Simulation of the Impacts of Value-Added-Tax Increases on Welfare and Poverty in Vietnam

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Abstract

This study predicts the impact of increasing VAT on household welfare as measured by the average expenditure and poverty rate in Viet Nam. We forecast the impact of two scenarios of increasing VAT. Scenario 1 is to increase VAT by 1.2 times, i.e. increasing 5% VAT and 10% VAT to 6% and 12% VAT, respectively. Scenario 2 applies a common rate of 10% on all items, i.e., commodities subject to 5% tax can be taxed by a 10% rate. The results show that Scenario 1 has a stronger impact on households compared to Scenario 2. In particular, Scenario 1 reduces households' expenditure by 0.89%, while Scenario 2 decreases households' expenditure by 0.32%. Under Scenario 1, the poverty rate is increased by 0.26 percentage points, while under Scenario 2, the poverty rate is increased by 0.22 percentage points. The number of poor people increases approximately by 240 and 202 thousand people in Scenarios 1 and 2, respectively. Regarding the impact on poverty, VAT only affects the near poor households. Better-off households are also affected, but this effect does not cause them fall into poverty.

Keywords: Value added tax, simulation, poverty, household expenditure, Vietnam.

JEL classification: H21; O23; O12.

1. Introduction

Value Added Tax (abbreviated as VAT) plays an important role in the economy, which is among the major sources of government revenue. However, VAT increases consumer price and limits consumption as well as production. Currently, the Ministry of Finance is in the process of proposing a revised law on value added tax, under which VAT will increase on most items, from 01/01/2019. Tax increase will have a direct impact on household living standards as well as producers' revenues, thus there have been various concerns about the negative effects of this movement on households and businesses, especially when the economic growth of Vietnam is not stable and the private sector has not remarkably developed.

When VAT is applied to an item, the tax burden is shared for both consumers and producers. The consumers have to pay higher prices while the producers receive lower prices per unit of product. Salanié (2002) points out that the distribution of tax burden depends on the elasticity of supply and demand for prices. If the price elasticity of demand is lower than supply, the tax burden will be more on the consumer side. Increasing taxes can also affect the economy through government spending as well as behavior of consumers and producers.

There are a number of studies which investigate the impact of tax reform in other countries, such as those of Auerbach and Kotlikoff (1987), and Emran and Stiglitz (2002). However, there is little research on the impact of VAT on household welfare. Bye, Strom and Avitsland (2003) analyze the impact of the 2001 VAT reform program, which applied the same value added tax (VAT) to all goods, services, and social welfare of the whole society for the Norwegian economy. The results show that tax reforms based on uneven taxation reduce welfare compared with tax reforms based on the uniform taxes on all goods and services.

In this study, we will forecast the impact of increasing VAT on welfare and poverty of households. We will estimate the demand function using the Almost Ideal Demand System model developed by Deaton and Muellbauer (1980). We will also estimate the elasticity of demand for commodities by price, and forecast the impacts of price increase on the real expenditures of households due to the rise in VAT. The method of estimating the demand function was developed by Deaton (1986) and applied to the case of Côte d'Ivoire by Deaton (1988).

This report consists of 6 sections as follows. Section 2 presents the data sources used in this study. Section 3 discusses the two scenarios of the VAT increase whose impacts are

predicted by this study. Section 4 presents the research method, and Section 5 presents the results of the analysis. Finally, section 6 presents some conclusions and recommendations.

2. Data source

This study utilizes the data of the Vietnam Household Living Standards Survey (VHLSS) which is collected by the General Statistics Office (GSO) in 2016 with technical assistance from the World Bank. VHLSS is conducted every two years. The survey contains very detailed data on basic demographic characteristics, employment and labor force participation, education, health, income, expenditure, housing, durable goods and goods, and the involvement of households in poverty reduction programs. Expenditure data consist of household expenditures for non-food and non-food items in the last 30 days and over the last 12 months.

The VHLSS 2016 has a sample size of 9399 households consisting of 35788 members, representing both urban and rural areas and eight geographic areas. Households are selected from 3133 communes nationwide, and therefore the VHLSS is very representative of the whole country.

3. Scenarios for VAT increase studied

In this report we will forecast the impact of VAT increases under two scenarios or options as follows:

- Scenario 1: Increase tax at 1.2%. Under this scheme, VAT will be adjusted correspondingly to the following commodity groups:

• Items subject to 5% VAT will be subject to 6% VAT

• Items subject to 10% VAT will be subject to 12% VAT.

• Items not subject to VAT (tax rate 0%) are still exempt.

- Scenario 2: Applying a 10% tax rate on all items (except for goods subject to tax exemption). So:

• Items subject to 5% VAT will be subject to 10% VAT.

• Items that are subject to 0% VAT and 10% are not adjusted.

Scenario 1 is the scheme that the Ministry of Finance plans to adjust. In addition, we also propose to study Scenario 2 of the 10% common tax rate. Common rates have the advantage of

simplifying tax collection and avoiding fraudulence and VAT evasion by adjusting the list of taxable items from 10% to 5% in production and business.

4. Research methodology

In this study, we use a static analysis method to forecast the impact of VAT adjustment on household living standards. Since the tax adjustment has not happened yet, we only forecast the potential impact but not estimate the causal effect of VAT adjustment. Increasing VAT has the same effect as increasing the selling price of goods. Our main assumption is that in the short term, with constant supply, increasing VAT will increase the price of the products. Since household budgets do not change, rising commodity prices will reduce demand for consumption of goods and household welfare, and thus may increase poverty rate. Suppose the VAT of a current item is 10%. When VAT is increased to 12%, the selling price of the product assumes an increase of 1.82%. Therefore we assume that in the short term the full impact of the VAT increase will be placed on the consumer.

If VAT is adjusted differently for different commodities, estimation of the impact on the total consumption is more complex. Households will adjust their consumption according to the degree of elasticity of the demand to the good price and the level of VAT adjustment applied to that product. In this study, we will estimate the demand function using the Almost Ideal Demand System model developed by Deaton and Muellbauer (1980). We first estimate the following model using data from the VHLSS 2016:

$$w_i = \alpha_i + \sum_{j=1}^{n} \gamma_{ij} \ln(p_i) + \beta_i \ln(X/P) \tag{1}$$

w_i is the share of expenditure of good item i in the total expenditure, p_j is the price of product j in total n products. X is the total expenditure of household. P is the price index calculated by the average price of goods with the weight, which is equal to the expenditure share of goods in total expenditure. We estimate model (1) with the following constraints (according to demand function theory):

$$\sum_{j=1}^{n} \gamma_{ij} = 0 \; ; \sum_{j=1}^{n} \alpha_i = 1 \; ; \sum_{j=1}^{n} \beta_i = 1 \tag{2}$$

We estimate the model (1) by the Maximum-Likelihood Estimation method using the Stata software. After estimating the model (1), we calculate the demand elasticity of the commodity i according to the following formula:

$$\epsilon_{ij} = \frac{\gamma_{ij} - \beta_i [w_j - \beta_i \ln(\frac{X}{P})]}{w_i} - \delta_{ij} \; , \tag{3}$$

in which δij = 1 if i = j,and δij = 0 if i ≠ j.

The demand function is often estimated for a certain group of commodities such as food items. In this study, we have to forecast the impact of raising VAT on all commodities. The number of good items surveyed in the VHLSS 2016 is 138. Estimation of demand functions of a large number of goods is very complex. As a result, in this study, we estimate the demand functionfor several groups of goods. Products are grouped according to the VAT rate for simplicity:

- Food items subject to 5% VAT: these are necessary goods such as rice, vegetables, fruits, and meat.
- Food items subject to 10% VAT: these are food items purchased from outside, processed, milk, tea, alcohol, soft drinks, oils, fats, sauces, and spices.
- Non-food items subject to 0% VAT include medical and educational goods.
- Non-food items subject to 10% VAT: Except for children's toys and books, all non-food items are subject to a 10% tax rate. For the sake of simplicity, we still group toys for children and books into the category of goods subject to a tax rate of 10%.

After estimating the elasticity of demand at the product price, we can predict the household expenditure change as the price of the product increases as follows:

$$dX = \frac{\partial X_1}{\partial p_1}dp_1 + \frac{\partial X_2}{\partial p_2}dp_2 + \frac{\partial X_3}{\partial p_3}dp_3 + \frac{\partial X_4}{\partial p_4}dp_4, \qquad (4)$$

In which *dp* is the price change in each commodity group due to the VAT increase, and *∂X/∂p is* the elasticity of the corresponding commodity group. It should be noted that we do not estimate cross-elasticity because cross-elasticity between groups of commodities is difficult to explain. We only have four commodity groups, with many good items in each group. As a result, it would be very difficult to explain whether these groups are substitutes or supplements to each other.

The VAT increase would reduce household consumption and increase the risk of household poverty. The predicted expenditure of the household after VAT increases will be used to forecast the poverty rate.

5. Result analysis

5.1. Household expenditure structure

According to VHLSS 2016, Vietnam's per capita expenditure is 34,551 thousand VND/person/year (approximately 2.9 million VND/person/month). As described above, we

classify the items that households consume into four groups. Figure 1 shows the share of expenditures of the four commodity groups in the total household expenditure. The share of food items with the 5% VAT in total household expenditures is 23.2%, while the share of food items with the 10% VAT is 15.3%. Spending on education and health accounts for 7.9% of the total expenditure, and othernon-food items account for 53.5%. Rural households have a higher share of food expenditure than urban households.

The expenditure structure is strongly correlated with living standards of households. Households in the highest quintile spent only 12.4% on necessary food items (the 5% VAT group), while households in the lowest expenditure quintile spent 36.3% of total expenditure on these items (Figure 2). Rich households have a significantly higher proportion of non-food, health and education expenditures than poor ones. Households with different spending structures will be affected differently by the impact of adjusting VAT since the VAT rates for these items and the price elasticities of demands of these items are different.

Figure 1. The proportion of expenditures on commodity groups
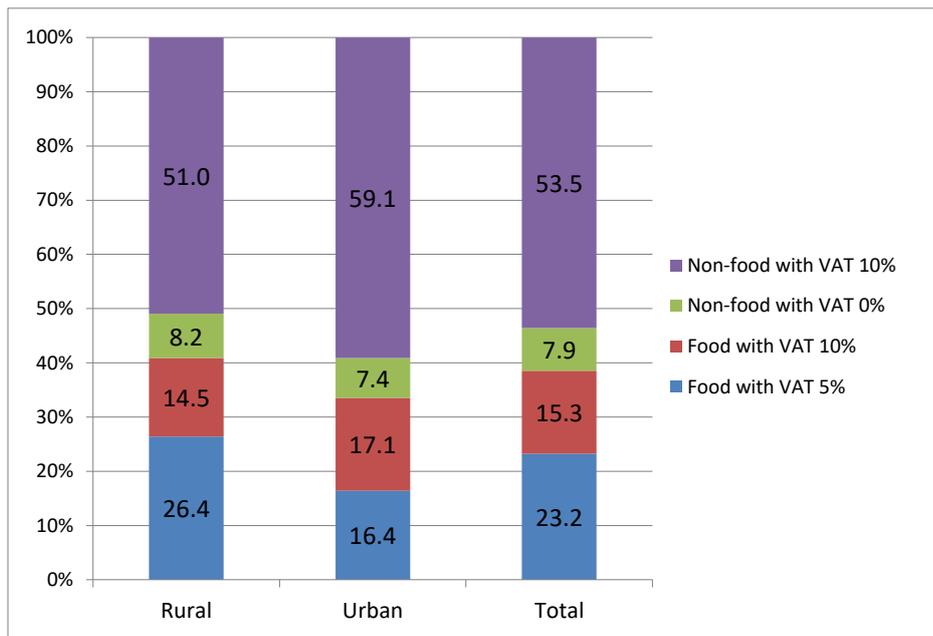
Source: Author's estimation from VHLSS 2016

Figure 2. The proportion of expenditure on commodity groups by expenditure quintile of households
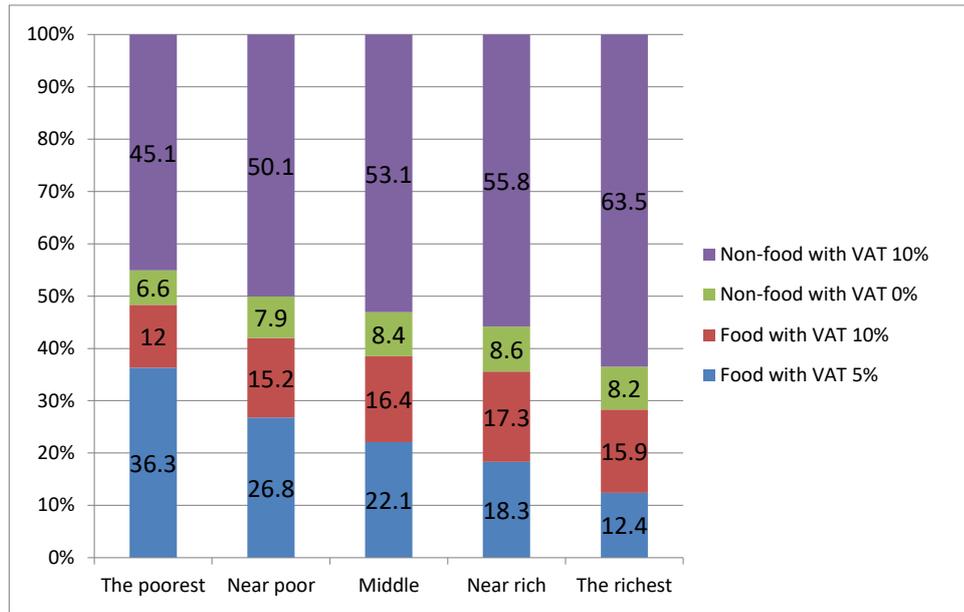
5.2. *Estimation of demand function and elasticity*

To estimate the demand function of four commodity groups, we need to compute the average price of these commodity groups. The unit price of food products can be calculated by the amount of expenditure for item divided by the quantity or volume of that item (this information is collected for each household in the VHLSS 2016). The average price of food is calculated by the weighted average of the items' unit price in the group whose weight is the proportion of expenditure on each item, such as the average price of the group of food items subject to 5% VAT, being calculated as follows:

$$P_{LT\_5\%} = \sum_{i=1}^{n} w_i p_i, \tag{5}$$

In which *wi* and *pi* are the share and unit price of good *im* respectively. Food items subject to 10% VAT are also computed similarly. The main difficulty is that there is no information on quantity of non-food items, and as a result, it is impossible to calculate unit price for this commodity group. In this study, we estimate the unit price of a non-food item based on the unit price of food, and in proportion to the amount of expenditure by commodity groups:

$$P_{PLT} = \left(W_{LT\_5\%}P_{LT\_5\%} + W_{LT\_10\%}P_{LT\_10\%}\right)/W_{PLT}, \tag{6}$$

where P_{PLT} is the unit price of non-food group; $W_{LT\_5\%}$ and $W_{LT\_10\%}$ are the share of food items with the 5% VAT and the share of food items with the 10% VAT in the total expenditure, respectively; $P_{LT\_5\%}$ and $P_{LT\_10\%}$ are the unit price of food items with the 5% VAT and the unit

price of food items with the 10% VAT, respectively; W_{PLT} is the share of non-food items (either 0% VAT or 10% VAT) in the total expenditure.

Figure 3. The elasticity of commodity demand according to price
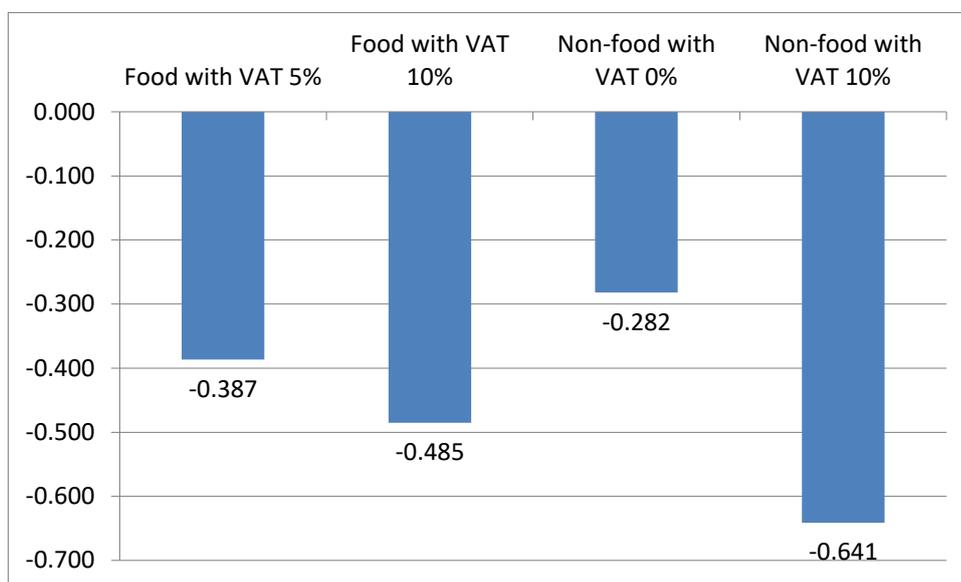
Source: Authors' calculation from the VHLSS 2016

Table P.1 in the appendix reports estimates of the parameters in demand functions using the data from the VHLSS 2016. The elasticity of demand of the four commodity groups is estimated based on formula (3). Figure 3 shows the estimation of this elasticity. Non-food items have the highest elasticity. If the price increases by 1%, the demand for this commodity is reduced by 0.641%. Elasticity of health and education to price is significantly lower, estimated at 0.282. The low elasticity implies the importance of health and education to households. The demand for food commodities subject to 5% VAT is 0.387, lower than the demand for food items subject to 10% VAT. The goods subject to VAT 5% are essential items such as rice, meat, vegetables, and fruits, thus have the low price elasticity.

5.3 Impacts of VAT increase on households by geographical areas

Table 1 presents forecast of the impact of VAT increase on per capita expenditure by geographical areas. Mean per capita expenditure 34551 thousand VND/person/year in 2016. Under Scenario 1 (with 1.2 times increase in a VAT), per capita expenditure decreases by 8.89% to 34245 thousand VND/person/year. Under Scenario 2 (application of a common VAT rate of 10%), the impact is lower: the per capita expenditure is reduced by 0.32%. There are two reasons why Scenario 2 has a smaller effect than Scenario 1. Firstly, in Scenario 2, VAT rate is increased for only food items with the current VAT rate of 5%. The share of household

expenditure on these food items in the total expenditure is 23,2%. In Scenario 1, VAT rates of all good items (except for items, which are exempted from VAT) are increased. Secondly, the elasticity of the food items with the 5% VAT rate is smaller than that of the food and non-food items with the 10% VAT rate. As a result, the effect of the VAT increase on the food items with the 5% VAT rate is lower.

It should be noted that the forecast analysis in this section predicts a smaller effect on per capita expenditure of Scenario 2 than Scenario 1, while the CGE model in the previous section shows a reverse direction. According to the CGE model, the effect on per capita expenditure of Scenario 2 is slightly higher than the effect of Scenario 1. A possible reason is that the CGE model takes into account the total effect including the effect though tax revenue. Scenario 1 has a much larger effect on budget revenue, and if the government spends revenue efficiently, it can reduce the negative effect of VAT tax on households. The impact forecast in this section only measures the short-term effect on household consumption, and this approach does not take into account the effect of government spending.

Regarding rural, urban and geographic areas, the impact of VAT increase under Scenario 2 is smaller than the impact under Scenario 1 for all groups. However, for each Scenario, the degree of influence varies across regions. Under Scenario 1, urban and rich areas such as the Red River Delta and the South East are more impacted than rural and poorer areas. However, under Scenario 2, the rural areas and poor areas such as the Northeast and Northwest regions are more affected, as Scenario 2 mainly regulates the VAT on essential goods consumed more by poor households.

In general, high-expenditure households are more likely to be affected in Scenario 1 but less likely to be affected in Scenario 2 than low-expenditure households. This is because high-expenditure households have a larger share of spending on non-food items and a smaller share of spending on food items.

Table 1. The impact of VAT increase on average expenditure by geographical areas

	Average expenditure per capita (thousand VND)	Scenario 1		Scenario 2	
		Average expenditure per capita (thousand VND)	% changes in average expenditure per capita	Average expenditure per capita (thousand VND)	% changes in average expenditure per capita
All country	34551	34245	-0.89	34439	-0.32
Urban/rural					
Rural	26084	25863	-0.85	25978	-0.40

	Average expenditure per capita (thousand VND)	Scenario 1		Scenario 2	
		Average expenditure per capita (thousand VND)	% changes in average expenditure per capita	Average expenditure per capita (thousand VND)	% changes in average expenditure per capita
Urban	52655	52165	-0.93	52529	-0.24
Geographical areas					
Red River Delta	45096	44687	-0.91	44970	-0.28
Northeast	26638	26409	-0.86	26522	-0.44
Northwest	18801	18646	-0.83	18708	-0.50
North Central	25159	24948	-0.84	25056	-0.41
South Central	30901	30632	-0.87	30799	-0.33
Central Highlands	27121	26886	-0.87	27026	-0.35
Southeast	47635	47195	-0.92	47516	-0.25
Mekong River Delta	27661	27424	-0.86	27555	-0.38

Source: Author's estimation from VHLSS 2016

Increasing VAT can reduce expenditure, and therefore affecting the poverty rate. In this study, we measure poverty using the expenditure poverty line computed by the GSO and World Bank. A household is defined as the poor if their per capita expenditure is less than the poverty line of 11,630 thousand VND/person/year. In VHLSS 2016, the poverty rate of the country was 10.1%. This poverty rate is projected to increase by 0.26 percentage points if VAT is increased under Scenario 1, and by 0.22 percentage points if VAT is increased under Scenario 2. The increase in the number of poor people in Scenarios 1 and 2 is 240 and and 202 thousand people, respectively.

While the VAT Regarding geographical areas, if the impacts of VAT increase on expenditures occur in all household groups, the impact on poverty mainly takes place in rural and poor areas. The northern mountainous areas and the central coastal regions are the areas where the number of poor people rises mainly due to the increase in the VAT.

Table 2. The impact of VAT increase in poverty by geographical areas

	Poverty rate (%)	Scenario 1		Scenario 2	
		Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment	Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment
All country	10.06	0.26	239925	0.22	202356
Urban/rural					
Rural	13.95	0.36	225901	0.29	186595
Urban	1.75	0.05	14024	0.05	15761
Geographical areas					

	Poverty rate (%)	Scenario 1		Scenario 2	
		Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment	Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment
Red river delta	1.26	0.00	0	0.	0
Northeast	15.36	0.72	79216	0.67	73156
Northwest	43.80	0.33	11064	0.33	11064
North Central	17.91	0.67	79139	0.73	85639
South Central	8.98	0.43	29922	0.22	15336
Central Highlands	23.51	0.00	0	0.00	0
Southeast	1.64	0.04	6447	0.00	0
Mekong river delta	9.21	0.20	34137	0.10	17161

Source: The author's estimation from VHLSS 2016

5.4. Impacts of VAT increase on households by demographic features

Table 3 predicts the impact of VAT increase on ethnic groups. In Scenario 1, better-off ethnic groups such as Kinh, Tay, Muong are more affected than other ethnic groups. In Scenario 2 poorer ethnic groups such as H'Mong, Dao, and Thai are more affected than richer ethnic groups. However, for each ethnic group, Scenario 1 still has a higher impact than Scenario 2 on per capita expenditure.

Table 3. The impact of VAT increase on average expenditure by ethnic groups

	Average expenditure per capita	Scenario 1		Scenario 2	
		Average expenditure per capita	% changes in average expenditure per capita	Average expenditure per capita	% changes in average expenditure per capita
Ethnic groups					
Whole country	34551	34245	-0.89	34439	-0.32
Kinh	37988	37648	-0.89	37871	-0.31
Tay	25655	25436	-0.85	25541	-0.44
Thai	14762	14646	-0.78	14673	-0.60
Khmer	18821	18665	-0.83	18722	-0.52
Muong	20816	20638	-0.85	20724	-0.44
Nung	19689	19525	-0.83	19591	-0.49
H'Mong	10175	10104	-0.69	10082	-0.91
Dao	14221	14112	-0.77	14120	-0.71
Others	17602	17451	-0.86	17521	-0.46

Source: The author's estimation from VHLSS 2016

The impact on the poverty rate of raising VAT tends to be higher in poor ethnic groups than rich ethnic groups. However, in terms of the number of poor people who can be increased due to the VAT change, the most affected ethnic groups are Kinh, Thai and Muong, since they have the largest population.

Table 4. The impacts VAT increase on poverty by ethnic groups

Ethnic groups	Poverty rate (%)	Scenario 1		Scenario 2	
		Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment	Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment
All country	10.06	0.26	239925	0.22	202356
Kinh	3.68	0.16	122826	0.13	99403
Tay	15.03	0.28	5220	0.28	5220
Thai	50.31	1.81	41305	0.92	21030
Khmer	21.18	0.00	0	0.00	0
Muong	29.61	1.49	24120	1.49	24120
Nung	21.37	0.58	6060	0.00	0
H'Mong	80.28	0.43	7866	1.88	34641
Dao	40.33	1.43	12366	1.43	12366
Others	46.64	0.41	20162	0.11	5576

Source: The author's estimation from VHLSS 2016

Table 5 reports the impact of VAT increase on households with different demographic characteristics. Households with a large number of members have lower expenditure than households with a small number of members. However, the impact of VAT increase does not differ between households with different household sizes. The impact of the VAT increase is not correlated with the proportion of female members as well as the proportion of children and elderly.

Female-headed households have higher expenditure than male-headed households. This is because in female-headed households, husbands are more likely to migrate or die. Female-headed households have a smaller size, and as a result female-headed households tend to have higher per capita expenditure. Female-headed households are less likely to be affected by the Scenario 2 tax increase because they have higher expenditure.

Similarly, households with divorced or unmarried heads have higher average expenditure than other households. Due to the higher level of expenditure, they are more affected by the Scenario   and less influenced by Scenario 2.

Table 5. Impacts of VAT increase on the average expenditure of households according to demographical characteristics

Household groups	Average expenditure per capita	Scenario 1		Scenario 2	
		Average expenditure per capita	% change in average expenditure per capita	Average expenditure per capita	% change in average expenditure per capita
The number of household members					
1	55332	54816	-0.93	55170	-0.29
2	47046	46617	-0.91	46894	-0.32
3	39642	39286	-0.90	39512	-0.33
4	34619	34316	-0.88	34508	-0.32
5	31861	31581	-0.88	31759	-0.32
6	27898	27654	-0.87	27802	-0.34
7 +	26128	25895	-0.89	26042	-0.33
The proportion of female members aged 15-65					
0-0.2	42030	41642	-0.92	41904	-0.30
0.2-0.4	35083	34775	-0.88	34969	-0.32
0.4-0.6	33073	32779	-0.89	32962	-0.34
0.6-0.8	34889	34582	-0.88	34783	-0.30
0.8-1	37983	37639	-0.90	37863	-0.32
The proportion of children aged 0-14					
0	43197	42810	-0.90	43065	-0.31
0-0.2	30407	30135	-0.90	30313	-0.31
0.2-0.5	31571	31293	-0.88	31467	-0.33
0.5-1	27750	27507	-0.87	27649	-0.36
The proportion of members aged 60 and above					
0	33739	33443	-0.88	33626	-0.33
0-0.2	30086	29815	-0.90	29993	-0.31
0.2-0.5	35234	34918	-0.90	35128	-0.30
0.5-1	41001	40631	-0.90	40867	-0.33
The proportion of member aged 80 and above					
0	34897	34587	-0.89	34785	-0.32
0-0.3	29079	28829	-0.86	28980	-0.34
0.3-1	35703	35386	-0.89	35582	-0.34
Household head gender					
Male	32845	32555	-0.88	32733	-0.34
Female	40670	40302	-0.91	40555	-0.28
Age of household head					
Below 31 years old	24690	24474	-0.87	24595	-0.38
31-50 years old	32466	32183	-0.87	32356	-0.34
51-60 years old	38125	37781	-0.90	38007	-0.31

Household groups	Average expenditure per capita	Scenario 1		Scenario 2	
		Average expenditure per capita	% change in average expenditure per capita	Average expenditure per capita	% change in average expenditure per capita
61-80 years old	36689	36359	-0.90	36575	-0.31
Above 80 years old	34072	33770	-0.89	33957	-0.34
Marital status of heads					
Married	34166	33864	-0.88	34054	-0.33
Widow	34619	34310	-0.89	34507	-0.32
Divorced	46455	46022	-0.93	46342	-0.24
Separated	33175	32883	-0.88	33074	-0.31
Unmarried	41072	40686	-0.94	40956	-0.28

Source: The author's estimation from VHLSS 2016

Households with five or six members are most affected. For example, Scenario 1 increases the poverty rate of households with 6 members by 0.78 percentage point. Accordingly, the number of poor people increases by 96.5 thousand for this group.

Households with the proportion of women aged 15-65 in the range of 0.6-0.8 are subject to much of the VAT effect on poverty. Households without male or female members are less likely to be impacted because they are generally small in size. Families with children and the elderly aged 80 and above are also more affected.

Table 6. The impact of VAT increase on poverty according to the demographic features of households

Household groups	Poverty rate (%)	Scenario 1		Scenario 2	
		Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment	Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment
The number of household members					
1	3.48	0.00	0	0.11	1737
2	3.41	0.00	0	0.00	0
3	4.55	0.16	22569	0.11	16122
4	7.61	0.12	34408	0.09	26220
5	10.36	0.35	69300	0.30	59215
6	14.00	0.78	96456	0.66	81870
7 +	28.22	0.20	17192	0.20	17192
The proportion of female members aged 15-65					
0-0.2	5.75	0.00	0	0.00	0
0.2-0.4	9.08	0.11	17748	0.11	17748
0.4-0.6	11.24	0.21	96863	0.22	102943

Household groups	Poverty rate (%)	Scenario 1		Scenario 2	
		Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment	Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment
0.6-0.8	9.61	0.57	117058	0.35	71672
0.8-1	7.81	0.16	8256	0.16	8256
The proportion of children aged 0-14					
0	3.53	0.03	9428	0.04	11165
0-0.2	11.38	0.26	12774	0.26	12774
0.2-0.5	10.63	0.37	150261	0.23	92368
0.5-1	19.66	0.39	67462	0.49	86049
The proportion of members aged 60 and above					
0	10.72	0.30	173237	0.26	148517
0-0.2	16.50	0.78	44892	0.53	30306
0.2-0.5	8.98	0.10	21796	0.10	21796
0.5-1	4.31	0.00	0	0.02	1737
The proportion of member aged 80 and above					
0	10.21	0.26	223349	0.22	185780
0-0.3	9.36	0.14	8320	0.14	8320
0.3-1	6.48	0.35	8256	0.35	8256
Household head gender					
Male	10.84	0.30	216333	0.24	177027
Female	7.27	0.12	23592	0.12	25329
Age of household head					
Below 31 years old	28.97	0.14	5058	0.89	31833
31-50 years old	11.63	0.37	161105	0.25	109610
51-60 years old	6.47	0.16	38620	0.16	38620
61-80 years old	7.53	0.19	35142	0.12	22293
Above 80 years old	9.90	0.00	0	0.00	0
Marital status of heads					
Married	10.37	0.27	216333	0.22	177027
Widow	8.58	0.00	0	0.02	1737
Divorced	5.67	0.00	0	0.00	0
Separated	18.63	0.00	0	0.00	0
Unmarried	7.33	1.43	23592	1.43	23592

Source: The author's estimation from VHLSS 2016

5.5. Impacts of VAT increase on households by socio-economic characteristics

The impact of the VAT adjustment is correlated with education and occupation of household of household heads. Household heads with high education 12jhtrand highly-skilled occupations are more likely to be affected by Scenario 1 but are less likely to be impacted by Scenario 2

than those whose heads receive low education and have low skill jobs. This is also evident in the breakdown according to expenditure quintile. Compared with poor households, the rich households are more affected by Scenario 1 but less influenced by Scenario 2.

Table 7. The impacts of VAT increase on household expenditure by occupation characteristics and education level of household heads and expenditure quintile

	Average expenditure per capita	Scenario 1		Scenario 2	
		Average expenditure per capita	% change in average expenditure per capita	Average expenditure per capita	% change in average expenditure per capita
Education level of household heads					
Below primary school	22485	22294	-0.85	22388	-0.43
Primary school	28764	28512	-0.87	28660	-0.36
Secondary school	33064	32775	-0.88	32950	-0.34
High school	45870	45460	-0.89	45745	-0.27
Colleges and university level	70203	69537	-0.95	70055	-0.21
Occupation of household heads					
Manager and specialist	63481	62883	-0.94	63339	-0.22
Secretary	45360	44945	-0.91	45240	-0.26
Agriculture sector	23213	23019	-0.84	23110	-0.44
Skilled labor	33828	33534	-0.87	33714	-0.34
Unskilled labor	27768	27529	-0.86	27667	-0.37
Unemployed	44990	44577	-0.92	44872	-0.26
Expenditure quintile					
Lowest expenditure group	11109	11023	-0.77	11037	-0.64
Near lowest expenditure group	19227	19069	-0.82	19132	-0.49
Medium expenditure group	26776	26549	-0.85	26667	-0.41
Near highest expenditure group	37991	37660	-0.87	37864	-0.33
Highest expenditure group	77742	77009	-0.94	77582	-0.21

Source: The author's estimation from VHLSS 2016

The impacts on poverty of VAT increase primarily fall on the low-income groups, or on households whose heads are low-educated, do unskilled jobs and work in the agriculture sector. Households with expenditure close to the poverty line will be most at risk. Thus the impact on poverty of VAT increases only occur for households in the lowest 20% quintile. Households with high expenditure also experience spending reduction, but this reduction does not make them fall into poverty as the near poor people.

Table 8. The impacts of VAT increase on poverty by occupation characteristics and education level of household heads and expenditure quintile

	Poverty rate (%)	Scenario 1		Scenario 2	
		Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment	Change in poverty rate (point %)	The number of poor people increased due to VAT adjustment
Education level of household heads					
Below primary school	24.53	0.39	79278	0.26	52181
Primary school	10.70	0.26	59917	0.23	53470
Secondary school	5.65	0.35	100730	0.34	96705
High school	2.00	0.00	0	0.00	0
Colleges and university level	0.25	0.00	0	0.00	0
Occupation of household heads					
Manager and specialist	0.59	0.00	0	0.00	0
Secretary	1.24	0.33	36949	0.24	26424
Agriculture sector	19.98	0.50	180085	0.46	165939
Skilled labor	2.61	0.00	0	0.00	0
Unskilled labor	10.95	0.33	22891	0.14	9993
Unemployed	5.12	0.00	0	0.00	0
Expenditure quintile					
Lowest expenditure group	50.32	1.29	239925	1.08	202356
Near lowest expenditure group	0.00	0.00	0	0.00	0
Medium expenditure group	0.00	0.00	0	0.00	0
Near highest expenditure group	0.00	0.00	0	0.00	0
Highest expenditure group	0.00	0.00	0	0.00	0

Source: The author's estimation from VHLSS 2016

6. Conclusion

This study predicts the impact of increasing VAT on household welfare as measured by the average expenditure and poverty rate in Viet Nam. We forecast the impact of two scenarios of increasing VAT. Scenario 1 is to increase VAT by 1.2 times, i.e. increasing 5% VAT and 10% VAT to 6% and 12% VAT, respectively. Scenario 2 applies a common rate of 10% on all items, i.e., commodities subject to 5% tax can be taxed by a 10% rate.

To forecast the impact, we estimate the demand function and elasticity of demand to price. Our main assumption is that in the short term, in which with the supply is fixed, increasing VAT will increase the price of commodities. Since household budgets do not change, an

increase in commodity prices will lead to a decrease in spending of households, thereby reducing household welfare, and increasing poverty rate. It should be noted that the adjustment of tax does not happen, thus we only forecast the potential effect of the VAT adjustment. It means that we estimate the effect of the VAT adjustment in the short-term.

The results show that Scenario 1 has a stronger impact on households compared to Scenario 2. In particular, Scenario 1 reduces households' expenditure by 0.89%, while Scenario 2 decreases households' expenditure by 0.32%. Under Scenario 1, the poverty rate is increased by 0.26 percentage points, while under Scenario 2, the poverty rate is increased by 0.22 percentage points. The number of poor people increases approximately by 240 and 202 thousand people in Scenarios 1 and 2, respectively.

The impact of Scenario 1 is greater than Scenario 2 for all population sub-groups. However, compared with poor households, rich ones are more affected by Scenario 1, but less affected by Scenario 2. This is because rich households have a large proportion of expenditures on non-food items and a small proportion of expenditures on food items. Scenario 2 will have a high impact on poor groups, since Scenario 2 mainly increases VAT on necessary food items. Regarding absolute value, Scenario 2 still has a lower effect than Scenario 1 for all groups.

Regarding the impact on poverty, VAT only affects the near poor households. Better-off households are also affected, but this effect does not cause them fall into poverty. Households with a large number of children and elderly, a high proportion of female workers are mostly affected in terms of poverty. Households with low educational attainment, low-skill occupation and working in agriculture sector are also more affected.

In general, the increase in VAT under Scenario 2 has a smaller impact than Scenario 1. The application of the common rate also facilitates the collection of taxes. However, Scenario 2 will also have some negative effects on low-income households. Therefore, the government should consider adjusting VAT in the coming time, as this is a trade-off of increasing budget for economic growth and poverty reduction in Vietnam.

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Appendix

Table P.1. Estimation of the demand function's parameters

	Coef.	Std. Err.	z	P>z	[95% Conf.Interval]	
alpha						
alpha_1	0.4029	0.0033	123.51	0.0000	0.3965	0.4093
alpha_2	0.1555	0.0035	45.01	0.0000	0.1487	0.1623
alpha_3	0.1656	0.0018	93.33	0.0000	0.1622	0.1691
alpha_4	0.2759	0.0020	136.12	0.0000	0.2720	0.2799
beta						
beta_1	-0.0828	0.0019	-43.72	0.0000	-0.0865	-0.0790
beta_2	0.0292	0.0020	14.38	0.0000	0.0252	0.0332
beta_3	0.0196	0.0011	18.45	0.0000	0.0175	0.0216
beta_4	0.0340	0.0011	30.60	0.0000	0.0318	0.0362
gamma						
gamma_1_1	0.0871	0.0013	69.01	0.0000	0.0847	0.0896
gamma_2_1	0.0153	0.0013	12.19	0.0000	0.0129	0.0178
gamma_3_1	-0.0182	0.0005	-38.36	0.0000	-0.0191	-0.0173
gamma_4_1	-0.0842	0.0007	-121.84	0.0000	-0.0856	-0.0829
gamma_2_2	0.0748	0.0016	46.36	0.0000	0.0717	0.0780
gamma_3_2	-0.0036	0.0006	-6.49	0.0000	-0.0047	-0.0025
gamma_4_2	-0.0865	0.0008	-107.49	0.0000	-0.0881	-0.0850
gamma_3_3	0.0545	0.0004	136.60	0.0000	0.0538	0.0553
gamma_4_3	-0.0327	0.0004	-89.23	0.0000	-0.0334	-0.0320
gamma_4_4	0.2035	0.0007	273.03	0.0000	0.2020	0.2050
Number of obs		9205				
Log-likelihood		41982				

Source: Authors' estimation from the VHLSS 2016