each industry or producer pays the necessary taxes for operation, such as license and registration fees, which are referred to collectively as the production tax. V1OCT includes all costs of production not included in the preceding matrices. These include the opportunity costs of liquidity and costs of holding

stocks. As these costs pertain to production, they are not defined in relation to fixed capital formation, household and government consumption, exports, or stocks.

The ORANI database includes two satellite matrices. One is a joint production (MAKE) matrix, while the other is a tariff matrix.

The MAKE matrix evaluates commodity c produced by industry i in terms of its basic price. There are typically two types of MAKE matrixes. One has values indicated along only one diagonal line, which is the case for an industry that produces only a single type of commodity. The other shows values other than zero along not only the main diagonal line, but also other lines, indicating either an industry that produces multiple types of commodities or one type of commodity produced by multiple industries. The supply table based on the 2008 SNA is an example of the latter.

The tariff matrix indicates the scale of tariffs levied on each imported commodity. This matrix is produced separately from the absorption matrices because the revenue from tariffs is already accounted for in the revenue indicated as the basic price. In other words, the first row of the database evaluates the given commodity using its basic price that includes the tariff applied to it. The tariff is accounted for separately because it is necessary to estimate tax rates using the tax bases and amounts of tariffs levied and incorporate those rates into our model.

The database so established must satisfy “costs equal sales.” The total cost, i.e., the sum of all columns along a given row, must equal the total sales, i.e., the sum of all rows along a given column.

Domestic output must also equal total use. The use of a commodity without profit margins (i.e., the sum of all users along the first row) must be sum(I,IND) MAKE (c,i), i.e., equal to MAKE_I. As for a commodity with profit margins, the use of margin service m must equal the total use of margins, to which the sum of all direct use of m (i.e., the sum of the first row) is added. The values indicated in all matrices, except for the tax and stock matrices, must be non-negative.

[Figure 3-1] ORANI Database Structure

		Absorption Matrix					
		1	2	3	4	5	6
		Producers	Investors	Households	Exports	Government	Stock change
		← I →	← I →	← 1 →	← 1 →	← 1 →	← 1 →
Basic price	↑ C×S ↓	V1BAS	V2BAS	V3BAS	V4BAS	V5BAS	V6BAS
Taxes	↑ C×S ↓	V1TAX	V2TAX	V3TAX	V4TAX	V5TAX	
Labor	↑ O ↓	V1LAB	C = type of commodity (domestic or imported) I = type of industry S = domestic and imported materials O = occupation (skilled or unskilled) - The investment taxes (V2TAX) and indirect taxes included in the stock are assigned a value of zero so that the indirect taxes are reflected in the basic prices. - Both the export tax (V4TAX) and government spending tax (V5TAX) in Korea have a value of zero.				
Capital	↑ 1 ↓	V1CAP					
Other production tax	↑ 1 ↓	V1PTX					
Other cost	↑ 1 ↓	V1OCT					

	Joint production matrix
Type	← I →
↑ C ↓	MAKE

	Tariff matrix
Type	← 1 →
↑ C ↓	V0TAR

Source: Nam, Moon, and Lee (2012), p. 260.

One problem that emerges from processing Korean data in this way is that correcting for scrap materials changes some of the flow variables in relation to intermediate materials and private consumption to negative values. This problem is particularly common with respect to primary metals. It occurs when the scrap material has a greater value than the input. The intermediate material and final demand matrices were thus balanced, and the resulting adjusted values were used as basic data.

First, input-output or supply-use tables and SNA data are together used to determine the control variables of the macroeconomic SAM. Next, each variable must be expanded into a matrix and a vector. Using categories, we may expand the values for intermediate material demand and domestic supply into 30-by-30 matrices, while expanding the values for employee compensation and operating surpluses into a 30-by-1 or 1-by-30 matrix.

〈Table 3-1〉 Korean ORANI Database (2014)

(Unit: KRW 1 trillion)

		1	2	3	4	5	6	0
		Production	Fixed investment	Household consumption	Exports	Government consumption	Stock change	Total
	Size	I	I	1	1	1	1	1
Basic transactions	C×S	V1BAS	V2BAS	V3BAS	V4BAS	V5BAS	V6BAS	V0BAS
	Sum	2,263.9	402.4	693.6	751.8	224.7	1,541.3	4,331.7
	Domestic	1,720.2	344.1	628.9	751.8	224.7	-352.9	3,658.0
	Imported	543.7	58.2	64.7	0.0	0.0	1,894.2	673.7
Indirect taxes	C×S	V1TAX	V2TAX	V3TAX	V4TAX	V5TAX	V6TAX	V0TAX
	Sum	46.3	33.7	51.0	0.0	0.0	0.0	131.0
	Domestic	35.5	31.0	45.0	0.0	0.0	0.0	111.5
	Imported	10.8	2.7	6.0	0.0	0.0	0.0	19.6
Labor	O	V1LAB						
	Sum	661.4						
	Skilled	661.4						
	Unskilled	0						
Capital	1	V1CAP						
		676.7						
Land	1	V1LND						
		0						
Production taxes	1	V1PTX						
		16.7						
Other costs	1	V1OCT						
		-7.0						
Total	1	3,658.0						

	Joint production
Size	I
C	MAKE
	3,658.0

	Tariff
Size	1
C	V0TAR
	10.2

Note: The wholesale, retail, and transportation margins are included in the basic prices.
Source: based upon Input-Output Table (2014).

Input-output tables indicate buyers' prices, producers' prices, and basic prices. Depending on the research objective, the correlation among these prices may have to be included in the SAM. The profit margin, which amounts to the difference be-

tween the buyer's price and producer's price, is subdivided into wholesale and retail margins and transportation margins. The Korean input-output table practice is to assume that there are no wholesale/retail and transportation margins on imported commodities. We therefore need to estimate the wholesale/retail and transportation margins of imported commodities by referring to the ratios of domestic and imported commodities, and include them in our SAM. As these margins indicate the transactions between transportation industries (overland and maritime transportation, warehousing, etc.), wholesale and retail distributors, and other commodities, the margin for each commodity must equal zero.

(2) Micro-SAM

The difference between the producer's price and basic price consists of the net product tax and the value of scrap materials. Each of these factors is included in the micro-SAM as a matrix. Private fixed capital formation and government fixed capital formation, in the form of vectors, are converted into matrices. As the 2008 SNA altered the structure of input-output tables in Korea and merged the import commodity taxes and tariffs into a single category of imported output taxes, it has become necessary for us to distinguish between tariffs and import taxes by referencing available materials.

Since 2010, input-output tables have consisted of 30 large-group, 82 medium-group, 161 small-group, and 382 basic-group classifications of commodities. This study uses 30 large-group classification. The lower we move down this hierarchy of categories, the better able we become to include the detailed characteristics of each commodity in our model, but the harder it becomes for us to find additional data necessary for our analysis. This is the reason for our choice of divisions as the level of analysis.

〈Table 3-2〉 Macro-SAM for Korea (2014)

(Units: KRW 1 trillion, percentage)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
SAM	Firms	DomCom	ImpCom	Labor	Capital	ProdTax	ComTax	Tariff	DirTax	HouH.	Enterp.	GovCur	GovInv	PrvInv	Stocks	ROW	Total
Firms	0	3524.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3524.3
DomCom	1598.5	0.0	0	0	0	0	0	0	0	670.9	0	183.0	3.5	278.8	-0.4	789.9	3524.3
ImpCom	491.9	0.0	0	0	0	0	0	0	0	70.0	0	0	1.2	59.8	1.9	0	624.7
Labor	698.3	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	698.3
Capital	661.2	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	661.2
ProdTax	17.2	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17.2
ComTax	57.3	0.0	0	0	0	0	0	0	0	58.7	0	0	0.2	27.6	0	0	143.8
Tariff	0	0	10.1	0	0	0	0	0	0	0	0	0	0	0	0	0	10.1
DirTax	0	0	0	0	0	0	0	0	0	65.7	47.2	0	0	0	0	0	112.9
Houhold	0	0	0	698.3	120.4	0	0	0	0	0	48.5	75.4	0	0	0	6.7	949.3
Enterpr.	0	0	0	0	540.8	0	0	0	0	7.1	0	0	0	0	0	2.1	549.9
GovCurr	0	0	0	0	0	17.2	143.8	10.1	112.9	27.6	5.9	0	0	0	0	0.2	317.7
GovInv	0	0	0	0	0	0	0	0	0	0	0	4.9	0	0	0	0	4.9
PrvInv	0	0	0	0	0	0	0	0	0	49.3	445.3	52.9	0	0	0	-179.7	367.8
Stocks	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	0	0	1.5
ROW	0	0	614.6	0	0	0	0	0	0	0	3.0	1.5	0	0	0	0	619.0
Total-Col	3524.3	3524.3	624.7	698.3	661.2	17.2	143.8	10.1	112.9	949.3	549.9	317.7	4.9	367.8	1.5	619.0	

IV Empirical Analysis

1. Overview
2. Micro-Level Analysis of Income and Consumption
3. Findings
4. Discussion

IV Empirical Analysis

1. Overview

At first glance, there appear to be numerous ways in which a government can finance a given level of required expenditures in order to achieve its policy objectives. The most common ways of achieving this involves increasing direct or indirect taxes. Direct taxes include corporate taxes levied on corporations, personal income taxes levied on households, and production taxes levied on production processes. Indirect taxes include VATs and tariffs/customs.

In 2008, shortly after their inauguration, the newly elected president and his administration in Korea introduced a series of tax-lowering measures. At the same time, worsening income inequality, exacerbated by the plummeting birth rates and rapid population aging and threatening to chip away at the growth potential of the Korean economy, began to emerge as a critical social issue. Since then, how best to reform the tax system by adjusting different tax rates has engendered much debate. Tax burdens and reforms are key subjects of interest for fiscal experts. As tax rates can exert profound and far-reaching effects on the national economy, they must be carefully calibrated in light of their potential effects on economic growth,

employment, and income distribution. However, the Lee Myung-bak administration appears to have proceeded with tax cuts in the absence of a solid consensus among fiscal experts. Opinions and ideologies collided sharply over the effects of the Lee administration's tax reform, and its legacy continues to be a subject of heated controversy. Some argue that the decrease in income taxes promoted economic activity and gave the Korean economy more room for growth. Others, however, argue that the tax cuts were not as drastic as advertised, and that the benefits were concentrated among large corporations and the wealthy, raising income inequality to a new level.

Corporate taxes refer to taxes charged on the productive activities of corporations. Ultimately, corporate taxes reduce surpluses for consumers and producers. When corporate taxes are raised, consumers end up paying higher prices and consuming less than before, while producers end up selling and profiting less than before. The decrease in the corporation/producer's profits depends upon the demand and supply elasticities of the original production factors, but ultimately culminates in lower wages and operating surplus. Higher corporate taxes, moreover, cause a contraction of investment and employment alike, as demonstrated by a number of studies. Kim (2010) specifically estimated that increasing corporate tax revenue by KRW 1 trillion led to a loss of KRW 298 billion in social welfare. However, he also estimated that the Gini coefficient would be lowered by

0.0264 percent to improve income inequality (Kim, 2010, p. 19).[1] He also found that the most cost-effective tax reform options were raising VATs and lowering corporate taxes.

Let us outline the structure of corporate taxes in Korea. Tables 4-1 and 4-2 show the distribution of corporate tax revenue across the 10 deciles of corporations in Korea as of 2014. The top 10 percent paid 95.7 percent of the total corporate tax collected, while the remaining 90 percent paid only 4.3 percent.

〈Table 4-1〉 Distribution of Corporate Tax Revenue by Decile

(Unit: Billion KRW)

Decile	Revenue	Income	Tax base	Tax assessment	Tax paid
Overall	4,323,588	172,213	221,825	44,102	35,444
10th	3,190.5	230,183	205,120	42,280	33,927
9th	253,330	10,565	9,458	1,041	839
8th	140,658	4,848	4,173	426	357
7th	85,888	2,384	1,949	199	171
6th	52,606	1,108	852	88	78
5th	28,729	368	260	27	26
4th	24,424	-2	9	2	3
3th	14,309	-508	0.2	2	3
2nd	26,748	-2,302	0.2	8	9
1st (lowest)	506,394	-74,430	3.2	26	32

Note: Based on a total of 550,472 registered corporations.
Source: National Tax Statistics Yearbook (2015).

Even if we were to limit our focus to corporations that turn profits (surpluses), 93.8 percent of the total corporate tax rev-

1) Efficiency and equity collide over increasing not only corporate taxes but also personal income taxes.

enue comes from the top 10 percent. Of all corporations, 40 percent have negative income and zero tax bases. Interestingly, although corporations in the first decile have the lowest income (negative), their tax bases or amounts paid are higher than those of the second and third deciles.

〈Table 4-2〉 Distribution of Corporate Tax Revenue by Decile: Surplus Corporations Only

(Unit: KRW 1 billion)

Decile	Revenue	Income	Tax base	Tax assessment	Tax paid
Overall	3,773,542	249,470	221,821	44,064	35,398
10th	3,045,370	223,294	189,943	41,379	33,220
9th	250,037	11,301	10,141	1,381	1,086
8th	144,907	6,018	5,376	551	449
7th	102,325	3,624	3,138	320	267
6th	72,658	2,259	1,902	194	165
5th	52,503	1,419	1,149	117	101
4th	38,478	863	670	70	62
3th	27,150	473	350	36	33
2nd	17,124	198	137	15	14
1st(lowest)	22,989	21	14	2	2

Note: Based on a total of 550,472 registered corporations.
Source: National Tax Statistics Yearbook (2015).

2. Micro-Level Analysis of Income and Consumption

(1) Income and Consumption Trends

Income and consumption are the two most basic indicators that researchers look at when analyzing household behavior.

Total income is divided into ordinary and non-ordinary income. In general, earned income makes up the largest proportion of total income. Household expenses are divided between consumption expenses and non-consumption expenses. The latter include taxes and contributions to mandatory social insurances.

The demand function derived from the problem of optimizing consumer choice using the Cobb-Douglas utility function shows that the proportions of average expenses remain consistent.

A more flexible alternative to the Cobb-Douglas function is the constant elasticity of substitution (CES) utility function, which can be expressed as follows:

$$u(x) = \left(\prod_{i=1}^{n} \alpha_i x_i \right)^{1/\rho},$$
$$s.t. \sum_{i=1}^{n} p_i x_i = m,\ 0 < \alpha_i < 1,\ \sum_{i=1}^{n} \alpha_i = 1.$$

From this, we can obtain the following demand function:

$$x_i = \frac{m}{p_i} \cdot \frac{\alpha_i^{\sigma}\, p_i^{1-\sigma}}{\sum_{j=1}^{n} \alpha_j^{\sigma}\, p_j^{1-\sigma}},\ i = 1,2,\ldots,n.$$

The elasticity of substitution here is $\sigma = 1/(1-\rho)$. Where the elasticity of substitution is 1, ρ equals 0, and the proportions of household expenses remain constant. This is the point at which

the CES utility function becomes the same as the Cobb-Douglas function. As the price elasticity and elasticity of substitution used in the CES function can have values other than one, it is a more flexible alternative to the Cobb-Douglas function. Yet the fact that the elasticity of expenses obtained using the CES function always equals one does not conform to reality. When the elasticity of expenses is always one, it means that the makeup of household expenses remains identical irrespective of household income levels. In economic analyses based on a CGE model, we thus need to devise a more realistic demand structure for our model.

(2) Stone-Geary Utility Function and LES Demand Function

In general, researchers avoid the problem discussed thus far by resorting to more flexible demand function systems. The most commonly used is the linear expenditure system (LES), which is a formalization of consumption that is essential to the Cobb-Douglas utility function. The LES function is free of the shortfalls of the other two utility functions we have discussed and also avoids the conclusion that the elasticity of expenses is always one. It can be expressed as follows:

$$u(x) = \prod_{i=1}^{n}(x_i - \mu_i)^{\alpha_i},$$
$$s.t.\ \sum_{i=1}^{n} p_i x_i = m,\ \mu_i > 0,\ 0 < \alpha_i < 1,\ \sum_{i=1}^{n}\alpha_i = 1.$$

Here, μ_i stands for essential expenses. We can derive the following demand function from the above:

$$x_i = \mu_i + \frac{\alpha_i}{p_i} \cdot \left(m - \sum_{j=1}^{n} p_j \mu_j\right), i, j = 1, 2, \ldots, n.$$

A slight modification of the foregoing produces a function that is more suited to empirical analysis:

$$p_i x_i = p_i \mu_i + \alpha_i \left(m - \sum_{j=1}^{n} p_j \mu_j\right) + \text{(error term)}$$

The dependent variable here is the expense per commodity (denominated in the nominal price).

The income (or expense) elasticity and price elasticity of each commodity under our LES-based demand function can be expressed as follows:

$$\epsilon_i = \frac{\alpha_i m}{p_i x_i},\ \sum \alpha_i = 1,\ \epsilon_i > 0,\ i = 1, 2, \ldots, n.$$
$$\gamma_i = \frac{(1-\alpha_i)\mu_i}{x_i} - 1,\ -1 < \gamma_i < 0.$$

A Korean study that employs this type of LES function to conduct an empirical analysis of micro-level data is Lee and Seong (2012). Their estimates, based upon Statistics Korea's 1995 household survey, are shown in Table 4-3.

〈Table 4-3〉 Household Expense Estimates Using the LES Function

Commodity	Consumed quantity	Minimum consumed quantity	Ratio of essential consumption	Ratio of optional consumption	|Frisch|
Groceries (except alcohol)	35.786	23.363	0.6529	0.3471	2.881
Housing	1.166	0.856	0.7341	0.2659	3.761
Light, heating, and water	4.362	3.021	0.6926	0.3074	3.253
Furniture and fixtures	6.52	3.452	0.5294	0.4706	2.125
Clothing and shoes	9.755	4.778	0.4898	0.5102	1.960
Medicine and health	14.207	7.747	0.5453	0.4547	2.199
Education	11.175	6.716	0.6010	0.3990	2.506
Culture and entertainment	41.387	16.919	0.4088	0.5912	1.691
Transportation (excluding fuel costs)	19.678	10.816	0.5496	0.4504	2.220
Communications	3.995	1.775	0.4443	0.5557	1.800
Other consumption	45.141	19.248	0.4264	0.5736	1.743
Tobacco	3.095	2.615	0.8449	0.1551	6.448
Soju (distilled Korean alcohol)	0.443	0.339	0.7652	0.2348	4.260
Beer	1.38	0.165	0.1196	0.8804	1.136
Gasoline	3.107	0.406	0.1307	0.8693	1.150

Note: Absolute values are shown for the Frisch parameters.
Source: Lee and Seong (2012), p. 81.

The authors show that commodities such as beer and gasoline had the lowest ratios of essential consumption (0.12 to 0.13) and, therefore, the lowest Frisch parameters. Commodities with the highest ratios of essential consumption were tobacco (0.8449), soju (0.7652), housing (0.7341), and light, heating, and water (0.692), with their Frisch parameters

being 6.448, 4.260, 3.761, and 3.253, respectively.

The following table shows the elasticity of substitution of each original production factor, estimated on the basis of Japanese data. The elasticity of substitution varies widely from industry to industry, from 0.023 for agriculture to 0.460 for electricity, gas, and water.

〈Table 4-4〉 Okagawa and Ban's Estimates of the Elasticity of Substitution (Labor-Capital)

Industry	Elasticity of substitution	Standard error	p-Value
Agriculture	0.023	0.0131	0.83
Mining	0.139	0.0396	0.43
Food	0.382	0.0442	0
Textiles	0.161	0.0275	0.35
Wood	0.087	0.0409	0.49
Pulp & Paper	0.381	0.0673	0
Chemical	0.334	0.0444	0
Other Non-metalic Mineral	0.358	0.0399	0
Basic Metals	0.220	0.0244	0.08
Machinery	0.295	0.0291	0
Electrical Equipment	0.163	0.0270	0.34
Transport Equipment	0.144	0.0362	0.35
Manufacturing	0.046	0.0269	0.81
Electricity, Gas, and Water	0.460	0.0692	0
Construction	0.065	0.0215	0.57
Transport	0.310	0.0573	0.01
Post and Telecomunications	0.370	0.0641	0.06
Financial and Business Services	0.264	0.0345	0.0
Personal Services	0.316	0.0560	0.0

Note: The p-values have been calculated for the null hypothesis (elasticity of substitution = zero).

Source: Okagawa and Ban (2008), p. 16, Table 5.

3. Findings

One major shortfall of macro-econometric or CGE models is that they do not adequately capture heterogeneity among households. One solution to this problem is to divide the household sector into groups and include them in the model. How detailed the grouping is depends upon the given research purpose, but a sample of at least 1,000 households is needed to capture the main differences, such as the region of residence, gender of household heads, and income level. Another problem is that the available micro-level data on individuals and households assign certain weights, but the refined data used to strengthen heterogeneity in a CGE model must not have different weights.

I base my analysis of household income and consumption on the Korean Taxation and Public Finance Panel Survey's raw data on individual income. The survey provides information on individuals' earned, business, and property incomes. I add up these different types of income by household and combine the sums with household data.

Private income transfers are sums of income transferred from other households and income from private pensions and insurances. The data on income taxes and general income taxes were combined into the single category of income tax, while the data on property taxes and general property taxes were combined into the single category of property taxes. Although

taxes on interest income should be considered as well, in principle, as the panel survey provides no data on this topic, it is missing from my analysis. Social security contributions include premiums and contributions paid toward the National Health Insurance scheme, employment insurance, and public pensions, data on all of which can be found in the panel survey.

Public income transfers include income from public pensions and benefits from other social insurances, data on both of which are available from the panel survey. Public income services include medical, educational, and other such public services and benefits provided in kind. While the panel survey provides information on other in-kind benefits, it lacks data on the medical and educational benefits provided.

Consumption expenditures are an area in which mismatch arises between the commodity classifications of the input-output tables and the classification of consumption spending by households. Therefore, I first matched the categories of consumption expenditures in the panel survey with those of household consumption expenditures in the National Accounts, and then matched them again to the 30 categories of the input-output tables.

Of the integrated household sample, households with missing values for income, consumption, and other household characteristics were omitted. Cross-sectional weights were then adjusted to re-calibrate all households, which were then re-sam-

pled in terms of household size, region, and gender of household head. As a result, a total of 1,056 households were included in the final sample. This process was necessary because a typical CGE model, on its own, makes it impossible to apply weights to different categories of private consumption or income. Table 4-5 summarizes the income and consumption levels by deciles of households from the re-sampled data.

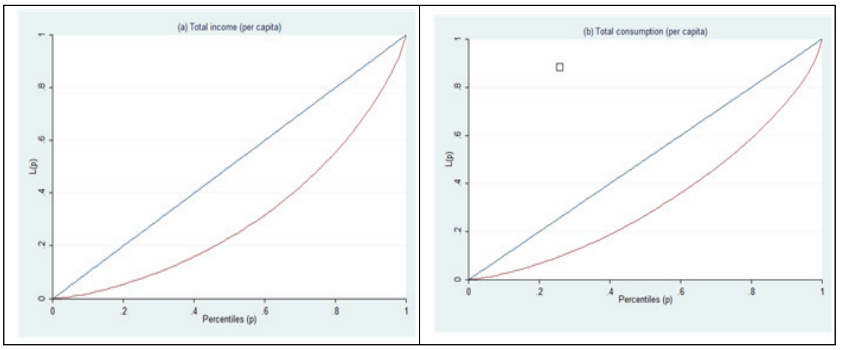
The Gini coefficients based on this sample are 0.390 for gross income per capita and 0.259 for gross consumption per capita. In other words, consumption is relatively more equal than income. The figures below show the Lorenz curves for gross income and consumption per capita. The Lorenz curves, too, indicate that the inequality of consumption is less than that of income in Korea.

〈Table 4-5〉 Decile Shares of Gross Income and Consumption (Deciles Based on Gross Income)

Decile	Gross income (1,000 KRW)	Gross consumption (1,000 KRW)	Share of income (%)	Share of consumption (%)
1	3,170	7,360	1.9	5.2
2	5,810	7,510	3.6	5.3
3	7,560	8,980	4.6	6.4
4	9,390	9,250	5.8	6.6
5	11,590	12,680	7.1	9.0
6	13,970	11,610	8.6	8.2
7	17,570	14,620	10.8	10.4
8	21,480	18,280	13.2	13.0
9	27,920	19,440	17.1	13.8
10	44,430	31,260	27.3	22.2
	162,880	141,000	100.0	100.0

Note: Estimated by re-sampling approximately 1,000 households from the raw data of the NaSTaB (KIPF).
Source: Raw data of the NaSTaB (KIPF).

[Figure 4-1] Lorenz Curves of Gross Income and Consumption Per Capita



Source: Raw data, NaSTaB (KIPF).

Child benefit income is included in the household data, and it includes income from all governmental subsidies for the costs of childcare, including daycare and education benefits, school meal allowance, allowance for families with multiple children, at-home care benefit, and others.

Basic pension income is also included in individual data. The amounts received were added up for each household and then combined with other household data.

The basic pension and child benefits are major examples of government welfare spending. Basic pension benefits are concentrated in the first four deciles, while child benefits are more evenly spread across the first six deciles. Because the government's social expenditures target different income groups who engage in complex economic transactions, it is important to devise an analytical tool capable of reflecting such diversity.

〈Table 4-6〉 Decile Shares of Basic Pension and Child Benefit Payouts (Deciles Based on Gross Income)

(Unit: points)

Decile	Basic pension	Child benefit	Gross income
1	0.1928	0.1118	0.0196
2	0.1778	0.1609	0.0359
3	0.1524	0.1250	0.0468
4	0.1497	0.1626	0.0581
5	0.0533	0.0951	0.0717
6	0.0787	0.1398	0.0864
7	0.0747	0.0671	0.1087
8	0.0250	0.0397	0.1329
9	0.0890	0.0687	0.1727
10	0.0066	0.0294	0.2748
	1.0000	1.0000	1.0000

Note: Estimated by re-sampling approximately 1,000 households from the raw data of NaSTaB (KIPF).
Source: Raw data of the NaSTaB (KIPF).

The table below summarizes the results of simulating diverse methods of financing a given level of social expenditures.[2] The short- and long-run effects of different methods of financing are presented separately. At first glance, the table seems to defy any easy reading and interpretation, which is a regrettable shortcoming of using a CGE model for analysis. Practice and effort, however, can lead to meaningful interpretations.

Raising different types of taxes—consumption, corporate, and personal income taxes—were compared as methods for financing social expenditures and in terms of their effects. The results of policy simulations involving these tax rate changes can be summarized as follows.

2) The software used was Gempack 12.0, and the solution method, Gragg 2-4-8.

First, financing the given social programs by raising consumption taxes rather than corporate or personal income taxes affects employment most adversely. Second, consumption taxes exert a greater adverse effect on economic growth than the other two types of taxes. Personal income and corporate taxes have neutral effects on short-run economic growth. Third, consumption taxes directly alter consumer prices and therefore affect inflation far more significantly than the other types of taxes. Third, whereas corporate and personal income taxes exert little effect on private investment, consumption taxes exert a relatively more noticeable effect. These results may be explained by the fact that the ORANI database of the Johansen type chosen for this study treats private consumption and government spending as exogenous variables in the short-run closure.[3] In the discussion of the CGE model, the closure of a model refers to "identifying which variable is an endogenous variable and which variable is an exogenous variable, or such information."

In the short term, raising corporate taxes reduced utility most significantly, but consumption tax increases reduced utility even further in the long term. The long-run effects of raising consumption taxes were the most severe, in general, including those on inflation and economic growth. Raising corporate and personal income taxes generally led to similar results. Further

3) This may indicate the need for a more rigorous sensitivity analysis.

research is needed to determine the causes of such similarity, and how the analysis results would change when different closure and parameters are used.

〈Table 4-7〉 Macro-Level Effects of Different Financing Methods: Summary

(Unit: percentage)

Tax type	Short-run			Long-run		
	Consumption	Income	Corporate	Consumption	Income	Corporate
Utility	0.1026	0.1801	-0.0332	-1.4027	-0.1224	-0.3355
CV (change in compensated variation)	-4566.17	8.766	-26.677	-2828.27	-46.001	-81.362
EV (change in equivalent variation)	17.015	29.844	-5.502	-218.592	-20.230	-54.821
Economic growth	-0.383	0.003	0.003	-0.067	-0.011	-0.011
Employment	-1.800	0.078	0.078	0	0	0
Capital income	0.805	0.040	0.04	-0.203	0.002	0.002
Labor income	1.200	0.091	0.091	-0.179	0.031	0.031
Consumer price	0.875	0.006	0.006	1.606	0.017	0.017
Private investment	1.119	0.005	0.005	-0.177	-0.023	-0.023

Note: Employment is an exogenous variable in long-run analysis.

4. Discussion

We need to understand the causes of differences in the results that using the same CGE model can produce, depending on whether the GAMS, favored by American researchers, or GEMPACK, developed in Australia, is used. All agree that using the same model and the same database produce the same results at all times. In the past, the Australian method was known to produce less accurate results due to approximation errors,[4)]

4) See Kendrick (2006), p. 170, Table 8.4.

but this turned out to be a mere rumor and is no longer an issue for users.[5)]

The main source of differences in results appears to be structural differences between the models. The Australian method, for instance, distinguishes between investment in industries and investment in commodities, and assigns them separate matrices. In contrast, the investment formula used by the American system does not assign a distinct status to commodities. Furthermore, results may differ depending on where the Leontief function is used. Differences in how formalized the models are may be another source of differences in results. See Horridge (2016) and the Appendix of this report for the correlations between variables and inter-institution transactions under the Australian model.

Differences in the analysis results may also reflect differences in the data used. The majority of existing studies in Korea used data that were compiled and edited according to the 1993 SNA. This study, on the other hand, uses the input-output table and National Accounts data based on the 2008 SNA. The American system also treats operating surpluses in net amounts only and does not include depreciation in calculations, while the Australian system models operating surpluses in gross amounts that include depreciation. In addition, the analysis results could also differ depending on which industries or commodities were

5) See "A miniature version of ORANI 78," GAMS Model Library No. 40.

combined, how far the household sector was divided, and to what extent the worker sector was divided.

Finally, differences in analysis results may reflect differences in the parameters included in the model. CGE models require information on numerous parameters, and it is rare for researchers to divulge complete information on all the parameters they have used. The dearth of empirical research on parameters in Korea has also led to the proliferation of criticism, in the evaluation of reports and studies published by Korean authors, regarding their use of parameters. As for this study, it was impossible to estimate and measure all the necessary parameters. I thus resorted to introducing the parameters already used in the existing literature, and explaining the rationale for selecting and using some of those parameters.

V Summary and Policy Implications

1. Summary of Research Findings
2. Policy Implications

V Summary and Policy Implications

1. Summary of Research Findings

A CGE model can be a useful tool for analyzing social expenditures and the financing thereof together. CGE models neatly summarize the details of transactions between institutions and sectors into a database, and model the interdependency between sectors based on that database. It is therefore unsurprising that researchers in many countries worldwide apply these models to the a-priori assessment of policy effects.

Using a CGE model, this study compares the likely effects of financing a given level of social expenditures by raising different types of taxes. Specifically, the taxes compared are consumption, corporate, and personal income taxes. The results of policy simulations involving the raising of these taxes to increase social expenditures by an equal amount can be summarized as follows.

First, financing the given social programs by raising consumption taxes rather than corporate or personal income taxes affects employment most adversely. Second, consumption taxes exert a greater adverse effect on economic growth than the other two types of taxes. Personal income and corporate taxes have neutral effects on short-run economic growth. Third,

consumption taxes directly alter consumer prices and therefore affect inflation far more significantly than the other types of taxes. Fourth, whereas corporate and personal income taxes exert little effect on private investment, consumption taxes exert a relatively more noticeable effect. These results may be explained by the fact that the ORANI database of the Johansen type chosen for this study treats private consumption and government spending as exogenous variables in the short-run closure.[6)]

In the short term, raising corporate taxes reduced utility most significantly, but increasing consumption taxes reduced utility even further in the long term. In general, the long-run effects of raising consumption taxes were the most severe, including those on inflation and economic growth. Raising corporate and personal income taxes generally led to similar results.

The tentative conclusion we may draw from these results is that raising corporate taxes has a more neutral effect on the economy than raising taxes on households. On the other hand, when we focus on the effects on employment and economic growth, increasing tax burdens on households could exert more negative effects on the entire economy.

CGE models are not free of faults, and further and more rigorous analyses are needed, in acknowledgement of the short-

6) This may indicate the need for a more rigorous sensitivity analysis.

comings of this study. By further dividing households with greater refinement, we may be able to employ a CGE model to analyze the income-redistribution effects on different income classes as well. Such additional information could play a key role in developing better policy measures.

2. Policy Implications

The policy implications of this study can be summarized as follows. First, policy-makers need to review the available financing options carefully before expanding social expenditures. Increasing government spending without regard for how it is to be financed can compromise the growth potential of the Korean economy in the long run, and must be avoided.[7)]

One important subject not examined in this study is the matter of combining different financing methods to minimize societal inefficiency and maximize the effectiveness of social expenditures. Past experiences have taught us that direct state intervention is unlikely to boost productivity significantly. It is therefore important to encourage creativity and innovation in the private sector by providing private sector actors with profit incentives that encourage them to enhance productivity. This will restore a virtuous cycle of economic growth in Korea.

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7) All researchers of social and welfare policy programs should consider how these programs are to be financed.

The following problems still remain, calling for further research and discussion.

First, carefully designed studies for analyzing the likely effects of childcare allowance and benefits should be attempted before deciding the payout threshold or eligibility criteria. The payout threshold in place today has little to do with the concept of levelized income that is commonly used in analyses of income distribution and poverty. It is important to incorporate such conceptual and analytical tools into policymaking in order to enhance the effectiveness of policy programs.

Second, it might be necessary to reflect economies of scale in setting the standard of payment of welfare expenditure. This is because the current method of payment is adding the same amount to each additional household member after the sixth member. Since it has a weak theoretical basis, an appropriate equalization index suitable for our reality can be introduced to establish the child allowance payment baseline. In designing the equivalence of scale index in the future, it is desirable to distinguish the number of adults and the number of children separately, and if possible, the number of elderly people among adults may be separated.

Third, in determining the baseline of the current welfare system, the 90% or less based on the income distribution of households with two or more persons may have a problem of relative equity. That is because the relative position of the

threshold varies depending on the number of household members.

Ideally, policy-makers in the Korean government should consider providing micro-level survey samples for academic research analysis to give researchers better access to relevant information on the distribution of welfare benefits and tax burdens. The societal cost engendered by the asymmetry and inaccuracy of information is bound to increase as social expenditures increase. It is therefore necessary to explore and find measures for maximizing the efficiency of social expenditures and the policy programs they support.

Finally, before introducing any new policy, it is important for policy-makers in Korea to evaluate, as their counterparts in other countries do, the likely effects of their programs using the latest research techniques and simulated experiments. Only through such testing and verification can the unforeseen side effects of policy programs be mitigated. In this respect, some accumulated experiences on the use of different closures are essential. [8)]

This study is significant in that the model it presents will go on to form part of the foundation upon which the role of research and testing in policymaking will be expanded. However, further accumulation of experience is needed to enhance the effectiveness of social policy programs. The model presented

8) Taylor (1990) compares different closures for each countries in Latin America.

herein should be improved continually so that it can be applied to the analysis of more diverse policy programs and instruments, with steady efforts being made to apply the model to real-life cases and experiences.

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