Chapter 4

The VAT system in Korea: Measuring its burden and revenue ratios

This chapter introduces the value-added tax (VAT) and excise tax systems in Korea, examines VAT revenue ratios across OECD member countries, and estimates the VAT burden of Korean households utilising the Household Income and Expenditure Survey of Statistics Korea and the consumption tax micro-simulation model of the OECD. Korea's VAT revenue ratio is relatively high amongst OECD countries at around 70%, with this largely attributable to the single rate system with a low standard rate. Meanwhile, by comparing the VAT burden ratios to income or expenditure across income or expenditure deciles, we observe that the distribution of the burden ratios may vary significantly across different combinations of ratios and deciles. Therefore, it may be misleading to rely on a specific measure of the VAT burden ratio, such as the VAT burden ratio to income across income deciles. It is necessary to assess the policy effects of the VAT by comparing multiple measures of policy indicators.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

4.1. Introduction

In principle value-added tax (VAT) is a general consumption tax imposed on all goods and services that generate added value. In reality, however, some transactions are exempted from the tax for social fairness and the promotion of certain industries. In addition, as the destination principle is followed internationally, individual governments impose the tax only when final consumption takes place in their countries. For example, the Korean government imposes VAT on goods and services imported to and consumed in Korea but not on goods and services that are exported from Korea and consumed overseas.

VAT is an indirect tax in that tax payers are different from tax bearers. In general, there is a series of transactions from the production to the final consumption of goods and services. The tax bearers are end consumers, while the tax payers are businesses participating in each transaction. Under a VAT system without exemption and zero rating, the VAT amount borne by the end consumers is paid by the businesses participating in each transaction stage. The VAT amount that should be paid by each business is equal to the difference between the output tax and the input tax, or equivalently, to the amount of added value generated by the businesses multiplied by the tax rate.

Because the tax bearers and the tax payers are not identical under the VAT system, it is difficult to directly assess the amount of VAT borne by individual tax bearers, i.e. end consumers. To estimate the VAT burden of end consumers, a tax simulation model based on household-level consumption expenditure data can be constructed. In this chapter we will estimate the VAT burden of Korean households by utilising the Household Income and Expenditure Survey of Statistics Korea and the tax simulation model of the OECD. Based on this estimate we will analyse the VAT burden ratios to income and expenditure across income and expenditure deciles. Before this analysis we will give a brief introduction to the VAT system in Korea, and will examine the VAT revenue ratios across OECD member countries.

4.2. The Korean VAT system

The Korean government introduced its VAT system in 1977 as a replacement for its sales tax and commodity tax. When first introduced, the system had a flexible tax rate allowing adjustments of around 3 percentage points on top of the 13% standard tax rate. However, the tax rate was initially set at 10% and the 10% single rate has been maintained since the introduction. In 2010, the local consumption tax, which shares 5% of VAT revenue, was newly established. It is noteworthy that the local consumption tax was not established in addition to VAT. Instead, it was introduced in a way that distributes the existing VAT revenue between the central and local governments by a ratio of 95:5.

Exemption and zero rating

An exemption of the VAT makes certain transactions of goods and services exempt from VAT liability with no input tax deduction. When exempt businesses supply exempt goods or services, they receive no VAT, i.e. output tax, from the purchaser of the exempt items and no VAT deduction of input tax that they already paid in the previous transaction stage. Therefore, if exempt transactions occur in intermediate stages, there is an accumulation effect of the tax burden in the later stages, which is equal to the amount of input tax deduction that was not received in the exempt transactions. In Korea VAT exemptions are mainly applied to non-processed foods, passenger transport services, healthcare services, education services, financial services, real estate leasing services, cultural artworks, and print/broadcasting media.

Zero rating of the VAT system makes certain transactions of goods and services exempt completely from VAT burden by allowing input tax deduction. Under zero rating the output tax amount is set to be zero, and thus the VAT is not collected in the stage, and all input taxes paid in the previous transactions are refunded. Zero rating is mostly applied to export goods and services, based on the destination principle. In other words, when exporting goods, taxable businesses are completely free from the VAT burden as the output tax amount is zero and all input tax is deducted and refunded. Internationally, the destination principle is applied to general consumption taxes such as VAT. With the application of a zero VAT rate on export products, the tax burden in the exporting country is completely removed. The VAT will be imposed by the importing country, where the final consumption will take place. However, in Korea, there are a number of cases for which zero rating is applied on domestic consumption. Examples include zero rating on agricultural and fishing equipment, urban railway construction services, and national defence supplies.

Meanwhile, the Korean government annually reviews each tax expenditure item and provides estimated expenditure, or tax revenue foregone, due to each item. In this context, a tax expenditure item means a temporary reduction of certain tax liability, such as an exemption of the VAT, to motivate economic agents to engage in certain activities. Table 4.1 shows the ten largest VAT-related tax expenditure items in terms of expenditure amounts as of 2012.

Table 4.1. **Top VAT-related tax expenditure items**

Unit: billion KRW (Korean Won)

Rank	Tax expenditure items	Amount
1	Deduction of deemed input tax on agricultural and marine products	2 069.1
2	VAT credit based on the use of credit cards	1 440.5
3	VAT zero rating on equipment for the agriculture/forestry/livestock industry	1 344.2
4	Special case of VAT input tax credit on scrap materials for recycling	665.3
5	Exemption of indirect tax on fuel for the agriculture/forestry/fishery	427.8
6	VAT zero rating on urban railway construction services	235.8
7	VAT zero rating on national defence supplies	219.2
8	Special case of VAT refund on agricultural/fishing equipment	158.4
9	Reduction of VAT on taxi transport businesses	151.3
10	VAT zero rating on fishing equipment	69.4

Source: Korean Ministry of Strategy and Finance (2013), *Tax Expenditures Statement 2014.*

Tax revenue

VAT is the tax with the largest revenue in Korea. The total national tax revenue is KRW 203 trillion in 2012. Excluding the share of local consumption tax, the VAT revenue is KRW 55.6 trillion, accounting for 27% of national tax revenue. In comparison, personal income tax revenue was around KRW 45.7 trillion, and corporate income tax revenue stood at around KRW 45.9 trillion. When total tax revenue is defined as the sum of national and local taxes, the total tax revenue was around KRW 256.9 trillion in 2012. The VAT revenue including local consumption tax in 2012 was around KRW 58.6 trillion, accounting for around 23% of total tax revenue.

4.3. VAT revenue ratio

The VAT revenue ratio is defined as the ratio of actual tax revenue to the maximum possible tax revenue. In this section we will examine the annual trend of the VAT revenue ratio in Korea and the relationship between the standard tax rates and the VAT revenue ratios across OECD member countries.

Trend in VAT revenue ratio

Essentially, VAT is a tax imposed on the final consumption that takes place in a single country. Therefore, the maximum potential base of the VAT can be approximated with the final consumption expenditure of national accounts, which includes the consumption expenditure of households, non-profit organisations serving households, and government entities. However, because the final consumption expenditure also includes VAT paid, the final consumption expenditure minus the actual VAT revenue can be viewed as the maximum potential VAT base.[1] Imagine the following conditions for the hypothetical VAT system:

1. Zero rating is applied only on export goods and services.
2. There is no tax exemption.
3. There is no reduced rate, and a single rate is applied on all transactions.
4. There is no VAT fraud, and all imposed taxes are paid.

In the hypothetical VAT system satisfying all of the above conditions, tax revenue can be calculated by multiplying the tax rate on the potential tax base. However, in reality, the VAT system does not satisfy these conditions. As mentioned, in Korea alone, zero rating is applied not only on exports but also on some domestic consumption, and exemptions are applied to various items. In addition, presumably there is some VAT fraud regarding transactions of precious metals such as gold and silver. Fortunately, the Korean VAT system satisfies the third of the above conditions as it maintains a single rate system with no reduced rates.

The VAT revenue ratio (VRR) is defined as the ratio between the tax revenue under the hypothetical VAT system and the actual tax revenue. Formally, the VRR is defined as follows:

$$VRR = \frac{VR}{(FCE - VR) \times r}$$

Here VR stands for the actual VAT revenue, FCE for the final consumption expenditure, and r for the standard VAT rate.

Figure 4.1 shows the trend of the annual VAT revenue ratio along with notable events. In recent years the VAT revenue ratio of Korea is around 70%. The VAT revenue ratio was around 60% before 2001, rose to and maintained at mid-60%, and recently increased to high-60% or 70%. It seems that the VAT revenue ratio gradually increased as people have actively used the income tax deduction based on credit card usage since 2000 and as the mandatory cash receipt rule was introduced in 2005. At the same time, there was little change in the tax revenue and the VAT revenue ratio during the global financial crisis in 2008 when the income tax deduction based on credit card usage and cash receipts were in force, while there were significant changes in the VAT revenue and the revenue ratio during the Asian currency crisis in 1997 when such systems did not exist.

Figure 4.1. **Trend in VAT revenue ratio with notable events**
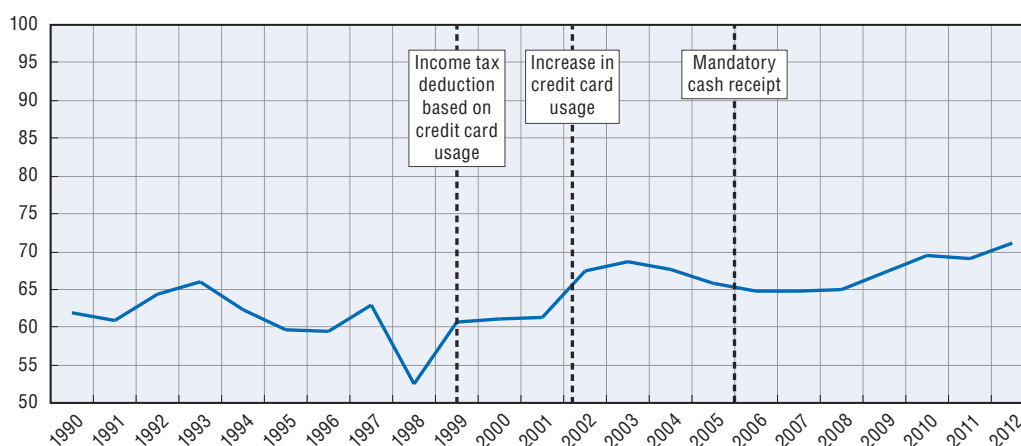
Source: Hong, S. and M. Sung (2013), "Future Developments for Value Added Tax Policy in Korea," *Korea Institute of Public Finance Annual Report 13-02.*

International comparison of VAT revenue ratios

The international comparison of the VAT revenue ratios shows that Korea's VAT revenue ratio is relatively higher than those of other countries. Currently, there is a VAT system in all OECD member countries except the United States. Among the 33 OECD member countries with VAT systems, only six countries show their VAT revenue ratios higher than 65% as of 2012. These six countries are Luxembourg (113%), New Zealand (96%), Switzerland (71%), Estonia (70%), Japan (69%) and Korea (69%). Table 4.2 shows the annual VAT revenue ratio trends since 2005 across OECD member countries.

It is argued that the main reason for a higher VRR is to maintain a lower standard VAT rate with more limited tax expenditures, such as reduced rates, exemptions, and zero rating. However, it does not seem that these factors are directly related with the VRR. For example, among the countries with relatively high VRRs, Switzerland (standard rate of 8.0% in 2012), Japan (5%), and Korea (10%) are maintaining lower tax rates than those of other countries, while Luxemburg (15%), New Zealand (15%), and Estonia (20%) are not. Moreover, in Australia, the standard VAT rate is relatively low at 10% but the VAT revenue ratio is not high at 47%. However, Denmark has a high VAT rate (25%), while its VAT revenue ratio (59%) is not low. Other than standard VAT rates and tax expenditures, VAT compliance may also influence the revenue ratios. Mexico (31%), Italy (38%), Turkey (40%), and Spain (41%) show relatively low VRRs with respect to their standard VAT rates.

Table 4.2. **VAT revenue ratios**

	Standard VAT rate 2012	2005	2006	2007	2008	2009	2010	2011	2012
Australia	10.0	0.56	0.54	0.54	0.49	0.51	0.50	0.48	0.47
Austria	20.0	0.59	0.57	0.58	0.59	0.58	0.58	0.58	0.59
Belgium	21.0	0.50	0.52	0.51	0.48	0.47	0.48	0.48	0.48
Canada	5.0	0.50	0.47	0.51	0.51	0.49	0.49	0.48	0.48
Chile	19.0	0.67	0.64	0.67	0.70	0.59	0.62	0.63	0.64
Czech Republic	20.0	0.56	0.53	0.54	0.57	0.55	0.53	0.55	0.57
Denmark	25.0	0.63	0.65	0.65	0.62	0.59	0.58	0.59	0.59
Estonia	20.0	0.76	0.81	0.80	0.67	0.73	0.67	0.68	0.70
Finland	23.0	0.60	0.61	0.60	0.58	0.56	0.55	0.56	0.56
France	19.6	0.52	0.51	0.51	0.50	0.47	0.47	0.48	0.48
Germany	19.0	0.54	0.56	0.54	0.55	0.55	0.54	0.55	0.55
Greece	23.0	0.46	0.46	0.48	0.46	0.39	0.45	0.38	0.37
Hungary	27.0	0.48	0.55	0.59	0.57	0.62	0.53	0.52	0.52
Iceland	25.5	0.61	0.64	0.59	0.52	0.45	0.44	0.44	0.45
Ireland	23.0	0.66	0.67	0.63	0.55	0.47	0.49	0.47	0.45
Israel	16.0	0.62	0.62	0.66	0.65	0.65	0.65	0.65	0.64
Italy	21.0	0.39	0.41	0.41	0.39	0.36	0.40	0.40	0.38
Japan	5.0	0.71	0.70	0.69	0.67	0.67	0.69	0.69	0.69
Korea	10.0	0.64	0.63	0.63	0.63	0.65	0.67	0.67	0.69
Luxembourg	15.0	0.90	0.89	0.94	0.97	0.97	0.99	1.05	1.13
Mexico	16.0	0.30	0.33	0.33	0.34	0.30	0.32	0.31	0.31
Netherlands	19.0	0.59	0.58	0.59	0.57	0.52	0.55	0.53	0.53
New Zealand	15.0	1.03	1.04	0.96	0.98	0.99	1.12	0.95	0.96
Norway	25.0	0.57	0.61	0.63	0.57	0.54	0.56	0.56	0.57
Poland	23.0	0.46	0.50	0.52	0.49	0.45	0.47	0.47	0.42
Portugal	23.0	0.56	0.51	0.51	0.49	0.43	0.48	0.45	0.47
Slovak Republic	20.0	0.60	0.57	0.53	0.53	0.47	0.46	0.49	0.43
Slovenia	20.0	0.66	0.68	0.69	0.68	0.59	0.59	0.60	0.58
Spain	18.0	0.57	0.57	0.53	0.43	0.32	0.46	0.39	0.41
Sweden	25.0	0.55	0.56	0.57	0.58	0.57	0.59	0.58	0.56
Switzerland	8.0	0.72	0.74	0.73	0.74	0.70	0.72	0.71	0.71
Turkey	18.0	0.38	0.39	0.36	0.35	0.34	0.39	0.43	0.40
United Kingdom	20.0	0.46	0.46	0.46	0.44	0.44	0.44	0.44	0.44

Source: OECD (2014), *Consumption Tax Trends*, OECD Publishing, Paris.

Figure 4.2 shows the scatter plot of the standard VAT rates and the VAT revenue ratios in OECD member countries as of 2012. In this figure the solid line represents the linear trend line of the VAT revenue ratio with respect to the standard VAT rate.

Figure 4.2. **Standard VAT rates and VAT revenue ratios**
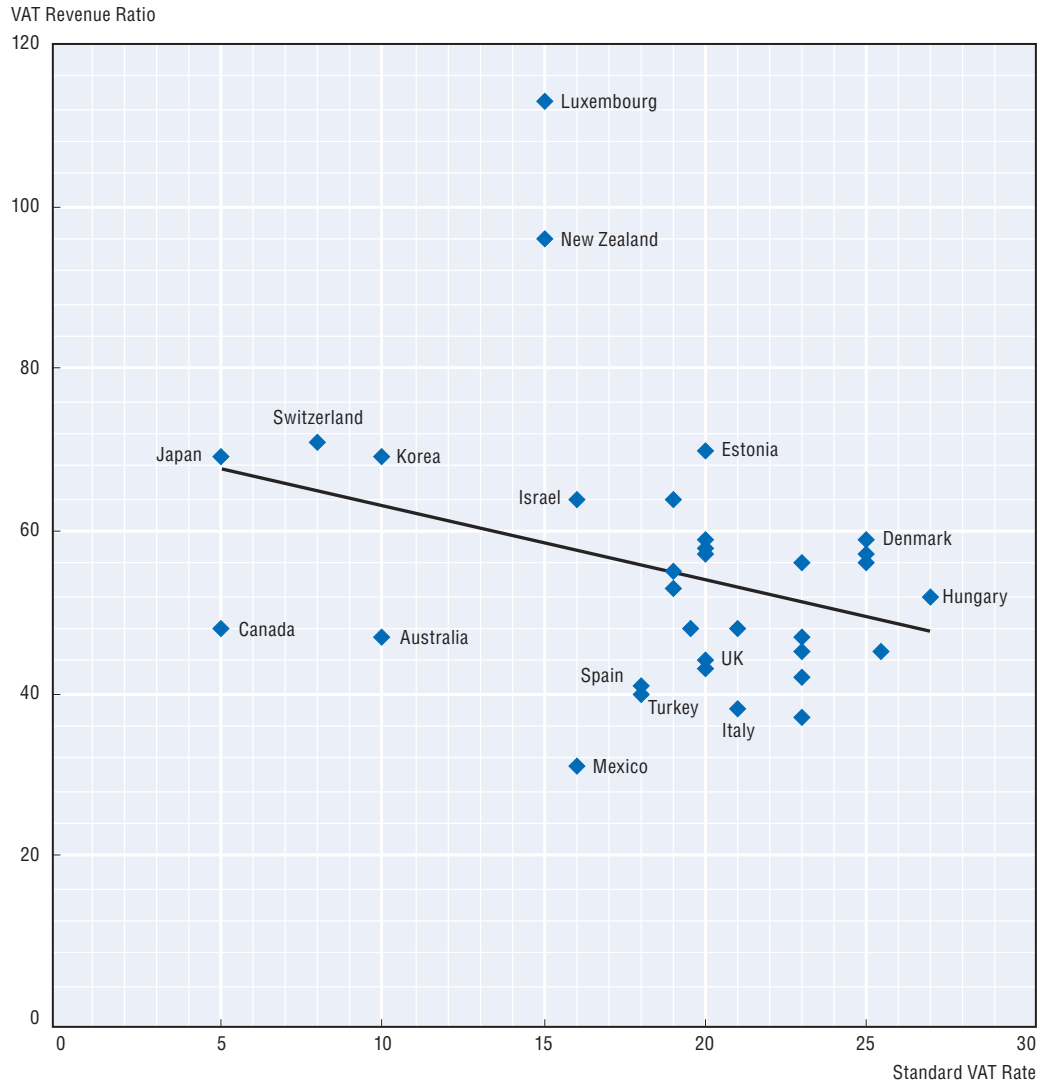
4.4. Distribution of VAT burden

To estimate the VAT burden on end consumers we will use the 2013 Household Income and Expenditure Survey of Statistics Korea and the tax simulation model of the OECD. The VAT burden of a household is estimated from data on the average monthly income and consumption of the household, and it is converted to the ratios to income and expenditure across income and expenditure deciles. Here income means equivalised disposable income while expenditure means pre-tax expenditure, which excludes VAT and other main consumption duties, such as transport fuel tax, liquor tax, and cigarette tax.[2]
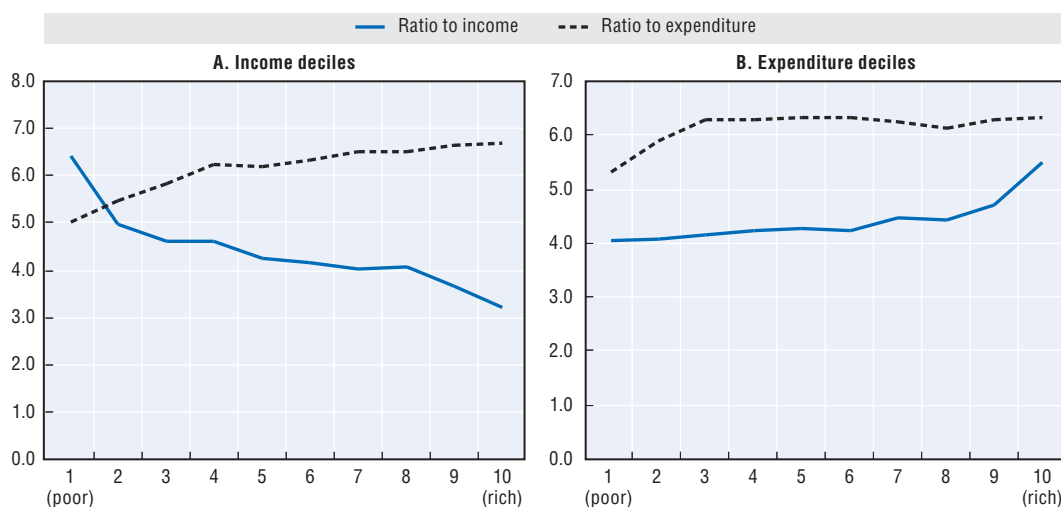
VAT burden ratio

The VAT burden ratio can be defined in two ways. One is the ratio of VAT burden amount to income and the other is to expenditure. Furthermore, households can be classified into income decile groups and expenditure decile groups, and each burden ratio can be calculated as the average of each decile group. Therefore, the VAT burden ratio can be measured in four different ways. Here all burden ratios are presented in

percentages (%). Table 4.3 shows the estimated VAT burden ratios. Table 4.3 (a) shows the burden ratios across income deciles and (b) shows the burden ratios across expenditure deciles. Figure 4.3 illustrates the distribution of the VAT burden ratios across income and expenditure deciles.

Table 4.3. **VAT burden ratios**

(a) Income deciles			(b) Expenditure deciles		
Deciles	Ratio to income	Ratio to expenditure	Deciles	Ratio to income	Ratio to expenditure
1 (poor)	6.4	5.0	1 (poor)	4.0	5.3
2	5.0	5.5	2	4.1	5.9
3	4.6	5.8	3	4.1	6.3
4	4.6	6.2	4	4.2	6.3
5	4.3	6.2	5	4.3	6.3
6	4.2	6.4	6	4.2	6.3
7	4.0	6.5	7	4.5	6.2
8	4.1	6.5	8	4.4	6.1
9	3.7	6.7	9	4.7	6.3
10 (rich)	3.2	6.7	10 (rich)	5.5	6.3

Figure 4.3. **Distribution of VAT burden ratios**

The VAT burden ratio to income across income deciles indicates that the burden ratio for the first decile (poorest) group is the highest at 6.4%, and the ratio for the tenth decile (richest) group is the lowest at 3.2%. However, the opposite result is found in the burden ratio to expenditure across income deciles. The burden ratio is the lowest for the first decile group at 5.0%, and the ratio is the highest for the tenth decile group at 6.7%. In addition, similar results are found in the ratio to income across expenditure deciles. The first decile group shows the lowest burden ratio at 4.0%, and the tenth decile group shows the highest ratio at 5.5%. Meanwhile, the ratio to expenditure across expenditure deciles shows that the burden ratios are low for the first two decile groups but they are at a similar level of around 6.3% for the other groups.

The total consumption tax burden is the sum of the estimated liquor tax, cigarette tax, and transport fuel tax burden plus the VAT burden. In Korea the liquor tax is an *ad*

valorem tax and thus its burden can be estimated directly from household expenditure data on each liquor item. Including the education tax added on the liquor tax, the tax rates are set at 93.6% for soju, beer and whisky, 33% for wine, and 5.5% for rice wine.
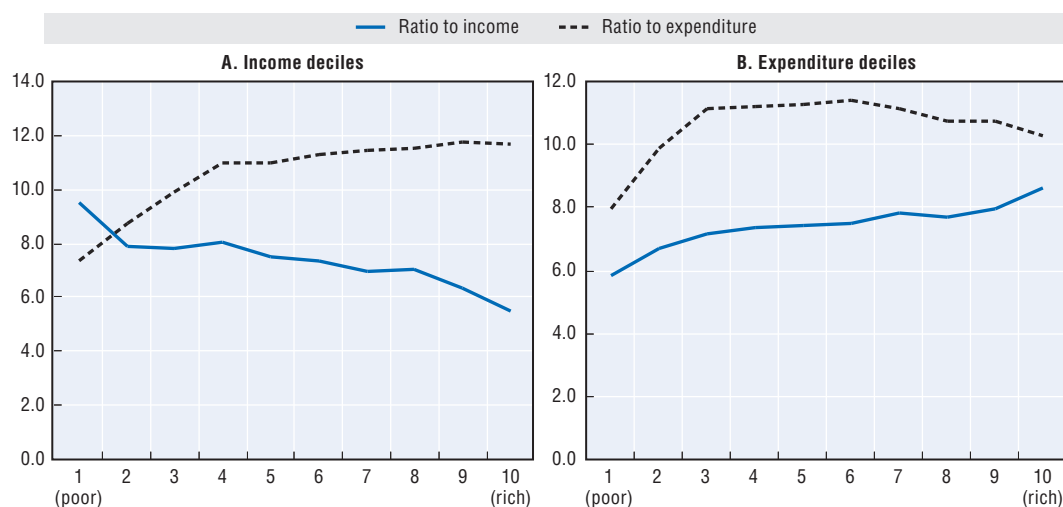
However, the cigarette tax and the transport fuel tax are *ad quantum* taxes and their burdens cannot be estimated directly from household expenditure data, which provide only expenditure amounts but not consumed quantities. Here consumed quantities are indirectly estimated by dividing expenditure amounts by annual average prices. The price of a pack of 20 cigarettes is assumed to be KRW 2 500, and including the education tax and other charges added on the cigarette tax, the tax rate is set at KRW 1 322.50 per pack. For the transport fuel tax, the annual average consumer prices and tax rates differ across gasoline, diesel and liquefied petroleum gas (LPG). The annual average consumer prices are assumed to be KRW 1 986 per litre of gasoline, KRW 1 806 per litre of diesel, and KRW 1 573 per litre of LPG. Including the education tax and the vehicle tax added on the transport fuel tax, the tax rates are set at KRW 745.89 per litre of gasoline, KRW 528.75 per litre of diesel, and KRW 316.25 per litre of LPG.

As in the comparison of the VAT burden ratios, there can be four different combinations of ratios and deciles, and these results are shown in Table 4.4 and Figure 4.4. Moreover,

Table 4.4. **Total consumption tax burden ratios**

(a) Income deciles			(b) Expenditure deciles		
Deciles	Ratio to income	Ratio to expenditure	Deciles	Ratio to income	Ratio to expenditure
1 (poor)	9.6	7.4	1 (poor)	5.8	7.9
2	7.9	8.7	2	6.7	9.9
3	7.8	9.9	3	7.1	11.1
4	8.1	11.0	4	7.3	11.2
5	7.5	11.0	5	7.4	11.3
6	7.3	11.3	6	7.5	11.4
7	7.0	11.5	7	7.8	11.1
8	7.1	11.5	8	7.7	10.8
9	6.4	11.8	9	7.9	10.8
10 (rich)	5.5	11.7	10 (rich)	8.6	10.3

Figure 4.4. **Distribution of total consumption tax burden ratios**

the burden ratios can be compared for each of the liquor tax, cigarette tax, and transport fuel tax, which are shown in Annex C.

The comparison of the total consumption tax burden ratio to income across income deciles shows that the first decile (poorest) group has the highest burden ratio at 9.6%, and the tenth decile (richest) group has the lowest ratio at 5.5%. However, the opposite result is found in the comparison of the total consumption tax burden ratio to expenditure across income deciles. The total consumption tax burden ratio to income across expenditure deciles shows a similar result. While the first decile group shows the lowest ratio at 5.8%, the tenth decile group shows the highest ratio at 8.6%. Meanwhile, the total consumption tax burden ratio to expenditure across expenditure deciles is relatively low for the first two decile groups, and the ratio is maintained at a similar level around 11% for the other groups. Interestingly, the burden ratio peaks for the sixth decile group and gradually declines afterwards.

VAT burden and household characteristics

The VAT burden ratio across income and expenditure deciles and across household characteristics is estimated in this section. First we estimate the VAT burden ratio across household compositions. Households are classified into six groups as follows: households of one adult, two adults, three or more adults, one adult with a child, two adults with a child, and three or more adults with a child. Here a child means a household member 16

Table 4.5. **VAT burden ratio to income by household compositions and income deciles**

Income deciles	1 adult	2 adults	>2 adults	1 adult+ch	2 adults+ch	>2 adults+ch	Average
1 (poor)	5.9	6.3	7.5	9.4	9.0	7.3	6.4
2	4.7	4.8	5.2	5.7	5.8	5.0	5.0
3	4.3	4.3	4.6	5.1	5.2	4.6	4.6
4	4.2	4.3	5.2	4.8	4.9	4.4	4.6
5	3.8	4.2	4.4	3.7	4.6	4.2	4.3
6	4.1	4.5	3.8	3.8	4.3	3.9	4.2
7	3.9	4.0	3.9	3.7	4.2	4.0	4.0
8	4.3	3.8	4.2	3.8	4.2	3.7	4.1
9	3.7	3.6	3.5	3.8	3.8	3.6	3.7
10 (rich)	3.1	3.2	3.5	3.2	3.2	3.2	3.2
Average	4.4	4.4	4.3	4.6	4.5	4.3	4.4

Table 4.6. **VAT burden ratio to expenditure by household compositions and expenditure deciles**

Expenditure deciles	1 adult	2 adults	>2 adults	1 adult+ch	2 adults+ch	>2 adults+ch	Average
1 (poor)	5.0	5.4	6.1	5.4	6.2	6.7	5.3
2	5.6	5.6	6.8	6.0	6.7	6.0	5.9
3	6.0	6.3	6.9	6.3	6.3	6.4	6.3
4	6.3	6.5	6.6	5.1	6.3	5.9	6.3
5	6.2	6.7	6.8	5.2	6.3	5.8	6.3
6	6.4	6.3	6.7	5.6	6.3	6.0	6.3
7	6.1	6.6	6.5	5.9	6.2	5.8	6.2
8	6.2	6.2	7.0	5.3	6.1	5.5	6.1
9	6.5	6.7	5.9	5.5	6.3	5.6	6.3
10 (rich)	6.5	6.2	6.5	6.0	6.4	6.0	6.3
Average	5.9	6.2	6.6	5.6	6.3	5.9	6.1

years old or younger. Note that there is no distinction between households with one child and those with two or more children.

Table 4.5 shows the estimated VAT burden ratio to income across household compositions and income deciles. Across household compositions, the burden ratio for households of one adult with a child is the highest at 4.6%. Regardless of having a child or not, households of three or more adults show the lowest burden ratio at 4.3%. When the burden ratios are compared across household compositions and income deciles, the burden ratio for households of one adult with a child in the first decile (poorest) group is the highest at 9.4%. For households of one adult in the tenth decile (richest) group, the burden ratio is the lowest at 3.1%.

Table 4.6 shows the estimated VAT burden ratio to expenditure across household compositions and expenditure deciles. Across household compositions, the burden ratio for households of three or more adults is the highest at 6.6%, and for households of one adult with a child, the burden ratio is the lowest at 5.6%. When compared across household compositions and expenditure deciles, the burden ratio is the highest at 7.0% for households of three or more adults in the eighth decile group, and the ratio is the lowest at 5.0% for households of one adult in the first decile group.

Next we examine the VAT burden ratio across income and expenditure deciles and ages of household heads. The head of a household is the household member with the highest income, and households are categorised into seven groups depending on ages of their household heads as follows: 0-19, 20-29, 30-39, 40-49, 50-59, 60-69, and 70+. These groups will be referred to as age groups.[3]

Table 4.7. **VAT burden ratio to income by age groups and income deciles**

Income deciles	20-29	30-39	40-49	50-59	60-69	70+	Average
1 (poor)	10.6	11.4	8.8	8.4	6.8	5.2	6.4
2	10.9	5.4	6.2	5.5	4.5	3.9	5.0
3	4.5	5.2	5.1	4.8	4.1	3.6	4.6
4	4.7	5.0	4.7	4.9	4.1	3.3	4.6
5	5.3	4.8	4.2	4.5	3.5	2.8	4.3
6	4.5	4.6	4.2	4.1	3.6	3.4	4.2
7	4.4	4.4	4.2	3.8	3.7	3.1	4.0
8	8.0	4.2	4.3	3.8	3.3	2.9	4.1
9	4.3	4.0	3.7	3.5	3.1	3.2	3.7
10 (rich)	2.8	3.4	3.3	3.1	3.0	2.4	3.2
Average	5.8	4.6	4.4	4.3	4.3	4.2	4.4

Table 4.8. **VAT burden ratio to expenditure by age groups and expenditure deciles**

Expenditure deciles	20-29	30-39	40-49	50-59	60-69	70+	Average
1 (poor)	7.6	6.6	6.7	6.1	5.4	4.9	5.3
2	6.3	6.7	6.7	6.4	5.8	4.9	5.9
3	7.5	7.0	6.5	6.6	6.0	4.9	6.3
4	7.1	6.7	6.2	6.6	6.1	5.0	6.3
5	7.6	6.8	6.1	6.4	6.3	5.2	6.3
6	7.5	6.8	6.2	6.5	5.9	5.2	6.3
7	7.5	6.6	6.2	6.2	5.8	4.5	6.2
8	6.7	6.7	5.9	6.3	6.2	3.9	6.1
9	6.2	6.9	6.1	6.2	6.1	5.3	6.3
10 (rich)	7.8	6.9	6.2	6.3	5.7	4.7	6.3
Average	7.3	6.8	6.2	6.4	5.9	4.9	6.1

Table 4.7 shows the estimated VAT burden ratio to income across age groups and income deciles. Across age groups, the VAT burden ratio to income is the highest at 5.8% for the 20-29 age group, and the lowest at 4.2% for the 70+ age group. When compared across age groups and income deciles, the VAT burden ratio is the highest at 11.4% for households in the 30-39 age group and in the first decile (poorest) group, and it is the lowest at 2.4% for households in the 70+ age group and in the tenth decile (richest) group.

Table 4.8 shows the estimated VAT burden ratio to expenditure across age groups and expenditure deciles. Across age groups, the VAT burden ratio to expenditure is the highest at 7.3% for households in the 20-29 age group, and the lowest at 4.9% for households in the 70+ age group. When compared across age groups and expenditure deciles, the VAT burden ratio to expenditure is the highest at 7.8% for households in the 20-29 age group and in the tenth decile (richest) group. It is the lowest at 3.9% for households in the 70+ age group and in the eighth decile group.

Lastly we estimate the VAT burden ratio across income and expenditure deciles and economic activity types of household heads. Households are classified into five categories depending on economic activity types of their heads, such as working, unemployed, self-employed, no compensation, and others.[4]

Table 4.9 shows the estimated VAT burden ratio to income across economic activity types and income deciles. Across economic activity types, the VAT burden ratio for unemployed households is relatively high at 4.8%, and the ratios for working and

Table 4.9. **VAT burden ratio to income by economic activity types and income deciles**

Income deciles	Working	Unemployed	Self-employed	Other	Average
1 (poor)	6.7	6.3	6.6	6.6	6.4
2	5.4	4.5	5.2	4.0	5.0
3	4.5	4.4	4.9	5.2	4.6
4	4.7	4.1	4.7	5.2	4.6
5	4.3	3.5	4.4	5.1	4.3
6	4.2	4.0	4.3	4.6	4.2
7	4.1	3.6	3.9	4.0	4.0
8	4.1	3.9	4.1	3.9	4.1
9	3.8	3.3	3.4	3.6	3.7
10 (rich)	3.2	2.8	3.3	3.3	3.2
Average	4.3	4.8	4.4	4.2	4.4

Table 4.10. **VAT burden ratio to expenditure by economic activity types and expenditure deciles**

Expenditure deciles	Working	Unemployed	Self-employed	Other	Average
1 (poor)	5.7	5.0	6.0	5.9	5.3
2	6.3	5.2	6.2	6.2	5.9
3	6.5	5.4	6.5	7.1	6.3
4	6.5	5.2	6.5	7.6	6.3
5	6.5	5.5	6.2	6.4	6.3
6	6.5	5.6	6.3	6.4	6.3
7	6.4	5.1	6.4	6.4	6.2
8	6.3	4.7	6.1	6.3	6.1
9	6.4	5.5	6.3	5.8	6.3
10 (rich)	6.4	5.6	6.6	6.5	6.3
Average	6.4	5.2	6.3	6.5	6.1

self-employed households are relatively low at around 4.3% and 4.4%, respectively. When compared across economic activity types and income deciles, the VAT burden ratio is the highest at 6.7% for working households in the first decile (poorest) group, and the lowest at 2.8% for unemployed households in the tenth decile (richest) group.

Table 4.10 shows the estimated VAT burden ratio to expenditure across economic activity types and expenditure deciles. Across economic activity types, the VAT burden ratio is relatively high for working and self-employed households at around 6.4% and 6.3%, respectively, and it is relatively low at 5.2% for unemployed households. When compared across economic activity types and expenditure deciles, the VAT burden ratio is the highest at 6.6% for self-employed households in the tenth decile (richest) group. For unemployed households in the eighth decile group, the ratio is the lowest at 4.7%. Also, the VAT burden ratio is relatively low at 5.0% for unemployed households in the first decile (poorest) group.

Estimated VAT burden ratio to expenditure across income deciles and ratio to income across expenditure deciles based on household characteristics are presented in Annex D.

4.5. Conclusion

If the single rate system is maintained, the VAT is a relatively efficient tax with less economic distortion compared to other taxes. However, in reality, there are a number of VAT reductions, such as reduced rates, exemptions, and zero rating. The VAT revenue ratio and the VAT burden ratio can be used to assess the policy effects of the tax system. Korea's VAT revenue ratio is relatively high at around 70%. This is mostly attributable to the single rate system with a low standard rate. Meanwhile, by comparing the VAT burden ratios to income or expenditure across income or expenditure deciles, we observe that the distribution of the burden ratios may vary significantly across different combinations of ratios and deciles. Therefore, it may be misleading to rely on a specific measure of the VAT burden ratio, such as the VAT burden ratio to income across income deciles. It is necessary to assess the policy effects of the VAT by comparing multiple measures of policy indicators.

Notes

1. For detailed information, see Chapter 3, "Measuring performance of VAT", in OECD (2014).

2. An introduction to this model can be found Chapter 2.

3. However, there are few observations (8 out of 9896 households in total) in the 0-19 age group, which is not considered when comparisons are made across age groups.

4. There are few observations (4 out of 9896 households in total) for no-compensation households. This type of households is not considered when comparisons are made across economic activity types.

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