

Analysis of Changes in the Effective Value-Added Tax Burden and Policy Implications

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I

Introduction

The rapid growth of the demand for public and social services in recent years has led an increasing number of researchers and policymakers to suggest raising value-added tax (VAT) rates. This is because a growing body of research is showing that it would be impossible for the Korean government to meet future fiscal demands simply by narrowing the scope of non-taxable goods and services, legalizing the underground economy, and reforming the tax spending structure.

Experts are also skeptical that the Korean government can meet fiscal demands by making use of other tax categories, such as corporate and income taxes. Raising the corporate tax rate may backfire by discouraging domestic and international investors from investing in Korean businesses. Personal income taxes in Korea already have a very small tax base. It would be necessary to impose especially high rates on certain income-earning classes or to expand the tax base dramatically to ensure sufficient revenue from income taxes.

Raising VAT rates, therefore, is increasingly perceived as an alternative solution, particularly in light of the radical increase in the fiscal demand that the reunification of the two Koreas could cause. As the economic gap between the two Koreas widens, the potential cost of national reunification increases to unprecedented heights.

From the perspective of political economy, policymakers are unlikely to raise VAT rates any time soon, given the implications such an abrupt change would entail. Nevertheless, VAT rates will have to rise at some point in the future, and so they warrant in-depth analyses and research. In particular, we need to analyze the problem of the regressivity of tax burdens from multiple angles

and mitigate it with proper policy solutions.

We also need to analyze the distribution of VAT burdens with a view to finding ways to improve the current VAT exemption system. Many states worldwide provide for VAT exemptions to protect low-income households and ensure a measure of equity in society.

The objective of this study is to analyze the current distribution of VAT burdens on households in Korea and the factors causing distribution changes, and then to explore ensuing policy implications. To this end, we estimate the effective VAT rates for various industries on the basis of the Input-Output Tables of the Input-Output Statistics. Then we apply these estimates, along with the data from the Household Income and Expenditure Surveys (HIESs), to estimate the VAT burdens on households. As the structure of industries and household consumption spending patterns change over time, we sought to determine the trend in the changing VAT burdens from year to year. Furthermore, based on our analysis of the VAT burdens and effective VAT rates, we analyze and discuss whether the VAT structure in Korea is indeed as regressive as some argue. This involves examining the income-redistributing effects of the four major categories of VAT exemptions (i.e., unprocessed food, educational services, medical and healthcare services, and financial and insurance services) and delineating the policy implications for future VAT reforms.

The relevant literature on the subject of this study includes Park(2008), Kim(2013), and Seong(2013) on effective VAT rates, on the one hand, and Seong, Park, Lee and Park(2012) and Hong and Seong(2013) on the VAT system, on the other. Pointing out the disparity between the statutory VAT rates and the effective VAT rates in Korea, Park(2008) cogently argues that researchers ought to use the latter over the former in analyzing the reality of VAT burdens. Kim(2013) uses the Input-Output Statistics of Korea and Germany to make a comparative analysis of effective VAT rates in the two countries. His research reveals that both Korea and Germany impose relatively high effective VAT rates on VAT-exempt goods and services, and that goods and services subjected to reduced VAT rates in both countries show little difference between effective VAT rates and statutory VAT rates. Kim(2013) also shows the effective VAT rates on goods and services in Korea to be higher than the effective rates we estimate in this study. Kim concludes that VAT exemptions in Korea and

Germany have significant indirect effects, particularly in terms of accumulation and redemption, and that VAT exemptions therefore compromise the efficiency of the VAT systems in the two countries. Seong(2013) estimates and analyzes the accumulative effect of effective VAT rates and exemptions in various categories of VAT-subjected goods and services. Using the input-output statistics on Korea from 2009, Seong analyzes VAT-exempt goods and services showing significant differences in effective VAT rates. He then analyzes the Gini coefficients and other variables to estimate the income-redistributing effects of VAT exemptions. Seong thus concludes that imposing VATs on educational and medical services could increase Korea's tax revenue and ensure greater efficiency in income redistribution. Contrary to this conclusion, which is confined to data from 2009, this study traces changes in the effective VAT rates from 1990 to 2012, thus providing a much longer-term time series for analysis.

Seong, Park, Lee and Park(2012) analyzes and suggests possible solutions to the main VAT-related issues, such as the scopes of VAT-exempt and zero-rated goods and services, deductions on deemed input taxes, deductions on credit card spending, consolidated VATs, and taxation on trusts. Hong and Seong(2013), on the other hand, surveys and analyzes the background factors prompting rises in VAT rates in major economies worldwide and compares Korea and these economies in terms of the scope of VAT exemptions. The authors also estimate and analyze the VAT burdens in Korea using statutory VAT rates and analyze the effects of readjusting the scope of VAT exemptions.

Our study is set apart from these earlier studies mainly because we trace changes in the effective VAT rates over a much longer time span, amounting to 20 years or so from 1990 to 2012, and track the changing VAT burdens on households in Korea accordingly. We use the basic-category data from the Input-Output Tables of 1990 through 2012 to estimate the effective AT rates, and then we apply our estimates to the HIESs data from Statistics Korea.

In addition to analyzing the VAT burden on each income quantile, we also estimate VAT burdens on households in different consumption spending quantiles with the goal of delineating how a shift in focus from income to consumption spending changes our interpretation of tax burdens. We use and analyze both criteria to determine which is the better yardstick of tax burdens—income, which entails significant short-term volatility due to temporary shocks, or consumption

spending.

In Section II, we estimate the effective VAT rates using the basic-category standard of the Bank of Korea(BOK)'s Input-Output Statistics. We estimate effective VAT rates for all the years included in the BOK's Input-Output Statistics, spanning from 1990 to 2012. Before analyzing these, we briefly discuss the method for calculating effective VAT rates, as formulated in Gottfried and Wiegard(1991). Then we discuss our estimates on the effective VAT tax rate by sector, obtained using the Gottfried-Wiegard method. In Section III, we apply our estimates on effective VAT rates to Statistics Korea's HIESs data in order to estimate and analyze changes in the effective VAT burdens on households. We thus match the industrial data from the Input-Output Statistics with the household data from the HIESs, estimate the effective VAT burdens on households using the income and consumption spending data from the HIESs, and analyze the distribution of the effective VAT burdens across income and consumption spending quantiles. Then we analyze the distribution of VAT exemptions across income and consumption spending quantiles as well. By surveying changes in household consumption spending patterns over time, we also identify and analyze major factors behind changes in the effective VAT burdens. In Section IV, we summarize our findings and subsequent policy implications.

II

Analysis of Changes in Effective VAT Rates

Here we outline the method we used to estimate the effective VAT rates.

1 Methodology

The method we used for estimating the effective VAT rates was first formulated in Gottfried and Wiegard(1991). We apply their method to the basic-category system of BOK's Input-Output Statistics.

A. Estimating the effective VAT rates

In the following we provide a detailed explanation of the Gottfried-Wiegard method on estimating effective VAT rates.¹⁾ First, let us call the producer price of a given good, i , p_i . Here p_i is defined as the sum of all values-added and input costs involved in producing i . This can be expressed as Equation (1).

$$p_i = \nu_i + \sum_{j=1}^n a_{ji} [p_j + (1 - \delta_j) t_j p_j], \quad i = 1, 2, \dots, n \quad (1)$$

1) The specifics of the method for estimating the effective VAT rates in this study are modifications of, and supplements to, the explanations provided in Marks(2003) and Park(2008).

Here v_i stands for the values-added that were generated by producing i . a_{ji} is the input coefficient used in the Input-Output Statistics and stands for the amount of input in the production of each unit of j . Now, δ_i is a dummy variable that equals 0 if i is a tax-exempt good and 1 if it is a taxable good. t_j stands for the statutory VAT rate on j . It equals zero if j is a tax-exempt good and 0.1 if j is a taxable good. Finally, n is the identification number of the given good, industry or sector. This study uses the basic-category system of the Input-Output Statistics, by far the most detailed of all Input-Output Statistics sorting systems, for estimating the effective VAT rate by category of goods or sector.

If i is a VAT-exempt good ($\delta_i = 0$) and the good that has been used as an input for the creation of i , j , is a taxable good ($t_j = 0.1$), the producer of i will not be able to receive refund on the input tax he paid upon purchasing j . The producer will therefore try to pass on the cost of this input tax to the consumer, increasing the good's price by the amount of the unrefunded input tax. If, on the other hand, i is a taxable good ($\delta_i = 1$), the producer will be able to obtain a refund on the entire amount of the input tax he has paid, and therefore use the producer price of the input, j , as his purchase price. Here the producer need not transfer the cost of the input tax to the consumer. Even if the input j were a tax-exempt good ($t_j = 0$), the producer of i would still use the producer price of the input j as his input price because he paid no VAT upon purchasing the input j .

Now, let us suppose a situation without a VAT system in place²⁾ and posit the producer price of the good i , \tilde{p}_i . In the absence of any VAT, the producer price of a given good would equal the sum of all the values-added created and the input costs involved in the production of that good. The sum of the input costs, in turn, would be the sum of the producer prices of all the goods involved in the production process. This can be expressed as Equation (2).

2) Alternatively, we may suppose a VAT system without any exemptions.

$$\tilde{p}_i = v_i + \sum_{j=1}^n a_{ji} \tilde{p}_j, \quad i = 1, 2, \dots, n \quad (2)$$

Here v_i , a_{ji} , n all retain the same definitions as those used in Equation (1). \tilde{p}_j stands for the producer price of the good j , in the absence of VATs. The Gottfried-Wiegard method assumes that the prices of the input factors and the amounts of inputs used remain constant irrespective of whether VATs exist. That is why we keep v_i and a_{ji} constant for both Equations (1) and (2).

If we transfer v_i to the left-hand side of Equations (1) and (2) and all the other price variables to the right-hand side, we obtain Equations (3) and (4), respectively.

$$\nu = (I - A')p - (I - \Delta)A'Tp \quad (3)$$

$$\nu = (I - A')\tilde{p} \quad (4)$$

Here ν stands for the value-added vector of each unit of each good, while I is re-written as an identity matrix of $n \times n$. A' stands for the transposed matrix, $[a_{ji}]$, on the Input Tables of the Input-Output Statistics. a_{ji} , in other words, indicates elements belong to column i and row j in A' . Δ represents the diagonal matrix that uses the dummy variable of tax exemption on each good, δ , as the element for the main diagonal line and zero (0) for other elements. T is a diagonal matrix that uses the statutory VAT rate, t , as the element of the main diagonal line. p is the producer price vector in a VAT system with certain VAT exemptions, while \tilde{p} is the producer price vector in a hypothetical situation lacking a VAT system.

As the prices of the input factors and the amounts of inputs used remain constant whether or not VATs exist, the value-added vector remains the same on the left-hand sides of both Equations (3) and (4). By subtracting Equation (4) from Equation (3) and re-writing the remainder, we arrive at Equation (5).

$$0 = (I - A')(p - \tilde{p}) - (I - \Delta)A'Tp \quad (5)$$

Equation (5) indicates that VAT exemptions create a discrepancy between the producer price vectors, p and \tilde{p} .

Now, let us label this discrepancy $\tilde{\tau}$, which then represents the tax burden under a VAT system with exemptions.³⁾ If we re-write Equation (5) with respect to $\tilde{\tau}$, we arrive at Equation (6).

$$\tilde{\tau} = p - \tilde{p} = (I - A')^{-1}(I - \Delta)A' T p \quad (6)$$

If we label the statutory tax burden vector, under a VAT system with exemptions, τ , we arrive at $\tau = T p$. If, on the other hand, we define τ^e as the effective tax burden vector per unit, we get Equation (7).

$$\tau^e = \tau + \tilde{\tau} = [I + (I - A')^{-1}(I - \Delta)A'] T p \quad (7)$$

If we define τ_i^e as the effective VAT burden per unit of good i , we get $\tau_i^e = \tau_i + \tilde{\tau}_i$. If we label the effective VAT rate on good i , t_i^e , we will see that the rate equals the effective tax burden, τ_i^e , divided by the producer price, \tilde{p}_i , in the absence of any VATs, as shown in Equation (8).

$$t_i^e = \frac{\tau_i^e}{\tilde{p}_i} = \frac{\tau_i + \tilde{\tau}_i}{\tilde{p}_i} \quad (8)$$

Here we ought to recall the fact that Korea's Input-Output Statistics data are compiled and organized not by quantity, as in most other countries, but by unit price. This implies that the producer price, \tilde{p}_i , equals 1 in estimating effective VAT rates for all sectors and industries using Equation (8) (Marks,

3) In a VAT system without any exemptions, the producer price of a good would be equal to the producer price of the same good in the absence of any VATs.

2003). See the Appendix at the end of this study for the effective VAT rates for all sectors and industries each year as estimated on the basis of this assumption.

Using the Gottfried-Wiegard method to estimate the effective VAT rates, we also assume that the prices of all the input factors and the amounts of inputs involved in the production of a given good remain fixed. This assumption helps us identify the price of the given good that will allow us to reach the current price equilibrium under the current VAT system, even if we were to eliminate the VAT system or its exemptions. Holding the prices of input factors constant, however, limits us to finding effective VAT rates with a partial-equilibrium model rather than with a complete one. Also in this method, the tax burden, $\tilde{\tau}$, under a VAT system with exemptions, as expressed by Equation (6), either always equals or is greater than zero (0). In other words, the effective VAT rates we estimate using the Gottfried-Wiegard method will always remain either equal to or greater than the statutory VAT rates.

2 Analysis of the effective VAT rate trend

This study estimated the effective VAT rates for various industries and sectors in Korea for a period spanning some 20 years, from 1990 to 2012. As we based our estimation process on BOK's Input-Output Statistics, we were only able to estimate and analyze trend in the effective VAT rates for the years in which BOK compiled its statistics.⁴⁾

A. Effective VAT rates in 2012

Of the Input-Output Statistics Tables available to us, the latest concern the year 2012. Because the Korean government imposes or exempts VATs on different categories of goods and services (and not entire industries or sectors), we had to use the most detailed sorting system in the statistics, i.e., the basic-category system. As of 2012, there was a total of 384 such basic categories of goods and services. In this section, we use the main categories of the Input-Output Statistics, together with predefined weights, to estimate and analyze the overall trend in effective VAT rates.

As of 2012, the categories of goods and services with low VAT rates in Korea were public administration and national defense, education, financial and insurance services, and public health and social services, with rates at 2.48 percent, 3.03 percent, 4.48 percent, and 4.76 percent, respectively. As we can see, all four categories had effective VAT rates of less than five percent. The effective VAT rates reflect both the VAT exemptions and the deductions on input taxes paid upon the purchase of input materials. The effective VAT rate for public administration and national defense is the lowest of all because these services require relatively less input materials than other services or industries. If all the input materials involved in the creation of a VAT-exempt good or

4) The Input-Output Statistics Tables used in this study concern the years 1990, 1995, 2000, 2003, and 2005 through 2012. It was not until 2005 that BOK began to publish its Input-Output Statistics on an annual basis.

service are exempt from taxes, the effective tax rate on that VAT-exempt good or service will be zero, like the statutory tax rate.

Other industries whose effective VAT rates range between 5 and 10 percent include agricultural, forestry and fishery products, real estate and rental, waterworks, waste processing and recycling, professional and science services, culture and other services, transportation, food and beverages, information, communications and broadcasting, and mineral products. Most of these industries include at least one VAT-exempt good or service. Because the effective rates we have estimated for these industries reflect VAT exemptions and deductions on input taxes, and because we have estimated these rates for industries and not individual categories of goods and services, each industry can always include both VAT-charged and exempt goods and services.

All the other industries are subject to effective VAT rates upwards of 10 percent. Of these, primary metal goods have the highest rate at 12.15 percent. Although the number and amounts of VAT-exempt input materials involved in the production of these goods are relatively greater, the absence of deductions on the input taxes on the materials keep the effective VAT rate for primary metal goods higher than for statutory ones. Effective VAT rates can differ significantly from statutory ones depending on whether the input materials used in the production of a given finished good are tax-exempt.

〈Table II-1〉 Effective VAT Rates (E-VATR) of 2012

(Unit: %)

Industry ¹⁾		E-VATR	Industry ²⁾		E-VATR
1	Agricultural, forestry, fishery goods	5,94	27	Public administration and national defense	2,48
2	Mineral goods	9,95	28	Educational services	3,03
3	Food and beverages	9,69	23	Financial and insurance services	4,48
4	Textile and leather goods	10,66	29	Public health and social services	4,76
5	Lumber, paper and printing	10,67	1	Agricultural and fishery goods	5,94
6	Coals and petrochemical goods	10,68	24	Real estate and rental	6,20
7	Chemical goods	10,66	17	Waterworks, waste processing and recycling	7,32

〈Table II-1〉 Continue

Industry ¹⁾		E-VATR	Industry ²⁾		E-VATR
8	Non-metallic mineral goods	10,79	25	Professional, scientific and technological services	8,03
9	Primary metals	12,15	30	Culture and other services	9,40
10	Metal goods	10,94	20	Restaurants and lodging services	9,48
11	Machinery and equipment	10,77	3	Food and beverages	9,69
12	Electric and electronic devices	10,50	22	Information, communications and broadcasting	9,94
13	Precision machinery	10,51	2	Mineral goods	9,95
14	Transportation equipment	10,73	18	Construction	10,10
15	Other manufactured and processed goods	10,57	12	Electric and electronic devices	10,50
16	Electricity, gas and steam energy	10,57	13	Precision machinery	10,51
17	Waterworks, waste processing and recycling	7,32	26	Business support services	10,54
18	Construction	10,10	15	Other manufactured and processed goods	10,57
19	Wholesale and retail services	10,64	16	Electricity, gas and steam energy	10,57
20	Restaurants and lodging services	9,48	19	Wholesale and retail services	10,64
21	Transportation services	11,70	7	Chemical goods	10,66
22	Information, communications and broadcasting	9,94	4	Textile and leather goods	10,66
23	Financial and insurance services	4,48	5	Lumber, paper and printing	10,67
24	Real estate and rent	6,20	6	Coals and petrochemical goods	10,68
25	Professional, scientific and technological services	8,03	14	Transportation equipment	10,73
26	Business support services	10,54	11	Machinery and equipment	10,77
27	Public administration and national defense	2,48	8	Non-metallic mineral goods	10,79
28	Educational services	3,03	10	Metal goods	10,94
29	Public health and social services	4,76	21	Transportation services	11,70
30	Culture and other services	9,40	9	Primary metal goods	12,15

Notes: 1) The numbers on the left-hand side indicate the industry or sector codes.

2) The industries have been arranged according to the sizes of their effective VAT rates, in both the ascending and descending orders.

B. Analysis of the effective VAT rate trend

Unlike other studies in the established literature, this study tracks how the effective VAT rates on various industries and sectors in Korea have changed over a long period of time, from 1990 to 2012. Over this period, however, the industrial categorization system used in BOK's Input-Output Statistics has been changing and evolving. Even the main categories of industries used in the Input-Output Statistics and in our estimation have been changing.

Therefore, we first identify and analyze the trend of change in the effective VAT rates concerning the period from 2000 to 2009, which retains the most similar industrial categories, and use our findings regarding this period to identify and estimate changes in the 1990s, in 2010, and afterwards.

1) Effective VAT rate trend: 2000 to 2009

Given the absence of change to the statutory VAT rates in Korea, the effective VAT rates have remained more or less the same since 2000. When we broke down the Korean economy into 28 main industrial categories and analyzed their effective VATs, we found either no change or only small increases in the VAT rates on most industries.

The extent to which effective VAT rates have increased differs from industry to industry. The effective VAT rate on agricultural, forestry and fishery goods, for instance, grew from 5.17 percent in 2000 to 6.40 percent in 2009, while the rate on food and beverages grew from 7.90 percent in 2000 to 9.25 percent in 2009. Why did effective VAT rates increase when there were no changes made to the existing VAT exemption system? The answer is that the weight of taxable goods in these industries, along with the weight of taxable input materials, increased relative to the weight of tax-exempt goods.

There were also industries whose effective VAT rates dropped between 2000 and 2009, such as real estate and rental, public administration and national defense, education and public healthcare, and social and other services. Even though decreases in the effective VAT rates of these industries were marginal, they were nonetheless most likely due to a decrease in the weight of taxable input materials involved in the production of their goods and services.

The effective VAT rate for the printing and duplication industry grew in 2005 because the re-organization of the publishing, printing and duplication industry, as used in the Input-Output Statistics of 2000 and 2003, led to the exclusion of tax-exempt goods, such as newspapers, from the industry. This was then manifest in the Input-Output Statistics for 2005. The rise in this industry's effective VAT rate, then, does not reflect any substantial change to the VAT system, but rather the transformation of the industrial categorization system.

From 2005 to 2009, the industrial categories used in the Input-Output Statistics remained completely intact. These five years are therefore the only years in our analysis period that provide identical industrial categories. Our estimation and analysis of effective VAT rates in these five years reveal few industries that experienced any change, and no industry saw its effective VAT rate drop. In other words, the effective VAT rates for all industries were on a marginal, yet steady, rise from 2005 to 2009, suggesting that the weight of tax-exempt inputs in the production of taxable goods and services was increasing, along with the weight of taxable inputs in the production of tax-exempt goods and services. Alternatively, we could interpret this rise as an indication that, as the Korean economy has been maturing and growing more complex, production has come to involve far more diverse input materials with increasingly complex tax profiles.

〈Table II-2〉 Effective VAT Rate Trend in the 2000s

(Unit: %)

Industry	2000	2003	2005	2006	2007	2008	2009
Agricultural, forestry and fishery goods	5.17	5.44	5.30	5.51	5.74	6.58	6.40
Mineral goods	9.32	9.57	9.59	9.56	9.54	9.63	9.71
Food and beverages	7.90	8.44	8.33	8.57	8.85	9.20	9.25
Textile and leather goods	10.65	10.64	10.58	10.66	10.69	10.76	10.75
Wood and paper products	10.38	10.37	10.34	10.39	10.40	10.44	10.43
Printing and duplication	8.35	8.26	10.27	10.30	10.30	10.33	10.34
Petrochemicals and coals	10.05	10.06	10.14	10.16	10.17	10.16	10.19
Chemical goods	10.36	10.32	10.32	10.33	10.33	10.33	10.37
Non-metallic mineral goods	10.37	10.35	10.33	10.35	10.36	10.38	10.38
Primary metal goods	10.35	10.37	10.36	10.37	10.40	10.44	10.45

〈Table II-2〉 Continue

Industry	2000	2003	2005	2006	2007	2008	2009
Metal goods	10.31	10.31	10.31	10.34	10.35	10.38	10.39
General machinery	10.35	10.36	10.36	10.39	10.41	10.44	10.46
Electric and electronic devices	10.35	10.39	10.46	10.48	10.50	10.56	10.61
Precision machinery	10.54	10.53	10.49	10.55	10.57	10.61	10.69
Transportation equipment	10.35	10.34	10.35	10.38	10.38	10.40	10.42
Other manufactured goods	10.40	10.40	10.37	10.40	10.40	10.43	10.44
Electricity, gas and waterworks	9.81	9.70	9.76	9.78	9.83	9.96	9.95
Construction	9.01	9.23	9.34	9.41	9.46	9.51	9.43
Wholesale and retail	10.29	10.35	10.33	10.35	10.36	10.37	10.39
Restaurants and lodging	11.29	11.30	11.34	11.45	11.47	11.72	11.73
Transportation and storage	8.53	8.52	7.95	8.40	8.28	8.13	8.64
Communications and broadcasting	9.40	9.26	9.72	9.72	9.77	9.85	9.92
Finance and insurance	2.08	2.42	2.16	2.55	2.45	2.77	2.78
Real estate and related services	8.31	8.62	7.90	8.04	8.11	8.17	8.15
Public administration and national defense	3.31	2.90	3.02	3.07	3.11	3.19	3.11
Education and public healthcare	3.88	3.67	3.47	3.51	3.51	3.58	3.65
Social and other services	9.14	9.32	8.75	8.79	8.80	8.87	8.88
Other	11.14	11.19	11.24	11.29	11.27	11.44	11.44

2) Effective VAT rate trend, 1990 to 2012

The changing and evolving industrial makeup of the Korean economy, and changes in the industrial categorization system used in the Input-Output Statistics over the years, limit our ability to conduct a consistent analysis of the changing effective VAT rates across industries over more than 20 years, from 1990 to 2012. Nevertheless, we strived to group the most similar industries together before identifying the overall effective VAT rate trend.

The Input-Output Statistics from 1990 provided for 26 main industrial categories in total. The number of industries included in the statistics increased to 28 in the period from 1995 to 2005 and has stood at 30 since 2010. The categories of industries used in these statistics have tended to become more detailed and specific over the years. The real estate and related services category, for instance, was divided into three new categories in 2010, i.e., real estate and rental;

professional, scientific and technological services; and business support services.

Overall, the effective VAT rates for almost all industries have been increasing little by little over the last two decades or so, suggesting, as pointed out earlier, that either the weight of tax-exempt inputs has increased in the production of taxable goods and services or the weight of taxable inputs has increased in the production of tax-exempt goods and services.

Industries with relatively clear changes in effective VAT rates include public administration and national defense. The effective VAT rate for this industry has been steadily decreasing over the years, from 4.6 percent in 1990 to 3.3 percent in 2000 and to 2.5 percent in 2012. The effective VAT rate on food and beverages, on the other hand, has been clearly increasing, from 7.4 percent in 1990 to 7.9 percent in 2000 and to 9.7 percent in 2012. The use of major industrial categories in our analysis prevents us from distinguishing between taxable and tax-exempt goods and services, but the rises in effective VAT rates in general point to an increasing weight of tax-exempt inputs in the production process.

〈Table II-3〉 Effective VAT Rate Trend, 1990-2012

(Unit: %)

Industry	1990	Industry	1995	2000	2005	Industry	2010	2012
Mnistry of Agriculture, Fishery, and Forestry (MAFF)	5.13	Agricultural, forestry and fishery goods	5.08	5.17	5.30	Agricultural, forestry and fishery goods	6.06	5.94
Mineral goods	7.71	Mineral goods	9.35	9.32	9.59	Mineral goods	10.08	9.95
Food and beverages	7.38	Food and beverages	7.92	7.90	8.33	Food and beverages	9.36	9.69
Textiles, leather	11.04	Textile and leather goods	10.83	10.65	10.58	Textile and leather goods	10.61	10.66
Paper and wood products	10.34	Wood and paper products	10.33	10.38	10.34	Lumber, paper and printing	10.63	10.67
		Printing and duplication	7.55	8.35	10.27			
Petrochemicals and coals	7.82	Petrochemicals and coals	10.06	10.05	10.14	Coals and petrochemical goods	10.52	10.67
Chemical goods	9.48	Chemical goods	10.36	10.36	10.32	Chemical goods	10.60	10.66
Ceramics and stoneware	10.30	Non-metallic mineral goods	10.30	10.37	10.33	Non-metallic mineral goods	10.72	10.79
Primary metals	10.29	Primary metal goods	10.31	10.35	10.36	Primary metal goods	12.18	12.15
Metal goods	10.33	Metal goods	10.31	10.31	10.31	Metal goods	10.91	10.94

〈Table II-3〉 Continue

Industry	1990	Industry	1995	2000	2005	Industry	2010	2012
General machinery	10.31	General machinery	10.35	10.35	10.36	Machinery and equipment	10.73	10.77
Electric and electronic devices	10.32	Electric and electronic devices	10.40	10.35	10.46	Electric and electronic devices	10.47	10.50
Precision machinery	10.38	Precision machinery	10.71	10.54	10.49	Precision machinery	10.47	10.51
Transportation machinery	10.37	Transportation equipment	10.35	10.35	10.35	Transportation equipment	10.66	10.73
Other manufactured goods	5.52	Other manufactured goods	10.44	10.40	10.37	Other manufactured and processed goods	10.50	10.57
Electricity, gas and waterworks	9.65	Electricity, gas and waterworks	9.77	9.81	9.76	Electricity, gas and steam energy	10.49	10.57
						Waterworks, waste processing and recycling	7.48	7.32
Construction	9.27	Construction	9.52	9.01	9.34	Construction	9.81	10.10
Wholesale and retail	10.26	Wholesale and retail	10.28	10.29	10.33	Wholesale and retail services	10.55	10.64
		Restaurants and lodging	10.26	11.29	11.34	Restaurants and lodging services	9.09	9.48
Transportation and storage	7.55	Transportation and storage	7.80	8.53	7.95	Transportation services	11.54	11.70
Communications	9.03	Communications and broadcasting	9.31	9.40	9.72	Information, communications and broadcasting	9.87	9.94
Finance and insurance	2.56	Finance and insurance	2.23	2.08	2.16	Financial and insurance services	3.91	4.48
Real estate and related services	7.99	Real estate and related services	8.44	8.31	7.90	Real estate and rental	6.23	6.20
						Professional, scientific and technological services	8.30	8.03
						Business support services	10.47	10.54
Public administration and national defense	4.62	Public administration and national defense	4.06	3.31	3.02	Public administration and national defense	2.50	2.48
Education and public healthcare	3.59	Education and public healthcare	3.24	3.88	3.47	Educational services	2.80	3.03
						Public healthcare and social services	4.67	4.76
Social and personal services	9.43	Social and other services	8.94	9.14	8.75	Culture and other services	9.27	9.32
Other	11.37	Other	11.21	11.14	11.24			

◁Table II-4▷ Effective VAT Rate Trend in the 2000s

(Unit: %)

Industry	2000	2003	2005	2006	2007	2008	2009	Industry	2010	2011	2012
Agricultural, forestry and fishery goods	5.17	5.44	5.30	5.51	5.74	6.58	6.40	Agricultural, forestry and fishery goods	6.06	5.98	5.94
Mineral goods	9.32	9.57	9.59	9.56	9.54	9.63	9.71	Mineral goods	10.08	9.93	9.95
Food and beverages	7.90	8.44	8.33	8.57	8.85	9.20	9.25	Food and beverages	9.36	9.53	9.69
Textile and leather goods	10.65	10.64	10.58	10.66	10.69	10.76	10.75	Textile and leather goods	10.61	10.66	10.66
Wood and paper products	10.38	10.37	10.34	10.39	10.40	10.44	10.43	Lumber, paper and printing	10.63	10.69	10.67
Printing and duplication	8.35	8.26	10.27	10.30	10.30	10.33	10.34				
Petrochemicals and coals	10.05	10.06	10.14	10.16	10.17	10.16	10.19	Coals and petrochemical goods	10.52	10.66	10.67
Chemical goods	10.36	10.32	10.32	10.33	10.33	10.33	10.37	Chemical goods	10.60	10.64	10.66
Non-metallic mineral goods	10.37	10.35	10.33	10.35	10.36	10.38	10.38	Non-metallic mineral goods	10.72	10.76	10.79
Primary metal goods	10.35	10.37	10.36	10.37	10.40	10.44	10.45	Primary metal goods	12.18	12.21	12.15
Metal goods	10.31	10.31	10.31	10.34	10.35	10.38	10.39	Metal goods	10.91	10.96	10.94
General machinery	10.35	10.36	10.36	10.39	10.41	10.44	10.46	Machinery and equipment	10.73	10.77	10.77
Electric and electronic devices	10.35	10.39	10.46	10.48	10.50	10.56	10.61	Electric and electronic devices	10.47	10.49	10.50
Precision machinery	10.54	10.53	10.49	10.55	10.57	10.61	10.69	Precision machinery	10.47	10.51	10.51
Transportation equipment	10.35	10.34	10.35	10.38	10.38	10.40	10.42	Transportation equipment	10.66	10.72	10.73
Other manufactured goods	10.40	10.40	10.37	10.40	10.40	10.43	10.44	Other manufactured and processed goods	10.50	10.56	10.57
Electricity, gas and waterworks	9.81	9.70	9.76	9.78	9.83	9.96	9.95	Electricity, gas and steam energy	10.49	10.58	10.57
								Waterworks, waste processing and recycling	7.48	7.56	7.32
Construction	9.01	9.23	9.34	9.41	9.46	9.51	9.43	Construction	9.81	10.04	10.10
Wholesale and retail	10.29	10.35	10.33	10.35	10.36	10.37	10.39	Wholesale and retail services	10.55	10.61	10.64
Restaurants and lodging	11.29	11.30	11.34	11.45	11.47	11.72	11.73	Restaurants and lodging services	9.09	9.42	9.48

〈Table II-4〉 Continue

Industry	2000	2003	2005	2006	2007	2008	2009	Industry	2010	2011	2012
Electricity, gas and waterworks	9.81	9.70	9.76	9.78	9.83	9.96	9.95	Electricity, gas and steam energy	10.49	10.58	10.57
								Waterworks, waste processing and recycling	7.48	7.56	7.32
Construction	9.01	9.23	9.34	9.41	9.46	9.51	9.43	Construction	9.81	10.04	10.10
Wholesale and retail	10.29	10.35	10.33	10.35	10.36	10.37	10.39	Wholesale and retail services	10.55	10.61	10.64
Restaurants and lodging	11.29	11.30	11.34	11.45	11.47	11.72	11.73	Restaurants and lodging services	9.09	9.42	9.48
Transportation and storage	8.53	8.52	7.95	8.40	8.28	8.13	8.64	Transportation services	11.54	11.68	11.70
Communications and broadcasting	9.40	9.26	9.72	9.72	9.77	9.85	9.92	Information, communications and broadcasting	9.87	9.92	9.94
Finance and insurance	2.08	2.42	2.16	2.55	2.45	2.77	2.78	Financial and insurance services	3.91	4.26	4.48
Real estate and related services	8.31	8.62	7.90	8.04	8.11	8.17	8.15	Real estate and rental	6.23	6.24	6.20
								Professional, scientific and technological services	8.30	8.15	8.03
								Business support services	10.47	10.51	10.54
Public administration and national defense	3.31	2.90	3.02	3.07	3.11	3.19	3.11	Public administration and national defense	2.50	2.52	2.48
Education and public healthcare	3.88	3.67	3.47	3.51	3.51	3.58	3.65	Educational services	2.80	2.85	3.03
								Public healthcare and social services	4.67	4.75	4.76
Social and other services	9.14	9.32	8.75	8.79	8.80	8.87	8.88	Culture and other services	9.27	9.32	9.32
Other	11.14	11.19	11.24	11.29	11.27	11.44	11.44				

III

Analysis of Effective VAT Burdens on Households

1 Data⁵⁾

In order to estimate and analyze the effective VAT burdens on households in Korea, we used the data gathered by Statistics Korea's Household Income and Expenditure Surveys (HIESs). Statistics Korea surveys the income and spending patterns of Korean households on a regular basis to measure the standard of living and any changes to it affecting Koreans. Before launching a HIESs each month, Statistics Korea distributes copies of books to sample households, which the households use to keep detailed records of their monthly earnings and spending activities. The HIESs are believed to provide the most detailed data available on Korean households' spending patterns.

<Table III-1> lists the summary statistics on the HIESs conducted from 1990 to 2012. During this period, the average age of household heads increased from 39.0 years old in 1990 to 51.1 years old in 2012, in keeping with the aging of the Korean population.⁶⁾ This change in the demographic structure is also

5) This section summarizes the findings of Statistics Korea's HIESs and is based on Statistics Korea's explanations from 2011 and 2014.

6) The scope of households included in the HIESs was expanded in 2003 to include not only households in urban areas, but also non-farming households in rural areas, and it was again expanded in 2006 to include single-person households. These changes may have raised the average age of household heads. Nevertheless, the phenomena of population aging and family nuclearization are also evident in the gaps between the HIESs of 2010 and the HIESs of 2012 that involve the same pool of households.

evident in the changing distribution of age among household heads. The proportion of households with household heads aged 15 to 30 has steadily decreased, from 19.9 percent in 1990 to 3.3 percent in 2012, while the proportion of households with household heads aged 61 or older has multiplied rapidly from 2.5 percent in 1990 to 25.7 percent in 2012. The nuclearization of families is another manifest trend, with the average number of family members per household dropping from 4 in 1990 to 2.8 in 2012. The standard deviations of the average age of household heads and the number of family members per household have also increased in size over time, indicating growing heterogeneity among households.

As is generally believed, the educational attainments of household heads have also been increasing over time. The proportion of household heads with less than high school diplomas decreased from 31.7 percent in 1990 to 26.5 percent in 2012, while the proportion of household heads with vocational college degrees or higher educational attainments increased from 19.9 percent in 1990 to 35.5 percent in 2012.

The average monthly household income, converted using the Consumer Price Index(CPI) of 2010(100.0),⁷⁾ has also increased by 1.59 times, or 2.13 percent a year, from KRW 2.106 million in 1990 to KRW 3.346 million in 2012. The real GDP, in the meantime, has multiplied threefold or grown at a rate of 5.1 percent a year. The average monthly household consumption spending, on the other hand, has increased by 1.5 times or at 1.86 percent a year, from KRW 1.354 million in 1990 to KRW 2.03 million in 2012. In other words, consumption spending grew relatively more slowly than income.

7) The CPI rose from 44.5 in 1990 to 60.2 in 1995, to 73.1 in 2000, to 86.1 in 2005, to 100.0 in 2010 and to 106.3 in 2012.

<Table III-1> HIEs: Summary Statistics

	1990	1995	2000	2005	2010	2012	N	
Avg. age	39.00 (261.40)	41.41 (294.84)	44.06 (422.05)	46.72 (393.72)	49.88 (522.32)	51.11 (541.98)	1990	9,298
Avg. no. of members	4.00 (31.90)	3.73 (29.94)	3.53 (39.03)	3.35 (34.36)	2.84 (50.68)	2.81 (51.24)	1995	10,573
Age distribution (%)							2000	6,413
~ 30	19.91	13.66	10.79	5.81	5.50	3.29		
31 ~ 40	40.74	41.02	32.42	27.69	22.35	21.73	2005	11,367
41 ~ 50	25.7	24.98	28.76	33.79	28.56	28.80		
51 ~ 60	11.13	14.52	17.75	18.15	20.38	20.53	2010	10,667
61 ~ 70	2.13	4.57	8.34	10.20	14.18	14.80		
71 ~	0.39	1.25	1.94	4.37	9.03	10.85		
Educational attainments (%)							2012	10,401
Less than high school	31.69	26.92	26.15	26.41	27.81	26.47		
High school	44.13	42.56	41.37	40.06	35.04	34.42		
Less than (vocational) college	4.27	3.21	4.03	3.30	4.23	3.60		
(Vocational) college	18.01	24.04	24.7	26.56	28.25	30.48		
Graduate school	1.90	3.26	3.75	3.67	4.67	5.04		
Avg. monthly income (in KRW 10,000)	93.8 (1,380.9)	187.1 (2,596.4)	222.1 (4,814.2)	289.8 (5,828.6)	317.7 (8,632.3)	355.6 (9,809.2)		
Avg. monthly consumption spending (in KRW 10,000)	60.3 (1,036.7)	112.5 (1,634.6)	148.4 (2,893.9)	187.2 (3,240.9)	200.2 (4,809.7)	215.7 (5,276.8)		

Notes: 1. The figures in the parentheses indicate standard deviations.

2. The monthly household income is the sum of ordinary and non-ordinary income per month per household. The average monthly consumption spending is the balance of the total household expenditure after the non-consumption spending has been subtracted.

3. The age and the educational attainments pertain to household heads, while the number of household members, income and consumption spending pertain to households as a whole.

2 Method for estimating effective VAT burdens

Here we need to outline the method we have used to estimate and analyze the effective VAT burdens on households in Korea. First, we applied the method of Gottfried and Wiegard(1991) to the Input Tables of BOK's Input-Output Statistics to estimate the effective VAT rates for different industries and sectors. Next, we matched the industrial categories of the Input-Output Statistics with the spending categories in Statistics Korea's HIESs. Through this matching process, we found effective VAT rates for the different household consumption spending categories used in the HIESs and estimated the effective VAT burdens for households.

No exact match could be found between the consumption categories of the HIESs and the basic industrial categories of the Input-Output Statistics. The matching process therefore necessarily entailed some arbitrary and subjective judgment calls on our part.

BOK's Input-Output Statistics have been reporting on 384 to 405 basic categories since 1990.⁸⁾ Statistics Korea's HIESs, on the other hand, have been reporting on 392 subcategories of household consumption spending across 12 main categories, which include food and beverages, liquors, medicine, housing, healthcare, and education.⁹⁾ The two sources of statistics overlap in certain categories, but diverge in others. In analyzing the goods and services consumed by individuals, HIESs' consumption spending categories allow for far more detailed organization than the Input-Output Statistics.¹⁰⁾

For instance, the HIESs divides "meat" into multiple categories, such as beef, pork, chicken and other unprocessed meat items, while the Input-Output Statistics has the broad categories of butchered meat, poultry, and other livestock

8) The number of industrial categories has been changing, from 405 in 1990 to 402 in 1995, to 404 in 2000, to 403 in 2005, and to 384 in 2010, in the light of the changing industrial structure of Korea.

9) A more detailed description of the HIESs' data is to follow in the subsequent section.

10) The Input-Output Statistics include categories of non-consumption goods in addition to the goods and services consumed by individuals. It therefore provides less information on consumption goods and services than the HIESs do.

products. It is therefore impossible to distinguish between beef and pork, for instance, using the Input-Output Statistics. In this case, we linked the HIESs' categories of beef and pork to the Input-Output Statistics' category of butchered meat, and then we treated the effective VAT rate on butchered meat as the effective VAT rate for both beef and pork. The HIESs also provides very specific categories for fruit—such as apples, pears, peaches, and grapes—and for vegetables—such as napa cabbages, lettuces, spinach, water parsley, and perilla leaves, while the Input-Output Statistics simply distinguish between fruit and vegetables. The HIESs is more specific on furniture, dividing it into desks, chairs, sofas, and standing closets, while the Input-Output Statistics distinguish among wooden furniture, metallic furniture, and other furniture. However, a desk can be made of wood, metals, or something entirely different, so we linked all the three industrial types of furniture to a single category of consumed furniture (e.g., desks), equating the average effective VAT rate of the former to the effective VAT rate of the latter. The HIESs' category of “men's jackets” was also matched with all the three relevant categories in the Input-Output Statistics, i.e., sewn apparel, woven apparel, and leather apparel.

3 Findings of the effective VAT burden analysis

This study matched the HIESs data from 1990, 1995, 1998, 2000, 2003, 2005, 2010, and 2012 with the benchmark and updated tables of the Input-Output Statistics in order to estimate and analyze the effective VAT burdens on Korean households.

A. Effective VAT burdens on different income and consumption spending quantiles

1) Distribution of elderly households

Before we proceed to the analysis of effective tax burdens on different income and consumption spending quantiles, we need first to ascertain the changing distribution of elderly households, which can directly or indirectly affect tax

burdens on households. Elderly households, with residents at age 65 or older, tend to have a higher level of average propensity to consume and different spending profiles than households of other age groups. For instance, elderly households spend little on education and a great deal on the consumption of unprocessed food and medicine. As the rapid aging of the Korean population has been increasing the proportion of elderly households, we need to identify the distribution of income and consumption spending quantiles among elderly households first.

First, as [Figure III-1] shows, the proportion of elderly households among all households has been steadily expanding throughout the analysis period, reflecting the greater phenomena of population aging across Korea. Especially noteworthy is the abrupt increase in the number of elderly households in the lowest income quantile. The proportion of elderly households in this quantile multiplied from 5.3 percent in 1990 to 73.5 percent in 2013. In the second income quantile, the proportion also multiplied from 3.3 percent to 47.6 percent. This may be due in part to the scope of sample households included in the HIESs being adjusted and expanded during the analysis period to include more elderly households,¹¹⁾ but it is also an outcome of the dramatic increase in the proportion of elderly households.

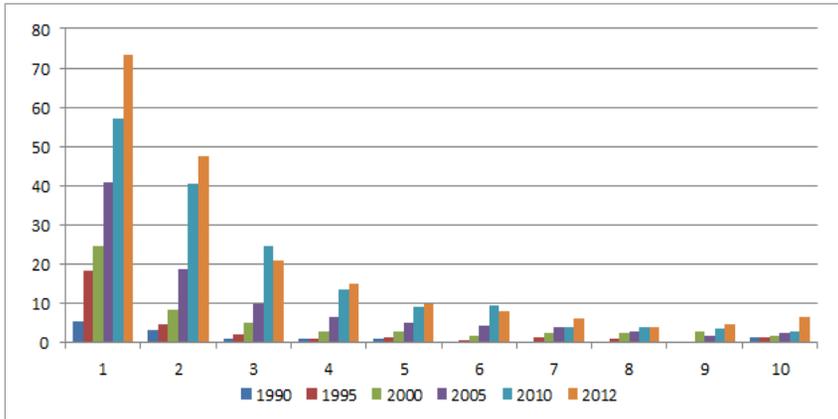
[Figure III-2] also shows the changing distribution of elderly households across consumption quantiles, particularly in the lower ones. The proportion of elderly households in the lowest first consumption quantile, for instance, multiplied from 3.9 percent in 1990 to 71.5 percent in 2012, and, in the second quantile, from 2.5 percent to 46.2 percent.

These radical changes in the proportions of elderly households across income and consumption spending quantiles suggest that the changing distribution of elderly households exerts significant effects on the distribution of tax burdens.

11) The scope of sample households included in the HIESs was first expanded in 2003 to include non-farming households in rural areas in addition to urban households, and it was expanded again in 2006 to include single-person households.

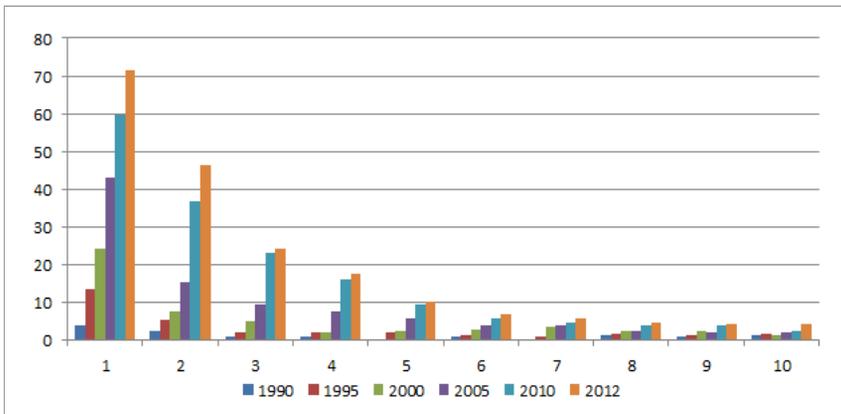
[Figure III-1] Distribution of Elderly Households across Income Quantiles

(Unit: %)



[Figure III-2] Distribution of Elderly Households across Consumption Spending Quantiles

(Unit: %)



2) Effective VAT burdens on different income quantiles

In this study, we decide income quantiles on the basis of the sums of both ordinary and non-ordinary income for households, i.e., the sums of both

cash flows and the flows of other in-kind benefits that substantially increase the worth of each household. Our definition of income does not include valuation gains and losses associated with the transfer, relocation, or possession of assets.

The first rows in <Tables III-2> through <Tables III-7> show the distributions of the HIESs-included households across 10 income quantiles.¹²⁾ The second rows indicate the median score on the average propensity to consume of each income quantile.¹³⁾¹⁴⁾ We used Statistics Korea's *User's Guide* on the HIESs and its definition of the average propensity to consume, i.e., the ratio of consumption spending to the amount of disposable income per household. (Here the disposable income is the balance of income after non-consumption spending is subtracted.) Our analysis reveals that, the higher the income quantile, the lower the average propensity to consume across all years, thus confirming the general perception that the average propensity to consume is a decreasing function of income.

The HIESs of 2012 shows that the average propensity to consume of all households is 78.2 percent, with the propensity score of the lowest first quantile, at 117.9 percent, indicating that households in that quantile spend more than their disposable income allows. The ratio falls steadily as we move up the income quantiles, dropping as low as to 56.5 percent in the highest income quantile. In fact, this phenomenon can be observed with all the HIESs since 2000. Whereas the average propensity to consume in the first income quantile reached 95.0 percent and 97.4 percent, respectively, in 1990 and 1995, the score steeply rose to 113.8 percent in 2000, to 119.6 percent in 2005, and to 121.2 percent in 2010, before taking a slight dip to 117.9 percent in 2012.¹⁵⁾ One key reason

12) The following analysis may be susceptible to the problem of seasonality, associated with converting income and consumption variables on an annual scale, as pointed out by Seong (2002). However, when we tested our results by analyzing the income and consumption variables of households that were included in all the 12 monthly HIESs of 2012, and presumably free from the problem of seasonality, we found no significant differences from our results based on all households.

13) We measured the average propensity to consume with respect only to households whose disposable income is greater to zero.

14) We used the medians instead of averages because using averages results in 1st quantile households, with very little income and relatively much greater consumption spending, overwhelming the entire quantile results.

the average propensity to consume can be greater than 100 percent in the first income quantile can be found in the relatively larger presence of elderly households in that group. Elderly households earn little in wages or business income, but tend to maintain their pre-retirement spending levels, even by dissaving the assets they have saved and accumulated prior to retirement. The reason the average propensity to consume remained below 100 percent in the first income quantile in 1990 and 1995 is that elderly households made up relatively little of this quantile in those years. That changed after the proportion of elderly households—with household heads aged 65 and older—in the first income quantile multiplied abruptly from 5.3 percent in 1990 to 18.25 percent in 1995, to 24.6 percent in 2000, to 40.9 percent in 2005, to 55.1 percent in 2010, and to 73.5 percent in 2012.

The third rows in <Tables III-2> through <Tables III-7> show the average effective VAT burdens on the different income quantiles. In all the years analyzed, the amount of the effective VAT burdens increased in proportion to income. The average effective VAT burden on all households in 2012, for instance, was KRW 1.826 million. The value dropped to KRW 0.427 million for the first income quantile, but rose to KRW 3.489 million for the highest 10th quantile—about 8.1 times greater than that of the first quantile. This confirms the general perception that the higher the income, the greater the absolute amount of consumption spending and the greater the amount of VATs.

The fourth rows in <Tables III-2> through <Tables III-7> indicate the effective VAT burden against income for each income quantile. This ratio of effective VAT burden against income drops as income rises in all the years analyzed. In other words, the distribution of the effective VAT burdens in Korea is regressive, with the lower income quantiles facing greater burdens than the higher ones. This finding confirms the general belief that the average propensity to consume is the decreasing function of income, and that under a “pure” VAT system imposing a single VAT rate to all goods and services, the distribution of the VAT burdens is regressive.¹⁶⁾

15) Aside from the first quantile, no other quantile had an average propensity to consume exceeding 100 percent.

The ratio of the VAT burden to income, according to the 2012 HIESs, was 7.3 percent for the first income quantile and drops as we moved up the quantiles, reaching 3.3 percent for the 10th quantile. This regressivity is noted in all the years analyzed, and it has worsened in recent years. The VAT burden ratio for the first income quantile amounted to 1.4 times that of the 10th quantile in 1990, but it had increased to 2.2 times that of the 10th quantile by 2012. This is because the tax burden on the 10th quantile has dropped somewhat over the years, while the tax burden on the first quantile has increased rather dramatically, as shown in Figure III-9. This, again, is associated with the increasing elderly households, with their higher average propensity to consume, in the lower income quantiles.¹⁷⁾¹⁸⁾

The fifth rows in <Tables III-2> through <Tables III-7> show the ratio of effective VAT burden against the consumption spending of each income quantile.¹⁹⁾ In all the years analyzed, the ratios have remained relatively intact in all the income quantiles, and they increase as we move up the quantiles.²⁰⁾ In other words, if we measure the effective tax burdens on households based on consumption spending patterns, we find no regressivity. Rather, the ratio of the tax burdens against consumption spending keeps growing in a progressive manner across the first four or five income quantiles.

16) Under a “pure” VAT system imposing a single rate, the effective VAT rates on all goods and services would be identical to the statutory ones. The ratio of tax burden to income, then, can be estimated by multiplying the average propensity to consume by the statutory VAT rate. Here the statutory VAT rate is a constant, holding the same for all income quantiles, while the average propensity to consume is a decreasing function of income. Therefore, only the changes in the average propensity to consume would cause changes in the tax burden ratios.

17) The proportion of households with household heads at age 65 or older in the first income quantile increased steadily, from 5.3 percent in 1990 to 18.2 percent in 1995, to 24.6 percent in 2000, to 40.9 percent in 2005, to 55.1 percent in 2010, and to 73.46 percent in 2012.

18) The average propensity to consume in households that can sustain their prior spending level with the significant amounts of assets they have accumulated over time, notwithstanding the sudden loss of income, may be equally high. However, the number of these households has not increased as dramatically over the years.

19) The effective VAT rate in this context can be defined as the ratio of the effective VAT burden to consumption spending. Of course, consumption spending is a concept that includes VATs, and so the meaning of the effective VAT rate used in this context differs from the concept of effective tax rates in general.

20) See [Figures III-3] through [Figures III-8].

Our analysis of the HIESs of 2012 reveals the average effective VAT rate on the first income quantile to be 7.1 percent. The rate keeps climbing up as we move up the quantiles, until it reaches its peak at 7.8 percent in the fourth quantile. It stays at around 7.7 to 7.8 percent in the remaining quantiles. The same pattern is repeated throughout all the analyzed years. In all income quantiles, however, the average effective VAT rate has been rising in recent years, from 6.2 percent in 1990 to 7.1 percent in 2012 in the first quantile and from 7.1 percent in 1990 to 7.7 percent in 2012 in the 10th quantile. In other words, the contribution of VATs to Korea's tax revenue has been steadily on the rise.²¹⁾

21) The C-efficiency, used as an indicator of the revenue-serving performance of VATs, is usually defined as the ratio of VAT revenue to consumption, divided by a single standard tax rate. In Keen (2013), for instance, C-efficiency (E^c) is defined as $E^c = \frac{V}{\tau_y C}$. Here, V stands for the VAT revenue; τ_y , the single standard tax rate; and C , consumption. If we divide the ratio of the effective tax burden to consumption spending by the statutory VAT rate of 10 percent, we can obtain a C-efficiency. As there has been no change to the statutory VAT rates, any change in the ratio of the tax burden to consumption would mean a concomitant change in the size of the C-efficiency.

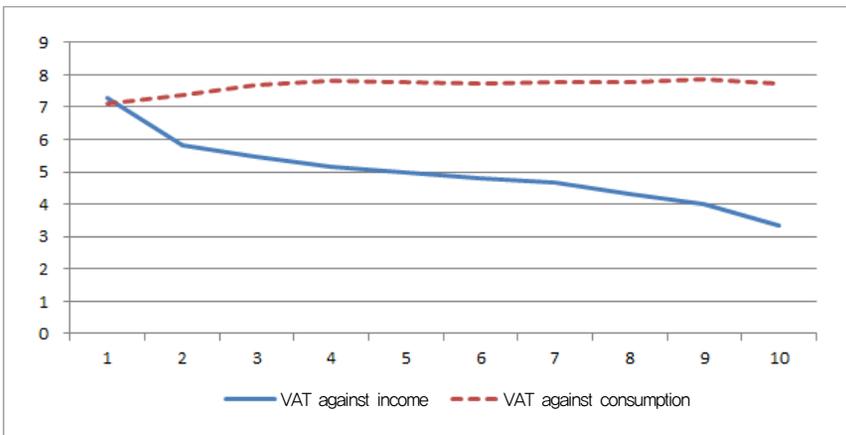
<Table III-2> **Effective VAT Burden Distribution across Income Quantiles: 2012**

Income quantile	Average propensity to consume (%)	VAT amount (in KRW 10,000)	VAT burden rate (%)	
			Against income	Against consumption
1	117.9	42.8	7.26	7.11
2	94.6	74.9	5.83	7.35
3	87.0	111.8	5.45	7.68
4	83.3	144.5	5.17	7.81
5	79.2	175.6	4.98	7.79
6	78.1	200.5	4.81	7.75
7	73.6	226.6	4.69	7.77
8	70.8	252.7	4.33	7.76
9	64.6	282.3	4.02	7.85
10	56.5	347.0	3.34	7.75
Overall ¹⁾	78.2	182.6	4.80	7.67

Note: 1) The average propensity to consume, whether per quantile or for all quantiles, is measured in terms of the median and not the average.

[Figure III-3] **Effective VAT Burden Distribution across Income Quantiles: 2012**

(Unit: %)



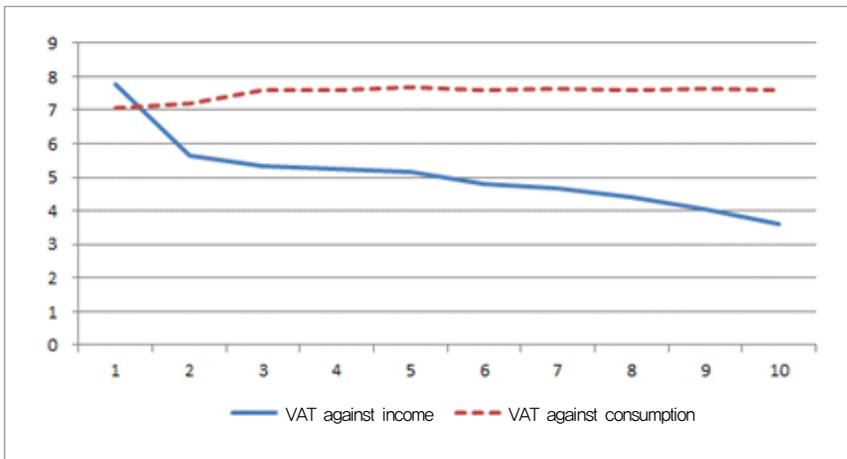
<Table III-3> Effective VAT Burden Distribution across Income Quantiles: 2010

Income quantile	Average propensity to consume (%)	VAT amount (in KRW 10,000)	VAT burden rate (%)	
			Against income	Against consumption
1	121.2	39.7	7.79	7.04
2	97.4	67.7	5.65	7.22
3	85.9	99.1	5.33	7.58
4	84.6	130.3	5.24	7.61
5	83.7	163.0	5.14	7.68
6	78.8	178.5	4.80	7.58
7	74.1	203.1	4.68	7.66
8	74.5	228.4	4.39	7.61
9	67.3	259.1	4.07	7.65
10	61.6	317.4	3.60	7.59
Overall ¹⁾	79.3	167.7	4.90	7.65

Note: 1) The average propensity to consume, whether per quantile or for all quantiles, is measured in terms of the median and not the average.

[Figure III-4] Effective VAT Burden Distribution across Income Quantiles: 2010

(Unit: %)



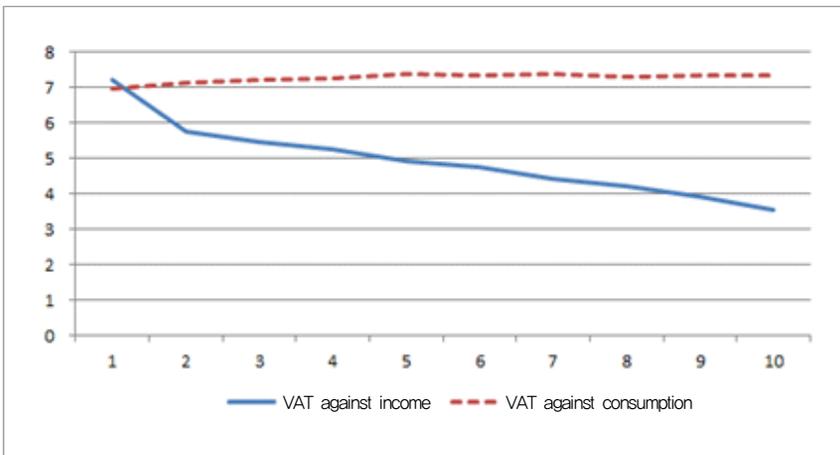
<Table III-4> **Effective VAT Burden Distribution across Income Quantiles: 2005**

Income quantile	Average propensity to consume (%)	VAT amount (in KRW 10,000)	VAT burden rate (%)	
			Against income	Against consumption
1	119.6	59.7	7.20	6.96
2	96.5	88.5	5.77	7.12
3	89.0	111.1	5.49	7.23
4	87.0	130.4	5.28	7.28
5	79.9	144.1	4.94	7.37
6	77.9	159.2	4.74	7.36
7	73.0	172.4	4.43	7.38
8	70.7	187.6	4.23	7.29
9	65.5	211.3	3.93	7.35
10	60.5	267.3	3.56	7.35
Overall ¹⁾	79.6	149.4	4.82	7.27

Note: 1) The average propensity to consume, whether per quantile or for all quantiles, is measured in terms of the median and not the average.

[Figure III-5] **Effective VAT Burden Distribution across Income Quantiles: 2005**

(Unit: %)



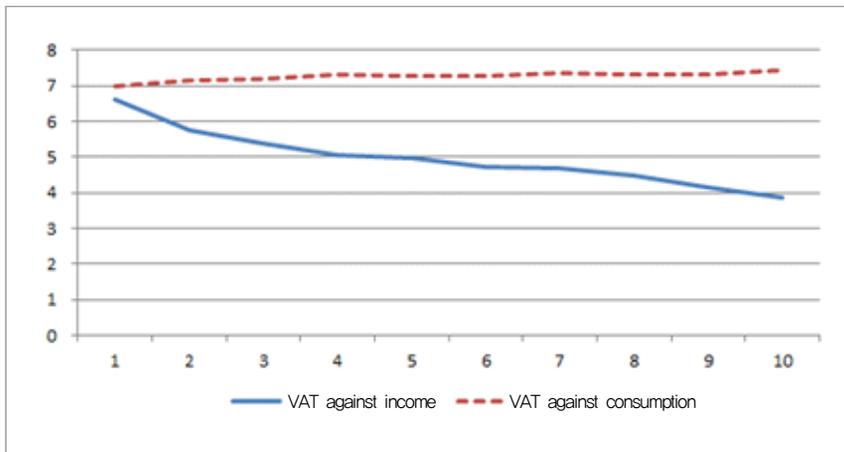
<Table III-5> **Effective VAT Burden Distribution across Income Quantiles: 2000**

Income quantile	Average propensity to consume (%)	VAT amount (in KRW 10,000)	VAT burden rate (%)	
			Against income	Against consumption
1	113.8	53.5	6.62	7.00
2	94.8	75.5	5.77	7.16
3	88.2	88.1	5.37	7.19
4	83.4	97.4	5.05	7.33
5	82.9	110.9	4.99	7.27
6	78.8	120.9	4.73	7.28
7	77.4	136.3	4.71	7.34
8	75.4	149.7	4.48	7.33
9	70.2	164.7	4.15	7.29
10	65.1	216.3	3.85	7.43
Overall ¹⁾	81.6	114.6	4.91	7.25

Note: 1) The average propensity to consume, whether per quantile or for all quantiles, is measured in terms of the median and not the average.

[Figure III-6] **Effective VAT Burden Distribution across Income Quantiles: 2000**

(Unit: %)



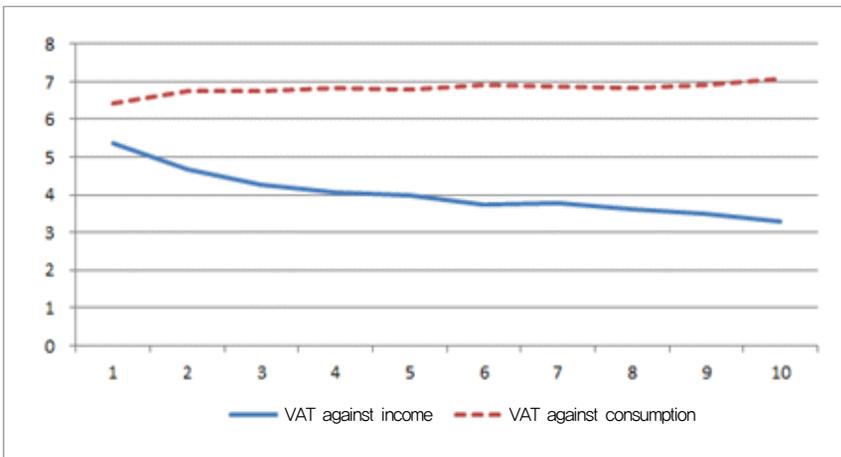
<Table III-6> **Effective VAT Burden Distribution across Income Quantiles: 1995**

Income quantile	Average propensity to consume (%)	VAT amount (in KRW 10,000)	VAT burden rate (%)	
			Against income	Against consumption
1	97.4	39.0	5.36	6.41
2	80.7	56.0	4.69	6.73
3	74.3	63.3	4.27	6.75
4	71.8	70.1	4.08	6.84
5	69.8	77.5	4.00	6.79
6	65.9	82.1	3.76	6.90
7	67.8	92.0	3.78	6.88
8	64.6	100.1	3.61	6.84
9	62.0	115.5	3.48	6.93
10	57.3	148.5	3.29	7.10
Overall1)	70.5	80.1	4.03	6.84

Note: 1) The average propensity to consume, whether per quantile or for all quantiles, is measured in terms of the median and not the average.

[Figure III-7] **Effective VAT Burden Distribution across Income Quantiles: 1995**

(Unit: %)



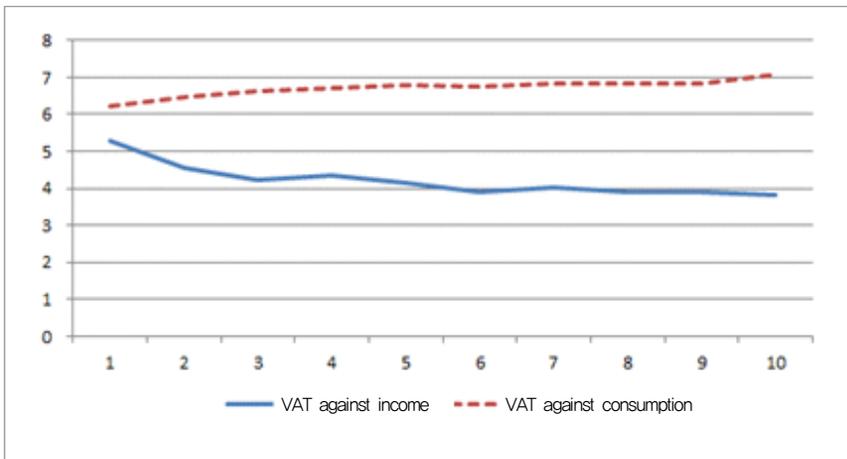
<Table III-7> Effective VAT Burden Distribution across Income Quantiles: 1990

Income quantile	Average propensity to consume (%)	VAT amount (in KRW 10,000)	VAT burden rate (%)	
			Against income	Against consumption
1	62.9	18.0	3.47	6.35
2	64.0	25.3	3.69	6.64
3	68.0	30.1	3.94	6.67
4	68.8	34.4	3.91	6.66
5	70.3	38.8	4.05	6.70
6	74.4	43.7	4.25	6.75
7	76.9	48.9	4.24	6.60
8	79.7	57.9	4.50	6.80
9	83.8	72.5	4.61	6.82
10	94.6	106.9	5.41	7.19
Overall ¹⁾	74.1	40.6	4.19	6.73

Note: 1) The average propensity to consume, whether per quantile or for all quantiles, is measured in terms of the median and not the average.

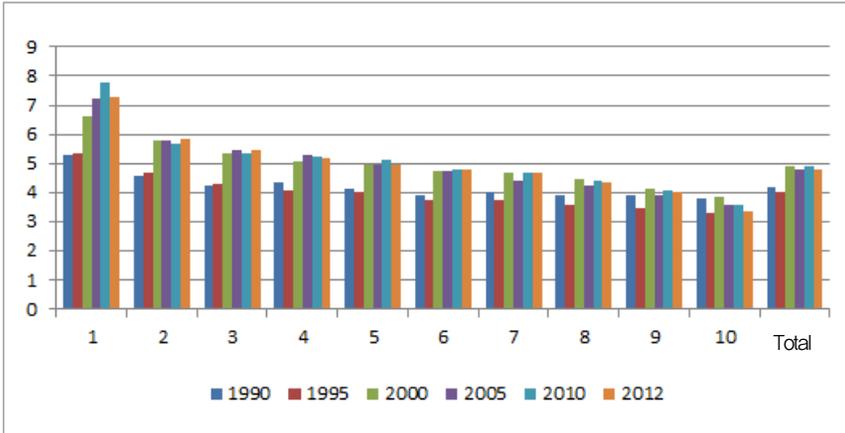
[Figure III-8] Effective VAT Burden Distribution across Income Quantiles: 1990

(Unit: %)



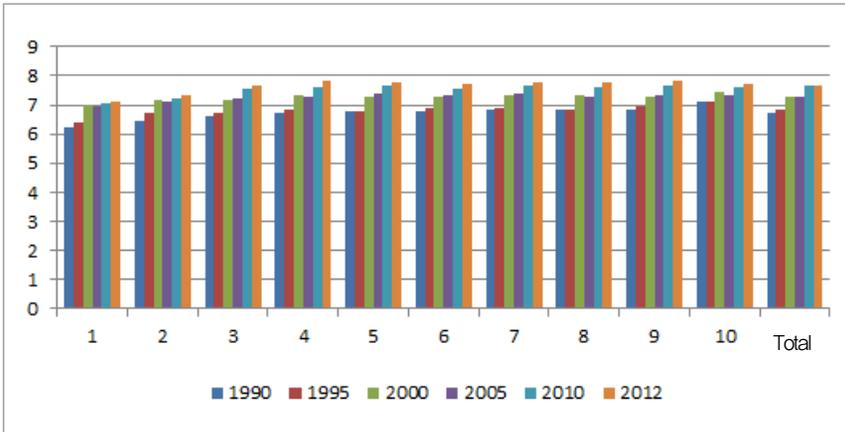
[Figure III-9] Trend in Effective VAT Burdens against Income by Income Quantile

(Unit: %)



[Figure III-10] Trend in Effective VAT Burdens against Consumption by Consumption Quantile

(Unit: %)



3) Analysis of effective VAT burdens by income quantile

As Poterba (1989) has noted in his analysis of the individual consumption tax burden distribution, households may plan their spending on the basis of lifetime income, not short-term income. According to the lifetime income hypothesis, consumption is an indicator more representative of lifetime income than annual income. As Crossley et al. (2009) has pointed out, income carries significant levels of short-term volatility due to temporary shocks, but consumption spending tends to be level thanks to the help of loans and savings. Retirees and students, for example, may be categorized in low income quantiles, but their lifetime income can be relatively great. Students can take out loans for current consumption using future expected income as their collateral. Retirees can maintain their consumption levels by dissaving the assets they have saved over the years. People who earn great amounts of income today do not spend all their income but are likely save significant portions of it for future spending. Thanks to this consumption smoothing effect, consumption spending as an indicator of the standard of living for households is often preferred to income. If lifetime income or the standard of living is a better indicator than current income of the economic capacity of a given household or individual, there is no reason why we should not use this indicator in estimating the distribution of tax burdens. We therefore estimate the distribution of tax burdens as measured by consumption as well.

For this study, we divided all the subject households again into 10 quantiles, this time according to their levels of consumption spending, and analyzed the distribution of effective VAT burdens accordingly. First, in all the analyzed years, the amount of VAT burdens increased in proportion to consumption spending. The VAT burden on the 10th quantile, for instance, was six times greater than that of the first quantile in 1990, 5.4 times greater in 1995, 5.3 times greater in 2000, 5.8 times greater in 2005, 11.2 times greater in 2010, and 10.4 times greater in 2012.

The ratio of VAT burden to income in each consumption quantile tends to narrow toward the mid-level quantiles and rise again in the higher quantiles. In other words, the VAT burdens tend to be low in the mid-level quantiles. Our analysis of the HIESs of 2012 shows that the ratio of the VAT burden

to income in the first consumption quantile was 5.2 percent and dropped to 4.5 percent in the fifth quantile before rising back up and reaching as high as 5.1 percent in the 10th quantile. The same pattern is repeated almost every year. In terms of the VAT burden rate, the differences among consumption quantiles were not as great as those among income quantiles. The analysis of the HIESs of 2012 shows that the difference between the fifth quantile with the lowest VAT burden rate (4.54 percent) and the first quantile with the highest VAT burden rate (5.19 percent) is only 0.65 percent. In other words, the VAT burden tends to move regressively in the lower five income quantiles, but then moves progressively in the upper five income quantiles. Yet the differences among consumption quantiles in terms of the ratios of VAT burdens to income remain marginal and generally proportional.

In contrast, the ratio of the tax burden to consumption spending, i.e., the average effective tax rate, tends to be low in low and high consumption quantiles and high in the mid-level quantiles. Yet the differences among consumption quantiles in terms of the effective VAT burden rates remain insignificant. In the 1990s, however, high consumption quantiles tended to carry greater VAT burdens than other quantiles, indicating a weak but clear progressive tendency. Since 2000, the VAT burden has remained in the seven-to-eight-percent range, generally proportional to consumption. If we use consumption spending as the main indicator of the economic capability of households, we can see that the trend in the distribution of the VAT burdens against consumption spending is either proportional or partially progressive rather than regressive.

[Figures III-17] and [Figures III-18] show the changing distribution of VAT burdens by year and consumption quantile. The ratios of tax burdens to income have grown through the 1990s to 2000s in the first five quantiles or so, but have remained relatively stable since 2000. The ratio has in fact been declining in the case of the 10th quantile since reaching a peak in 2000. The average effective VAT rates for all consumption quantiles, on the other hand, have been growing in recent years, as we have seen in our analysis of the average effective tax rates on income quantiles.

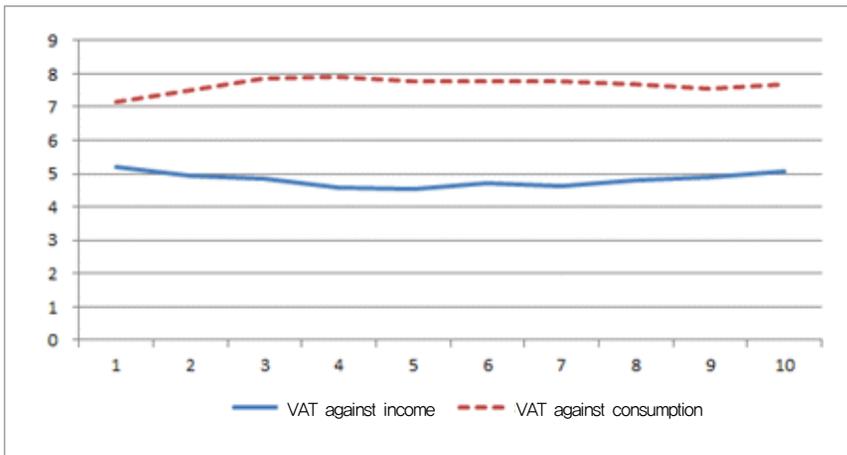
<Table III-8> Effective VAT Burden Distribution by Consumption Quintile: 2012

Consumption quintile	VAT burden (in KRW 10,000)	VAT burden rate (%)	
		Against income	Against consumption
1	39.7	5.19	7.13
2	75.5	4.93	7.53
3	111.1	4.85	7.88
4	140.5	4.58	7.89
5	172.4	4.54	7.78
6	198.3	4.72	7.79
7	227.5	4.65	7.76
8	259.3	4.81	7.68
9	305.1	4.91	7.55
10	411.3	5.05	7.68
Overall ¹⁾	182.6	4.80	7.67

Note: 1) The figures listed here are medians and not averages.

[Figure III-11] Effective VAT Burden Distribution by Consumption Quintile: 2012

(Unit: %)



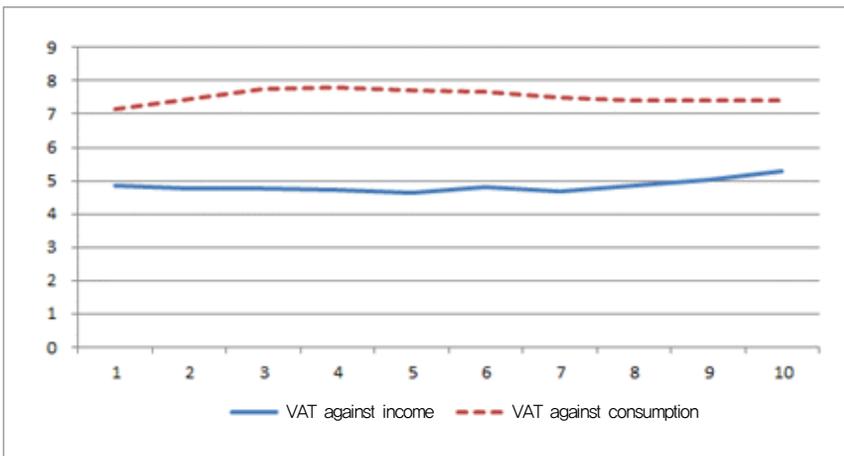
<Table III-9> Effective VAT Burden Distribution by Consumption Quintile: 2010

Consumption quintile	VAT burden (in KRW 10,000)	VAT burden rate (%)	
		Against income	Against consumption
1	34.0	4.84	7.16
2	67.7	4.77	7.44
3	99.1	4.77	7.77
4	128.1	4.72	7.81
5	156.4	4.62	7.71
6	182.4	4.80	7.66
7	205.0	4.67	7.50
8	236.6	4.86	7.42
9	283.0	5.03	7.40
10	380.4	5.30	7.42
Overall ¹⁾	167.7	4.90	7.65

Note: 1) The figures listed here are medians and not averages.

[Figure III-12] Effective VAT Burden Distribution by Consumption Quintile: 2010

(Unit: %)



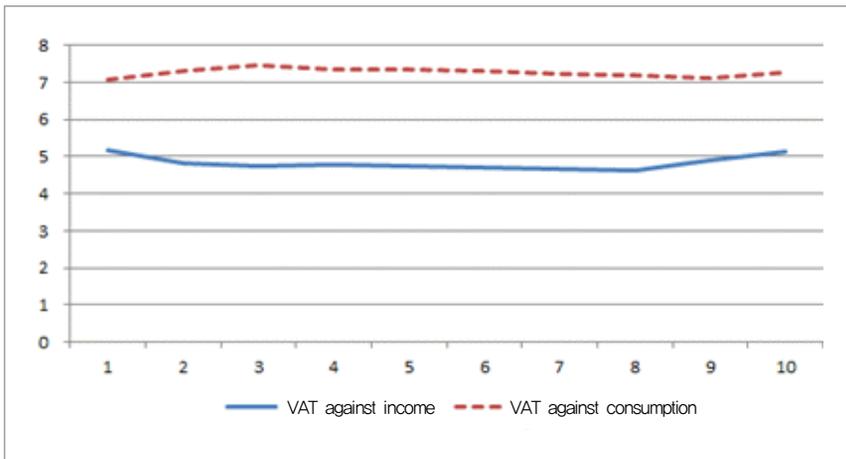
<Table III-10> Effective VAT Burden Distribution by Consumption Quintile: 2005

Consumption quintile	VAT burden (in KRW 10,000)	VAT burden rate (%)	
		Against income	Against consumption
1	55.3	5.16	7.09
2	86.2	4.80	7.33
3	109.0	4.73	7.45
4	124.7	4.78	7.37
5	143.7	4.75	7.33
6	159.3	4.70	7.32
7	176.1	4.68	7.23
8	197.8	4.64	7.20
9	232.1	4.88	7.12
10	318.4	5.13	7.27
Overall ¹⁾	149.3	4.82	7.27

Note: 1) The figures listed here are medians and not averages.

[Figure III-13] Effective VAT Burden Distribution by Consumption Quintile: 2005

(Unit: %)



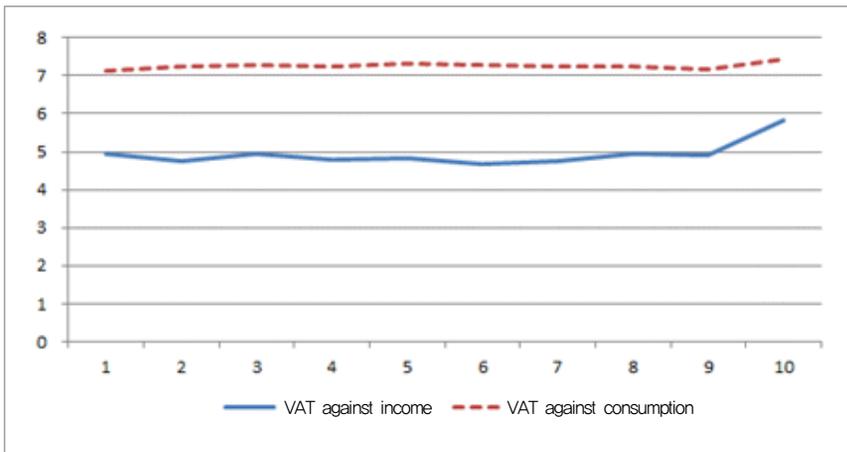
<Table III-11> Effective VAT Burden Distribution by Consumption Quantile: 2000

Consumption quantile	VAT burden (in KRW 10,000)	VAT burden rate (%)	
		Against income	Against consumption
1	49.3	4.96	7.12
2	70.6	4.76	7.24
3	84.9	4.94	7.30
4	96.6	4.80	7.24
5	109.3	4.82	7.31
6	123.0	4.70	7.28
7	137.5	4.77	7.25
8	154.5	4.93	7.23
9	182.6	4.90	7.18
10	261.6	5.81	7.44
Overall ¹⁾	114.6	4.91	7.25

Note: 1) The figures listed here are medians and not averages.

[Figure III-14] Effective VAT Burden Distribution by Consumption Quantile: 2000

(Unit: %)



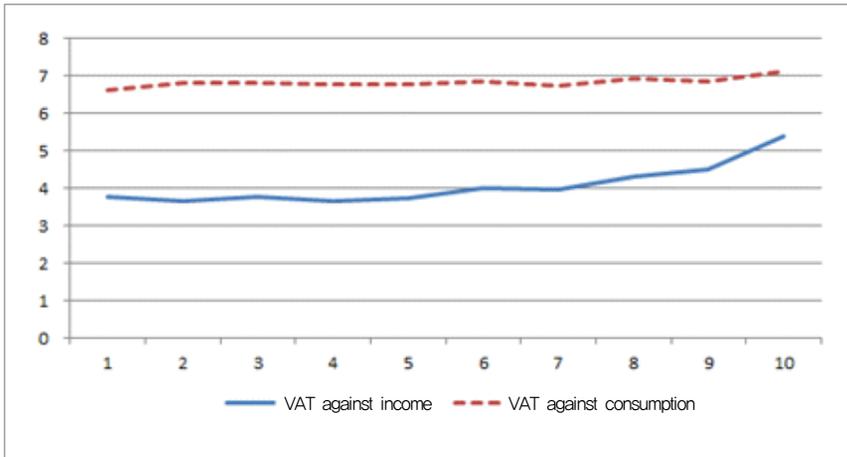
<Table III-12> Effective VAT Burden Distribution by Consumption Quintile: 1995

Consumption quintile	VAT burden (in KRW 10,000)	VAT burden rate (%)	
		Against income	Against consumption
1	35.2	3.77	6.62
2	50.8	3.64	6.83
3	60.7	3.76	6.82
4	67.6	3.66	6.78
5	76.3	3.73	6.78
6	86.5	4.00	6.86
7	96.6	3.98	6.75
8	112.3	4.32	6.92
9	133.8	4.51	6.85
10	189.2	5.39	7.14
Overall ¹⁾	80.1	4.02	6.84

Note: 1) The figures listed here are medians and not averages.

[Figure III-15] Effective VAT Burden Distribution by Consumption Quintile: 1995

(Unit: %)



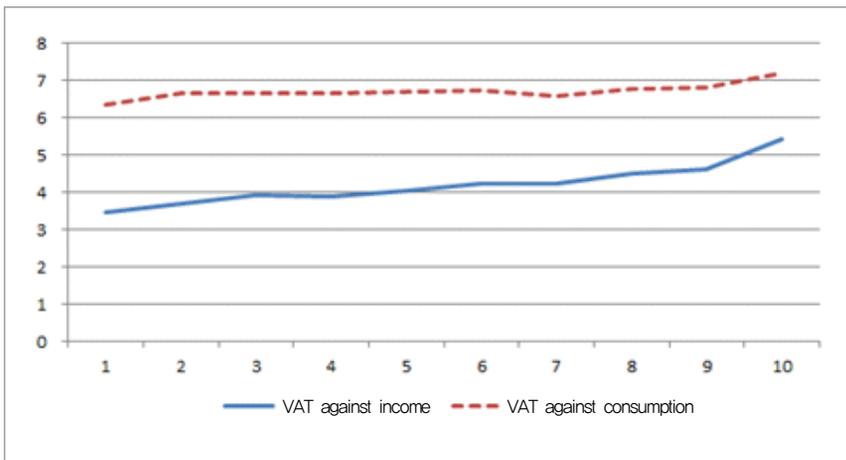
<Table III-13> Effective VAT Burden Distribution by Consumption Quantile: 1990

Consumption quantile	VAT burden (in KRW 10,000)	VAT burden rate (%)	
		Against income	Against consumption
1	18.0	3.47	6.35
2	25.3	3.69	6.64
3	30.1	3.94	6.67
4	34.4	3.91	6.66
5	38.8	4.05	6.70
6	43.7	4.25	6.75
7	48.9	4.24	6.60
8	57.9	4.50	6.80
9	72.5	4.61	6.82
10	106.9	5.41	7.19
Overall ¹⁾	40.6	4.19	6.73

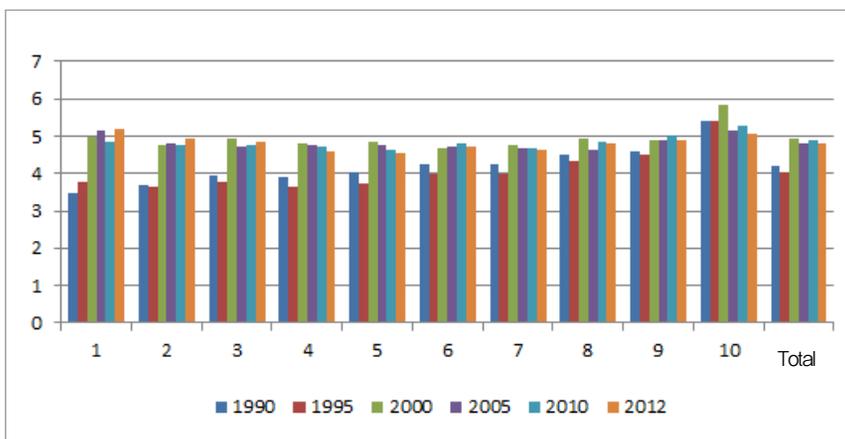
Note: 1) The figures listed here are medians and not averages.

[Figure III-16] Effective VAT Burden Distribution by Consumption Quantile: 1990

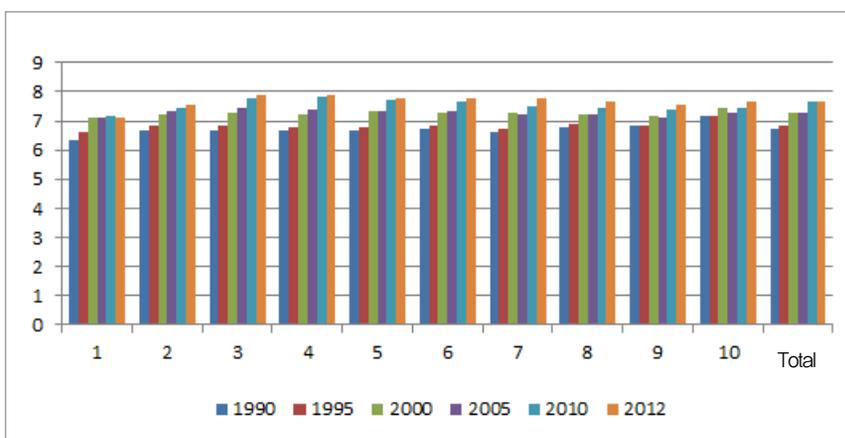
(Unit: %)



[Figure III-17] Trend in VAT Tax Burden against Income by Consumption Quintile



[Figure III-18] Trend in VAT Tax Burden against Consumption by Consumption Quintile



4) Section conclusion

If we use annual income as the yardstick for effective VAT burdens, the

burdens move in a regressive manner across the income quantiles in all the analyzed years. This regressive tendency, in fact, has been on the rise in recent years, as shown in [Figure III-9]. However, if we switch our yardstick to consumption spending, we begin to see some proportional, and even partially progressive, tendencies, as shown in [Figure III-10]. The average effective tax rates, defined as tax burdens against consumption spending, have been on the rise across all income quantiles in recent years.

Using consumption spending as the measure of the effective VAT burdens on all consumption quantiles reveals proportional and partially progressive distributions of burdens across the quantiles, whether against income or consumption. Even so, the VAT burdens have been on the rise in all consumption quantiles in recent years.

In other words, depending on which variable—income or consumption—we use as the yardstick for effective VAT burdens, the resulting distribution of tax burdens can be either regressive or proportional/progressive. The argument that the current VAT structure in Korea is regressive is therefore as equally valid as the argument to the contrary.

However, we need to decide which variable is the most appropriate yardstick to use. We may begin to answer this question by recalling the ability-to-pay principle, one of the key principles of taxation. As Lee(1994) has pointed out, we call a tax regime progressive if it imposes average effective tax rates in proportion to the economic abilities of taxpayers. We call a tax regime regressive if it fails to impose such proportional average effective tax rates. So now, we need to determine which variable—income or consumption—is the more appropriate measure of economic abilities.

Poterba(1989) and Crossley et al.(2009) argue that, while annual income responds to temporary shocks(e.g., unemployment and diseases) with greater sensitivity, consumption that can withstand such shocks with relative stability, thanks to the smoothing effects of savings and loans, is the better indicator of the standard of living or economic abilities. As we have seen, using consumption as the yardstick of VAT burdens on Korean households shows that VAT burdens or average effective tax rates move in a proportional/progressive manner across consumption quantiles. According to this standard, therefore, the Korean VAT structure is in no way regressive.

In reality, however, we know there are plenty of short-sighted people who base their spending and saving decisions on their current situations only, without any consideration for future income flows. There are also people who are not able to take out loans on their future expected income due to the uncertain prospects of the financial market. Moreover, we have typically been using annual income as the indicator of taxpayers' ability to pay when we analyze and discuss whether a tax regime is regressive or not. The above points are why some researchers still argue that annual income should still be used both as the indicator of taxpayers' ability to pay and as an indicator of the regressivity of a given tax regime (Murphy, 2010).

Lee (1994) points out that both annual income and consumption are not free from the problem of endogeneity, i.e., taxpayers' choices, and therefore stand as imperfect indicators of economic abilities. If either of these two variables is fundamentally flawed as a complete indicator of the ability to pay, we ought not to rely solely on one or the other—the regressive or the progressive side. We need to analyze the distribution of tax burdens for our situation using both income and consumption as measures. However, as we have discussed earlier, almost three-fourths of all households in the lowest income quantile are elderly households, and the proportion of the elderly among the poor will only increase in the future with Korea's rapidly aging population. Given these demographic likelihoods, we will increasingly have to resort to consumption more than annual income as the main indicator of economic abilities.

B. Analysis of factors of change in effective VAT burdens

In this subsection, we will identify and analyze the factors that have led to changes in the distribution of effective VAT burdens in Korea. There are two groups of factors prompting changes. The first are those that change the effective VAT rates. We have based our estimates on effective VAT rates on statutory VAT rates and the Input Tables of BOK's Input-Output Statistics. Therefore, institutional changes to statutory VAT rates and structural changes in production—i.e., changes in the makeup of inputs—can always change our effective VAT rates. The second group of factors that change consumption

patterns are demographic changes, which exert both direct and indirect effects on consumption patterns.²²⁾

First, let us consider the likelihood of changes in effective VAT burdens resulting from institutional changes to statutory VAT rates. In Korea, the statutory VAT rate has remained at 10 percent of the consumer price over the last 47 years. While the scope of VAT-exempt goods and services has been readjusted and modified to some extent from year to year, the overarching VAT exemption system remains intact. Changes in the effective VAT burdens are therefore unlikely to result from institutional changes to statutory VAT rates.

Next, we need to consider changes in the industrial makeup of the Korean economy as possible factors behind change in the effective VAT burdens. In Section III, we discussed the changing main categories of industries listed on BOK's Input-Output Statistics. We saw that the Input-Output Statistics' industrial categories have changed multiple times from 1990 to 2012 in response to dramatic transformations taking place in Korea's industrial sector. When we confined our focus to the years 2000 to 2009—the period that industrial categories remained mostly intact—the effective VAT rates on most industries either remained constant or increased slightly from year to year. Yet the extents of growth in effective VAT rates differ from industry to industry. For instance, the effective VAT rate on agricultural, forestry and fishery goods rose from 5.17 percent in 2000 to 6.40 percent in 2009, while the rate on food and beverages rose from 7.90 percent to 9.25 percent over the same period. Given little change in the overarching VAT exemption system, these increases in the effective VAT rates likely reflect the growing weights of taxable goods and services being produced, along with the growing weights of taxable inputs involved in production.

Meanwhile, over this period, the effective VAT rates dropped in the cases of real estate and related services, public administration and national defense, education and public healthcare, and social and other services. The marginal

22) The emergence of new products and changing preferences of consumers may also cause changes to consumption patterns. Yet these have been omitted from the scope of this study due to the limits to the available data and to analysis techniques.

decreases in the effective VATs imposed on these goods and services may reflect the relative decreases in the amounts of VAT-charged inputs involved in their production.

When we expand our scope to the 22 years from 1990 to 2012, it is impossible to make consistent analyses of the effective VAT rates on different industries due to the transformation of Korea's industrial structure over this period. Nevertheless, we did our best to match and group together similar industries to more accurately measure changes in the effective VAT rates. Over the last two decades or so, the effective VAT rates have been growing marginally across almost all industries, suggesting that either the weight of tax-exempt inputs in the production of taxable goods and services has been increasing, or, conversely, the weight of taxable inputs in the production of tax-exempt goods and services has been increasing. As the Korean economy matures, the makeup of inputs used has diversified and grown more complex.

Public administration and national defense are services whose effective VAT rate has declined with relatively greater clarity. The effective VAT rate on these services dropped from 4.6 percent in 1990 to 3.3 percent in 2000 and further to 2.5 percent in 2012. In contrast, the effective VAT rates on food and beverages, mineral goods, and coals and petrochemical goods have risen. The rate on food and beverages, for example, grew from 7.4 percent in 1990 to 7.9 percent in 2000, and again to 9.7 percent in 2012. In general, rises in effective VAT rates on certain industries indicate the growing weights of tax-exempt inputs used in production in those industries.

Finally, we also need to review demographic changes that can likely change the distribution of effective VAT burdens. The rapid aging of the Korean population over the last two decades has radically increased the proportion of elderly households among Korean households, especially in the lowest two income quantiles.

Elderly households are characterized by their particularly high average propensity to consume. As <Table III-14> shows, the average propensity to consume in elderly households ranges from 85 to 96 percent, while in non-elderly households it ranges from 70 to 81 percent. In other words, elderly households' average propensity to consume is about seven to 24 percent higher than that of non-elderly households.

<Table III-14> Average Propensity to Consume: Elderly vs. Non-Elderly Households

(Unit: %)

	1990	1995	2000	2005	2010	2012
Elderly households (A)	96.0	94.0	93.4	88.6	85.5	89.3
Non-elderly households (B)	74.0	69.8	81.1	78.8	78.5	76.1
A-B	22.0	24.2	12.3	9.8	7.0	13.2

Note: The figures are medians estimated on the basis of the HIESs data from each year. Using averages instead of medians would raise the elderly households' average propensity to consume above 100 percent in all the analyzed years.

Another key characteristic of elderly households is that they have a great tendency to consume VAT-exempt goods and services. As <Table III-15> shows, elderly households' propensity to consume VAT-exempt goods and services is 3.6 to 9.8 percent higher than that of non-elderly households. The gap was especially apparent with respect to unprocessed food, widening to 5.5 to 11.1 percent. As for medicine and healthcare services, elderly households' average propensity to consume was also 0.9 to 6.7 percent higher than that of non-elderly households.

The average propensity to consume VAT-exempt goods and services has been on steady decline in recent years in both elderly and non-elderly households. This change in the consumption structure is more evident in non-elderly households than in elderly ones. The proportion of unprocessed food, for instance, has been decreasing radically in the consumption profiles of elderly households and non-elderly ones alike, but with greater clarity in the latter. On the other hand, the proportion of medicine and healthcare services has been increasing in the consumption profiles of both elderly households and non-elderly ones alike, but at a greater pace in the former. As the proportion of elderly households has multiplied dramatically in both low-income and low-consumption quantiles, the phenomenon has likely affected the distribution of effective VAT burdens on low quantiles. For example, the effective tax burden against income has been rising dramatically in the first income quantile in recent years,²³⁾ most likely due to the steep increase in the proportion of elderly households, with their above-income and high average propensity to consume, in that quantile.

Moreover, the average effective tax rate of the first income quantile remained constantly lower than those of all other income quantiles throughout the analysis period.²⁴⁾ This was because lower income and consumption quantiles have a greater propensity to consume VAT-exempt goods and services and because the increasing presence of elderly households in these quantiles have added to that propensity. In recent years, the average effective tax rates have been increasing across all income and consumption quantiles, primarily reflecting the change in the overall consumption structure, with an increasing preference for taxable goods and services and the dramatic growth in the proportion of elderly households with their high average propensity to consume.

〈Table III-15〉 Consumption of VAT-Exempt Goods and Services: Elderly vs. Non-Elderly Households

(Unit: %)

	1990	1995	2000	2005	2010	2012
All VAT-exempt goods and services						
Elderly households	50.5	51.2	46.8	46.0	48.5	48.6
Non-elderly households	46.8	43.2	40.5	39.0	39.8	38.9
A-B	3.6	8.0	6.3	7.0	8.8	9.8
Unprocessed food						
Elderly households	27.8	25.8	21.2	20.5	20.1	20.2
Non-elderly households	22.3	16.8	13.1	10.6	9.4	9.1
A-B	5.5	9.1	8.1	9.9	10.7	11.1
Medicine and healthcare services						
Elderly households	4.1	7.1	6.9	9.3	11.1	10.8
Non-elderly households	3.2	3.2	3.4	3.9	4.4	4.5
A-B	0.9	3.9	3.6	5.4	6.7	6.4

Notes: All the figures are averages, estimated on the basis of the HIESs data from each year.

23) The same phenomenon is observed even when we switch our yardstick to consumption.

24) The same phenomenon is observed even when we switch our yardstick to consumption.

C. Analysis of effective tax burdens from major exemptions and of the effects of taxing them

In this subsection, we analyze the income-redistributing effect of the current VAT exemption system in Korea and explore how taxing currently VAT-exempt goods and services will likely affect income distribution and tax revenue. Before we proceed with our analysis, however, we must point out that our underlying assumption is that the Input Tables of the Input-Output Statistics and the spending level per good or service, as surveyed by Statistics Korea, will remain constant whether the VAT exemptions exist or not. In other words, the underlying model of analysis here is a static one that assumes the production and consumption structures of goods and services are free from the effects of introducing and abolishing VAT exemptions.

The Korean government provides VAT exemptions in pursuit of diverse policy goals related to different areas. In this study, we confine our focus to the four major categories of VAT exemptions—unprocessed food, educational services, financial and insurance services, and medical and healthcare services—using the HIESs data from 2012.

1) Analysis of the effective tax burdens of major VAT exemptions

We need to analyze the income-redistributing effects of the effective tax burdens of major VAT exemptions using a five-stage model. In the first stage, we identify the items of consumption enumerated in the HIESs that are subject to the four major categories of VAT exemptions. The HIESs lists 392 items of consumption in total, and we need to identify those related to our major categories. In the second stage, we match the items of consumption on the HIESs and the basic industrial categories of the Input-Output Statistics to find the basic industrial categories subject to VAT exemptions. In the third stage, we convert all the basic industrial categories of the Input-Output Statistics into those that are taxable and tax-exempt so as to re-estimate the effective VAT rates on all of the categories. This process will change the effective VAT rate estimates on not only the industries directly subjected to VAT exemptions, but also on the industries related to the VAT-exempt industries. In the fourth stage, using

the map of matches between the Input-Output Statistics and the HIESs, we re-estimate the effective VAT rates on all items of consumption. In the final stage, we re-estimate the effective VAT burdens that would apply if none of the VAT exemptions existed to identify the differences in the resulting tax burdens.

We next need to determine how VAT exemptions on unprocessed food help to alleviate tax burdens on households. First, by taking into account exemptions on unprocessed food from the 10-percent statutory VAT rate, we estimate and analyze the extent to which these exemptions reduce both tax burdens on different types of households and the average effective tax rates. If we divide our sample households into 10 income quantiles, as the upper-left chart of [Figure III-19] shows, the tax-alleviating effect is the greatest on the lower income quantiles—for example, the VAT exemptions on unprocessed food cut the tax burden on each household of the first income quantile by KRW 51,000 per year on average. For each household in the 10th-income quantile, the margin of the cut amounts to KRW 27,000 per year. Measuring these changes in the tax burdens against consumption spending, we can see that the average effective tax rate dropped by 0.8 percent on the first income quantile but by a meager 0.06 percent on the 10th income quantile. Thus, VAT exemptions on unprocessed food appear to contribute to the redistribution of income.

What happens if we switched our yardstick of economic abilities from income to consumption? As the upper-right chart in [Figure III-19] shows, the average effective tax rate on the first consumption quantile dropped by 0.9 percent, percent thanks to the VAT exemptions on unprocessed food, but only by a mere 0.04 percent on the 10th consumption quantile.

Let us now analyze the income-redistributing effect of VAT exemptions on unprocessed food by age. Elderly households are by far the biggest winners, saving KRW 77,000 per household on average per year. The tax-alleviating effect of the VAT exemptions declines as the ages of the household heads fall. Household heads aged 35 to 40, for instance, save an average of only KRW 9,000 per year. Furthermore, the VAT exemptions serve to increase the tax burdens on household heads under the age of 35, for these households spend relatively little on unprocessed food, but relatively much more on goods and services that involve unprocessed food as inputs. If we suppose a hypothetical

tax regime that taxes all goods and services without exemption, then the effective VAT rate would equal the statutory VAT rate of 10 percent. Now if we introduce VAT exemptions on unprocessed food, taxpayers who are final consumers of unprocessed food will pay almost zero VATs.²⁵⁾ However, producers who use unprocessed food as inputs to produce goods and services will attempt to transfer the cost of their input taxes onto consumers, thus raising consumers' VAT burdens above the 10-percent rate. Therefore, if the proportion of VAT-exempt unprocessed food in consumers' consumption profiles is significantly smaller than the proportions of other goods and services consumed, the VAT exemptions on unprocessed food can significantly increase consumers' tax burdens. The supposed VAT exemptions on unprocessed food have, as a matter of fact, reduced the effective VAT rates on 77 items of consumption, raised rates on 312 others, and kept rates intact on three in the HIESs.²⁶⁾²⁷⁾

Our analysis of the distribution of VAT burdens by the educational attainment level of household heads reveals U-shaped patterns in the amounts of VAT burdens cut and the average effective tax rates. Household heads with mid-level educational attainments benefit the most from VAT exemptions, while household heads with relatively low or high educational attainments benefit comparatively less. In particular, household heads with less than a high school education can save KRW 60,000 each per year in reduced tax burdens, with their average effective tax rate dropping by 0.53 percent. This may also be because many of these under-educated household heads are elderly.

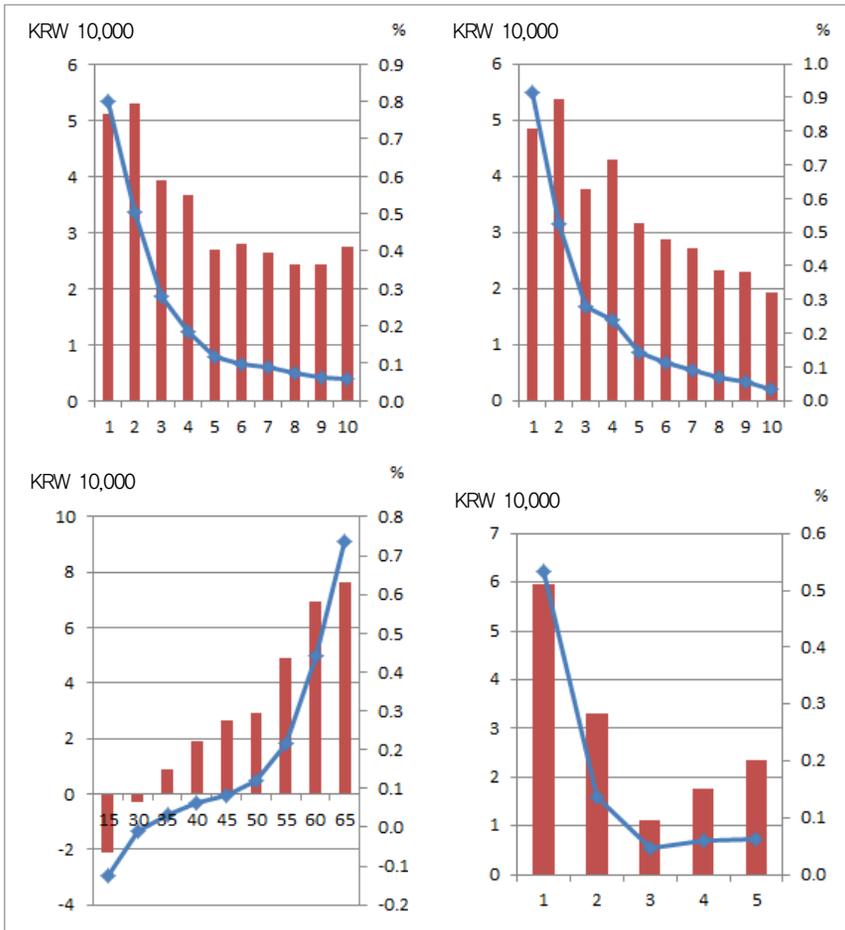
25) If the production of unprocessed food involves VAT-exempt inputs and if other goods and services produced using unprocessed food as inputs are also VAT-exempt, VAT exemptions on unprocessed food can reduce the effective VAT rates.

26) In general, the effective VAT rates on items of consumption qualifying as unprocessed food drop drastically as a direct result of the VAT exemptions. The effective rates on other goods or services indirectly affected by the unprocessed food VAT exemptions may rise or drop, but whichever the case, the margin of change will be relatively small.

27) The three items with the unchanging rates are wages for domestic helpers, food-related services, and other domestic services.

[Figure III-19] Tax-Alleviating Effect of VAT Exemptions on Unprocessed Food

(Units: KRW 10,000, %)



- Notes: 1. Clockwise, from the upper-left corner are tax-alleviating effects on the 10th income quantile, the 10th consumption quantile, household heads with different educational attainments, and household heads of different age groups.
2. Educational attainments: 1 = less than high school; 2 = high school graduate; 3 = (vocational) college dropout or currently enrolled or on leave from (vocational) college; 4 = (vocational) college graduate; 5 = graduate school and beyond.
3. The bar graphs indicate the amounts of VAT burdens on taxable items after the VAT burdens on VAT-exempt items are subtracted.
4. The line graphs indicate the changing amounts of VAT burdens as ratios to consumption spending.

Now, let us analyze the VAT exemptions on educational services affect the distribution of tax burdens across households. If we divide our sample households into 10 income quantiles and apply the VAT exemptions, there is little change to the amount of VAT burdens on low quantiles, as the upper-left chart of [Figure III-20] shows. However, the amount of VAT burdens clearly begins to decrease incrementally in the fifth quantile and above. A household in the fifth quantile, for example, can save about KRW 38,000 per year in tax burdens, while one in the 10th quantile can save about KRW 337,000 per year on average. Measuring the changes in tax burdens against consumption spending, we can see that the average effective tax rate on the fifth quantile is reduced by 0.15 percent and the rate on the 10th quantile is cut by 0.79 percent. In other words, if we use income as the yardstick of economic abilities, the VAT exemptions on educational services worsen income redistribution.

We obtain similar results even after switching our yardstick from income to consumption. As the upper-right chart in [Figure III-20] shows, the VAT exemptions on educational services cut the amount of VAT burdens and the average effective tax rate on each household of the fifth consumption quantile by KRW 26,000 and 0.11 percent, respectively. The margins of the cuts grow larger as we move up the quantiles, reaching KRW 513,000 and 0.91 percent for the 10th quantile.

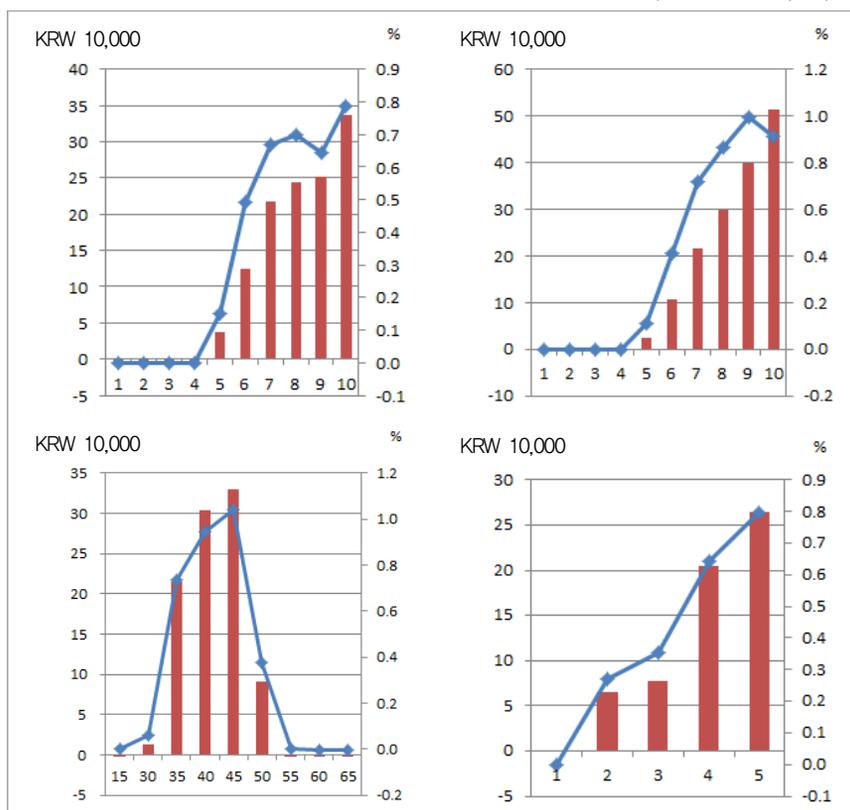
The VAT exemptions on educational services do little to alleviate the tax burdens on elderly households and young households with household heads under the age of 35. The benefits of these exemptions are concentrated in households with household heads aged 35 to 55, presumably with school-age children. Household heads aged 45 to 49, for example, can save KRW 329,000 each per year on average, with their average effective tax rate dropping by 1.04 percent. The second-most benefitting household heads' age group is aged 40 to 44, saving KRW 305,000 each per year on average, with their average effective tax rate dropping by 0.95 percent.

Finally, we analyzed the tax-alleviating effect of VAT exemptions on educational services on household heads with different levels of educational attainments. In sum, the higher the educational attainment level of the household head, the larger the tax-alleviating effect. VAT exemptions on educational services can save a household head with a graduate degree KRW 254,000 per year,

lowering his or her average effective rate by 0.80 percent. The educational service VAT exemptions lowered the effective VAT rates on 54 items of consumption, raised rates on 335 others, and kept rates intact on three, according to the HIESs.

[Figure III-20] Tax-Alleviating Effect of VAT Exemptions on Educational Services

(Units: KRW 10,000, %)



- Notes: 1. Clockwise, from the upper-left corner are tax-alleviating effects on the 10th income quantile, the 10th consumption quantile, household heads with different educational attainments, and household heads of different age groups.
2. Educational attainments: 1 = less than high school; 2 = high school graduate; 3 = (vocational) college dropout or currently enrolled or on leave from (vocational) college; 4 = (vocational) college graduate; 5 = graduate school and beyond.
3. The bar graphs indicate the amounts of VAT burdens on taxable items after the VAT burdens on VAT-exempt items are subtracted.
4. The line graphs indicate the changing amounts of VAT burdens as ratios to consumption spending.

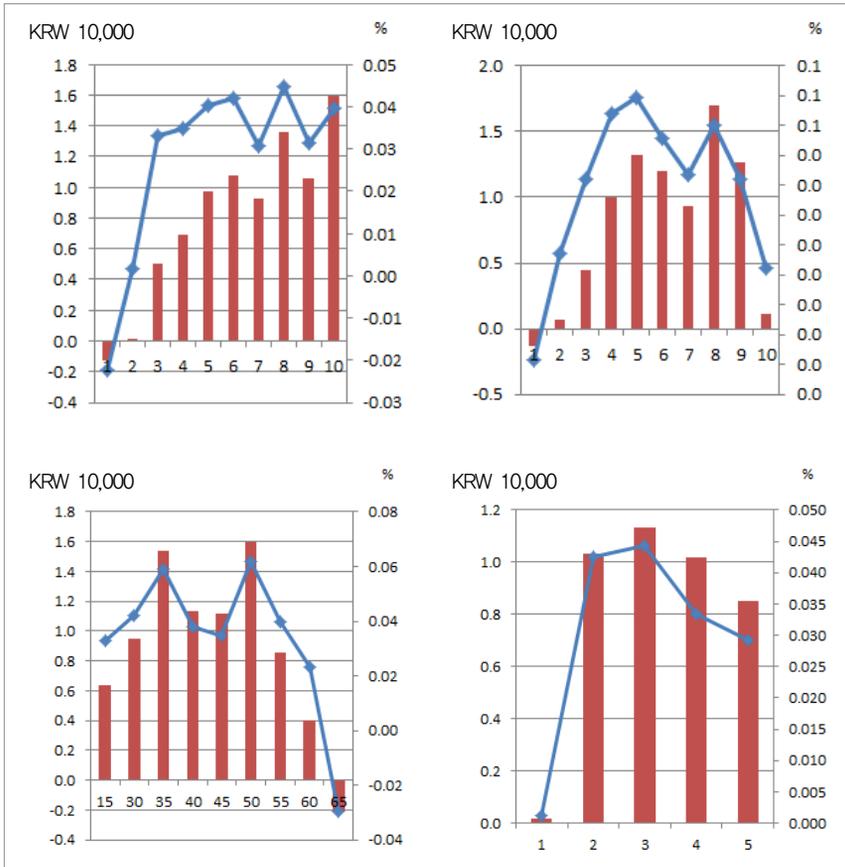
Let us now turn to the analysis of the tax-alleviating effect of VAT exemptions on financial and insurance services. If we divide our sample households into 10 income quantiles, the third and higher quantiles benefit from these exemptions, as the upper-left chart in [Figure III-21] shows. However, VAT exemptions appear to have added to the tax burdens on the first-quantile households. Like unprocessed food, financial and insurance services also involve taxable goods and services as inputs. Exemptions on inputs in production can generate the effects of accumulation and redemption in the final stage of production, thereby raising the effective VAT rates for end consumers. This is also evident in the movement of average effective tax rates along income quantiles. These rates dropped by 1.2 to 1.7 percent on the third income quantile and above thanks to the VAT exemptions on financial and insurance services, but ended up rising by 0.02 percent on the first quantile. In the meantime, the exemptions served to decrease the effective VAT rates on 97 items of consumption and increase the rates on 292 others, according to the HIESs. If the weights of the 292 items with raised effective VAT rates are relatively greater in consumers' consumption profiles, the overall amount of the tax burdens may indeed increase as a result. The VAT exemptions on financial and insurance services therefore serve to worsen the redistribution of income by mostly benefitting higher income quantiles.

We may also divide our sample households into 10 consumption quantiles, and see that the VAT exemptions on financial and insurance services mostly benefit households in the fourth through ninth quantiles. The tax-alleviating effect of these exemptions is either trivial or non-existent on the lowest two consumption quantiles and the highest 10th quantile. As the upper-right chart in [Figure III-21] shows, introducing these exemptions cuts the amount of tax burdens and the average effective tax rate on an eighth-quantile household by KRW 17,000 per year and 0.05 percent, respectively. By contrast, the amount of tax burdens and the average effective tax rate on a 10th-quantile household rise by KRW 1,300 per year and 0.03 percent, respectively.

The VAT exemptions on financial and insurance services also serve to slightly increased the amount of tax burdens on elderly household heads and primarily benefited households with household heads aged 35 to 55. Household heads aged 50 to 54 can save KRW 329,000 each per year on average thanks to these

[Figure III-21] Tax-Alleviating Effect of VAT Exemptions on Financial and Insurance Services

(Units: KRW 10,000, %)



- Notes: 1. Clockwise, from the upper-left corner are tax-alleviating effects on the 10th income quantile, the 10th consumption quantile, household heads with different educational attainments, and household heads of different age groups.
2. Educational attainments: 1 = less than high school; 2 = high school graduate; 3 = (vocational) college dropout or currently enrolled or on leave from (vocational) college; 4 = (vocational) college graduate; 5 = graduate school and beyond.
3. The bar graphs indicate the amounts of VAT burdens on taxable items after the VAT burdens on VAT-exempt items are subtracted.
4. The line graphs indicate the changing amounts of VAT burdens as ratios to consumption spending.

exemptions, with their average effective tax rate dropping by KRW 1.04 percent, while household heads aged 40 to 44 can save KRW 16,000 each per year on average, with their average effective tax rate dropping by 0.06 percent.

The VAT exemptions on financial and insurance services cause little change to the tax burdens on household heads with less than high school education. These exemptions save household heads with high school education or higher between KRW 8,000 and KRW 12,000 each per year. The changes in average effective tax rates resulting from these exemptions bore little relation to the educational attainments of household heads.

Finally, we need to analyze how the VAT exemptions on medical and healthcare services affect the tax burdens and average effective tax rates on households. When we divide our sample households into 10 income quantiles, we can see that the tax-alleviating effect of these exemptions grows in proportion to income, as shown in the upper-left chart in [Figure III-22]. A first-quantile household, for instance, saves KRW 22,000 per year thanks to these exemptions, while a 10th-quantile household saves KRW 57,000 per year. The higher the income level, the higher the level of spending on medical and healthcare services. When we measure tax burdens against consumption, we see that the average effective tax rates decrease by 0.38 percent on the first income quantile and by 0.13 percent on the 10th quantile. In other words, these VAT exemptions appear to contribute to the redistribution of income in Korea, giving higher income quantiles greater benefits in terms of the absolute amount.

Similar results are observed even when we divide our sample households into 10 consumption quantiles. As the upper-right chart in Figure III-22 shows, the average effective tax rates dropped by 0.37 percent on the first consumption quantile and by 0.12 percent on the 10th consumption quantile.

Elderly households benefitted the most from the VAT exemptions on medical and healthcare services, with their average effective tax rate dropping by 0.39 percent. Household heads aged 15 to 34 benefitted the least, with their average effective tax rate dropping by a meager 0.09 percent. In general, the margins of decrease in the average effective tax rates were proportional to the household head's age.

While the margins of decrease in the absolute amount of tax burdens tended to be proportional to the educational attainments of household heads, the reverse

was the case with the average effective tax rates. The VAT exemptions on medical and healthcare services reduced the effective VAT rates on 91 items of consumption, raised the rates on 298 others, and kept the rates intact on three, according to the HIESs.

In sum, the VAT exemptions on unprocessed food and medical and healthcare services have income-redistributing effects. The VAT exemptions on unprocessed food, in particular, benefitted low-income and low-consumption quantiles. On the other hand, the VAT exemptions on medical and healthcare services, while income-redistributing in effect, gave greater benefits to higher income and consumption quantiles in terms of the absolute amount. Worsening the redistribution of income were the VAT exemptions on educational, financial and insurance services, as these exemptions mostly served to reduce the average effective tax rates on upper income quantiles and mid-to-upper consumption quantiles. These exemptions also raised the average effective tax rates on low income and consumption quantiles.

[Figure III-22] Tax-Alleviating Effect of VAT Exemptions on Medical and Healthcare Services

(Units: KRW 10,000, %)



- Notes: 1. Clockwise, from the upper-left corner are tax-alleviating effects on the 10th income quantile, the 10th consumption quantile, household heads with different educational attainments, and household heads of different age groups.
2. Educational attainments: 1 = less than high school; 2 = high school graduate; 3 = (vocational) college dropout or currently enrolled or on leave from (vocational) college; 4 = (vocational) college graduate; 5 = graduate school and beyond.
3. The bar graphs indicate the amounts of VAT burdens on taxable items after the VAT burdens on VAT-exempt items are subtracted.
4. The line graphs indicate the changing amounts of VAT burdens as ratios to consumption spending.

2) Effects of taxing VAT-exempt goods and services on income redistribution and tax revenue

How would taxing VAT-exempt goods and services—in our case, unprocessed food, educational services, financial and insurance services, and medical and healthcare services—affect income redistribution and tax revenue in Korea?

Assuming that the consumption behavior and industrial structure in Korea remain constant, taxing VAT-exempt goods and services would upend our findings on the effects of VAT exemptions analyzed earlier. Abolishing VAT exemptions would change the relative prices of affected goods and services, thus likely inducing consumers and producers to change their minds. However, for simplicity of analysis we assume that they would not change their minds.

Under this assumption, taxing the VAT-exempt unprocessed food and medical and healthcare services would worsen the redistribution of income in Korea. In particular, taxing unprocessed food would significantly increase the average effective tax rates, together with the absolute amounts of tax burdens on lower income and consumption quantiles, including elderly households for whom unprocessed food makes up a significant portion of their consumption profiles. Abolishing VAT exemptions on medical and healthcare services would also significantly raise the average effective tax rates on lower income and consumption quantiles.

In contrast, taxing educational, financial and insurance services would improve the redistribution of income. Taxing educational services, for instance, would progressively increase the absolute amounts of tax burdens and average effective tax rates along the ladder of income and consumption quantiles, starting from the fifth quantile. The new taxes would also increase the average effective tax rates on households whose heads have higher levels of educational attainments, are aged 35 to 55, and likely have school-age children. However, abolishing VAT exemptions on financial and insurance services may raise the average effective tax rates on the mid- to upper quantiles, but remain ambiguous with respect to the highest quantiles.

We may now analyze the effects of abolishing these VAT exemptions on the tax revenue in Korea in general. Household VAT burdens amounted to KRW

32.4 trillion in total according to the HIESs of 2012. With the aggregate amount of all household consumption spending amounting to KRW 42.5 trillion, we can estimate that the average effective tax rate on all households as of 2012 was 7.63 percent. In that year, the Korean government earned KRW 58.6 trillion in VATs alone (including the five-percent local consumption taxes), which was about 1.8 times greater than the estimate on the VAT burdens on households made in the HIESs. Therefore, to estimate the VAT revenue based on the HIESs data, we need to readjust the HIESs' estimate on tax revenue using a multiplier of 1.8.

Abolishing VAT exemptions on unprocessed food would increase the total tax revenue by KRW 1.3 trillion or 2.2 percent to KRW 59.9 trillion. Abolishing VAT exemptions on education services would increase the total tax revenue by KRW 5.53 trillion or 9.4 percent to KRW 64.1 trillion.²⁸⁾ Abolishing VAT exemptions on financial and insurance services, would increase the total tax revenue by KRW 0.4 trillion or 0.7 percent to KRW 59.0 trillion. Finally, abolishing the VAT exemptions on medical and healthcare services would increase the total tax revenue by KRW 2 trillion or 3.4 percent to KRW 60.6 trillion.

〈Table III-16〉 Effects of Abolishing Major VAT Exemptions on Tax Revenue

(Units: KRW 1trillion, %)

		Estimate	Margin of increase	Rate of increase
Abolishing VAT exemptions on	Unprocessed food	59,86	1,27	2,16
	Educational services	64,11	5,51	9,41
	Financial and insurance services	59,01	0,41	0,70
	Medical and healthcare services	60,56	1,97	3,36
Tax revenue as of 2012		58,60		

Note: The estimates have been obtained using a multiplier of 1.8.

28) The educational service market is divided between the public and private education markets. If the VATs on these services are to be abolished, they will mostly affect private educational services. This, however, may reduce the estimated effect of abolishing VATs on the total tax revenue.

In sum, abolishing VAT exemptions on unprocessed food and medical and healthcare services would worsen income redistribution, but abolishing those on educational, financial and insurance services would improve income redistribution. Abolishing VAT exemptions on all the four major categories of goods and services would increase the total tax revenue, with the margin of estimated increase most prominent in the case of educational services. The revenue-enhancing effect of abolishing VAT exemptions on financial and insurance services, on the other hand, is likely to be marginal. Therefore, in order to improve income redistribution and increase the total tax revenue, abolishing VAT exemptions on educational services would be the most effective option.

IV

Conclusion and Policy Implications

In this study on VAT rates in Korea, we analyze the distribution of effective VAT burdens on Korean households, the possible effects of major VAT exemptions on income redistribution, and the main factors that could cause changes in effective VAT burdens. We began by explaining why we need to use effective VAT rates and not statutory rates in analyzing the VAT burdens. All states worldwide, including Korea, impose VATs and VAT exemptions for various economic and social policy goals, including income redistribution and the encouragement of the production of certain goods and services. The current VAT exemption system, however, does not provide for deductions on input taxes, which causes producers to transfer the costs of the input taxes onto consumers. VAT exemptions in the production and distribution processes also simultaneously generate the effects of accumulation and redemption, raising the tax burdens on end consumers above what would be the level if all inputs were equally taxed. Therefore, to ensure the accuracy of the analysis of tax burdens under a VAT regime with exemptions, we needed to estimate and use effective VAT rates instead of statutory ones.

For our study, we used the method from Gottfried and Wiegard(1991) for estimating effective VAT rates, employing the data on the Input Tables of BOK's Input-Output Statistics and its statistics' most detailed basic industrial categories. We also discuss the inherent limits of the Gottfried-Wiegard method. To estimate the effective VAT burdens on Korean households, we matched the items of consumption on Statistics Korea's HIESs with the basic industrial categories on BOK's Input-Output Statistics. By applying the effective VAT rates we

estimated to household spending per item, we further estimated the effective VAT burden by item of consumption and added up all the estimates to arrive at the effective VAT burdens per household. We repeated this process for the years 1990, 1995, 2000, 2005, 2010 and 2012 to identify and analyze the trend in the distribution of effective VAT burdens on households in Korea.

Our analysis of the distribution of effective VAT burdens on households revealed the following. First, if we equate annual income with taxpayers' economic abilities, the ratio of tax burdens to income is higher in lower income quantiles and lower in the higher income quantiles, thus rendering the Korean VAT structure regressive in terms of tax burdens. However, when we measure VAT burdens against consumption spending, this appearance of regressivity disappears altogether, with partial progressivity appearing even in certain consumption quantiles. Moreover, when we use consumption—perceived as the more representative indicator of lifetime income or the standard of living—and not annual income as the measure of taxpayers' economic abilities, the appearance of regressivity in tax burdens also disappears, regardless of whether we measure tax burdens against households' consumption spending or income. This pattern of the distribution of effective VAT burdens was observed with respect to all the analyzed years. Therefore, the answer to the question of whether the Korean VAT system is regressive or not depends on which variable—annual income or consumption—we use as the indicator of taxpayers' economic abilities. That means neither annual income nor consumption spending can serve as a complete and perfect indicator of economic abilities by itself, and so we ought to consider both variables when analyzing the distribution of tax burdens. Nevertheless, given the overwhelming presence of elderly households in the lowest income quantile and the rapid aging of the Korean population, consumption spending may serve as a better indicator of economic abilities and the standard of living—both throughout a lifetime and at certain points within it—than annual income.

The amount of tax burdens measured against consumption spending has been on the rise in all income and consumption quantiles in recent years, particularly since 2000. Since the introduction of the VAT system in Korea, the statutory VAT rate has been fixed at 10 percent and little change has been made to the VAT exemption system. Therefore, a rising tax burden against consumption

spending suggests that a transformation is taking place in the overall consumption structure toward reduced weights of tax-exempt goods and services, which is in keeping with the dramatic increase in the number of elderly households with their high average propensity to consume. The rapid aging of the population in Korea has radically increased the presence of elderly households in low income and consumption quantiles, thus raising the effective tax burdens on these quantiles significantly.

Our analysis of the income-redistributing effect of major categories of VAT exemptions revealed that VAT exemptions on unprocessed food and medical and healthcare services were particularly effective in income redistribution. The VAT exemptions on unprocessed food especially benefitted low income and consumption quantiles in terms of not only the ratios of tax burdens, but also the absolute tax amounts. In contrast, VAT exemptions on educational, financial and insurance services worsen income redistribution, since they provide cuts in tax burdens proportional to income and consumption. If Korean policymakers were to reform the VAT exemption system with the goal of improving income redistribution, they would first need to start by reforming or abolishing VAT exemptions on educational, financial, and insurance services before tackling either unprocessed food or medical and healthcare services. If they also wanted to increase tax revenue, their most effective course of action would be to first focus on educational services rather than financial and insurance services.

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