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EFFECTS OF TAXES AND BENEFITS ON INCOME DISTRIBUTION IN KOREA

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This paper examines the redistributive effects of Korea's fiscal policies, including consumption taxes and in-kind benefits. Using the Household Income and Expenditure Survey of 2007, we find that taxes and transfers reduce income inequality in Korea by 13.8 percent. Contrary to the popular belief that direct taxes are the key tool for redistribution, in-kind benefits, direct taxes, and social security contributions all decrease the Gini coefficient by 6.7, 4.7, and 2.9 percentage points, respectively. The redistributive effect of consumption taxes is small and negative (–0.5 percentage point). Policy simulations indicate that education spending financed by the personal income tax has a positive redistributive effect and that the lower 70 percent of households enjoy positive net benefits. Spending targeting the poor has a strong redistributive effect, which implies low popularity because the majority of households face net losses.

1. Introduction

Korea has experienced major socioeconomic changes mainly because of an economic slowdown, rapid open-door development, low birth rates, and an aging population, particularly since the late 1990s. Korea's decreasing birth rate and aging population aggravated inequality in income distribution, causing equity concerns in Korea. Worsening income distribution necessitates increased redistribution by raising taxes and welfare spending. The Noh Administration of Korea (2002–07) increased welfare spending to address rising inequality, particularly since the mid-1990s.

There is intense debate over the relationship between welfare spending and growth. One view is that welfare spending reduces income inequality and thus leads to growth. The opposing view is that unproductive welfare spending results in tax increases and thus hurts economic growth. Whatever the true relationship may be, it is very important to determine the distribution of income and the effectiveness of government intervention for redistribution. For instance, aggressive government intervention is not necessary if income inequality decreases. However, active redistributive policies are strongly recommended if income inequality increases. In particular, in cases of fiscal stress, the government should find a cost-effective way to reduce income inequality.

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Many studies have examined income distribution and its trend in Korea.[1] Therefore, the present study analyzes the redistributive effects of taxes and government spending, not income distribution itself. The shares of indirect taxes and in-kind benefits in total government revenues and benefits are not negligible. On the contrary, the amounts of indirect tax revenues and in-kind benefits far exceed those of direct tax revenues and cash benefits. The government often increases consumption taxes to support in-kind benefits such as education, which cannot be analyzed with direct taxes and cash benefits. Hence, we extend the analysis by adding consumption taxes and in-kind benefits to direct taxes and cash benefits, following Jones (2008). Garfinkel *et al*. (2006) showed that cross-national differences in inequality were narrowed when in-kind benefits and indirect taxes were incorporated in the redistribution analysis.

The rest of this paper proceeds as follows. Section 2 explains the Korean tax and benefit systems and compares these systems with those of other OECD countries. Section 3 introduces the data and the calculation methods for taxes and benefits. Section 4 presents the redistributive effects of cash benefits, taxes, and in-kind benefits. The amount and progressivity of tax burdens and benefits are explained first, followed by the redistributive effects of taxes and benefits. Section 5 conducts a policy simulation to identify the marginal distributive effects of changes in taxes and benefits. Section 6 concludes.

2. Brief Summary of Korea's Tax and Benefit Systems

For a better understanding, we summarize Korea's tax and benefit systems in Sections 2.1 and 2.2. In Section 2.3, we compare Korea's systems with those of other OECD countries.

2.1. *Tax System*

The Korean tax system consists of income-, consumption-, and property-based taxes. Of these, Value Added Tax (VAT), Personal Income Tax (PIT), and Corporate Income Tax (CIT) are the three main taxes, which accounted for 56.2 percent of total tax revenues in 2007. Taxes considered in the analysis are PIT, Property Tax (PT), Comprehensive Real Estate Holding Tax (CREHT), VAT, Individual Excise Tax (IET), Liquor Tax (LT), Transportation–Environment–Energy Tax (TEET), Tobacco Consumption Tax (TOBT), and their related surtaxes. These taxes are detailed in Table 1.[2]

[1]See Na and Hyun (1993), Hyun and Kang (1998), Sung and Lee (2001), Park *et al*. (2002), Cheong (2001), NABO (2004), Yoo and Kim (2002), Hyun *et al*. (2003), and Cho (2008).

[2]CREHT is a tax on real estate ownership; its tax base is the excess of the total real estate value over 600 million KRW. LT is an excise tax levied on all alcoholic beverages in which the alcohol content is 1 percent or higher. IET is an excise tax on selected consumption goods and services, such as passenger cars, kerosene, hunting rifles, jewelry, luxurious furniture, luxurious fur products, and so forth. TEET is levied on gasoline and diesel oil. TOBT is an excise tax on tobacco products, including cigarettes. Surtaxes on PIT, IET, LT, TEET, and TOBT are included in the analysis. A part of the Inhabitant Tax (IHT) is a surtax (10%) on PIT and CIT, and the other part is a lump-sum tax on households. EDUT is a surtax on IET, LT, and TEET. LEDUT is a surtax on TOBT. EDUT and LEDUT are earmarked to finance education. DRVT is levied on TEET. The rates of surtaxes vary from 10 to 50 percent. Their tax bases are the tax liabilities of mother taxes.

TABLE 1

REVENUES OF TAXES AND PUBLIC CHARGES OF KOREA IN 2007 (UNIT: TRILLION KRW)

Source of Taxation	Title of Tax	Revenue	Included in Analysis?
Income	Personal Income Tax (PIT)	38.86 (15.0%)	Yes
	Corporate Income Tax (CIT)	35.42 (13.7%)	No
	Inheritance and Gift Tax	2.84 (1.1%)	No
	Inhabitant Tax (IHT, Surtax on PIT)	3.89 (1.5%)	Yes
Consumption	VAT	40.94 (15.8%)	Yes
	Individual Excise Tax (IET)	5.16 (2.0%)	Yes
	Liquor Tax (LT)	2.27 (0.9%)	Yes
	Tobacco Consumption Tax (TOBT)	2.76 (1.1%)	Yes
	Transportation–Environment–Energy Tax (TEET)	11.46 (4.4%)	Yes
	Driving Tax (DRVT)	3.27 (1.3%)	Yes
	Education Tax (EDUT)	3.86 (1.5%)	Yes
	Local Education Tax (LEDUT)	1.38 (0.5%)	Yes
	Security Turnover Tax	2.41 (0.9%)	No
Properties	Registration Tax	7.39 (2.9%)	No
	Acquisition Tax	7.49 (2.9%)	No
	Automobile Ownership Tax	2.66 (1.0%)	Yes
	Property Tax	3.88 (1.5%)	Yes
	Comprehensive Real Estate Holding Tax	2.41 (0.9%)	Yes
Other		26.63 (10.3%)	No
Total taxes (A)		204.98 (79.3%)	
Charges and Social Security contributions	Health promotion charge	1.50 (0.6%)	Yes
	Other public charges	12.86 (5.0%)	No
	Public pension contributions	15.52 (6.0%)	Yes
	Other Social Security contributions	2.97 (1.1%)	Yes
	Health insurance fee	20.74 (8.0%)	Yes
Total charges (B)		53.60 (20.7%)	
Included taxes		160.88 (62.2%)	
Excluded taxes		97.70 (37.8%)	
Total (A + B)		258.58 (100%)	

Notes: Other includes all the other taxes not listed in the above classifications due to their small shares of tax revenues.

Furthermore, households bear public charges and social security contributions such as public pension contributions, National Health Insurance (NHI) fees, Health Promotion Charges (HPCs) levied on tobacco products, and so forth. Of these, HPCs, NHI fees, public pension contributions, and other social security contributions are included in the analysis.

In 2007, revenues from taxes, social contributions, and public charges totaled 160.88 trillion KRW, accounting for 62.2 percent of all taxes, contributions, and charges. The other taxes and charges are excluded from the analysis because of limited data availability.

2.2. *Cash and In-Kind Benefits*

The social security system of Korea is mainly composed of public assistance programs, social insurance programs, and social welfare service programs (the types and outlay of benefits are in Table 2).

The most important public assistance program is the National Basic Livelihood Security System (NBLSS), which was introduced in 2000 to guarantee the

TABLE 2
SOCIAL EXPENDITURE OF KOREA IN 2007 (UNIT: TRILLION KRW)

Classification	Type of Benefit	Outlay	Included in Analysis?
Cash benefits	NBLSS—Living cost	2.7	Yes
	Pensions	19	Yes
	Other cash benefit	9.1	Yes
In-kind benefits	Education	30.7	Yes
	Health	23.9	Yes
	Housing	13.9	Yes
	Childcare	1.2	Yes
	NBLSS—Medical Aid	3.6	Yes
	Other social programs	N.A.	No

minimum cost of living for low-income households after the 1997 economic crisis by expanding the existing public assistant system. The recipients of the NBLSS are determined by means-tested income. There are other public assistance programs for the old and for the disabled.

The Korean government provides social insurance for health, pensions, unemployment, and industrial accident compensation. The National Health Insurance (NHI) program covers the whole population under a compulsory social insurance system. Its financial sources are contributions from the insured and government subsidies for programs for low-income households—that is, the Medical Aid program of the NBLSS. The NHI system adopts the coinsurance method, thus patients should pay about one-third of the medical fees.

Public pensions can be classified by occupation: general public and special occupations such as military servicemen, civil servants, and private school teachers. The largest and thus the most important pension is the National Pension—that is, the pension for the general public. Since Korean pensions adopted the funded system and the National Pension system was established in 1998, the National Pension Fund accumulated large amounts of assets (214.6 trillion KRW in 2007). There are other cash benefits of the social insurance programs, such as unemployment benefits and industrial accident compensation.

Social welfare service programs (73 programs in 2009) are provided to children, the old, the disabled, and women. The benefits are generally in-kind, such as care services for the old and infants. The government subsidizes the operating cost of childcare facilities (based on the facility size) and also pays the fees of low-income households.

Government support for education is another major in-kind benefit. Except for a small number of special schools, the operating cost of elementary, middle, and high schools is generally financed through the support of the central government. Tuition is another funding source. According to the law, 19.4 percent of national tax revenues are transferred to the local education authority. The local education authority[3] then allots the funds to schools according to student

[3]Local education authorities (or governments) are independent of local administrative authorities (or governments) in Korea. Local administrative governments also support local schools financially. However, their support is negligible in its scale.

numbers. Normally, students are randomly assigned to nearby schools by a computerized system. Consequently, notable differences between public and private schools and among regions do not exist.

2.3. *International Comparison*

OECD (2008) data are used for an international comparison. As shown in Table A2 in the online Appendix,[4] cash benefits account for 3.7 percent of disposable income in Korea, the lowest among the 24 OECD countries. Most retirees belong to the poorest decile, and their share of cash benefits (14.1 percent) is also the lowest among OECD countries (the OECD average is 69.7 percent). The average household (direct) tax burden is 29.3 percent of disposable income in OECD countries. The tax burden is the highest (53.1 percent) in Iceland and the lowest (19.4 percent) in Ireland, whereas that in Korea is only 9.1 percent. Thus, both cash benefits and taxes are the lowest in Korea, showing substantial differences between Korea and other OECD countries.

The progressivity of the (tax) burden means that the burden/income ratio increases with income. That is, the higher the income, the higher are the effective tax rates. In some sense, progressivity indicates the redistributive effects of the unit burden.[5] Consequently, the progressivity of the tax burden multiplied by the size of the tax burden yields the redistributive effect. Directions of redistributive effects are reversed in the case of benefits. The regressivity of benefits is pro-poor and effective in income redistribution. The regressive distribution of burdens (benefits) does not necessarily mean that the poor bears (receives) a greater burden (benefit) than the rich. Regressivity or progressivity is determined exclusively by the burden/income or benefit/income ratio of each income decile.[6]

The progressivity of cash benefits and taxes is often measured by concentration coefficients, whose values lie between –1 and 1. Positive values imply that distributions are progressive, whereas negative values imply the regressivity of distributions. The concentration coefficients of cash benefits are negative for 18 countries: Australia, Belgium, Canada, Czech Republic, Denmark, Finland, Hungary, Iceland, Ireland, the Netherlands, New Zealand, Norway, Slovak Republic, Sweden, Switzerland, U.K., and U.S. including Korea; whereas they are positive for 12 countries: Austria, France, Germany, Greece, Italy, Japan, Luxembourg, Mexico, Poland, Portugal, Spain, and Turkey (Table A3 in the online Appendix). The coefficient for Korea is –0.248, the fourth lowest among OECD countries, implying that cash benefits are very regressively distributed in Korea (i.e., positive income redistribution).

[4]The Appendix can be downloaded from the website of the journal (http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1475-4991).

[5]As long as (tax) burdens increase at lower rates than income or decrease with income, the effective rates of burdens decrease with income. Therefore, it is quite possible that higher income deciles bear greater burdens than lower income deciles, even under the regressivity of burdens.

[6]There is no doubt that the progressive burden structure always decreases the relative income inequality. In contrast, the regressive burden always increases relative income inequality, even when the absolute burden is greater for the rich than for the poor, because income redistribution is measured by relative income discrepancies between deciles. Similarly, the regressive benefit structure always decreases relative income inequality, even when the absolute benefit level is greater for the rich than for the poor, because the structure reduces the relative income ratio between deciles. In this sense, we can conclude that the regressively distributed benefit structure is pro-poor.

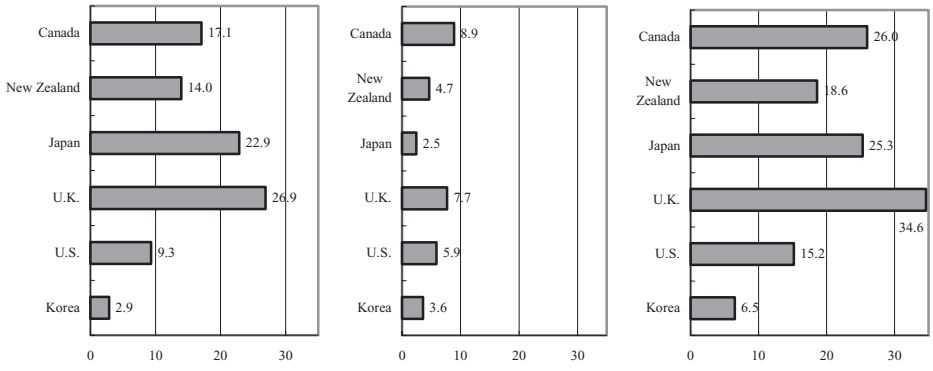

Figure 1. Redistributive Effects of Taxes and Cash Benefits Measured in Percentage Changes in Gini

Notes: The redistributive effects are measured by tax/benefit-induced percentage changes in Gini coefficients. The figures are calculated based on data from the U.S. Census Bureau (2007) for 2005 data on the U.S., Jones (2008) for 2006/07 data on the U.K., the Ministry of Welfare and Labor (2007) for 2005 data on Japan, Hyslop and Yahanpath (2005) for 2004 data on New Zealand, and Statistics Canada (2007) for 2005 data on Canada. The figures for Korea are from the authors' calculations for 2007.

Figure 1 indicates that redistributive effects are the smallest in Korea among selected OECD countries. The total effect of taxes and cash benefits is 6.5 percent in Korea, whereas it ranges from 15.2 percent in the U.S. to 34.6 percent in the U.K. Redistributive effects in Korea are the weakest for both the taxes and the cash benefits. The changes in the Gini index derived from cash benefits are 9.3–26.9 percent in most countries, which are approximately 3.2–9.3 times that in Korea. As cash benefits (measured by the concentration coefficient) are comparatively regressive in Korea, the low level of redistributive effects implies that the size of cash benefits is far smaller than those in other OECD countries. The patterns for taxes are similar to those for cash benefits except for Japan. Excluding Japan, the impact of taxes on income distribution (measured by percentage changes in Gini) is greater in other countries than in Korea in Figure 1. Taxes reduce the Gini coefficient by 3.6 percent in Korea, whereas the reduction in other OECD countries (except Japan) is from 4.7 to 8.9 percent. The reduction of Gini in Japan is 2.5 percent, which is 1.1 percentage points smaller than that in Korea.

3. Data and Analysis Methods

This section presents the data used in the analysis of distributional effects and the simulations in Sections 4 and 5. In general, we use reported values for tax burdens and benefits. However, imputation methods are used when survey data are not reliable or when data on benefits (i.e., in-kind benefits) do not exist. Sections 3.2 and 3.3 describe the imputation method in detail.

3.1. *Data*

The Household Income and Expenditure Survey (HIES) by the Statistical Office of Korea for 2007 is used to estimate the distributions of various incomes, taxes, and government spending and to analyze the redistributive effects of the government's fiscal policies. The HIES data are a stratified random sample drawn from almost all types of households, except those engaged in the agriculture, forestry, and fishing industries.[7] The descriptive statistics of the 2007 HIES are shown in Table A1 in the online Appendix.

The HIES is compiled on a monthly basis by the bookkeeping or daily diary recording of each surveyed household. Therefore, there exist 12 monthly records for each household. In this paper, the dataset is annualized by adding the monthly records because the bulk of the government's tax and expenditure policies are implemented annually and income or wage contracts are also set annually in most cases.[8] The equivalence scale, which divides income by the square-root of household sizes, is used to adjust the economies of scale.

3.2. *Methods of Analysis*

3.2.1. Estimation of Taxes and Cash Benefits

Taxes and contributions analyzed in this paper include PIT, PT, CREHT, VAT, IET, TEET, LT, TOBT, related surtaxes, public pension contributions, National Health Insurance fees, and other social security contributions. They are detailed in Tables 1 and 2. Cash benefits cover public pensions and other social security benefits.[9] We use the reported data in the HIES for property tax, social security contributions, and cash transfers.

We impute the income tax of individual income earners by applying the income tax law because the reported income tax data of the HIES are not reliable.[10] This is done by using various HIES data for each household member. The total household income tax is calculated by summing the income taxes of household members. We assume that all income deductions for dependants are applied to the highest income earner because his or her marginal tax rate is the highest.

[7]Those households accounted for 6.9 percent of whole households according to the 2005 population census in Korea.

[8]There are many ways to convert monthly records into annual values. The simplest way is to multiply the average monthly values by 12. However, this method is often misleading, unless monthly/quarterly distributions are independently and identically distributed. One example is seasonality. As the 2007 HIES shows seasonality, we adjust seasonality with the nearest neighbor estimation method.

[9]Several taxes and benefits are excluded from the analysis because they are not easily tractable to estimate due to the lack of necessary information such as the corporate income tax, the capital gains tax, and government expenditure on unification and/or foreign affairs. Therefore, please note that the estimated results do not fully cover all taxes and benefits.

[10]Income tax amounts are frequently misreported or sometimes not reported because many respondents (in the HIES) do not remember the actual amount or because they do not want to reveal them. In addition, for the self-employed, the income tax reported in the current year is the tax burden of the income realized in the previous year. In this regard, using the income transition rule between two consecutive years, we estimate the 95% confidence interval as 15.1 to 59.6 million KRW for the current year when the self-employed individual's income for the prior year is 30.0 million KRW. Therefore, it is more appropriate to use imputed values rather than reported values in the case of the individual income tax.

Indirect taxes are imputed by using consumption data. VAT is imputed from expenditure on taxable items by applying a 10 percent tax rate.[11] Excise taxes are imputed similarly; 10 percent of the VAT and 25 percent of profits are subtracted, resulting in net expenditure, which consists of the excise tax base and the excise tax. Finally, excise tax is calculated by applying the excise tax rate.[12]

3.2.2. Estimation of In-Kind Benefits

In-kind benefits cover medical, education, childcare, and housing benefits in this paper. The survey does not have data on in-kind benefits because they are provided in the form of services. Therefore, in-kind benefits are imputed by using the survey data.

There are two main methods for analyzing the redistributive effects of taxes and benefits. One is to measure individual preferences (Aaron and McGuire, 1970). This method, known as the "behavioral approach," analyzes the benefits of government expenditure by the estimated demand function. This method measures the increase in consumption induced by changes in government transfers (Ravallion *et al*., 1995). However, as indicated in van de Walle (1998), the behavioral approach is limited by difficulties in obtaining unbiased estimators because of simultaneity and omitted variables.

The second method is the "benefit incidence" method. Taxes and benefits of households are directly calculated with actual receipts and government spending on goods and services. This method has been widely used in the analysis of the redistribution effect.[13] However, the benefit incidence method is often criticized because it cannot consider the behavioral changes in individuals or households. That is, the value of in-kind benefits is less than that of cash benefits if the beneficiary's consumption of in-kind services for utility maximization is less than the offered amounts. However, government spending can be a good approximation of the value of in-kind benefits (Garfinkel *et al*., 2006). Hence, we adopt the benefit incidence method rather than the behavioral approach because government spending is a good measure of in-kind benefits and because the estimation of demand equations might have faced a biased estimator problem or required unavailable data.

The estimation of in-kind benefits is as follows. The medical and educational benefits of the NBLSS are determined by the means-tested income. We select households as the recipients whose private income given by the sum of market income and private transfers is less than 85 percent of the minimum subsistence level because the average actual income is 85 percent of the means-tested income. The average benefit levels of the medical or educational benefits of the NBLSS are assigned to each individual or student of the selected households.

Medical benefits, covered by the National Health Insurance (NHI) program, are allocated according to the average medical expenditure by gender and age

[11]Corporations also consume goods and services on which VAT is imposed, and their level of consumption is quite high. Therefore, the imputed VAT in the HIES covers only household tax amounts. Thus, we do not allocate the VAT burden of corporations to households because of limited information.

[12]The excise tax is levied only once at the time of carry-out from factory warehouses or customs.

[13]See Meerman (1979), Selowsky (1979), and Demery (2000).

group. The greater the medical expenditure, the greater are the medical benefits because individuals only pay a part of their medical fees. Therefore, the average medical benefits of a household are measured by its share of medical expenditure to the total medical expenditure of all households.

The primary recipients of education expenditure are students. The government provides education services to all elementary, middle, and high school students without systematic differences among regions. Therefore, the total education expenditure divided by the number of students—that is, the average cost—is allocated to each student. For tertiary education, only the education benefits of government-owned universities are considered because such institutions offer lower tuition than private universities. The average expenditure is allocated to students in government-owned colleges/universities. Although the government supports private universities, we exclude the in-kind benefits of education expenditure for private universities because the size of the benefits is minimal.

Childcare expenditure is distributed in two ways: as subsidies for organizations and for the poor. Government subsidies conferred to childcare organizations are uniformly allocated to each recipient—that is, by the average value. Government support for the poor depends on income and is thus allocated based on the level of income.

The Korean government provides various housing support programs. The essential components of such programs are housing loans with low interest rates, rental deposits for individuals, and operating cost subsidies for home builders. The requirements for individual support depend mainly on the income level of individuals purchasing or renting houses. The support provided to companies building houses for sale or for rent to low-income households is assumed to be distributed to eligible households. Thus, each component of related government spending divided by the number of eligible households depending on household income is allocated to each eligible household. Another form of housing support is the provision of rental houses at low prices; this is not included in the analysis because of limited data on rental prices.

3.2.3. Definitions of Income

The different types of income are defined as follows. Market income (or original income) is defined as income from supplying labor and/or capital. Private income is defined as market income plus private transfers such as financial aid from relatives. This paper focuses on the analysis of the effects of government intervention, and thus we analyze the effects of taxes and benefits based primarily on private income. Market income and private income are calculated directly from the HIES. Gross income is imputed by combining all transfers or cash benefits from private and public sectors to market income. Disposable income is obtained by subtracting direct taxes (income and property taxes) and social security contributions from gross income. The data in HIES are used directly for social insurance fees and taxes on properties, and income tax is imputed as previously explained. Post-tax income is derived by subtracting all indirect (consumption) taxes from disposable income. Final income is defined as post-tax income combined with the above-mentioned in-kind benefits.

4. Redistributive Effects of Taxes and Benefits

The total redistributive effect is calculated by multiplying the revenue size and progressivity. Section 4.1 presents the amounts of taxes and benefits by income decile. Section 4.2 shows the progressivity of each tax and benefit. Section 4.3 addresses the redistribution effects of taxes and benefits by various income definitions.

4.1. *Distribution of Taxes and Benefits*

Direct and indirect taxes per household, including social security contributions, are 5,198 thousand KRW, and cash and in-kind benefits are 4,982 thousand KRW in 2007. In this paper, the sample is decomposed into deciles based on gross income in an ascending order by using cumulative sample weights. The distribution of taxes and benefits by income decile is shown in Table 3.

On average, the first decile (the lowest income group) household pays 806 thousand KRW in taxes and receives 3,749 thousand KRW in benefits, resulting in net benefits of 2,943 thousand KRW. On the other hand, the tenth decile (the highest income group) household pays 14,273 thousand KRW and receives 6,228 thousand KRW, resulting in net benefits of –8,045 thousand KRW. The income tax burden per household (1,558 thousand KRW) is the heaviest of all burdens, followed by the VAT (1,264 thousand KRW) and public pension contributions (813 thousand KRW). These results are shown in Table 3 and online Table A4.

The benefits from fiscal expenditure are positively correlated with income regardless of cash or in-kind benefits. However, the benefits increase at lower rates than income. Therefore, their overall distribution is regressive and has positive redistributive effects. The average benefits of the first decile are 3,749 thousand KRW, and those of the tenth decile are 6,228 thousand KRW. The benefit size is the greatest for educational benefits (2,330 thousand KRW), followed by National Health Insurance benefits (1,211 thousand KRW) and public pension benefits (791 thousand KRW). Low-income deciles receive more housing service benefits than high-income deciles. High-income deciles receive more National Health Insurance benefits and public pensions than low-income deciles.

The differences in the benefit size across deciles are relatively small because major benefits such as medical services and education are usually determined by the household size or the number of children or students, not by income. The positive correlation between benefits and income is due in part to the progressive benefit structure of several benefits and the weak but positive correlation between the household size and income.

Table 3 provides the summary statistics of the net distribution. On average, the net benefits from government intervention are positive in the lower 60 percent (1st through 6th deciles) but negative in the upper 30 percent (8th through 10th deciles). The 7th decile is –443 thousand KRW, which is relatively close to zero; this implies that households in the 7th decile are a mixture of households with positive and negative net benefits.

TABLE 3

DISTRIBUTIONS OF TAXES AND BENEFITS BY INCOME DECILES IN 2007 IN KOREA (UNITS: THOUSAND KRW, %)

	Deciles	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Avg.
Benefits	Cash	1,458	1,221	1,160	1,163	1,256	1,091	1,331	1,207	1,183	2,066	1,313
	(Pub. pensions)	301	461	502	714	913	553	983	939	994	1,547	791
	In-kind	2,291	2,945	3,270	3,931	3,877	3,932	3,975	4,069	4,237	4,162	3,669
	(National Health Ins.)	642	787	914	1,186	1,056	1,191	1,228	1,369	1,684	2,058	1,211
	(Education)	1,077	2,015	2,294	2,648	2,712	2,622	2,701	2,660	2,511	2,063	2,330
	Total (A)	3,749	4,166	4,430	5,094	5,133	5,023	5,306	5,276	5,420	6,228	(A′) 4,982
Burdens	Direct taxes	71	152	313	546	851	1,205	1,599	2,300	3,236	6,798	1,707
	(Income tax)	27	98	256	463	746	1,091	1,454	2,147	3,010	6,287	1,558
	Soc. Sec. contribution	207	482	745	967	1,168	1,498	1,852	2,179	2,542	3,592	1,523
	Cons. taxes	528	959	1,236	1,604	1,751	2,034	2,298	2,525	2,869	3,883	1,968
	(VAT)	366	653	816	1,026	1,124	1,292	1,450	1,632	1,828	2,452	1,264
	Total (B)	806	1,593	2,294	3,117	3,770	4,737	5,749	7,004	8,647	14,273	5,198
Net	C = A − B	2,943	2,573	2,136	1,977	1,363	286	−443	−1,728	−3,227	−8,045	−216
C/A′	(%)	59.1	51.6	42.9	39.7	27.4	5.7	−8.9	−34.7	−64.8	−161.5	−4.3
C/A	(%)	78.5	61.8	48.2	38.8	26.6	5.8	−8.3	−32.8	−59.5	−129.2	−4.3

Notes: C/A′ denotes the relative ratio of each decile's net benefits to total average burdens. C/A denotes the relative ratio of each decile's net benefits to each decile's total burdens. Both are measured in percentage terms.

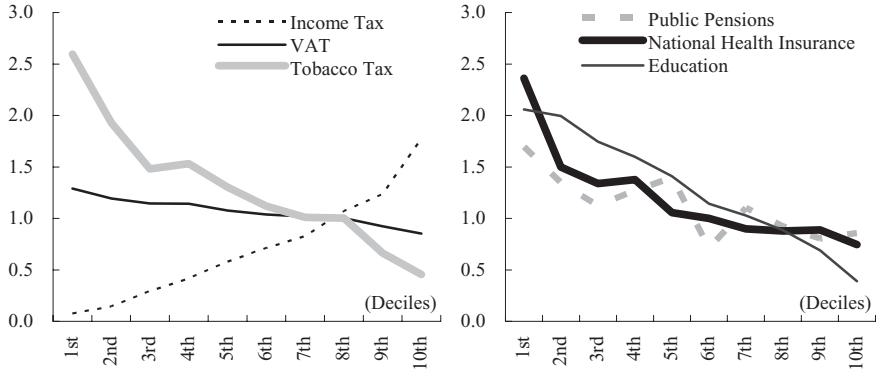

Figure 2. Ratios of Effective Rates of Tax Burdens/Benefits to Average Effective Rates (2007) (unit: multiplicity)

4.2. *Progressivity of Taxes and Benefits*

Among numerous indices of progressivity measures, we use the ratios of the effective rate of burdens/benefits of each decile to those of average burdens/benefits (see Figure 2, and Table A4 in the online Appendix). The loci across income deciles are upward-(downward-, flat) sloping to the right for progressively (regressively, proportionally) distributed burdens/benefits.

Income tax is the greatest burden, and its burden structure is very progressive with strong and positive income redistributive effects. For education services, the benefit structure is highly regressive with positive redistributive effects. In particular, its average benefit per household is 2,330 thousand KRW, which is approximately half the total benefits; its redistributive effects are thus substantial. Medical services and public pensions have similar distributional effects as education.

The burden structure of TOBT is very regressive. However, its negative income redistributive effect is negligible because its average burden is only 79 thousand KRW. The VAT burden is the greatest among all taxes and is regressive. It is almost neutral to income and has virtually no redistributive effect because the VAT burden is nearly proportional.

4.3. *Redistributive Effects in Terms of Gini Coefficients*

We now present changes in Gini coefficients as measures of redistribution which are measured by their percentage changes: redistributive effects are measured in percentage terms by changes in Gini coefficients relative to the Gini of private income.[14] The redistributive effects of taxes and benefits are shown in Figure 3. In 2007, government intervention yields 13.8 percent of the redistributive effect from private income (0.31928) to final income (0.27514) in terms of percentage changes in Gini relative to the private income Gini. The component-by-component decomposition shows that in-kind benefits, income tax, and other

[14]Other indices such as the Atkinson index, the SCV (squared coefficient of variation), and MLD (mean log-deviation) provide results that are qualitatively comparable to those of Gini.

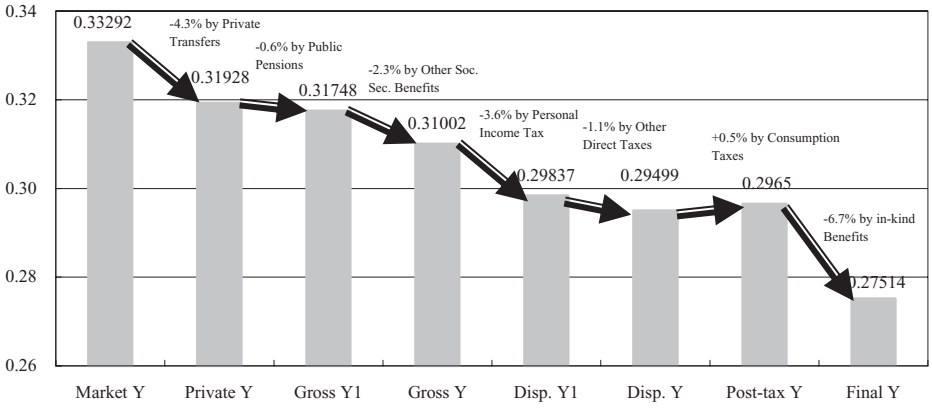

Figure 3. Gini Coefficients and Redistributive Effects (2007)

Notes: 1. Gross Y1 = private income (Private Y) + public pensions.

2. Disp. Y1 = Disposable Income 1 = Gross Income – Income Tax.

3. Redistributive effects are measured in percentage terms by changes in Gini coefficients relative to the Gini of private income.

4. Gini estimates are not derived from decomposition but from direct calculations by using numerous concepts of incomes through the addition and/or subtraction of income components. The percentage changes in Gini denote marginal changes because of the inclusion/exclusion of each tax/benefit.

5. An alternative equivalence scale of the square root of the household size yields qualitatively very similar results; it slightly changes the Gini coefficient of market income from 0.33292 to 0.34085. It also slightly changes the redistributive effects measured by the percentage changes in Gini coefficients from –4.1% to –4.3% for private transfers, from –0.6% to –1.0% for public pensions, and from –6.7% to 5.1% for in-kind benefits. Those of other factors do not change. Although these differences may seem significant for several factors, the overall redistributive effects of each factor are similar in their signs.

social security contributions account for 6.7, 3.6, and 2.3 percentage points, respectively. The distribution structure of public pension benefits is irregular, and its redistributive effects are limited.

Other direct taxes (property tax and social security contributions) generate minimal redistributive effects (1.1 percentage points). In contrast, consumption taxes raise the Gini by 0.5 percentage points and thus have negative redistributive effects. The benefits from education services have the greatest redistributive effect (4.5 percentage points); this suggests that with much stronger effects than income tax or other in-kind benefits, education plays the largest and most important role in reducing income inequality.[15]

It is widely recognized that income taxes generate the greatest income redistributive effect. However, in-kind benefits from fiscal expenditure are the most effective in income redistribution. This phenomenon seems widespread in developed countries. Taxes cannot discriminate taxpayers in terms of the amount of benefits (e.g., deductions or tax credits) they receive, and thus more taxes than necessary are usually required to support a specific targeting group. In this sense, taxes are expensive tools in income redistribution. However, fiscal expenditure, or

[15]Redistributive effects of education services are generally substantial because education services are almost uniformly distributed over the income deciles.

welfare expenditure in particular, can be potentially cost-saving because the government can choose and confine subsidies to a selectively identified recipient group. Therefore, the latter is, in general, more parsimonious and effective in redistribution. Consumption taxes are widely known to increase income inequality because of their regressive burden structure. However, their negative effects are extremely negligible and insignificant in Korea. This is mainly because the burdens of major consumption taxes such as VAT, IET, and TEET are more or less proportional to income. In 2007, the redistributive effects of cash benefits such as public pensions and other public cash benefits are smaller than those of income tax. However, cash benefits are expected to grow rapidly in the near future as the National Pension system matures.

Private transfers are usually transferred between household members or close relatives and are used mainly for living expenses.[16] Private transfers decrease income inequality quite remarkably. In terms of percentage changes in Gini relative to the private income Gini, private transfers reduce Gini by 4.3 percentage points. The total income redistributive effects from market income to final income relative to the private income Gini are 18.1 percent. Of the total effects, 13.8 percentage points are by the public sector, which account for 76.4 percent of the total effects.

5. Policy Simulations

The previous analysis excludes several taxes and benefits, such as corporate income tax and national defense. They are not imputed or distributed to each income decile because of limited data and/or lack of necessary information. This implies that the exact net benefits or costs of all taxes and benefits are difficult to identify. In this regard, policy simulations may be helpful in identifying the marginal effect. In this section, we analyze the redistributive effects of policy changes in welfare expenditure financed by taxes (conditional on a balanced budget). Section 5.1 describes the scenarios, and Section 5.2 presents the simulation results.

5.1. *Scenarios*

For the policy simulations, income tax, VAT, TOBT, TEET, and National Health Insurance fees are chosen as burden items, and NBLSS, education, childcare, housing, and National Health Insurance are chosen for benefit items. Each tax or benefit item is assumed to increase by 1 trillion KRW. The scenarios are as follows: the income tax burden can rise by increases in tax rates, decreases in income deduction levels, changes in tax brackets, or combinations of these changes. We consider only the cases in which all of the tax rates are increased proportionally by 4.1/100—that is, from 8, 17, 26, and 35 percent to 8.33, 17.70,

[16]The average private transfer income per household in 2007 is 1,943 thousand KRW, 5.0 percent of gross income (38,601 thousand KRW). It is even greater than the average public transfers (1,313 thousand KRW or 3.4 percent of gross income). One reason why private transfers between family members and relatives are large in Korea is the strong Confucius tradition requiring children to be subservient to their parents. Another explanation is the relative immaturity of Korea's social welfare system (the national pension system introduced in 1988). Therefore, a large share of the old population is not supported by the public pension system.

27.07, and 36.44 percent, respectively. The VAT burden can be increased by either rate increases or decreases in exemptions. We choose to increase the rate by 0.25 percentage points from 10 to 10.25 percent. The rate structure of TOBT is a specific tax system; an increase in TOBT revenues by 1 trillion KRW is equivalent to an increase in the TOBT rate per cigarette pack (or per 20 cigarettes) by 220 KRW. TEET rates of gasoline and diesel oil need to be increased by 7.4 percent. As the TEET rates were 505 KRW and 358 KRW per liter at the end of 2007, the rates are required to increase to 544 KRW and 386 KRW, respectively. As the annual revenue from National Health Insurance fees was 21.73 trillion KRW in 2007, the fees need to be raised by 4.6 percent to increase the revenue by 1 trillion KRW.

The scenarios of increasing benefits are as follows. The most essential components of NBLSS are cash and medical benefits. We increase each of them by 0.5 trillion KRW. The National Health Insurance benefits are increased by 1 trillion KRW. In 2007, the total benefits (or the total expenditure in National Health Insurance) were 24.6 trillion KRW. Thus, the benefits from the additional 1 trillion KRW are equivalent to an approximately 4.07 percent increase in benefits. As it is difficult to determine the total amount of education expenditure for colleges or universities, we assume for simplicity that the expenditure (benefits) increases by 500 billion KRW for elementary schools and 250 billion KRW for middle and high schools. Additional benefits per student are calculated by dividing the benefits by the number of students. Childcare benefits are assumed to be increased by 1 trillion KRW; they are assigned equally to suppliers of childcare services and direct recipients. In addition, it is unnecessary to support people who are beneficiaries of the NBLSS and those belonging to the second-lowest income group[17] because they are already 100 percent subsidized. Thus, the additional per capita childcare benefit is calculated based on the share of eligible households which is equivalent to the share of eligible households in the 3rd and 4th income deciles. Housing services consist of (indirect) subsidies for home loans, rental deposits, and operation costs of construction companies building small- and medium-sized houses.[18] The additional housing benefit is assumed to be equally allocated (250 billion KRW each) to the four services.

5.2. *Simulation Results*

An increase in the burden/benefit of 1 trillion KRW results in an approximately 61 thousand KRW burden/benefit increase for each household. The average distributions over income deciles are shown in Table A5 in the online Appendix. The distribution of deciles with positive net benefits is shown in Table 4.

If additional expenditure is devoted to education services, the range of deciles with positive net benefits will become wider. In contrast, the range will become narrower if additional expenditure are devoted to the NBLSS or childcare services.

More specifically, additional education expenditure financed by increases in income tax will result in net benefits for the lower seven deciles (1st–7th) and in net burdens for the upper three deciles (8th–10th). If the expansion of childcare

[17]The second lowest income group consists of households with income reflecting 100–120 percent of the poverty line (or the minimum subsistence level) set by the central government.

[18]Small houses are defined as houses 85 m^2 or smaller in Korea.

TABLE 4

Ranges of Net Benefit Recipient Income Deciles of Increases in Taxes/Benefits

	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Income Tax ⇒ Education	■	■	■	■	■	■	■			
Income Tax ⇒ Childcare	■	■	■	■	■	■				
Income Tax ⇒ National Health Insurance	■	■	■	■	■	■	■			
Income Tax ⇒ NBLSS	■									
VAT ⇒ Education	■	■	■	■	■	■	■			
VAT ⇒ Childcare	■	■	■	■	■	■				
VAT ⇒ Housing	■	■	■	■	■					
Transportation Tax ⇒ Education	■	■	■	■	■	■				
Transportation Tax ⇒ Housing	■	■	■	■	■					
TOBT ⇒ Education		■	■	■	■	■	■		■	
TOBT ⇒ National Health Insurance									■	■
National Health Insurance ⇒ Education	■	■	■	■	■	■	■			
National Health Insurance ⇒ National Health Insurance	■	■	■	■	■	■				
All Five Taxes ⇒ All Five Benefits	■	■	■	■	■					

Notes: Shaded areas denote net benefit recipient deciles.

services is financed by income tax, the burdens will exceed the benefits for the 7th–10th deciles. If the NBLSS is expanded along with increases in the income tax, the benefits will be concentrated only in the first income decile, and thus other deciles will face net burdens. The expansion of fiscal expenditure financed by increases in VAT will produce slightly different results. Education services financed by VAT will yield net benefits for the lower seven deciles and net burdens for the upper three deciles. The expansion of childcare and housing services will yield net burdens for the 7th decile and the 6th decile or higher, respectively. If the expansion of fiscal expenditure is financed by increases in TOBT, where the distribution is severely regressive, the relative burden of low-income deciles will generally increase. If National Health Insurance expenditure is raised by the same increase in the TOBT burden, the net benefits will be concentrated in high-income deciles (9th–10th).

If all the benefits of all five types of expenditure are raised and if the benefits are financed by each of the five taxes, the net benefits will be positive for the lower 50 percent (1st–5th), whereas the upper 50 percent will face net burdens (see the last row in Table 4). The average benefits and burdens per household in the first decile are 868 thousand KRW and 76 thousand KRW, respectively; the net benefits are 791 thousand KRW. The average benefits and burdens per household in the tenth decile are 194 thousand KRW and 697 thousand KRW, respectively; the net burdens are 504 thousand KRW.

Governments often prefer concurrent increases in taxes and benefits. However, the realization of such policies generally depends upon political processes. The major factors affecting policy mixes and final decision making include economic environments, growth, distribution and redistribution, and the philosophy of ruling parties.

The last row in Table 4 shows the overall effects of concurrent increases in all of the burdens and benefits. The households in the lower half of the income

distribution enjoy net benefits, whereas those in the upper half suffer from increased net burdens.

This paper considers only the first-round effects, not the second-round effects or the changes in the behavior of economic agents such as labor supply and savings/consumption. Further, this paper does not focus on long-term effects of taxes/benefits on human capital formation. Therefore, the results of this paper may change if these secondary and/or long-term effects are considered. Although our analysis considers only first-round effects, its primary contribution is the provision of an analytical tool that can predict the expected incidental outcomes of tax/benefit policies to policy/decision makers. Furthermore, this paper contributes by providing an international comparison of tax/benefit analysis under the equivalent analyzing framework of OECD.

6. Conclusions and Implications

Income inequality in Korea has been increasing rapidly, particularly since the 1997 economic crisis, because of globalization, the country's declining economic growth, and a rapidly aging population. One way to address this trend may be reforms in Korea's tax/benefit system so that more net benefits are concentrated in low-income groups. In this regard, this paper estimates the distributions of taxes/benefits and conducts policy simulations.

The total income redistributive effects of taxes and benefits are 13.8 percent in terms of percentage changes in Gini coefficients for "before and after" government intervention in 2007. The income tax is the most progressive, showing the greatest redistributive effect of 3.6 percentage points. It is widely recognized that the burden of consumption taxes is regressive with a large and negative redistributive effect. However, this effect is found to be small and insignificant (–0.5 percentage points). All benefits have positive redistributive effects as expected. Overall, the redistributive effect of in-kind benefits is 6.7 percentage points. Education benefits are the greatest (4.5 percentage points), whereas the benefit concentration index is the highest for the NBLSS.

The simulation results suggest that combining taxes and benefits, such as expanding education expenditure financed by the income tax, has a wide range of support groups in the lower 70 percent of households (1st–7th deciles) and has positive redistributive effects. However, expenditure with a limited range of deciles in terms of net benefits, such as NBLSS (financed by taxes with a regressive burden structure such as TOBT), is unpopular because its coverage is far less than half of all households. Excluding financing by TOBT or LT, which has a very regressive burden structure, any combination (or policy mix) of taxes and benefits has positive redistributive effects. Furthermore, as benefits are more concentrated in low-income deciles, the redistributive effects become stronger. However, such policies may be less popular because they generally narrow the range of deciles with positive net benefits. Therefore, any policy showing strong redistributive effects tends to be popular and likely be implemented if only redistribution issues are considered. However, note that these simulation results are applicable only to the given choice set, and thus different scenarios may lead to different results.

Korea's income redistribution by direct taxes and cash benefits is the smallest among OECD countries. However, the gap between Korea and other OECD countries can be narrowed if in-kind benefits and indirect taxes are incorporated (Garfinkel *et al*., 2006). However, the overall redistributive effects of taxes and benefits in Korea are still very low compared with those in other OECD countries. This is mainly because the relative sizes (or shares) of taxes/benefits are not as large as those of other OECD countries. The taxes and benefits considered in the present paper have positive redistributive effects and are expected to grow rapidly in size. The cash benefits from the National Pension are expected to grow dramatically because of the aging population and maturing of the pension, which can play an important role in reducing the gap between Korea and other OECD countries. If the cash benefits of the national pension and the personal income tax, which is one of the strongest redistributive policy tools, are expanded, Korea's income redistribution structure can come closer to that of New Zealand in taxes and that of the U.S. in cash benefits in the near future as shown in Figure 1.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Table A1. Descriptive Statistics: HIES for the Year 2007 (unit: thousand KRW).
Table A2. Shares of Cash Benefits and Household Taxes in Household Disposable Income; Percentage Shares in the Mid-2000s and Point Changes in These Shares Since the Mid-1990s.
Table A3. Progressivity of Cash Benefits and Household Taxes; Concentration Coefficients for Cash Benefits and Household Taxes, Mid-2000s.
Table A4. Ratios of Taxes/Benefits to Average Values (Decile Share/Average Share) (unit: multiplicity).
Table A5. Effects of Increasing Taxes/Benefits by One Trillion KRW per Household by Income Deciles (unit: KRW).

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