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Analysis of Net Tax Burden in Korea: Evidences from HIDS Data

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Executive Summary

1. Research Background

In recent days, there is an active discussion on the size of the social welfare expenditures. We need to evaluate first on the efficiency of current fiscal expenditure, because the source of the government expenditure is mostly financed by tax. Specifically, we need to investigate whether the expenditure properly attain its original objective, the effectiveness of the short- and long-term expenditures, and the appropriateness of the size of the government expenditures.

In this research, we investigated the burden of net-tax by income decile group. The net tax is defined as the difference between taxes and benefits. A micro-simulation model for the tax-benefit model is started to be developed with the basis of this research.

2. Major Findings

Major findings can be summarized as follows. The overall average amount of the market income per month is 3,430 thousand Won. The monthly amount for the first income decile is 210 thousand Won, 2,830 Won for the fifth dcecile, and 8,920

thousand Won for the richest decile.

Private transfer varies according to the income decile groups. It is 100 thousand Won for the first decile group, 110 thosand Won for the fifth decile group, and 220 thousand Won for the tenth income decile group. On the other hand, the public transfers are heavily concentrated on the lowest income decile group. 380 thousand Won per month for the lowest income decile group. 220 thousand Won for the second lowest income decile group, 130 thousand Won for the third income decile group. For the richest income decile, the amount of the public transfer per month is only 60 thousand Won per month.

Thanks to the public transfers, the total income from the lowest income decile group tose to 800 thousand Won, and 1,610 won for the second income decile group. The amount of the public transfer decreases as the income increase, it is clear that the public transfers serve as a useful policy instrument for the income redistribution.

Regarding income tax burden, the overall burden per household is 130 thousand Won per household. By income deciile, it is zero or very close to zero for the income decile up to the foth decile group, but the tenth (richest) income decile group paid 400 thousand Won per month. These figures are close to Sung Myong-jae et al. (2010) but slightly lower than those of Park Ki-baek (2010). One reason why we have this kind of result is due to the fact that almost lower half of the workers are not

paying income taxes.

For the social security burden is concerned, the average burden per month is 350 thousand Won. It is 30 thousand Won for the lowest income decile group, 60 thousand Won for the second decile group, and the highest income decile group pays 420 thousand Won per month.

The average magnitude for the disposable income is 3,360 thousand Won per month. It is 750 thousand Won for the lowest income decile, 1,530 thousand Won for the second lowest income decile group, 2,920 thousand Won for the fifth income decile group, and 3,360 thousand Won for the highest income decile group.

The overall burden for the value-added tax is 180 thousand Won per month. 80 thousand Won for the lowest income decile group, 110 thousand Won for the second lowest income group, 170 thousand Won for the fifth decile group, and 330 thousand Won for the highest income decile group.

The benefit distribution of the in-kind social benefits by decile can be summarized as follows: 320 thousand Won for the lowest income decile group, 290 thousand Won for the second lowest income deciles group, whereas the amount for the fifth income decile and above is 510-570 thousand Won and is quite stable.

3. Policy Implications

The function of income redistribution by the public transfers is one of the most efficient method for the reduction of the social inequality. Proper efforts must be exercised in order to guarantee the improvement in public transfer mechanism or the elimination of illegal recipients. Also, in-kind transfers are known to be regressive in nature and thus it has only limited implication for the reduction of social inequality.

Although long time and considerable amount of budget are required in developing micro-simulation model, the overall benefits from the model is huge. Therefore, we need to exert all the possible efforts and supports for the development and/or practical application of the model.

Chapter 1

Introduction

1 Introduction

1.1 Motivation

Lately, there have been active debates as to what extent should social welfare spending be expanded. This discussion on the choice between growth and distribution has been the main topic of long ongoing debates. According to a traditional school of thought, spending aimed at income redistribution makes resources used for unproductive areas, so this camp believes that it lowers economic efficiency or otherwise raises tax burden. In other words, growing expenditures for redistribution result in slower growth and rising unemployment and thus impedes the growth of household incomes. Those against this idea, on the other hand, claim that better distribution advances social integration, and economic growth is promoted when the financial resources are replenished through increased savings.

Yet it seems there are not sufficient debates over the short- and long-term effects social welfare spending on various sectors have on economic growth, employment and inflation. The chance is that progress in low birth rate and growing average life expectancy and consequent rapidly aging society would further exacerbate income gap and poverty in the future. Worse yet, changing external factors like tapering of quantita-

tive easing in the United States are likely to weigh heavily on Korea. Continuous increase in social welfare spending without consideration on the soundness of fiscal balance is not desirable. Therefore, assessment on how effective government spending is made should now take place beforehand so that we can use limited resources efficiently. In detail, discussion has to be carried out to see on what purpose financial expenditures on each area are spent, what economic benefits are expected in a medium- to long-run, and whether the size of such spending is appropriate or not.

1.2 Research Objective and Organization

Since fiscal spending varies widely in their composition, it is not simple to examine the impact on each income group. Specifically, it is hard to evaluate how much each individual is benefiting from pure public goods and non-pure public goods. Pure public goods, for instance, are impossible to exclude and non-competitive in their character so it is not possible to measure how much they are consumed and what are their prices. This nature makes it difficult to quantitatively analyze the size of the benefits each individual enjoys. Meanwhile, non-pure public goods are consumed at lower than going rate as government subsidizes them, so it is not easy to find their right market price.

The purpose of this study is to primarily look at the effect of income redistribution of major social welfare expenditures and taxes. Then based on this finding, a tax-benefit micro-simulation model actually applicable for the policy authority will be developed. This development process involves lengthy efforts and considerable budget but our intention is to develop a model that can be applied by the policy authority in reality as earliest as possible, starting with this study.

The structure of this study is as follows: The second section reviews previous results on this issue, followed by the introduction on the procedure and the data necessary to analyze the tax burden and the distribution of social benefits for each income group and the distribution of net tax burden in the next section. In the fourth chapter, the results of the analysis of the distribution of the net tax burden are presented, with the summary of the results, policy implications and the direction for future study being covered in the last section.

Chapter 2
Summary of Previous Literature

2 Summary of Previous Literature

2.1 Analysis of Pure Public Goods

(1) Behavioral Approach

There are broadly two kinds of studies on the income redistribution effects of fiscal spending: behavioral approach and benefit approach. Here, behavioral approach is a method of directly estimating individual preference and it began with a research by Aaron and McGuire (1970). These two scholars illustrated that the estimated amount of household public goods is inversely proportional to marginal utility of income and they used this finding to propose the criteria for distributing the benefits of public goods. The researches performed based on such behavioral approach in Korea are the studies by Shim Sang-Dal (1988), Park Ki-Baek et al. (2004), Sung Myung-Jae and Park Ki-Baek (2008), and Cho Kyung-Yeop (2009).

The character of this approach is that income elasticity of marginal utility is directly estimated using time-series data and the spending on pure public goods are attributed to each income decile depending on this estimated size of elasticity.[1)]

1) It is based on the Lindahl equilibrium that every household consumes the

According to this view, if income elasticity of marginal utility is over 1, the benefits of public goods are progressively distributed to income and if such elasticity is less than 1 then these benefits are distributed regressively (Aaron and McGuire, 1970). Shim Sang-Dal (1998) estimated that elasticity is 1.03~1.17 when using consumption expenditure data of the urban household panel study during 1963~1985 and he believed that the benefits derived from public goods are progressive over income deciles. Park Ki-Baek et al. (2004) broke down consumption goods into ten categories by using urban household panel study data for the period of 1965~2003 to estimate income elasticity. It turned out that this elasticity amounts to 1.164~1.182, which is larger than 1 so the benefits from public goods in Korea has a progressive relationship with income.

Cho Kyung-Yeop (2009) also used behavioral approach to analyze the attribution of the benefits from pure public goods on an income decile level but he employed the lower limit value of 1.164 of Park Ki-Baek et al. (2004) instead of directly estimating income elasticity. Another difference with the two previous studies is that a general equilibrium model is adopted to review both direct and indirect impact of pure public goods.

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same amount of public goods and its details can be referred from a research of Shim Sang-Dal (1988) or Cho Kyung-Yeop (2009).

(2) Benefit Approach

Benefit approach is a standard method employed for a research on the attribution of the benefits from non-pure public goods. Here non-pure public goods are goods or services like health, medicine, education and social overhead capital that can be consumed by a household at a low price as the government subsidizes them. This approach estimates the distribution of benefits as per income decile by viewing government subsidies (or spending) as benefits because the demand for non-pure public goods is hard to estimate precisely. Arbitrary distribution criteria is applied on certain government expenditures or subsidies and it is distributed to household income; this income before and after this attribution is compared to figure out the extent of redistribution effect.

The study using this approach originated from Meerman (1979) and the notable advocates of this method in Korea are Shim Sang-Dal (1988) and Park Ki-Baek et al. (2004). Shim Sang-Dal (1988) classified fiscal spending excluding public goods into six categories: educational expenditures, social security expenditures, social development expenditures, industrial development expenditures, land and resource development expenditures, and R&D expenditures - and set an attribution hypothesis of each fiscal spending.

The criteria Shim Sang-Dal (1988) applied to distribute such

spending is as follows: Educational expenditures are broken down into expenses for elementary school education, secondary school education, university education, and other educations and they are distributed to each income decile using the share of household member in each age decile. In case of social security expenses, 50% of job training spending are distributed depending on the number of the employed per each income decile and the rest 50% are distributed in accordance with the number of family members in the ages of 21~29. Medical insurance expenditures are distributed pursuant to the number of public official and educator family members. Fifty percent of household spending, among social development expenses, are distributed based on the number of households without houses and the balance 50% are distributed according to the number of households, viewing this figure as improvement in the housing environment. The benefits from R&D expenses are assumed to be divided between producers and consumers, so 50% of them are distributed based on business income expenses and the remaining 50% depending on the total consumption spending. What is unique in Shim Sang-Dal's research is that it examined the propagation effects of fiscal spending through an inter-industry analysis, but it did not consider inter-industry effect and the attribution of benefits at the same time.

Park Ki-Baek et al. (2004) proposed the distribution criteria

for education expenses, medical expenditures and medical benefits. First of all, education expenses are divided into elementary, middle and high school expenditures, university spending and other expenses, and the per-capita education spending are calculated by dividing educational expenses with the count of students in the category in question. Then the resulting amount is distributed based on the proportion of sample in population. Medical expenses are distributed in proportion to health care expenses and medical benefit spending, and national health insurance contributions are distributed across entire households. Medical benefits are distributed on the basis of the amount recognized as income under the National Basic Living Security Act.[2)]

2.2 Summary of Previous Literature

Choi Gwang and Lee Sung-Kyu (2011) pointed out that the progress of welfare state brings about bigger scale of tax-welfare churning, in which the welfare benefits financed from the identical persons go back to them again. They suggested a trade-off between lowering of income tax and scaling back of welfare spending on the middle decile as a political solution to reduce this size.[3)]

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2) As such, distribution criteria of the benefits from non-pure public goods can considerably differ depending on the judgments of researchers.

Kim Tae-Il (2009) analyzed the benefit distribution of government transfer expenditures for each income decile of income earners and looked at tax spending (earned income tax deduction) besides explicit financial resources such as subsidies. The benefits of subsidies (not including public pension) per each income decile are progressive but those of tax spending are regressive. Since the scale of tax spending benefits is bigger than that of subsidies, the overall picture is regressive. Income tax exemption and child-care allowance designed to ease child-rearing burden have differing effects, but he argued that subsidies are more valid if we are to achieve the original intention of 'alleviating child-rearing burden.'[4)]

Lee Jun-Koo and Lee Sang-Young (1996) used the 1993 KHPS data of Daewoo Economic Research Institute to re-examine the claim that progressiveness of tax burden has gained ground in the mid-1990s. They explicitly considered wide-ranging tax evasion and pointed out that the progressiveness of tax burden in Korea is exaggerated.[5)] According to their argument, actual tax burden is much more regressive than it is popularly known.

Hyun Jin-KWon and Na Sung-Rin (1994a) consolidated urban

3) Choi Gwang and Lee Sung-Kyu (2011), "Tax-Welfare Churning and Ways to Reduce It," Public Finance Study 4 (1), 67-109.
4) Kim Tae-Il (2009), "Analysis of the Effect of Government Fiscal Spending on Households by Income decile," presentation for the 2nd National Survey of Tax and Benefit Symposium.
5) Lee Jun-Koo and Lee Sang-Young (1996), "Income Redistribution Effect of Korean Tax System," Journal of Economics 35 (2·3).

household panel study data and agricultural household panel study data of 1991 to mitigate the issue of sample representativeness of urban household panel study and they analyzed income tax burden of 82.4% households. Sample grossing-up method was first introduced to this instance. Average share of city income burden is 6.6% and that for rural area is 1.7%. Income tax distribution of urban households is relatively progressive and income tax burden in general is progressive. Average share of this burden is 5.8%. The income redistribution effect on city households is shown to be relatively larger. When measured on all households, income tax is said to improve Gini's coefficient by 5.2%.[6)]

Hyun Jin-KWon and Na Sung-Rin (1994b) employed consumption data of non-worker households from a 1987 KHPS study to estimate consumption function and calculate their real income. The house ownership pattern and the number of household members are critical to consumption spending and estimated incomes are thought to mirror the reality better than surveyed incomes. The rates of income tax burden and value-added tax burden for entire urban households are respectively 2.94% and 3.73%. They insisted that tax burden of worker households is bigger than that of non-worker households. The burden of income tax is progressive but the

6) Hyun Jin-KWon and Na Sung-Rin (1994a), "Analysis of Tax Burden of Korean Income Tax System: Empirical Results using the Combined Data of City and Rural Households," Economics Study 42 (1), 189-208.

rate of this tax burden for income decile 10 is lower than those for income deciles 8 and 9. But burden of value-added tax is regressive so the burden for income decile 1 is the highest with 9.39% and that for income decile 10 is the lowest with 2.17%. Income tax burden for worker households is more progressive and the effect of redistribution is also consequently more pronounced in worker households. Finally, they stressed a need to pay attention to horizontal equity along with vertical equity.[7)]

Park Ki-Baek et al. (2004) broke down fiscal expenditures into transfer expenses, pure public goods and non-pure public goods, and analyzed the direct income redistribution functions of such expenditures. This study analyzed what impact do government fiscal spending have on individual disposal income and consumption. It was revealed that government spending on pure public goods like defense, security, administration and diplomacy somewhat worsen income distribution while its spending on matters such as housing, education and medical service improve income distribution based on disposable income. Net taxes, a combination of government's transfer income and tax, are found to make income distribution better.

A recent research by Sung Myung-Jae et al. (2010) covers in depth the distribution of tax burdens and benefits while in the course of the Korea Institute of Public Finance establishing the

7) Hyun Jin-KWon and Na Sung-Rin (1994b), "Measuring the Equity of Korean Tax System: Focused on the Tax Burden Gap between Worker Households and Non-Worker Households," Economics Study 41 (3), 147-180.

a static tax and public finance simulation model. Its key features are that it directly takes into account behavioral changes of other economic players resulting from institutional shifts and it includes an estimation model of social insurance fees. Also the elasticity of labor supply is directly estimated and the resulting value is used, but it failed to reach to the point where any change in labor supply is inherently determined in the model.[8)]

2.3 Tax-Benefit Model

There are two possible ways of developing tax-benefit model by combining micro survey data. One is to develop an micro-simulation model that can handle household heterogeneity, and the second is to incorporate the micro data into the computable general equilibrium (CGE) model.

The first dynamic micro-simulation model was developed by the Guy Orcutt (1957) in the paper titled ""A new type of socio-economic system (Review of Economics and Statistics)." Since then, there were rapid development in both the modern computer technology and the econometric/statistical software. In addition to that, it was also possible to access the household panel data as well as the administrative data on tax payment.

8) For now, this model is believed to be the most advanced among Korean researches and this study is also benchmarking this model.

If there were some heterogeneity in individuals, the representative model by Ramsey-Cass-Koopmans model has limitation in explaining real life. Thus the distribution of the heterogeneity of the unit of analysis (usually households and/or individuals) can be analyzed by the method of simulation. With this methodology, it is possible to analyze the non-linear relationship between tax and benefit or the composition effects of the heterogeneity. It can also serve as a useful tool for the prediction of pension wealth that is determined by the individual's work history.

With these distinctive features, micro-simulation models can be used in various applied fields such as tax-benefit model, pension, long-term population projection, health care, and long-term care. But survey data alone cannot provide us with proper answer to our questions in hand. Therefore, in the micro-simulation model, it is necessary to compile the consolidated synthetic database with the surveys and/or administrative data. In this step, it is required to reconcile the data discrepancies and to fill up the missing information by the imputation.

In case of Canada, which is one of the leading country in the world, began to develop micro-simulation model as early as in 1984, and have fifteen models so far (See Figure 1). In Canada, ModGen which is based upon C language is the most popular simulation language for the development of the micro-simu-

lation model. The development of the models was mostly carried out by the consortium of Government, Universities and research institutions. The models currently in use are as follows:

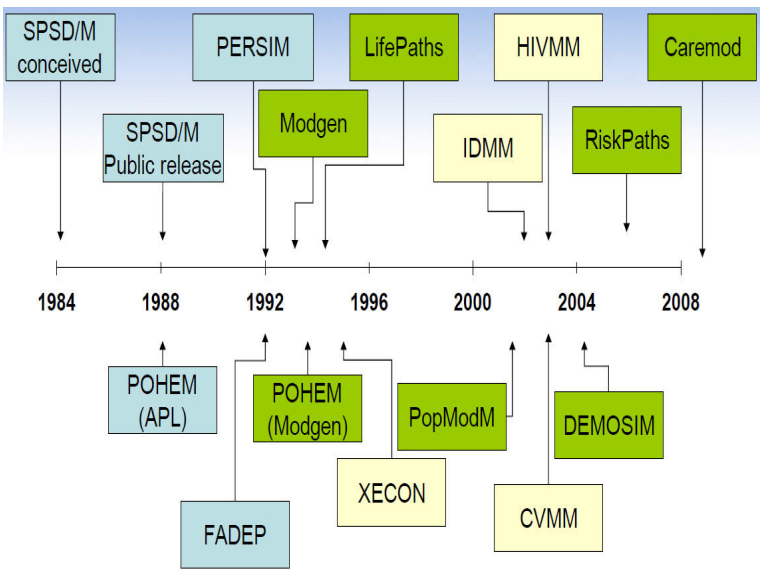
- Static tax-benefit model, SPSD/M, Modeling Division
- large scale general purpse socio-economic lodels, LifePaths, Modeling Division
- population projection model, Demosim, Demography Division
- health-disease model, Pohem, Health Analysis Division
- and many others

SPSD/M, developed by the Statistics Canada, is a static micro-simulation model for the tax-transfer model for the period of 1991-2015. It does not consider the behavioral change of the agent and just analyze the tax burden and consumption of the eleven types of commodities. Four data bases (SLID, EL, SHS, and Income Tax) are used to make synthetic database which is composed of 200 thousand individuals. For the user interface, ModGen (base language is C++) is used, and the programmers are mainly responsible for the development and maintenance of the model.

The LifePaths model contains the behavioral equations estimated from the micro data, and has longitudinal and cross-sectional consistency. It can serve as a fundamental steps

in consolidating the data, and provide detailed information on the distributions, and estimate the maximum level of income before retirement based upon individual's life-time income, and finally [provide an answer to the hypothetical questions, such as replacement rate, etc.

Figure 1. Development profess of the Canadian MS model



source: Spielauer, M. (2012), "Microsimulation and Public Policy: Issues and Prospects." http://www.spielauer.ca/Auckland_MS.pdf

The usefulness of the micro-simulation model is very large in the planning and actual performing stages of the social policy, because the model can provide meaningful answers to the hypothetical questions. More specifically, we can compare the policy effectiveness and/or social equity among alternatives,

and also distinguish beforehand the winners and/or the loosers of the economic agents due to the policy change.

In the next section, the distribution of the tax and the social benefit in Korea will be presented.

Chapter 3

Data and Methodology

3 Data and Methodology

3.1 Analysis of the Distribution of Tax Burden

We first investigate the tax and social security burdens from the macro-economic standpoint. Since 1970, The ratio of tax burden to nominal GDP in Korea rose steadily to peak of 21% in 2007. Since then, It has been decreased to 19.8% as of 2011.

Social security burden has grown steadily and reached to 6.1% as of 2011. The national burden (i.e., total tax burden), which is the sum of tax burden and social security burden, stands at 25.9%.

Table 2 summarizes the itemized tax revenue for various years. The Government of Korea does not provide the so-called 'scientific tax data' to the researchers in Korea, though many countries provide it to allow researchers to analyze tax burden and benefits. Since micro-level data is necessary to make an analysis of tax burden and benefits, there is no other way but to employ household panel study data supplied by other agencies. The data available now are HIDS data by the Statistics Korea; KOWEPS data of the Korea Institute of Health and Social Welfares; KLIPS data of the Korea Labor Institute and the Korea Employment Information Service; Korean Retirement

and Income Study data of the Institute of National Pension Service; and National Survey of Tax and Benefit data of the Korea Institute of Public Finance. But none of them stands out to dominate all others, so we will review tax and social security burden by using 2010 HIDS data of the Statistics Korea.

Table 1. Trends of Tax and Social Security Burdens

(billion Won)

	Tax (A)	Social security burden (B)	Tax and social security burden (C=A+B)	GDP (in current prices) (D)	Tax burden (%) A/D	Social security burden (%) B/D	Public burden (%) C/D
1970	398			2,775	14.3		
1975	1,550	13	1,565	10,478	14.8	0.1	14.9
1980	6,575	73	6,687	39,110	16.8	0.2	17.1
1985	13,531	207	13,766	85,699	15.8	0.2	16.1
1990	33,215	3,760	37,262	191,383	17.4	2.0	19.5
1995	72,091	9,913	82,003	409,654	17.6	2.4	20.0
2000	113,535	22,759	136,295	603,236	18.8	3.8	22.6
2005	163,443	43,902	207,345	865,241	18.9	5.1	24.0
2006	179,338	48,255	227,592	908,744	19.7	5.3	25.0
2007	204,983	53,588	258,571	975,013	21.0	5.5	26.5
2008	212,786	59,415	272,201	1,026,452	20.7	5.8	26.5
2009	209,709	62,165	271,873	1,065,037	19.7	5.8	25.5
2010	226,878	67,129	294,007	1,172,803	19.3	5.7	25.1
2011	244,681	75,316	319,997	1,237,128	19.8	6.1	25.9

Sources: MOFE and NTS.

Table 2. Itemized Tax Revenues

(Billion Won)

	2005	2008	2009	2010	2011
Total	20,423.7	157,528.6	154,330.5	166,014.9	180,153.2
○ Internal tax	104,427.9	136,556.3	36,476.9	43,506.1	59,601.8
- Direct tax	56,327.2	78,286.7	72,105.0	77,806.2	77,806.2
• Income tax	24,650.5	36,355.1	34,423.3	37,461.9	42,287.7
• Corporate tax	29,805.5	39,154.5	35,251.4	37,268.2	44,872.8
• Excessively increased valuable land tax	-	-	-	-	-
• Inheritance tax	702.0	1,181.7	1,220.7	1,202.8	1,258.6
• Gift tax	1,170.9	1,595.3	1,209.6	1,873.3	2,074.1
• Asset revaluation tax	-1.7	-	-	0.0	0.1
- Indirect tax	45,483.5	53,936.1	56,931.6	60,732.4	64,252.1
• Value added tax	36,118.6	43,819.8	46,991.5	49,121.2	51,906.9
• Individual/special consumption tax	4,399.5	4,499.4	3,642.0	5,065.8	5,537.3
• Liquor tax	2,595.1	2,829.4	2,764.1	2,878.2	2,529.3
• Telephone tax	-0.3	0.0	0.0	0.0	0.0
• Securities transaction tax	2,370.5	2,787.5	3,533.9	3,667.1	4,278.7
- Stamp duty	500.0	572.9	543.7	521.9	623.9
- Carry-over from previous year	2,117.2	3,760.7	6,896.6	4,445.6	4,232.4
○ Traffic/energy/ environment tax	10,287.8	11,909.3	10,092.0	13,970.1	11,546.0
○ Defense duty	-8.6	0.3	0.2	0.5	0.2
○ Education tax	3,526.6	4,175.7	3,751.2	4,642.7	4,244.5
○ Special tax for rural development	1,748.8	2,757.2	2,803.2	2,866.6	3,658.8
○ Comprehensive real estate holding tax	441.3	2,129.9	1,207.1	1,028.9	1,101.9

Sources: NTS, Statistical Yearbook of National Tax (each year).

(1) Tax Burden

A. Direct Tax

The size of income tax was calculated by adding up ordinary income tax, non-ordinary income tax and business income tax. Property tax is a total of ordinary property tax and non-ordinary property tax.

B. Indirect Tax

Value added tax in Korea is one of the representative indirect taxes and its tax rate is 10%. Some daily necessities and services are exempt from this tax and such examples are tap water, briquette, book costs, housing rent, medical and health service, and education service. Tax exemption items such as briquette (C364), health (C433), book (C546) and education (C563) are distinguishable in the HIDS data, so they were not included in estimating value added tax burden.

Automobile-related tax burdens could not be calculated because HIDS data (Statistics Korea) does not contain information on displacement volumes although it includes that for vehicle purchasing costs. The same limitation also prevented us from estimating the burdens of vehicle ownership taxes.

The data covers the fuel cost of vehicles (C464) as a gaso-

line-related item. Yet there are many tax items that are applicable and they follow a specific duty mechanism. As this task called for information on gasoline price, no estimation is made on gasoline-related tax burdens in this research.

Tobacco consumption tax is imposed in accordance with the count or the volume. A pack of cigarette in Korea is subject to a total of 1,564.5 Won in tax, a combination of three taxes (641 Won in tobacco consumption tax, 320.5 Won in local education tax, and 227 Won in value added tax) and three charges (7 Won in waste charge, 354 Won in nation's health promotion fund charge, and 15 Won in tobacco stabilization fund charge). This charge is identically levied on a packet of cigarette, regardless of its price. But KHPS data's deficiency of cigarette consumption data hinders us from analyzing tobacco consumption tax. Still, tax burden arising out of tobacco consumption can be calculated since the National Survey of Tax and Benefits (by KIPF) investigated both the amount of cigarette consumption spending and tobacco prices.

Tax rates on liquor vary by the factory price or imported price depending on the type of alcohol involved. Five percent tax rate on raw rice wine, 72% on beer and distilled spirits, and 30% on wine and refined rice wine are applied. Ten percent local education tax is added on top, but this tax is not applied to unrefined rice wine, clear rice wine and ethanol, even though beer or distilled spirits are subject to 30% of this tax.

Table 3. Liquor Tax Table (as of January 1, 2010)

Name of liquor		Alcoholic content of liquor	Liquor tax rate[1]	Education tax rate[2]	Remark
Fermented alcohol	Unrefined rice wine	7	5%	-	
	Clear rice wine	11	30%	-	
	Wine	12	30% (15%)	10%	
	Refined rice wine	16	30%	10%	
	Beer	4	72%	30%	
Distilled spirits			72%	30%	Soju, whisky, brandy, general distilled spirits, liquor
Other liquors			72%	30%	Alcohols of category a, c or e in annex table no.4
			10%	10%	Alcohol in category c in annex table no.4, whose non-volatile portion is at least 30 degrees
			30%	10%	Alcohol in category b in annex table no.4
Ethanol		95	57,000 Won/kl		600 Won is added per every additional 1 degree in alcoholic content

Notes: 1) Any folk or farmer alcohol whose consumption is no more than 200kl annually (at most 100kl for distilled spirits) is subject to 50% less general liquor tax rate.

2) Alcohol whose liquor tax rate is over 70% is subject to 30% in education tax rate and alcohol whose liquor tax rate is no more than 70% is subject to 10% in education tax rate. No education tax is imposed on unrefined rice wine, clear rice wine and ethanol.

(2) Social Insurance Burden

Social insurance system bodes heavily on the incomes of households. In Korea, there are national pension, national health insurance, employment insurance, occupational safety

and health insurance and elderly long-term care insurance. This system is aimed at realizing the basic ideal of a welfare state, "maintaining the humanistic life," and the state often makes its subscription compulsory for any social decile needing this service.

All citizens in the ages between 18 and 60 are subject to the national pension, and this insurance is mandatory for those involved in certain income-earning activities. The number of its subscribers as of late 2010 was 19.229 million, 77.7% of 24.748 millions of economically active population.[9] In addition, there are 1.052 million members for government employees pension and 0.305 million members for teachers pension, both of which are so-called special occupation pensions.[10]

In case of national health insurance, it is applied to entire population and the one with income becomes its member and the one without any income is a dependent of this insurance. As of the end of 2010, there were 48.759 million people who are subscribing this insurance. The burden of national health insurance cost differs by whether you are a worker or not, and 5.08% of this cost is levied on the income of each worker. If there is one worker in a given family, other wage earning family members were considered as dependents and thus not sub-

9) The number of people who have history of enrolled in national pension service in the past stands at 3~4 million.

10) They are not explicitly considered in this study as they cover relatively smaller range of population and there is a gap between the criteria of income subject to premiums and nominal income.

jected to this cost. Meanwhile, if there is no earned income in a given household, the consumption spending level of this household is regarded as the proxy representing its income and this household is applied with insurance cost at a rate of 5.08%. But national health insurance cost is calculated after taking into account the different average burden of such premium between locally insured person and insured worker.[11)]

The burden of elderly long-term care insurance is linked with that of national health insurance and the rate varies depending on whether you are a worker or not. The rate of this insurance for a given worker is also 5.08% and that for others such as the self-employed or no-income earner is 6.55%.

Employment insurance is provided as part of the unemployment benefit project and the employment stabilization and vocational competency development project. Those who can subscribe to this insurance is a workplace that has one or more employees or a worker who is working at any construction site of a certain size. There are 10.131 million subscribers, which are 40.9% of economically active population as of the end of 2010.[12)]. Unemployment benefits are 0.9%, which are levied evenly for both the workers and the employer. But no estimation is needed for the burden of the employment stabilization

11) For national health insurance, it is said that locally insured workers pay 90% of this cost compared with insured workers.

12) The reason why the size of employment insurance subscribers is small is because this insurance is applied to wage earners, who account for mere 70% of the total employed.

and vocational competency development project on households since the entire expense of its premium is paid by employer.

Occupational health and safety insurance is a social insurance levied entirely by employer and there are 14.199 million subscribers, 57.4% of economically active population, as of December 2010.[13)]

3.2 Analysis of the Distribution of Benefits

(1) Expenditures on Pure Public Goods

This study defined "public administration and defense" contained in a 2010 inter-industry relations table as pure public goods. The government in 2010 spent a total of 64,137.5 billion Won on "public administration and defense" and it was distributed to each income decile based on its disposable income. Here, 1.164, as estimated by Park Ki-Baek et al. (1984), was used for income elasticity of the efficiency required for this distribution. This elasticity is close to the lower limit value of Park Ki-Baek et al. (1984), but near to the upper limit value of Shim Sang-Dal (1988). The benefit of pure public goods distributed to income decile 1 is only 1,162.1 billion Won but the

13) Since occupational health and safety insurance is entirely borne by mployer, it is not included in this analysis.

amount for income decile 10 reaches 18,328.2 billion Won, as it progressively increases in income deciles.[14]

(2) Transfer Income

The figure below indicates the concept of income that is commonly used. Market income is an income earned for supplying labor and capital, and is gained mainly through market activities.[15] Private income is the sum of market income and ordinary private transfer income. Gross income is obtained by adding transfer income to private income, and disposable income is obtained by deducting direct tax and social security contributions from this gross income. Post-tax income equals disposable income net of consumption tax (or indirect tax). Final income is the sum of post-tax income and in-kind benefits. Consumption tax includes value added tax, special consumption tax, transportation tax, fuel tax, tobacco consumption tax (surtax on consumption tax), and education tax. There are several in-kind benefits, such as medical benefits, health insurance, education, child-care and housing for the recipients of the National Basic Livelihood Security System.

14) The reason why it is distributed progressively is because income elasticity value of efficiency function is over 1.
15) It is also called 'primary income' depending on researchers.

Table 4. Distribution of the Benefits from Pure Public Goods

(10,000 Won, point, 1 billion Won)

Income Deciles	Disposable income	Scale	%	Distributed benefits
1	623	1.0000	0.0181	1,162.1
2	1,189	2.1205	0.0384	2,464.4
3	1,557	2.9034	0.0526	3,374.2
4	1,848	3.5454	0.0642	4,120.3
5	2,130	4.1822	0.0758	4,860.3
6	2,405	4.8165	0.0873	5,597.5
7	2,763	5.6608	0.1026	6,578.7
8	3,206	6.7303	0.1220	7,821.6
9	3,902	8.4588	0.1533	9,830.4
10	6,663	15.7709	0.2858	18,328.2
Total	26,290		1.0000	64,137.5

Note: Calculated from the raw data of HIDS

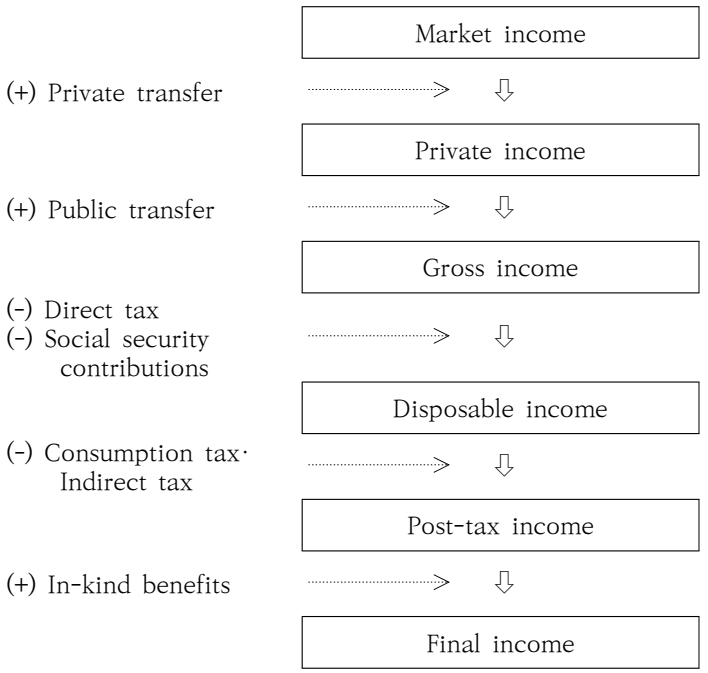
(3) In-kind Benefits

Fiscal spending is given to the public in the form of either cash benefits or in-kind benefits. The former is intended for directly increasing household's disposable income and thus raising welfare standards. Cash benefits, public pension and unemployment benefits of National Basic Livelihood Security System are included in this category. Meanwhile, in-kind benefits refer to the benefits supplied in the form of service: national health insurance and medical benefits, a sort of medical-related government support, in addition to education serv-

ice belong to this category.[16] Service benefits provided to all citizens, such as defense or security service, also decileified as in-kind benefits. In this paper, focus of analysis is put only on national health insurance because there are no medical cost expenditures involving medical benefits, a type of in-kind benefits given to the households that receive the supports of National Basic Livelihood Security System.

16) There are government-run medical institutions like health center but they are not included in this undertaking as it is hard to collect their statistical data such as their actual use and paid amounts.

Figure 2. Classification of Incomes by Type



Source: Sung, Myung-Jae et al. (2010)

A. In-kind Benefits under National Basic Livelihood Security System

The benefits from the National Basic Livelihood Security System are cash benefits, medical benefits and educational benefits. We focus only on medical benefits and educational benefits. These benefits are applicable to the recipients of this

system whose recognized monthly average income is less than minimum livelihood expenses and those who do not have any dependent defined under the law.[17)]

The size of per-capita average medical benefits as of 2010 is approximately 3.15 million Won, so the amount of medical benefits a household receives is calculated depending on the number of household members.

Table 5. Average Medical Benefits

(10,000 Won)

	2000	2005	2008	2010
Per-capita average medical benefits	50.8	125.7	205.9	275.0

Source: NTS, Statistical Yearbook of National Tax (various years)

Educational benefits for elementary school students are paid out in the amount of 37,500 Won a person (once a year) to cover auxiliary textbook expenses and the same amount (once a year), and 51,000 Won of per-capita school supplies expenditures is paid out for middle-school students. The entire expenses for enrollment and tuition fees are paid out for high-school students and 125,900 Won in textbook expenses (including auxiliary textbook expenditures) per person and 51,000 Won a person for school supplies are subsidized

17) When the criteria for dependent is taken into consideration, a person whose private income is lower than 83.7% of minimum livelihood expenses is eligible for this benefit (Sung Myung-Jae, et al., 2010)

additionally.[18] But enrollment and tuition fees vary by location and this information is missing in our micro data, so it was not reflected in this study. Educational benefits were distributed in accordance with the number of households with elementary-school, middle-school or high-school aged students.

Finaly, in-kind benefits under the National Basic Livelihood Security System were calculated as a sum of medical benefits and educational benefits.

B. National Health Insurance Benefits

National health insurance is an in-kind benefit as the National Health Insurance Service is directly paying the involved expenses to hospitals and pharmacies. Total medical expenses in 2010 were 43,657 billion Won, out of which 11,160.2 billion Won (25.56%) and 32,496.8 billion Won (74.44%) were each borne by the insured person and the National Health Insurance Service as medical care expenses.[19] National health insurance is applied to all Korean population and the benefits are given to only those who visit medical institutions. Therefore, medical expenses were calculated using micro data and benefits were distributed in proportion to these figures. Outpatient medical expenditures, hospitalization costs

18) See 'Bokjiro' (http://www.bokjiro.go.kr/)
19) Statistical Yearbook of National Tax (http://www.finomy.com/news/articleView.html?idxno=83).

and medicine expenses fall under this medical expense category and a household which does not have any medical spending receives no national health insurance benefits. A person who receives medical benefits from the National Basic Livelihood Security system, was not considered as the recipients of national health insurance coverage.

Table 6. Population and Benefit Size of National Health Insurance

(10,000, 1 billion Won, 10,000 Won, %)

	1995	2000	2005	2010
Applicable population (year-end)	4,401.6	4,589.6	4,739.2	4,890.7
Total medical expenses (1 billion Won)	5,977.5	12,912.2	24,861.5	43,628.3
Total benefits (1 billion Won)	3,835.3	8,789.3	17,988.6	32,496.8
Per-capita medical expenses (10,000 Won)	13.6	28.1	52.5	89.5
Share borne by the insured(%)	35.8	31.9	27.6	25.6

Source: NTS, Statistical Yearbook of National Tax (various years)

For your information, a gross amount of livelihood benefits, housing benefits, educational benefits, childbirth benefits and funeral benefits paid out to basic livelihood protection subsidy beneficiaries stands at 3,977.8 billion Won.[20)]

20) Pursuant to Table 6-1-8 (p. 346) of *Statistical Yearbook of Health and Welfare*.

C. Educational and Child-care Benefits

The third category of in-kind benefits are supports for educational and child-care services. Primary beneficiaries of education service are students and the distribution of education expenditures vary widely by region, by student gender or by school type. Typically, a big difference in the size and extent of benefits is witnessed school-to-school depending on their individual features even if schools are located in the same region. However the micro data we adopted lacks information on these individual characteristics.

Table 7. The Amount of Subsidies per Student of each School

(10,000 Won)

	Elementary-school student	Middle-school student	High-school student	University student
2000	69.6	89.7	98.1	37.5
2003	79.4	133.4	188.1	38.5
2005	91.7	144.5	197.0	44.6
2008	153.1	189.4	248.1	69.5
2009	162.2	192.5	241.2	89.2

Source: Sung Myung-Jae, et al (2010).

This deficiency of micro data prevented us from estimating the size of educational and child-care benefits. Sung Myung-Jae, et al. (2010) assumed average amount of benefits per student in a school unit as the amount of educational bene-

fits and divided the totals by the number of students of each household. Tally is made again by each household to investigate the distribution of such benefits.

Table 8. The Number of Students and Budgets for Schools (2010)

(1,000 persons, 1 billion Won, 10,000 Won)

	Elementary-school student	Middle-school student	High-school student
Number of students (1,000 persons)	3,299.1	1,974.8	1,962.4
Tax budget (1 billion Won)	6,181.1	4,237.4	5,199.8
Per-capita budget (10,000 Won)	187.4	214.6	265.0

Source: MOE, Statistical Yearbook of Education (various years).

Table 9. The Number of Students and Budgets for High-School Courses (2010)

(1,000 persons, 1 billion Won, 10,000 Won)

	Number of students (1,000 persons)	Tax budget (1 billion Won)	Per-capita budget (10,000 Won)
2010	2,345.5	41,297.8	176.1

Source: MOE, Statistical Yearbook of Education (various years).

Table 10. Per-Capita Government Subsidies by Course (2010)

(10,000 Won)

	Elementary-school student	Middle-school student	High-school student	University student
2010	187.4	214.6	265.0	123.3

Source: MOE, Statistical Yearbook of Education (various years).

D. Child-care Service

child-care related support was the duty of the Ministry of Health and Welfare for a long time but this responsibility has been transferred to the Ministry of Gender Equality and Family since 2003 as it was newly established then. child-care-related expenditures are borne by both the central government and local governments, and this could somewhat differ by local government.[21] The size of the general budget of the central government in 2010 was 2,127.5 billion Won.

As is demonstrated in the table below, most of the child-care budget is spent on subsidizing the infant and toddler child-care fees, accounting for 76.7% of total (as of 2010). child-care budget in 2010 jumped considerably by 24.4% from previous year and the child-care subsidy, which occupies the largest

21) The share borne by local government is higher in Seoul. But other than Seoul area, the breakdown is almost half and half between the central government and local government.

share, grew by 27.3% year on year.

Table 11. Size and Composition of Child-care Budget (2010)

(1 billion Won, %)

	2009	2010	2010 (%, composition)	Growth rate (%, in 2010)
child-care budget	1,710.4	2,127.5	100.0	24.4
- Support for child-care facilities operational expenses	339.9	349.5	16.4	2.8
- Support for infant and toddler child-care expenses	1,282.2	1,632.2	76.7	27.3
- Reinforcement of child-care facilities functions	21.2	9.4	0.4	-55.7
- Establishment of child-care infrastructure	16.4	12.2	0.6	-25.6

Source: http://www.kcpi.or.kr/site/hp2/contents/information/information03_1.jsp

Estimated population of the Statistics Korea illustrates that there are 2.725 million toddlers and infants in the age decile of 0~5 as of 2010. Among them, 1.28 million are attending child-care facilities and 665,000 of them are low-income decile infant and toddler users. Majority of child-care budget is spent on providing supports and child-care facilities for toddlers and infants. The former is not granted to all parents of these infants and toddlers, and it is an in-kind benefit offered to a demographic decile in the age of 0~5 who are attending child-care facilities.[22)]

22) The subsidies are directly paid out to child-care facilities, so they are

The child-care expense supports for toddlers and infants can be broken down into differentiated subsidies varying by different income levels and subsidies given to those who satisfy certain qualifications. Differentiated child-care expense supports cover the toddlers and infants of low-income decile in the age decile of 0~4 and child-care expense subsidies granted to a family with at least two children are just given out to its second child in the age of 5 or younger when this household in question has income level lower than the monthly average income of city worker households and both children go to child-care facilities. Free-of-charge child-care expense supports a five-year-old child is entitled to are dolled out to a five-year-old pre-schooler whose household's income is no more than 90% of the average income of urban worker households.[23]

The child-care supports bestowed on child-care facilities are the government subsidizing part of the labor costs of the employees of the owner of these child-care institutions.[24] The benefits from child-care spending supports are calculated by adding up child-care expense supports for low-income decile and the supports for child-care facilities. Only low-income children benefit from child-care expense subsidies but the sup-

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regarded as in-kind benefits.

23) Households in agricultural and fishing villages are subjected to these supports irrespective of their income level.

24) Separate support is granted to the agricultural and fishing villages.

ports for child-care facilities are benefiting all users irrespective of their individual income level. Out of total child-care budget, 1.4 trillion Won is spent on supporting low-income decile's child-care subsidies so we can tell that low-income-decile children received 2.058 million Won per person. The supports for child-care facilities translated into the benefits of 593,000 Won per each student. Therefore, it can be estimated that a single low-income decile child enjoyed 2.65 million Won in benefits, a sum of these two kinds of supports, and rest of children attending these facilities received the per-capita benefits of 593,000 Won.

Chapter 4

Analysis of Net Tax Burden

4 Analysis of Net Tax Burden

4.1 Analysis of Tax Burden by Income Decile

Using 2010 HIDS data of the Statistics Korea, this study made estimations on the distribution of various incomes: the distribution of private/public transfer income, tax, social insurance burden, in-kind benefits of health insurance, education and child-care by income decile. The beauty of this data is that the annual data of previous year is released in March of every year and this feature plays a key role in making a preemptive policy effect analysis in the future based on a tax-benefit model. Another important characteristic is related to its high quality of household representativeness, since it is a official household panel survey data carried out by the Government of Korea. But on the flip side, a dynamic analysis is impossible because it is not a panel survey and it is not associated with labor market variables.[25)]

In this study, we will use 2010 HIDS data of the Statistics Korea to examine the distribution of tax burdens and benefits by each income decile. Reference income is applied with the

25) The need for the issue of tie-in with labor market variables has been brought to the fore by researchers for a long time, but it is not provided to general researchers as of late 2013.

division of income deciles based on private income as in the case of Park Ki-Baek (2010), and household weight adequate for each step is used in the calculation process.

First, overall average of market income (hereinafter referred to as 'monthly average') is 3.43 million Won and this monthly average for the lowest decile is 210,000 Won, for second income decile is 1,070,000 Won, for fifth income decile is 2,830,000 Won, and for the higest income decile is 8,920,000 Won. Private transfer demonstrates that it is irrelevant to income deciles, and the figures for the first and the second income deciles are 104,000 Won and 154,000 Won each and for the fifth income decile and the highest income decile are 110,000 Won and 222,000 Won, respectively. Public transfer, on the other hand, is concentrated on the lower income deciles and it steadily decreases from 383,000 Won in the lowest income decile to 223,000 Won in the second lowest income decile and 128,000 Won in the third income decile, and records only 58,000 Won in the highest income decile. Due to such public transfer income, gross income for the lowest income decile rose to 796,000 Won and rose to 1,605,000 Won for the second income decile.

Table 12. Distribution of Tax Burdens and Benefits by Income decile

(10,000 Won)

	1	2	3	4	5	6	7	8	9	10	Average
Market income	21	107	176	233	283	329	386	454	551	892	343
Private transfer	10	15	16	13	11	13	12	10	15	22	14
Private income	31	123	192	245	294	341	398	465	566	914	356
Public transfer	38	22	13	9	7	7	6	7	5	6	12
Gross income	80	161	220	267	312	360	415	482	586	942	382
Income tax	0	0	1	1	2	4	5	8	15	40	14
Property tax	1	1	1	1	1	1	1	2	2	4	3
Premiums	3	6	10	13	17	19	22	26	31	42	35
Disposable income	75	153	208	251	292	337	386	446	538	857	336
Value added tax	8	11	12	16	17	19	20	22	24	33	18
Consumption tax	0	0	1	1	1	1	1	2	3	4	1
Post-tax income	66	140	192	230	268	310	357	414	502	809	273
- Basic life insurance	8	0	0	0	0	0	0	0	0	0	1
- National health insurance	19	19	18	18	17	18	17	17	17	18	18
- Education	4	10	15	20	25	32	33	34	37	39	25
- child-care	0	1	1	1	1	1	1	0	0	0	1
*Total in-kind benefits	32	29	34	40	44	51	52	51	53	57	44
Final income	98	169	226	270	311	361	408	466	555	866	317

Note: Calculated from the raw data of HIDS.

Now looking at income tax burden, it is trivial in the income deciles of 1, 2 and 3 (less than 10,000 Won) and 4, 5, 6, 7 and 8 (10,000~100,000 Won). But the highest income decile paid 400,000 Won for this expense. On average, a typical household paid around 140,000 Won, which is somewhat lower than Park Ki-Baek's figure, but close to what Sung Myung-Jae, et al. (2010) identified.[26)]

In terms of social insurance burden, 190,000 Won a year is generally borne on average. By income decile, this burden is 33,000 Won for the lowest income decile, 63,000 Won for the second lowest income decile, and 169,000 Won for the fifth income decile. The highest income decile paid 418,000 Won for the social insurance. If we investigate the size of disposable income, a gross income deducted with direct tax and social security burden, the figure of this income is 753,000 Won for the lowest income decile, 1,531,000 Won for the second lowest income decile, 2,920,000 Won for the fifth income decile, and 8,570,000 Won for the tenth income decile. Its overall average is 3,360,000 Won.

The Gini coefficient of market income is 0.3741 but it decreases to 0.3620 (-3.2%) for private income which includes private transfer. The Gini coefficient of gross income containing public transfer is 0.3278 (-9.4%) and the Gini coefficient

26) Park Ki-Baek (2010) pointed out that over 50% of households in Korea do not pay income tax, meaning more careful verification in the future is called for on the accuracy of tax burden.

calculated using disposable income, which is deducted with tax and social security contributions, is 0.3208 (-2.1%). Inequality of post-tax income is 0.3271 (+2.0%) and Gini coefficient for final income is 0.3024 (-7.6%).

As is indicated in the earlier table, reduction in inequality is evident if we compare market income to gross income (-9.4%), but it is relatively less noticeable (-2.1%) in the movement from gross income to disposable income. Inequality is rather increased from disposable income to post-tax income (+2.0%) due to the fact that indirect tax is regressive in nature.

Table 13. Gini and Concentration Coefficients by Income Type

Income	Coefficient	Standard error	Gap in coefficients	% Var
Market income	0.3741	0.0842	-	-
Private income	0.3620	0.0811	-0.0121	-3.2
Gross income	0.3278	0.0693	-0.0342	-9.4
Disposable income	0.3208	0.0688	-0.0070	-2.1
Post-tax income	0.3271	0.0699	0.0063	2.0
Final income	0.3024	0.0642	-0.0247	-7.6

Note: Calculated from the raw data of HIDS.

Figure 3. Market Income Lorenz Curve and Private Income Concentration Curve (2010)

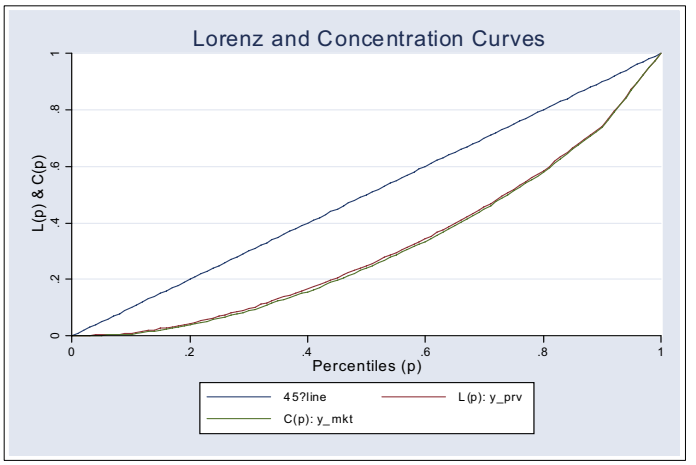


Figure 4. Concentration Curves of Post-Tax Income and Final Income

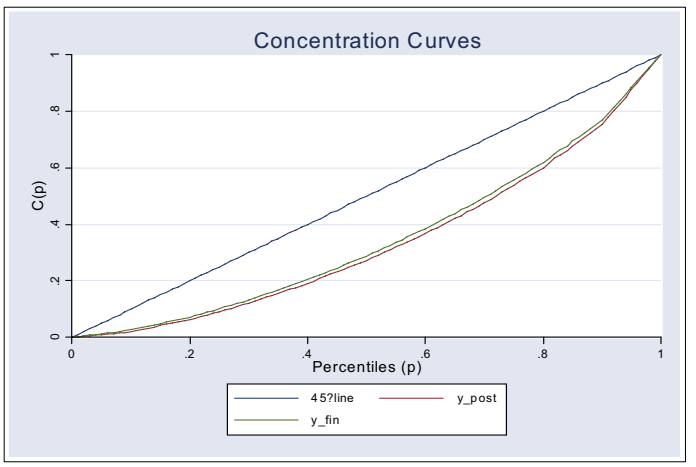


Table 14. Shares of Income, Tax and Benefit by Income decile (2010)

	1	2	3	4	5	6	7	8	9	10	Total
Market income	0.6	3.1	5.1	6.8	8.2	9.6	11.3	13.2	16.1	26.0	100
Private transfer	7.6	11.3	11.6	9.2	8.1	9.2	8.4	7.6	10.7	16.3	100
Private income	0.9	3.4	5.4	6.9	8.2	9.6	11.1	13.0	15.9	25.6	100
- Public pension	31.3	18.3	10.9	7.0	5.7	5.3	5.7	4.9	4.8	6.1	100
- Other benefits	25.3	14.8	8.1	6.7	5.8	5.5	4.4	7.1	6.0	16.3	100
- Public transfer	31.9	18.6	10.7	7.5	6.0	5.6	5.0	5.7	4.3	4.8	100
*Transfer income total	19.0	14.7	11.2	8.4	7.1	7.5	6.8	6.7	7.7	10.9	100
Gross income	2.1	4.2	5.8	7.0	8.2	9.4	10.9	12.6	15.3	24.6	100
Income tax	0.1	0.2	0.9	1.7	2.7	4.4	6.3	10.3	17.8	48.5	100
Property tax	5.6	5.6	5.8	6.0	6.3	6.9	8.1	10.6	14.4	21.9	100
*Direct tax	1.1	1.2	1.8	2.6	3.5	5.1	7.0	10.9	18.3	46.7	100
- Public pension contributions	0.6	2.2	4.7	6.7	8.7	10.2	12.4	14.3	17.2	23.0	100
- National health insurance premium	3.2	4.7	6.5	7.5	9.2	9.7	11.1	12.6	14.8	20.7	100
- Other social insurance remiums	0.0	0.3	0.9	1.5	1.8	2.1	2.4	3.0	36.7	51.3	100
*Premiums	1.6	3.1	5.1	6.6	8.3	9.3	10.9	12.6	15.0	20.5	100
*Direct tax total	1.4	2.5	4.1	5.3	6.8	8.0	9.7	12.1	16.0	28.7	100
Disposable income	2.1	4.3	5.9	7.1	8.3	9.5	11.0	12.6	15.3	24.3	100
- Value added tax	4.4	5.9	6.8	8.5	9.5	10.1	11.2	12.2	13.4	18.1	100
- Consumption tax	1.7	3.3	4.4	7.0	8.0	9.5	10.1	11.5	18.7	25.8	100
- Transportation tax	0.6	2.3	4.2	7.5	9.4	11.3	13.1	13.7	16.5	21.4	100
- Liquor tax	3.7	7.5	9.3	11.2	11.2	11.2	11.2	11.2	11.2	14.9	100
- Tobacco tax	3.8	8.3	9.2	8.9	11.0	12.7	12.6	11.2	10.5	11.4	100
*Consumption tax total	3.6	5.2	6.3	8.3	9.5	10.4	11.5	12.3	14.1	18.8	100
Post-tax income	2.0	4.3	5.9	7.1	8.3	9.6	11.0	12.8	15.5	25.0	100
- Basic life protection	99.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100
- Health insurance	10.9	10.6	10.2	10.2	9.7	10.0	9.7	9.3	9.4	10.1	100
- Education	1.6	3.8	6.0	8.2	10.2	12.8	13.4	13.8	14.7	15.6	100
- child-care	5.1	12.5	13.5	17.1	16.7	16.9	12.9	3.3	2.0	0.0	100
*In-kind benefits total	7.2	6.6	7.6	9.0	9.9	11.5	11.7	11.6	12.1	12.9	100
Final income	2.7	4.6	6.1	7.3	8.5	9.8	11.1	12.7	15.1	23.5	100

Note: Calculated from the raw data of HIDS.

4.2 Progressivity and Horizontal Equity of Tax

Many of tax-related researches are centered on the matter of how progressive a taxation system is, meaning 'how much does taxation reduce income inequality.' The index most widely employed for this purpose is Reynolds-Smolensky Index (RS - Reynolds-Smolensky's redistribution effect index), defined by the gap in Gini coefficients of pre-tax income and post-tax income.

Reynolds-Smolensky (1977): $RS = G(X_0) - G(X_1)$

Here X_0 and X_1 are respectively pre-tax income and post-tax income, and $G(\cdot)$ is Gini coefficient. Kakwani progressivity index is defined as follows:

Kakwani (1977): $K = C(T, X_0) - G(X_0)$

T is the tax amount paid ($T=X_0-X_1$) and C(.) is the concentration index. The re-ranking effect as a consequence of levying tax can be calculated from the following formula:

Re-ranking: $R = C(X_1-X_0) - G(X_1)$

The following relationship holds among RS, K and R indexes:

$$RS = [g/(1-g)]\ K - R\ = VE - RS$$

where g indicates average tax rate. The first term on the right side is a parameter showing the extent of vertical equity (VE).

Suites' (1977) progressivity index is S = 1 - (L/K) and K stands for the area below the proportional line and L for the Lorenz curve of tax burden by income.

Meanwhile, Musgrave-Thin index (1948) or redistribution effect index equals to $MT = (1-G(X_1))/(1-G(X_0))$ and Atkinson-Plotnick index (horizontal equity index) is equal to $0.5*R/G(X_1)$.

Table 15. Tax Progressivity and Horizontal Equity Index (2010)

Measures	Formula	Scale
Pre-tax Gini	G(X0)	0.3514
Post-tax Gini	G(X1)	0.3488
Average tax rate	g	0.0842
Reynolds-Smolensky index	RS = G(X0) - G(X1)	0.0026
Kakwani progressivity index	K = C(T, X0) - G(X0)	0.0592
Vertical equity	VE = [g/(1-g)]K	0.0054
Reranking	R = G(X1) - C(X1)	0.0028
Suits progressivity index	S = 1 - (L/K)	0.0708
Musgrave-Thin index	MT = (1-G(X1))/(1-G(X0))	1.0041
Atkinson-Plotnick index	AP = 0.5*R/G(X1)	0.0040

Note: They are the outcomes from the analysis of raw data of HIDS. The inequality evasion parameter was set to 2.

4.3 Analysis of Net Tax Burden

The following table compares gross burden, gross benefit and net benefit by income deciles. The gross burden is the sum of direct tax (including social security contributions) and indirect tax, and gross benefit is the sum of public transfers and in-kind benefits.

In the lowest income decile total benefit is 70 per month, total burden is 13.4 and net benefit is 566,000 Won on monthly average. The corresponding figures for the second income decile are 51.5, 20.8 and 307,000 Won, respectively. Gross burden rises up to the sixth income decile, while gross benefit de-

creases gradually up to 46.6 in the third income decile, though it picks up again afterwards slightly.

The net benefit, defined as the gap between total benefit and total burden, is the largest in the lowest income decile, but it gradually decreases up to the sixth income decile. The size of gross burden and gross benefit is similar at the seventh income decile, and total burdens exceed total benefits in the eighth and above deciles, so in these income deciles the net benefit has a negative value. Negative net benefit indicates net burden and it grows exponentially in the income deciles 7, 8, 9 and 10. Net burden for income decile 10 reaches 750,000 Won on monthly average.

Up to now, we have reviewed tax and social welfare burden and benefit structure using HIDS data of the Statistics Korea. However, it is necessary to develop a micro-simulation model containing detailed institutional elements in order to perform a more practical analyses of policy effectiveness.

In the next section we will present a summary of findings coupled with discussions on implications and future direction.

Table 16. Total Burden, Total Benefit and Net Benefit of by Income decile (2010)

(10,000 Won, %)

Income decile	Total burden	Total benefit	Net benefit	Ratio of net benefit to final income (%)
1	13.4	70.0	56.6	0.58
2	20.8	51.5	30.7	0.18
3	28.2	46.6	18.4	0.08
4	37.0	48.6	11.6	0.04
5	44.3	50.9	6.6	0.02
6	50.3	57.4	7.1	0.01
7	58.3	57.5	-0.8	-0.00
8	67.4	58.0	-9.4	-0.02
9	83.5	58.6	-24.9	-0.04
10	133.1	62.6	-70.5	-0.08
Average	53.6	56.2	2.5	0.08

Figure 5. Comparisons between Total Burden and Total Benefit

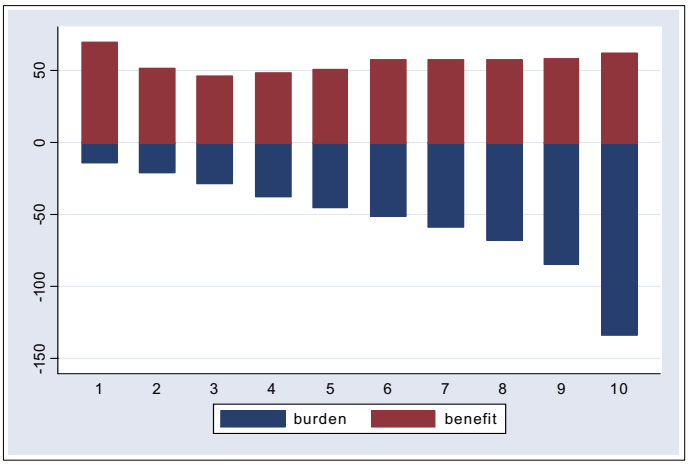
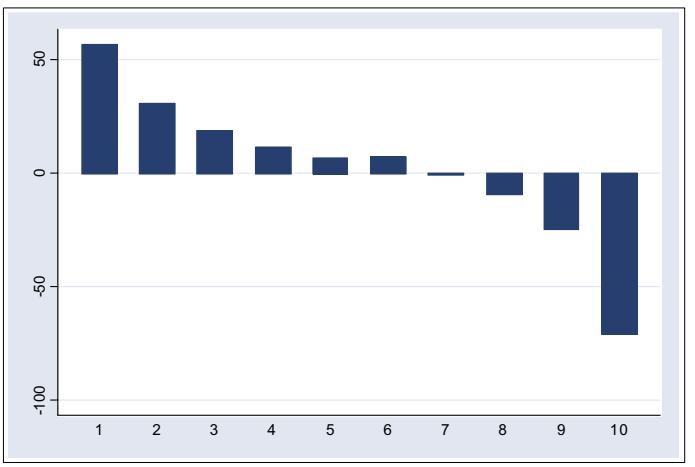


Figure 6. Comparisons of Net Benefits by Income Decile



Chapter 5

Summary and Policy Implications

5 Summary and Policy Implications

5.1 Summary of Findings

This study divided households into ten groups according to their private income, with the Statistics Korea data, and reviewed the distribution of tax burden and social spending per each group. The Statistics Korea data is selected as it is the official household survey statistics with the largest sample size in Korea and it covers relatively in-depth social security contributions and consumption spending items.

Major findings can be summarized as follows: Overall average of market income is 3.43 million Won a month, with the figures for the lowest income decile, the fifth income decile and the highest income decile are 210,000 Won, 2,830,000 Won and 8,920,000 Won, respectively. Private transfer changes in tandem with income decile, as indicated by 100,000 Won for the lowest income decile, 110,000 Won for the fifth income decile, and 220,000 Won for the highest income decile. Meanwhile, public transfer is concentrated on low income deciles and it gradually decreases with income levels. It is 380,000 Won for the lowest income decile, 220,000 Won for the second income decile, and 130,000 Won for the third income decile. The corresponding figure for the highest income decile is just

60,000 Won.

Driven by public transfer income, gross income for the lowest income decile rose to 800,000 Won a month and for the second lowest income decile to 1,610,000 Won monthly. Public transfer is demonstrated to shrink in size in higher income deciles, and thus we can confirm that it is a useful policy tool for income redistribution.

Regarding income tax burden, a household in overall is shown to pay 130,000 Won of such tax on average. Such burden is non-existent or trivial in income deciles 1 to 4, amounting to only 10,000~20,000 Won, but it is monthly 400,000 Won on average in the highest income decile. These figures are quite similar to those of Sung Myung-Jae (2010), but somewhat lower than those of Park Ki-Baek (2010).

The social insurance burden is monthly 30,000 Won for the lowest income decile, 60,000 Won for the second lowest income decile, 170,000 Won for the fifth income decile, and 420,000 Won for the highest income decile. What this finding tells us is that 350,000 Won a year on average is paid by a household in general.

Examining the size of disposable income, its monthly average amount in income decile 1 is 750,000 Won, in income decile 2 1,530,000 Won, in income decile 5 2,920,000 Won, and in income decile 10 857,000 Won. It is revealed that entire average is 3,360,000 Won.

Lowest income decile bears 80,000 Won, income decile 2 110,000 Won, income decile 5 170,000 Won, and income decile 10 330,000 Won a month on average in terms of value added tax.

The distribution of benefits from in-kind benefits shows that they are 320,000 Won and 290,000 Won per month on average in income decile 1 and 2, but they are in the range of 510,000~570,000 Won in income decile 5 and above, indicating they are not so much varying in these medium to high income deciles.

The income redistribution function of public transfer income designed to mitigate social inequality is proven to be the most effective policy instrument. Therefore, efforts must be exerted to improve its delivery mechanism to fundamentally remove any illegal receipt or any corruption of relevant parties if we are to further increase its effectiveness in the future. The regressive nature of in-kind benefits make them only a limited policy tool for increasing social equality.

5.2 Policy Implications and Suggestions

Though the tax statistics of the Statistics Korea are those on entire taxpayers, they are based on the sample of households taken from HIDS data or KOWEPS data, so there are some discrepancies between the two. This gap is reported to exist in all countries and many advanced economies provide so-called

"scientific taxpayer data file" (administrative data) to address these inconsistencies. Even though we use re-sampling technique, the re-sampling method is applied when administrative data is not available and we should also embrace this method in future researches. Yet no one would dispute that the most desirable solution of all is providing scientific data to researchers.

Our belief is that further study is necessary for labor supply elasticity as an extension of tax burden and benefit analysis. Though some researches have been made to some degree already on this topic, they are known to differ widely. In specific, it is said that there are considerable variations in estimated labor supply elasticity results depending on the data and analysis methods used. Thus, future studies should first separate male and female labor supply, and make analysis accordingly.

Kim Hye-Won et al. (2010) introduced the basics of a miro-simulation model and Sung Myung-Jae et al. (2010) developed a public finance simulation model (KIPFSIM10) containing the burdens of National Health Insurance, elderly long-term care insurance and some in-kind benefits. Although developing a tax-benefit micro-simulation model entails lengthy time and extensive endeavors, the benefits public can gain from it is immense. So no effort or support should be spared for it to become practically applicable as earliest as possible.

If information of regions can be put into use in the modelling

stage, then explicitly including local tax burden in the model can be considered as an important process. Next step is making a simulation model a dynamic one that includes aging and asset accumulation process. When this job is completed, analysis can be conducted on the long-term redistribution effect of all taxes or social benefits or the effect of old-age income security policies, and the impact of aging.

In addition, we should strive to link with a computable general equilibrium model to make a connection with macro factors. This analysis method is a standard approach embraced by advanced OECD member states, and the government agencies and research institutes in Korea should also work together to make it a reality.

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