



The Impact of Production Tax on Agriculture Sector in Vietnam: A Computable General Equilibrium Approach

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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Abstract

A small fluctuation in the production tax may cause enormous changes in most of remaining economic value. Especially in Vietnam, a developing country, the effect of this problem in terms of agriculture sector should not be ignored. This paper would like to study this effect based on the computable general equilibrium model approach. With the latest Input – Output table of Vietnam in 2007, this paper conducts the Computable General Equilibrium (CGE) model for six simulations (increasing the agricultural production tax rate by 5%, 10%, 20% and decreasing by 5%, 10%, 20%). Consequently, we can find out that an increase of 5% of production tax amount in agriculture activity will lead to an increase of Government surplus of 111.117 billion Vietnam Dong (VND), as well as decrease the social welfare by 1918.705 billion VND. On the other hand, a decrease of 10% in this production tax will be resulted in the Vietnamese government's deficit of 218.628 billion VND while the general social welfare increases by 3899.943 billion VND.

Keywords: Vietnam; agriculture sector; production tax; simulation; Computable General Equilibrium (CGE) model; social welfare; Government deficit.

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1 Introduction

For every country, the Government financing and expenditure play an absolutely important role in the economic development as well as social welfare. In which, it is worth discussing the important impact of the production tax on the whole economy. A change in the production tax policy will have significant effects on other national economic value. In terms of Vietnam, which is a developing country, agriculture sector still plays a very important part in the development of the whole country economic. In 2013, agriculture was accounted for 643,862 billion VND (about 17.96%) in Vietnam total GDP value. There are such a lot of relevant regulations on this area activity.

In this paper, I would like to use the computable general equilibrium model to identify the impact of this factor on Vietnamese economy, as described by Ballard, Fullerton, Shoven and Whalley [1]. The most important purpose is to identify how the whole economic term reacts with the change in macroeconomic policies, specifically the tax rate change in agricultural activity. In some concerns, the CGE is one of ideal quantitative methods to evaluate the policy reform in the whole economy. Kato [2,3] conducted the effect of tax/subsidy reforms of health related sectors by CGE model.

The lasted Input-output table of Vietnam in 2007 that is available from Asian Development Bank (ADB) website will be used to conduct this study. According to this table, the domestic output and import value of one nation were prepared separately for product-by-product and industry-by-industry in one specific year. The Input-output table for domestic output plays an important part in analyzing the impact of economic policies on the domestic economy.

When we change the value of one specific value, the remaining value may change accordingly. Therefore, this paper is about to find the changes in other economic value when Vietnamese Government is assumed to increase or decrease the production tax rate on the agriculture sector.

Initially, we have to introduce the Social Accounting Matrix (SAM) table, which is a short form of Input-output table to conduct this mentioned analysis. In order to create the SAM table for this Computable General Equilibrium (CGE) model, the original sized 15x15 table should be reformatted to the 11x11-sized table. Accordingly, the effect of policy change is also evaluated through the social welfare increase or decrease since applying six cases of simulation.

2 Data Description and Research Model

2.1 Data description

This paper is conducted based on the data collected from Asian Development Bank (ADB). The latest Input-output Table (I/O table) for Vietnam is available for the year 2007. This I/O table consists of 15 different intermediate sectors, which is used to calculate the final Social Accounting Matrix (SAM) as the Table 1. The 11x11 sized SAM (refer to the Appendix 1) is taken to handle the effect of production tax in agriculture sector on remaining economic values. In more detail, this table includes value of economic sectors, production factors, taxation amount and final consumptions of the whole economy. The total value of each row equals to each column respectively. In addition to that, the data about the taxation amount collected in 2007 from the household side (collected from the Vietnamese General Statistical Office (GSO)) is also used to finalize the SAM table.

In general, the initial input-output table with 15 different intermediate sectors is transformed in an SAM table with 03 main commodity sectors. They consist of 1) agriculture sector (the total value of the agriculture, forestry, fishing and hunting), 2) secondary sector (the total value of the industry, constructions and utilities) and 3) tertiary sector (in terms of services). To make it short and clear, this paper will name three sectors as "agriculture, secondary and services sectors" and use them in later parts. Besides, it is also important to emphasize that the capital and labor forces are considered as two main production factors in this economy. Finally, this economy illustrates following utilizers of the production of goods and services includes 1) households consumption; 2) government consumption; 3) gross capital formation (investments) and 4) foreign sector.

2.2 Research model

This paper also employs the conventional static type of computable general equilibrium model to conduct this research. As can be seen in the SAM table as an attachment, Vietnamese economy has three different sectors – household side, government side and investment side. Accordingly, each of three economic sectors is assumed to always want to achieve the highest level of utility. Specifically, the household side will maximize their utility by consuming three types of commodity goods and services (from agriculture, secondary and services activities). Furthermore, while the government's target is to balance the budget financing through taxation system and national expenditure, the investment firms have to enhance the profit maximization. More importantly, the economy is assumed to be very competitive; therefore, all sectors of the economy are about to fully achieve the optimal price in equilibrium through being determined by the relevant markets in the economy.

- **From the household side:**

We assume that households are homogenous and have following utility function:

$U(X_1, X_2, \dots, X_n) = \prod_{i=1}^n X_i^\alpha$
 In which, X_i : the consumption of good i
 n : the number of sectors in economy
 α : parameter value

Then, the budget constraint is: $P_1X_1 + P_2X_2 + \dots + P_nX_n = \sum_{i=1}^n P_iX_i = I - S^H$
 In which, P_i : The price of good i
 I : Household income
 S^H : Household saving

The household income is defined as: $I = r\bar{K} + w\bar{L}$
 In which, r, w : the rental cost and wage rate
 K, L : the endowments of capital and labor

- **From the firm side:**

Firm have following production function: $Y_i = K_i^{\beta K} L_i^{\beta L}$
 In which, β : parameter value
 Then, firms try to maximize their profit denoted by: $\Pi = P_i^Y Y_i - rK - wL$
 In which: P_i^Y : the price of composite goods and services
 Y_i : the production amount

- **From the government side:**

The government's budget constraint is: $\sum_{i=1}^n P_iX_i^G + S_G = T^I + T^P + T^m$
 In which: $\sum_{i=1}^n P_iX_i^G$: the government consumption
 S_G : the government saving
 T^I, T^P, T^m : the value of income tax, production tax and international tax respectively

This model assumes that all three sectors of economy try to maximize their own functions. To do so, we have to find the first order conditions and combine with following market clear conditions:

- The final goods and services consumption equals to the total of domestic goods and services and import goods and services
- The amount capital in households equals to the total capital required in all firms
- The amount labor in households equals to the total labor required in all firms
- The budget constraint of investment sector

$$\begin{aligned} X_0 &= X_i + X_i^G + X_i^S \sum_{i=1}^n X_{ij} \\ \bar{K} &= \sum_{i=1}^n K_i \\ \bar{L} &= \sum_{i=1}^n L_i \end{aligned}$$

$$\sum_{i=1}^n P_i X_i^S = S^G + S^H + S^F$$

(In which, S^G, S^H, S^F : defines the savings from the government, households and foreign sectors).

From the profit maximization form of the firm size with respect to the labor and capital, we can estimate the value of parameter values in this CGE model.

As we have some economic functions from the above part:

$$Y_i = K_i^{\beta_K} L_i^{\beta_L} \text{ (Production function)}$$

$$\Pi = P_i^Y Y_i - rK - wL \text{ (Profit function)}$$

Then, by taking the first order conditions, we can yield the demand functions such that:

$$K_i = K_i(P_i^Y, r_i, w_i, \beta_{K,i}, \beta_{L,i}) = \frac{\beta_{K,i}}{r_i} P_i^Y Y_i$$

$$L_i = L_i(P_i^Y, r_i, w_i, \beta_{K,i}, \beta_{L,i}) = \frac{\beta_{L,i}}{w_i} P_i^Y Y_i$$

By some re-arrangements, we have the following parameter values for each economic sectors:

$$\beta_{K,i} = \frac{r_i K_i}{P_i^Y Y_i}$$

$$\beta_{L,i} = \frac{r_i L_i}{P_i^Y Y_i}$$

It is noted that the value of $\beta_{K,i}$ and $\beta_{L,i}$ can be calculated by these above formulas and the Vietnamese SAM table and illustrated in Table 1.

Through this CGE model, a generated solution will present the market clearing prices for the output of the economy, production factors and import – export activities. The initial economic is described as equality in demand and supply side (as can be seen in SAM table) from each economic sector. Then, with new production tax rates, the CGE model will find the new equilibrium solutions at which the demand and supply side will be also equal. Additionally, a net effect on social will be also calculated (through social welfares and government deficits). As the research of Isaac Dadson and Kato [4], they discussed that the Ghanaian society can improve the efficiency and equity by utilizing a governmental surplus through the increased remittances without increasing the tax revenue.

3 Research Results and Discussion

3.1 Benchmark model

The calibration process is based on the important assumption that the economy is in the equilibrium status; then that provides the ability for static equations to create a base-year equilibrium, or the short-term solution in other words.

According to the CGE model, based on the actual data of Vietnamese economy, the benchmark model, which should be absolutely close to the realistic scenarios, will be extracted. Therefore, the benchmark case will fully reflect the real economy situation that is pivotally necessary to make the subsequent simulation scenarios become more significant.

Accordingly, the parameter values of the research model are as the following Table 1. This table shows the parameter values with respect to three main commodity sectors: agriculture, secondary and Services. The parameter in this model is calculated based on actual data of Vietnam, therefore, all values of calculated endogenous variables produced by this model are also realistic.

Table 1. Parameter value

No	Parameter	Agriculture sector	Secondary sector	Services sector
1	ALPHA	0.0692	0.5200	0.4108
2	TETA	0.0000	0.0079	0.9921
3	AY	0.4481	0.2428	0.6314
4	GSAI	0.0295	0.8864	0.0841
5	GAMMA	0.0848	0.4410	0.1710
6	GAMMAD	0.9152	0.5590	0.8290
7	KAPPAE	0.2547	0.3319	0.1611
8	KAPPAD	0.7453	0.6681	0.8389

Furthermore, the good benchmark model should be able to demonstrate the real economic status. In order to achieve that target, there should be as least as possible in the difference between two types of data. As the hereunder table, there are comparative tables of six sectors in Vietnam economy. As can be seen that, there is not much difference between actual data and CGE benchmark model. Therefore, the model can effectively evaluate the effect of changes in macroeconomic policy on the general economy situation.

Finally, the social welfare is calculated based on the equivalent variation (EV) as being showed in the latter part of this study.

Table 2. Comparative table of actual data and benchmark model
Unit: Billion VND

No	Content	Sector	Actual data	Benchmark model
1	Final consumption	Agriculture	57677.8920	57677.8921
		Secondary	433692.0989	433692.1000
		Services	342652.7188	342652.7179
2	Capital income	Agriculture	15886.0000	15886.0000
		Secondary	234652.0000	234651.9999
		Services	193785.0000	193785.0000
3	Labor income	Agriculture	132335.0000	132334.9999
		Secondary	171686.0000	171685.9999
		Services	256505.0000	256505.0000
4	Export	Agriculture	85873.2799	85873.2799
		Secondary	569560.0999	569560.0999
		Services	118259.3999	118259.4000
5	Import	Agriculture	23265.0000	23265.0220
		Secondary	904330.0860	904330.7277
		Services	127036.0000	127035.9899
6	Saving	Private sector	113922.2891	113922.2891
		Gov. sector	49554.5938	49554.5937
		Foreign sector	280938.1875	280938.9596

3.2 Analyzing the impact of production tax on economic values

In order to analyze how the production tax impacts on Vietnam economy, this paper conducts six simulations consist of increase and decrease by 5%, 10% and 20% respectively. For every simulation, the results are presented as following tables.

3.2.1 Effect of change in production tax on household consumption

As seen in the Table 3, if the Government increases current production tax in agriculture by 5%, 10% and 20%, the household consumption on agriculture, secondary and services will reduce by 0.2481%, 0.4969% and 0.9891% respectively. On the other hand, if the production tax rate on agriculture is reduced, the household consumption for these three commodity goods and services and services will increase slightly. More specifically, if the tax rate goes up by 5%, the total consumption for each kind of goods and services among the household sector will be increased by 0.2501%. Besides, for the cases of increase in 10% and 20%, the result should be the increase of 0.5044% and 1.0185% accordingly.

Table 3. The effect of change in production tax on household consumption
Unit: Billion VND

No	Case	Household consumption	Value	Change (%)
1	No change	Agriculture	57677.8920	-
		Secondary	433692.0990	-
		Services	342652.7180	-
2	Increase by 5%	Agriculture	57534.7656	-0.2481%
		Secondary	432615.9015	-0.2481%
		Services	341802.4327	-0.2481%
3	Increase by 10%	Agriculture	57391.2853	-0.4969%
		Secondary	431537.0431	-0.4969%
		Services	340950.0451	-0.4969%
4	Increase by 20%	Agriculture	57107.3900	-0.9891%
		Secondary	429402.3757	-0.9891%
		Services	339263.4809	-0.9891%
5	Decrease by 5%	Agriculture	57822.1626	0.2501%
		Secondary	434776.8998	0.2501%
		Services	343509.8006	0.2501%
6	Decrease by 10%	Agriculture	57968.8099	0.5044%
		Secondary	435879.5718	0.5044%
		Services	344381.0029	0.5044%
7	Decrease by 20%	Agriculture	58265.3305	1.0185%
		Secondary	438109.1719	1.0185%
		Services	346142.5718	1.0185%

These results assume the situation that in Vietnam, if the agriculture tax rate increases or decreases, the household sides will decide to decrease or increase their consumption. Not only the directions but also the values of consumption amount should be taken into account. Accordingly, Vietnamese households adjust their expenditures by a small or large amount in respective with the small or large tax rate.

3.2.2 Effect of change in production tax on international trade activities

According to this CGE, the change in production tax rate of agriculture should have a real effect on international trade activities. There are extremely clear trends of increasing and decreasing international trade when changing the agricultural production tax rate. As showed in Tables 4 and 5, the export and import values of agriculture, secondary and services will increase in value if the government decreases the tax rate. Specifically, the 10% decrease of agriculture production tax rate is responsible for an increase in services importing sector from 118259 billion VND to 127598 billion VND (the change of 0.3%). Additionally, the inversed result can be found if the production tax rate in this sector increases by 5%, 10% or 20%.

Table 4. The effect of change in production tax on export value
Unit: Billion VND

No	Case	Sector	Export	
			Value	Change (%)
1	No change	Agriculture	85873.2800	-
		Secondary	569560.1000	-
		Services	118259.4000	-
2	Increase by 5%	Agriculture	85815.6952	-0.0671%
		Secondary	569226.0865	-0.0586%
		Services	118096.8489	-0.1375%
3	Increase by 10%	Agriculture	85757.7582	-0.1345%
		Secondary	568891.1563	-0.1174%
		Services	117933.7815	-0.2753%
4	Increase by 20%	Agriculture	85644.0720	-0.2669%
		Secondary	568228.4517	-0.2338%
		Services	117611.1288	-0.5482%
5	Decrease by 5%	Agriculture	85931.6789	0.0680%
		Secondary	569896.8099	0.0591%
		Services	118423.2558	0.1386%
6	Decrease by 10%	Agriculture	85991.8810	0.1381%
		Secondary	570239.1317	0.1192%
		Services	118589.9234	0.2795%
7	Decrease by 20%	Agriculture	86114.5787	0.2810%
		Secondary	570931.3113	0.2407%
		Services	118926.9260	0.5645%

Table 5. The effect of change in production tax on import value
Unit: Billion VND

No	Case	Sector	Import	
			Value	Change (%)
1	No change	Agriculture	23265.0000	-
		Secondary	904330.0860	-
		Services	127036.0000	-
2	Increase by 5%	Agriculture	23203.2852	-0.2653%
		Secondary	902146.8983	-0.2414%
		Services	126759.4592	-0.2177%
3	Increase by 10%	Agriculture	23141.3353	-0.5315%
		Secondary	899957.0750	-0.4836%
		Services	126482.0503	-0.4361%
4	Increase by 20%	Agriculture	23018.7583	-1.0584%
		Secondary	895624.2145	-0.9627%
		Services	125933.1560	-0.8681%
5	Decrease by 5%	Agriculture	23327.2512	0.2676%
		Secondary	906532.1868	0.2435%
		Services	127314.74016	0.2194%
6	Decrease by 10%	Agriculture	23390.5705	0.5397%
		Secondary	908770.3377	0.4910%
		Services	127598.2738	0.4426%
7	Decrease by 20%	Agriculture	23518.5959	1.0900%
		Secondary	913295.9097	0.9914%
		Services	128171.5799	0.8939%

3.2.3 Effect of change in production tax on production factors

Since there are changes in term of production tax rate in agriculture, according to the CGE model, the production factors including capital and labor are also affected. More specifically, if the tax rate in agriculture is increased by 5%, there will be a deduction of 0.359% in labor income and capital income in the agriculture sector. On the other hand, if this tax rate is reduced by 5%, there will be another increase of 0.3618% in these production factors. Then, for the case of increasing and decreasing the agriculture production tax rate of 20%, the income of the main production factors will go down and up by almost 1% respectively. There are very similar direction of results can be found in the other cases of simulations (as can be seen in Table 6).

Table 6. The effect of change in production tax on production factors
Unit: Billion VND

No	Case	Sector	Capital income		Labor income	
			Value	Change (%)	Value	Change (%)
1	No change	Agriculture	15886.0000	-	132335.0000	-
		Secondary	234652.0000	-	171686.0000	-
		Services	193785.0000	-	256505.0000	-
2	Increase by 5%	Agriculture	15828.9730	-0.3590%	131859.9488	-0.3590%
		Secondary	234085.3490	-0.2415%	171271.4029	-0.2415%
		Services	193363.1707	-0.2177%	255946.6424	-0.2177%
3	Increase by 10%	Agriculture	15771.9078	-0.7182%	131384.5789	-0.7182%
		Secondary	233517.1427	-0.4836%	170855.6678	-0.4836%
		Services	192940.0018	-0.4360%	255386.5116	-0.4360%
4	Increase by 20%	Agriculture	15658.9977	-1.4289%	130444.0051	-1.4289%
		Secondary	232392.8700	-0.9628%	170033.0800	-0.9628%
		Services	192102.6998	-0.8681%	254278.2104	-0.8681%
5	Decrease by 5%	Agriculture	15943.4707	0.3618%	132813.7476	0.3618%
		Secondary	235223.2255	0.2434%	172103.9441	0.2434%
		Services	194210.2151	0.2194%	257067.8392	0.2194%
6	Decrease by 10%	Agriculture	16001.7954	0.7289%	133299.6090	0.7289%
		Secondary	235803.9716	0.4909%	172528.8541	0.4909%
		Services	194642.7268	0.4426%	257640.3367	0.4426%
7	Decrease by 20%	Agriculture	16119.7252	1.4713%	134281.9988	1.4713%
		Secondary	236978.2483	0.9914%	173388.0280	0.9914%
		Services	195517.2674	0.8939%	258797.9291	0.8939%

3.2.4 Effect of change in production tax on income tax (tax from household)

Table 7 shows the result of six simulations in term of income tax value. The third column presents the total value of production tax rate in accordance with six simulations; the fourth column shows the income value that Vietnamese government can collect from the residents. We can observe opposite directions between the production and income tax amounts.

In the relevant authorities decide to raise the tax rate on agriculture by 5%, 10% or 20%, the respective income tax rate will be reduced by 0.2481%, 0.4969% or 0.9891% in return. Nevertheless, there will be numbers of 0.2501%, 0.5044% and 1.0185% increase in income tax if the production tax rate on agriculture goes down by 5%, 10% and 20%. The detail of these results is stated in hereafter table.

3.2.5 Effect of change in production tax on national savings

As mentioned before, Table 8 illustrates the value of the impact of production tax rate on agriculture on the saving situation of the country as the whole. In general, the private sectors have a tendency to increase their

savings regardless of the change in agricultural production tax rate. In contrast, according to the model, the foreign sector will decrease their saving if Government decides to increase the production tax on agriculture and vice versa.

As we can observe, if the production tax on agriculture increases by 5%, the saving from the private sector will go up by 5.7% to reach 120461 billion VND and the foreign sector will go down by 0.7% until 278971 billion VND.

Table 7. The effect of change in production tax on income tax (household tax)
Unit: Billion VND

No	Case	Production tax value	Income tax value	Change (%)
1	No change	69906.4200	56904.0000	-
2	Increase by 5%	70158.7429	56762.7938	-0.2481%
3	Increase by 10%	70409.8805	56621.2387	-0.4969%
4	Increase by 20%	70910.5079	56341.1526	-0.9891%
5	Decrease by 5%	69653.5852	57046.3347	0.2501%
6	Decrease by 10%	69400.7773	57191.0144	0.5044%
7	Decrease by 20%	68893.4299	57483.5565	1.0185%

Table 8. The effect of change in production tax on savings
Unit: Billion VND

No	Case	Saving	Value	Change (%)
1	No change	Private sector	113922.2910	-
		Foreign sector	280938.2000	-
2	Increase by 5%	Private sector	120461.2346	5.7398%
		Foreign sector	278971.0120	-0.7002%
3	Increase by 10%	Private sector	120160.8281	5.4761%
		Foreign sector	276997.7645	-1.4026%
4	Increase by 20%	Private sector	119566.4332	4.9544%
		Foreign sector	273092.4762	-2.7927%
5	Decrease by 5%	Private sector	121062.9613	6.2680%
		Foreign sector	282922.4335	0.7063%
6	Decrease by 10%	Private sector	121369.9987	6.5375%
		Foreign sector	284938.2458	1.4238%
7	Decrease by 20%	Private sector	121990.8274	7.0825%
		Foreign sector	289013.2695	2.8743%

3.2.6 Effect of change in production tax on social welfare

Lastly and importantly, the effect of tax rate fluctuation should be evaluated by calculating the social welfare as well as the value of government deficit. In this CGE model, this paper uses an equivalent variation (EV) to identify the social welfare of the whole economy after changing the tax rate. Besides, government deficit should be also considered in this paper. If the government decides to increase the tax rate, it means that the government can collect more money and deficit should be decreased, in this case; the negative value in government deficit can be observed. In contrast, the inversed result should be found if the relevant authorities applies lower production tax rate in the agriculture sector. In general, it can be seen in Vietnam case that the increase in production tax rate will be associated with the decrease in social welfare and government deficit. In contrast, increasing trends of social welfare and government deficit will be observed in the case of decrease in agriculture production tax rate.

As can be observed in Table 9, if the tax rate goes up by 5%, the social welfare will face with a loss of 1918.7047 billion VND, while the government surplus will increase 111.11687 billion VND. For the largest

amount of tax rate decrease in this study of 20%, the social welfare will gain of 7874.9939 billion VND and the government deficit also goes up to 433.4336 billion VND. In contrast, a loss of 414.7848 billion VND in social welfare and 1328.3550 billion VND will be resulted if there is a increase of 20% in agriculture production tax rate. These results imply that the economic society is going to suffer from changes in the production tax rate, especially when the government budget is surplus.

Table 9. The effect of change in production tax on social welfare and government deficit
Unit: Billion VND

No	Case	Production tax value	Social welfare	Government deficit
1	No change	69906.4200	0	0
2	Increase by 5%	70158.7429	-1918.7047	-111.1168
3	Increase by 10%	70409.8805	-3842.1516	-220.6991
4	Increase by 20%	70910.5079	-414.7848	-1328.3550
5	Decrease by 5%	69653.5852	1934.0396	110.5000
6	Decrease by 10%	69400.7773	3899.9427	218.6282
7	Decrease by 20%	68893.4299	7874.9939	433.4336

4 Conclusion

This paper studies the effect of changes in production tax rate on agriculture sector on all Vietnamese economic sectors. With adapting six simulation cases of changing tax rate by increasing or decreasing 5%, 10% and 20%, there are many results could be found. Initially, from this CGE model, we can find out that there are negative relations between the household consumption, international trade, capital requirement, labor requirement, income tax, saving from the foreign sector and the production tax rate on agriculture. Additionally, the private sector intends to increase their saving no matter how the agricultural production tax rate changes.

This CGE model also finds out that while this production tax rate expansion policy makes some improvements in social welfare, it also causes some deficit in government deficits. However, as we can observe from modeling results, this policy (increasing the production tax rate on agriculture sector) has positive effects on economic efficiency with six times as much as the loss. In more detail, if the tax rate reduces by 20% (the total amount of production tax shown in SAM table will decrease from 69906 billion VND to 68893 billion VND), the highest Vietnamese social welfare can be obtained with a value of 7875 billion VND and the government deficit also increase by 433 billion VND. Additionally, if the tax rate increases by 10%, while the government surplus goes up of 220.6991 billion VND, the total social welfare in this economy will be decreased by 3842.1516 billion VND. This implies that the government should consider imposing the policy whether or not increase or decrease the production tax rate. A social welfare benefit enhances the tax reform (decreasing production tax rate on agriculture sector).

This study assumes that the total government expenditure is stable despite the fact that the production tax rate changes. More importantly, this paper only plays a focus on the effect of the tax in agriculture sector on the whole economy without considering any further policies may be applied. To sum up, any changes in agricultural production tax rate should have resulted in the fluctuation in other economic values.

Although this paper conducts a CGE model based on Vietnamese input-output table, is can be applied in other countries also in order to investigate the effect of the agriculture production tax rate policy on the whole economy. With the consideration of budget and production constraints within a computable general equilibrium model, this paper emphasizes the important role of governmental budget constraint since conducting some simulations on tax changes.

Competing Interests

Author has declared that no competing interests exist.

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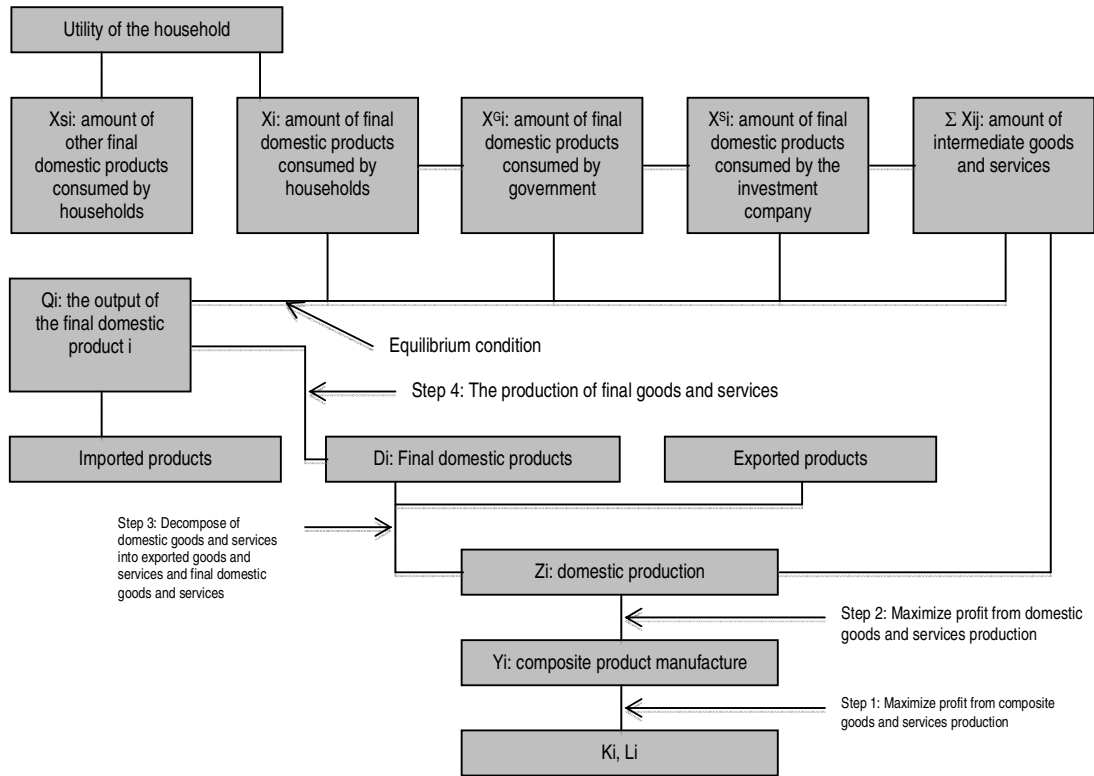
Appendix 1

Social Accounting Matrix (SAM) of Vietnam in 2007

Content	Agri.	Secondary	Services (11-15)	Capital (25)	Labor (23)	Prod. tax	Tariff	Final cons (HH)	Final cons (Gov.)	Final cons (Invest)	Foreign Sector	Total
Agri. (1)	60414.777	124482.268	18802.800					57677.892	0.000	13125.962	85873.280	360377
Secondary (2-10)	102239.59	985852.992	134418.000					433692.099	610.664	393926.547	569560.100	2620300
Services (11-15)	19902.290	156552.061	109596.000					342652.718	76645.162	37362.573	118259.400	860970
Capital (25)	15886.000	234652.000	193785.000									444323
Labor (23)	132335.00	171686.000	256505.000									560526
Tax (Prod. tax 17+24)	6334.341	42744.679	20827.400									69906
Tax (Tariff)	0.000	0.000	0.000									0
Final cons (Household)				444323	560526							1004849
Final cons (Gov.)						69906.420	0.000	56904.000				126810
Final cons (Invest.)								113922.291	49554.594		280938.200	444415
Foreign sector (29)	23265.000	904330.086	127036.000									1054631
Total	360377	2620300	860970	444323	560526	69906	0	1004849	126810	444415	1054631	

Appendix 2

General description of economy



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