The Effects of Rice Export Policy on Regional Income, Prices and the Poor: A 'Bottom-up' Regional CGE model for Vietnam

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Abstract: A 'bottom up' regional CGE model for Vietnam is constructed for 28 commodities and 8 regions (using a GSO input-output table for 2005). The model is used to analyze the recent dramatic increases in the world price of rice on the regional economy of Vietnam, and the Vietnamese policy response to limit exports. Although results show limited 'pro-poor' outcomes, the CGE model and a micro-simulation (using 2006 VHLSS data) show that recent rice export quotas resulted in falls total rural savings as measured by the difference in total income less total production cost and consumption of rice.

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1. Introduction

The year 2008 witnessed rapid increases in the prices of many commodities in the world, including dramatic increases in the price of rice. Rising from US$ 400 per ton in January 2008 to roughly US$ 1000 per ton in May 2008, movements in international rice prices caused considerable concern in both import and export countries. Some rice exporters, including Vietnam, placed an export ban on rice to ensure continued low domestic prices for rice and domestic food security.

As the second biggest rice exporter in the world, an increase in world rice prices is potentially beneficial to Vietnam. However, rice also plays an important role in the living standards of Vietnamese households, both as producers and consumers. Rice contributes nearly 69 percent of calorie intake in Vietnam as a whole, and 71 percent in rural areas and 61 percent in urban areas (Vu and Glewwe, 2008). On the other hand, half of the households produce rice (Vu and Glewwe, 2008), which makes it hard to generalize on the relative benefits of increases in the price of rice. Net producers clearly benefit, but those that mostly consume rice are worse off.

The rice export ban applied in Vietnam generated considerable debate among various stakeholders. We contribute to this debate by simulating the export ban together with three other policy scenarios in a 'bottom-up' eight-region Computable General Equilibrium Model (CGE) model of Vietnam, with data from the 2005 GSO input-output table. We then simulate the results on individual households using the 2006 Vietnamese Household Living Standard Survey (VHLSS 2006). Our results show that although there were limited 'pro-poor' outcomes, the overall effect of the rice export quotas resulted in falls total rural savings as measured by the difference in total income less total production cost and consumption of rice.

The structure of the paper is as follows. Section 2 provides the background and reviews existing studies in Vietnam that have tried to estimate the welfare impact of government policies in rice market. Section 3 describes the methods and data. The results from the CGE model and micro-simulation on household data are discussed in section 4. Section 5 offer concluding remarks.

Background

Vietnam has made remarkable progress in the rice production in the last thirty years, moving from being a large importer of rice from 1976-80, to now the second largest exporter of rice in the world. About 7.5 million hectares of land is under rice cultivation, producing approximately 39 million tonnes a year. More than 50% of the rice output is produced by the Mekong River Delta and more than 90% of exported rice comes from this region. As recent as the year 2008, Vietnam rice exports reached 5 million tonnes of rice with export revenue of about 3 billion USD, contributing roughly 3 per cent to the GDP of Vietnam.

There have been many policy changes over the last thirty years in the rice sector. Most important are the pervasive land and market reforms in agriculture, which moved the system of rice production from commune-based public ownership and control to one with effective private property rights over land and farm assets, competitive domestic markets and individual decision making over a wide range of agricultural activities (Kompas et al. 2009). The outstanding successes in increasing rice production aside, the Vietnamese rice market is characterized by many constraints and concerns. Paddy markets, for example, especially between the North and the South, are not fully integrated (Baulch et al, 2008). Although the strict quota regime on rice export was removed in 2001, the government still monitors rice exports by setting the export target for each year based on the production of the previous year, with adjustment if needed during the year. There are also a number of bureaucratic procedures that export enterprises need to go through in order to export rice, such as receiving price approval from the Vietnam Food Association on export prices on all export contracts.

In the year 2008, the Vietnamese government faced a significant challenge to its practice of monitoring and controlling rice exports. With rapid increases in international rice prices from US$ 400 in January 2008 to roughly US$ 600 in March, and an overall high inflation rate in the domestic economy for food prices (18.9 percent in 2007 and 14.5 percent in the first three months of 2008), the Government of Vietnam banned the signing of new export contracts from the 25th March until the

end of May 2008. In addition, in July 21, 2008, an export tax was imposed on rice sold at $800 a tonne or more. When the tax went into effect on Aug. 15, prices for Vietnamese ‘5% broken rice’, the highest quality grain among the country's common grades for export, had fallen to $550 per tonne, free-on-board basis. The export tax was subsequently abolished on December 19, 2008 to help boost domestic supply.

A temporarily ban on rice exports versus full trade liberalization generates an essential trade-off. On one hand, liberalization leads to further increases in domestic rice prices, which result in increases in input costs for all producers since wages, especially unskilled labour and labour involved in small manufacturing, are often correlated with the price of rice. The cost of rice to consumers also increases, of course. On the other hand, increases in rice prices increase profits for net rice producers, many of whom are the poor. As seen in Figure 1 much of the potential gain from the rice price surge was foregone as the ban on export was in effect from March until the end of May 2008.

A number of researchers have explored the impact of trade liberalization in the rice sector on household welfare. Minot and Goletti (1998) use an aggregate multi-market spatial equilibrium model, which employs data from the International Food Policy Research Institute surveys in 1994-1995, in combination with the survey data from the 1992/1993 Vietnamese Living Standard Survey, to show that although rice export liberalization would increase rice prices and exacerbate regional inequality, it would also increase average real income and slightly reduce the incidence and severity of poverty. Nielson (2003) uses a General Trade Policy Analysis Project (GTAP) model, with data from the Vietnam Input Output Table 1997, and shows that an export quota has been a binding and restrictive policy that has kept both Vietnamese rice production and exports well below their maximum potential amounts.

Although the rice export quota has been removed since 2001, we are not aware of any published studies that measure the effect of export policy in Vietnam and its welfare impact on households, apart from our study. Most of the studies on impact of trade liberalization focus on Vietnam’s trade agreements and accession to the World Trade Organization. Using a ‘bottom-up’ eight-region Computable General Equilibrium Model (CGE) with data from the input output table for the year 2005, we simulate the

impact of an export ban, with and without full rice domestic market integration, together with two other policy scenarios, which include free trade and a trade tariff. We then use those results generated from the CGE model and combine them with the 2006 Vietnamese Household Living Standard Survey (VHLSS2006) to simulate and measure the welfare impact of those policy scenarios on households who are both rice producers and consumers.

2. Methodology

2.1 'Bottom-up' Regional CGE model for Vietnam

The 'bottom-up' multi-regional General Equilibrium Model (CGE) for Vietnamese economy used in this paper is based on an ORANI model for Australian Economy (Horridge 2003). To have 'bottom-up' and multi-regional characteristics, the General Equilibrium Model for Vietnamese economy is a combination of eight ORANI models (representing 8 regions in Vietnam), with full regional dimension.

The model has 28 industries (*I*) which produce 28 commodities (*C*) (see the Appendix); 8 regions (*R*) with four sectors, which include households (urban and rural), the government, investors and the foreign sector (exports and imports). Labour is classified as skilled and unskilled labour. The taxes in the model are comprised of excise, value-added taxes and duties. The margins include wholesale and retail charges and transportation charges.

The model has seven structural equations. The production equation is assumed to exhibit a Constant Elasticity of Substitution (CES) specification in labour (CES in skilled and unskilled), land and capital to generate Primary Inputs; CES in goods from regions to generate Intermediate Products; and Leontief in Intermediate Products and Primary Factors to generate output. We assume that this is short-run model with fixed capital stocks as our analysis focuses on the short-run impact of the temporary rice export ban.

The household demand equation is also CES in two composite commodities, made up of two sets of 28 goods from each region and final consumption goods, taken separately, and combined as Stone-Geary in utility. Parameter values for household

demand are drawn from the Vietnamese Monash (VIPAG) model. The investment demand equation is CES in two composite commodities and combined as Leontief in capital good outputs (see Appendix 4). Export demand is assumed to be specified as follows:

$$Export(C,R) = QF(C,R)\left[\frac{P(C,R)}{e * PF(C,R)}\right]^{EXP\_ELAST(C,R)}$$

where *Export* is the real export volume of good *C* in region *R*; *QF* and *PF* are the quantity and price shift parameters of good *C* in region *R*; *P* is the export price; *EXP_ELAST(c,r)* is the elasticity of export demand of good *C* in region *R*; and *e* is the exchange rate. For the export demand schedule to be downward slopping, *EXP_ELAST(c,r)* must be negative in the model.

Government expenditure and composition is held fixed as is the demand for inventories. Margins (with the exception of inventory demand) are given and the usual market clearing conditions are imposed.

2.2. Micro-simulation

As the household can be a consumer or producer of rice, or both, any change in the price of rice affects not only consumption but also income and production. To measure the impact of various policy scenarios, we use a metric of 'rice household savings' from rice production as an indicator of the household welfare, given by the difference between revenue and the cost of rice production, less the consumption of rice. All terms are in values. Household savings before the price shock is used as the benchmark and compared across all policy scenarios modelled in the CGE framework. The household is considered to be 'better off' if it has more savings after a resulting price shock.

2.3. Data

This paper uses the 8-region Inter-regional Input Output table (2005) for Vietnam's economy (VIRIO 2005) to construct the CGE model. It covers eight regions including the Red River Delta, the North East, the North West, the North Central, the South Central, the Central Highlands, the Southeast, and the Mekong Delta. The VIRIO (2005) has 28 industries (*I*) which produce 28 commodities (*C*) which include Paddy,

Other crops, Livestock and Poultry, Forestry, Fish Farming, Fisheries, Oil and Gas, Mining, Processed Seafood, Processed Rice, Other Agricultural Processing, Textiles, Paper, Wood, Rubber, Non-Metallic Mineral Products, Transport Equipment, Metal Products, Other Manufacturing, Electricity and Water, Construction, Transport (Margin), Communication, Trade (Margin), Financial services, Public Administration, Hotels and Restaurants, and Other Services.

For the simulation exercise, the Vietnam Household Living Standard Survey in 2006 (VHLSS 2006) is used to simulate various shocks generated from the Computable General Equilibrium Model (CGE model). There are two reasons for choosing the 2006 VHLSS for this micro simulation exercise. First, this is the latest Household Living Standard Survey. Second, the survey time, which was in May and September of 2006, is the closest to the time frame of the Intra-regional Input Output Tables 2005 (IO Tables 2005) for Vietnam, also the latest or most recent IO Tables. There is thus strong comparability between the macro and micro data.

The 2006 VHLSS was carried out by the General Statistics Office in Vietnam. The sample of 2006 VHLSS was selected to represent the whole country (urban/rural), 8 regions (urban/rural), and provinces and cities. A total of 45,945 household interviews were conducted for the 2006 VHLSS, and income and expenditure data were gathered for 9,189 of them, or roughly 0.05 per cent of all households in Vietnam (GSO 2006). This paper relies on income and expenditure data of these 9,189 households as the income data of the remaining households is not yet released to public. In this report, we use the term ‘2006 VHLSS’ to refer to the sample of 9,189 households.

2.4. Policy scenario design

The key exogenous shock in the model is a 30 percent increase in rice export prices as the result of an upward shift of the world demand schedule for rice. This roughly corresponds to the movement in world rice prices. Four policy scenarios are implemented to trace the effect of the shock and its impact on Vietnam’s economy. In the first scenario, Vietnam allows free exports so the domestic prices go up in parallel with the world price. In the second scenario, Vietnam sets an administrative rice export limit, banning all additional rice exports for a certain date, which helps control

the increase in domestic prices. This was the actual policy action taken by the Government of Vietnam in March 2008.

The third policy scenario is trade but with export limits. In this case, the government fails to keep the domestic rice price low as the market is not fully integrated and rice from surplus areas does not reach the areas with supply shortages. This scenario is designed as having an administrative rice export limit and a producer tax of 15 per cent. In a sense, this is case closest to reality as the Government of Vietnam banned the export of rice for a few months and, since the Vietnamese domestic market is fragmented, rice did not shift from the rice-surplus region of the Mekong River Delta to other regions. The last scenario is the case where the Government of Vietnam imposes a 5 percent tariff on rice exports.

3. Results and discussion

3.1 Model results

At the national level, the increase in international rice price does not have a large impact on GDP in the Vietnamese economy (see Table 1), with the change in GDP ranging from a reduction of 0.37 percent under the scenario of export limits and producer tax to an increase of 0.6 percent under the scenario of export limits alone. The free trade scenario results in a marginal reduction of 0.06 percent of GDP while the tariff leads to as small 0.01 percent increase in GDP. Despite the fact that the economy gains from higher price on its rice export, the surge in the domestic price of rice has the effect of increasing the domestic cost of production, since wages (correlated with the price of rice) also increase.

Table 1: GDP growth under different scenarios (percentage change)

	Free trade	Export limit	Export limit & producer tax 15 %	Export Tariff 5%
Country GDP growth	-0.06	0.6	-0.37	0.01

At the sub-national level, exports expand substantially under free trade and export tariffs, while the domestic price varies under different scenarios. As seen in Table 2, the domestic price of rice rises highest in the case of free trade, followed by the case of an export tariff. The objective of controlling the domestic price by the Government

of Vietnam can be best achieved in the case of export limit. However, as the domestic market is likely fragmented (see Baulch et al., 2007), the scenario of export limit and producer tax is more likely to occur.

Table 2: Percentage Change in Regional Domestic Rice Prices by Scenario

Regions	Free trade	Export limit	Export limit & producer tax 15 %	Export Tariff 5%
Red River Delta	27.64	-7.32	12.32	21.58
North East	23.94	-4.70	13.62	18.06
North West	26.10	-4.02	13.68	20.93
North Central Coast	26.16	-4.45	13.57	20.21
South Central Coast	24.52	-4.14	13.84	18.64
Central Highland	26.78	-5.15	12.70	21.69
South East	32.02	-18.27	6.49	25.75
Mekong River Delta	34.24	-16.8	6.41	27.97

The gain in regional GDP from the international rice price surge does not spread evenly across the regions (see Table 3). The Mekong River Delta ranks the first in benefiting from the rice price rise with its GDP increasing most, or shrinking least in all scenarios. Despite being the country's second largest rice producer, the South East region does not have a comparative advantage in rice production, and higher rice prices do not affect this region greatly. Among the policy scenarios, an export tariff appears to be the least distorting with regional GDP growth moving in line with the case of free trade. The export limit and producer tax hurts all regions while the export limit narrows the regional gap in GDP growth, harming mostly the Mekong River Delta and favouring the North West, Central Highlands and South East regions.

Table 3: Regional effect of price change on GDP by scenario (percentage change)

Regions	Free trade	Export limit	Export limit & producer tax 15 %	Export Tariff 5%
Red River Delta	0.05	0.41	-0.62	0.06
North East	-0.25	0.26	-0.72	-0.22
North West	-0.91	0.78	-0.89	-0.72
North Central Coast	0.12	0.29	-0.59	0.1
South Central Coast	-0.25	0.15	-0.56	-0.18
Central Highland	-1.3	0.82	-0.54	-1.06

South East	-0.88	0.6	-0.22	-0.66
Mekong River Delta	2.17	1.07	-0.18	1.96

The sub-national distribution pattern can be explained by two main regional features. First, is the share of paddy and processed rice in regional GDP. As seen in Figure 2, all regions except the Northwest and Central Highlands 'export' rice, with the Mekong Delta by far the largest international exporter. While the Red River Delta and the North Central Coast regions also substantially benefit from the rice price increase, the South East region is worse off as its paddy and processed rice share in its GDP is the lowest among all regions.

Second, the industrial employment structure also matters (see tables 4a and 4b). Because the wage rate in the model is indexed with the consumer price index, the nominal wage increases in all regions with an increase in the price of rice. Therefore, industries with higher output prices such as Paddy, Processed Rice, or Live Poultry can increase labour employment and hence achieve higher output. On the other hand, regions with a lower share of those industries will have lower average labour employment.

Table 4a: The Effect of a Rice Price Increase on Regional Wages by Scenario (percentage change)

Regions	Free trade	Export limit	Export limit & producer tax 15%	Export Tariff 5%
Red River Delta	4.93	-1.06	0.99	3.91
North East	4.74	-1.26	1.17	3.68
North West	6.5	-1.9	1.59	5.25
North Central Coast	5.12	-1.09	1.1	4.05
South Central Coast	3.17	-0.43	0.95	2.44
Central Highland	4.5	-1.6	0.82	3.68
South East	2.31	-0.91	0.36	1.87
Mekong River Delta	8.37	-1.33	0.75	6.91

Table 4b: The Effect of a Rice Price Increase on Regional Employment by Scenario (percentage change)

Regions	Free trade		Export limit		Export limit & producer tax 15%		Export Tariff 5%	
	Skilled	Unskilled	Skilled	Unskilled	Skilled	Unskilled	Skilled	Unskilled
Red River Delta	-0.75	1.44	0.63	0.58	-0.83	-0.93	-0.61	1.17
North East	-0.92	0.31	0.41	0.34	-0.88	-1.05	-0.76	0.22
North West	-1.91	-0.84	1.06	1.13	-1.06	-1.19	-1.54	-0.66
North Central Coast	-0.45	1.06	0.4	0.4	-0.73	-0.86	-0.38	0.85
South Central Coast	-0.69	0.33	0.22	0.19	-0.76	-0.8	-0.54	0.26
Central Highland	-1.8	-1.53	1.04	1.2	-0.67	-0.74	-1.47	-1.25
South East	-1.5	-1.31	0.99	1.02	-0.36	-0.37	-1.21	-1.05
Mekong River Delta	2.16	5.17	1.56	1.73	-0.34	-0.28	1.84	4.34

Despite the gain in output price, rural households suffer more than urban households in terms of consumer price changes in all scenarios except the second, where the domestic price of rice does not move with international prices (see Table 5). Furthermore, in all cases, when the domestic price of rice is higher, the North West regional households have to buy a more expensive consumption bundle (with higher rice prices) than other regions. This is because North West is a remote region. Higher margin costs (trade and transportation) are thus applied to consumption goods in the region. Compared with the growth in GDP, in Table 5, we can see that households, in particular rural households, suffer in all cases except when government intervention can prevent the domestic price of rice from increasing in line with international prices.

Table 5: The Effect of a Rice Price Increase on the CPI by Scenario, Urban and Rural (percentage change)

	Free trade		Export limit		Export limit & producer tax 15%		Export Tariff 5%	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Red River Delta	3.14	5.48	-0.87	-1.66	0.92	1.79	2.49	4.34
North East	3.27	5.39	-0.96	-1.64	1.05	1.95	2.54	4.2
North West	4.58	7.83	-1.5	-2.71	1.34	2.43	3.69	6.31
North Central	3.29	5.19	-0.84	-1.43	0.96	1.69	2.6	4.1

Coast								
South Central Coast	2.22	3.9	-0.36	-0.66	0.85	1.76	1.72	3
Central Highland	3.61	6.42	-1.4	-2.65	0.77	1.46	2.94	5.24
South East	2.16	4.44	-0.93	-2.2	0.37	0.83	1.75	3.59
Mekong River Delta	4.17	6.78	-1.29	-2.58	0.56	1.05	3.44	5.57

3.2 Micro-simulation results:

For the micro-simulation results, household savings under the four policy scenarios are compared with the benchmark, which is household savings before the shock. This is a short run analysis, where it is assumed that there is no change in both supply and demand due to price changes.

Figure 3 represents the proportion of households 'better off' by under the four scenarios by quintile and urban-rural. 'Better-off' simply means more saving per person (i.e., it could be as little as 1 VND or more per person). The left panel shows the gain from the increase in rice prices is uniform under the free trade and export tariff scenario. The export limit appears to be the most 'pro-poor' scenario with more poor than rich people benefitting from the gain. In contrast, the pro-rich pattern is shown under the export limit with producer tax. This also appears to be the worst policy choice as the fewest people can enjoy gains. On the lower panel, rural dwellers are seen better off compared to their urban counterparts in all cases except for the export limit with a producer tax.

Looking at the magnitude of the change in the household yearly savings per capita compared with the benchmark household yearly saving per capita before the shock, the urban dwellers in general also suffer much more than their counterparts in the rural areas under all scenarios. This is expected as most of them are net rice buyers. As seen in Figure 4, which represents the change in household yearly per capita saving by regions for samples in the rural and urban areas, export limits with producer tax hurts all urban and rural areas. Though the export limit has positive effect on all rural and most of the urban areas, its magnitude is relatively small. Free trade is the most beneficial policy measure followed by the export tariff to the rural areas (see Figure 5).

In fact, the urban sample has 49, 32 and 26 per cent of urban households from the poorest, near the poorest and the middle groups, respectively, who have income from planting paddy. The two poorest urban groups have a similar pattern of income with about 35 per cent from wage income and 10 per cent from providing services, 3 per cent from paddy, 4 per cent from other crops and 3 per cent from livestock. These items increased in cost most under the free trade and export tariff scenarios. The middle group earn about 24 per cent income from their business in ferrous metal and other products and 21 per cent from wage, which have their values increase by 2.7 and 5 per cent, respectively under free trade. The near-the-richest group, on the other hand, generates only 18 per cent and 17 per cent income from their business ferrous metal and other products and wage income, respectively. The richest group earned about 59 per cent of their income from their business in non-metallic mineral products, which has a price increase of 3.6% under free trade.

From the consumption side, processed rice accounts about 27 per cent of the poorest group consumption, compared with 19 and 14 per cent, respectively, for the near the poorest and the middle groups in urban areas. In the contrast, the richest group spends only about 5 per cent on rice in their consumption bundle compared with 9 per cent for the near the richest group. This explains why the near the richest group is relatively worst off under free trade, though the magnitude is very small in urban areas. Under the trade limit, the richest group gains least as this group consumes many products which are not reduced much under this scenario such as construction materials, gasoline and restaurants.

For the rural households, as it can be seen in Figure 5 the impacts on per capita saving under free trade and export tariff have the same pattern with smaller magnitude for the latter scenario. It is not surprising to see the Mekong River Delta, which produces about 13 per cent of the paddy and 10 per cent of the processed rice of Vietnam, benefits most under these two scenarios with per capita saving rising by 793,000 VND, per person, in this region, under free trade and 587,000 VND under the export tariff. The change in saving is about 18 times and 12 times larger, depending on the scenario, than the change in savings in the Central Highlands region, the most disadvantaged region under those scenarios. Under the free trade and export tariff

scenarios, the Central Highlands per capita saving falls by 46,000 VND and 40,000 VND, respectively. As the soil in the Central Highlands is more suitable for planting perennial crops, including coffee, pepper, rubber, cashew, tea and cotton, the rural households are more likely net rice buyers compared to other regions in the country. So the higher are rice prices the more disadvantaged the Central Highlands region will be.

Overall, the change in household savings in given in Table 6, where the change in regional savings is the product of the change in rice household savings and the number of households in each region.

Table 6: Change in regional savings by scenarios (USD 1,000)

Region	Free Trade	Export Limit	Export Limit & Producer Tax 15%	Tariff 5%
Red River Delta	123,325.80	30,479.62	-59,552.73	86,705.65
North East	73,796.60	9,543.00	-42,666.89	54,105.23
North West	6,464.83	10,008.17	-11,144.50	1,594.21
North Central Coast	109,427.79	19,168.53	-43,407.58	83,433.51
South Central Coast	31,433.28	3,829.78	-24,905.49	22,211.73
Central Highlands	-12,457.03	23,599.74	-16,013.43	-14,166.94
South East	-24,077.64	30,306.43	-17,654.52	-23,125.55
Mekong River Delta	733,107.58	87,512.81	-47,023.31	537,620.66
Total	**1,041,021.22**	**214,448.09**	**-262,368.45**	**748,378.48**

Source: Own calculation using the 2006 VHLSS, Note: USD = 16,000 VND

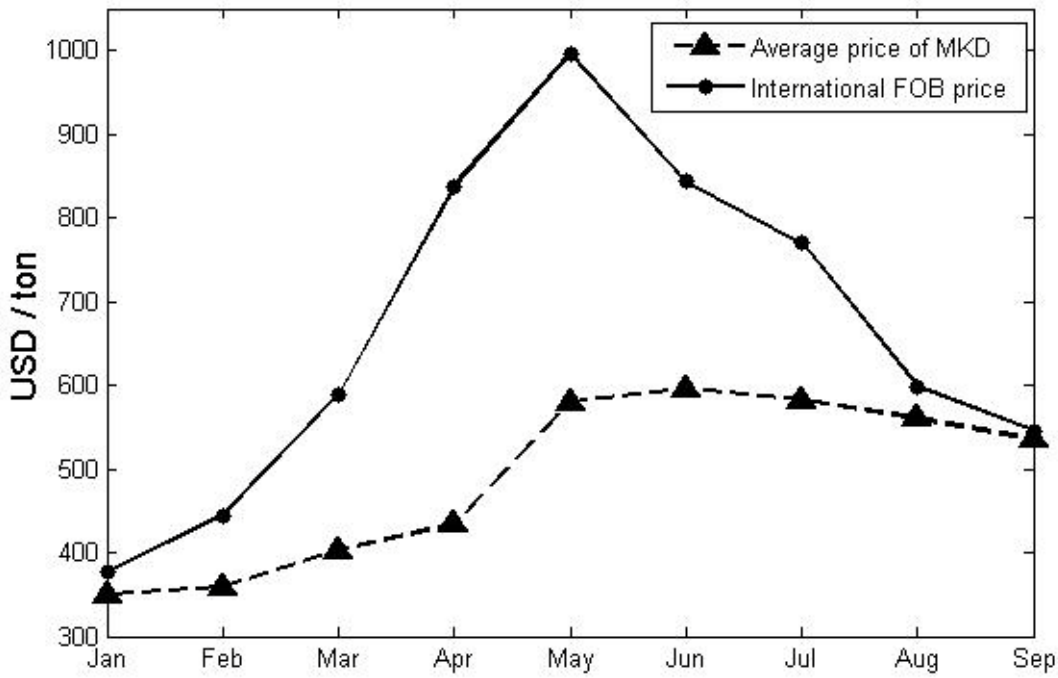
For the whole country, the increase in savings is roughly 1 billion USD under free trade and about 750 million under 5 per cent tariff. In contrast, all regions suffer losses under the export limit and producer tax scenario. Under free trade and tariff, about 70-80 per cent of the gain goes to Mekong River Delta. The South East is the worst off in both cases. Under the export limit and the 15 per cent producer tax, the

Mekong River Delta is harmed the most, followed by the North Central Coast and North East regions.

4. Closing Remarks and Recommendations

Using a 'bottom up' regional CGE model and a micro-simulation of the effect of different rice export policies in Vietnam, this paper analyses the effect of the recent dramatic increases in the world price of rice, and Vietnam's policy response. A number of results are obtained. First, alternative rice export policies have little or no national impact on GDP, but large and differential regional impacts in this model. In general, policies other than increased free trade (of some sort) greatly impact the Mekong River Delta region most in terms of lost profitability. Second, although the long term benefits of free trade in rice exports predominate, depending on the extent of the increase in demand and export prices, CGE results and a micro-simulation show that the recent government policy of limiting exports potentially generates short-run regional benefits that favor 'pro-poor' outcomes and small rural households, in terms of both a lower CPI in rural areas and a larger proportion of individuals made 'better off' (by at least 1 VND, or more). Finally, even in the short run case, measures of average total savings per person, using a VHLSS-Simulation, increase in all regions (except in the Central Highlands) with free trade, or trade with a small export tariff. It is thus clear that although export bans have a limited 'pro-poor' impact, free trade generates the largest increases in welfare, or measures of rice household savings.

Figure 1: Vietnam domestic retail rice price and free-on-board world price (USD/ton)



Sources: Data on retail rice prices of Mekong River Delta from General Statistics Office; Data on free on board rice price of Vietnam from FAOSTAT Database, 2008. FAO, Rome. 22 Sep 2008.

Figure 2: Share of Paddy Production and Rice Processing Industries in Regional GDP (percentage)

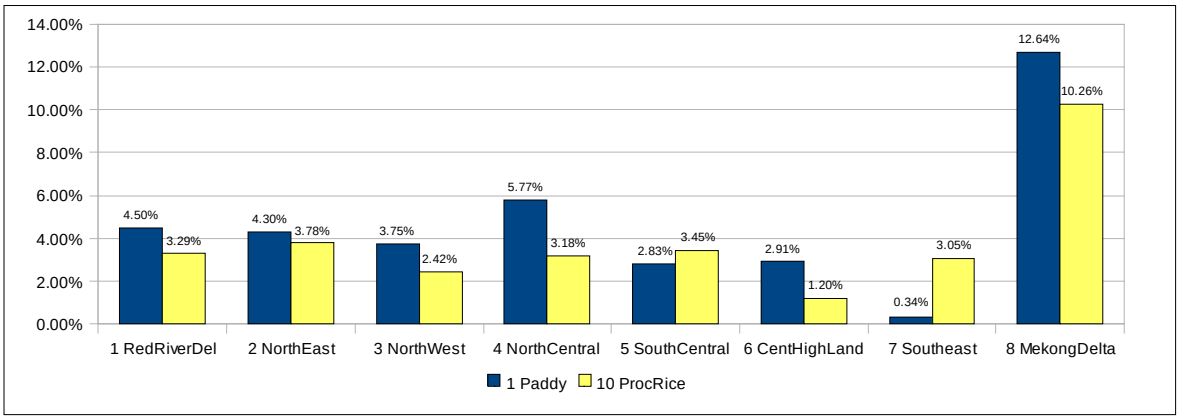
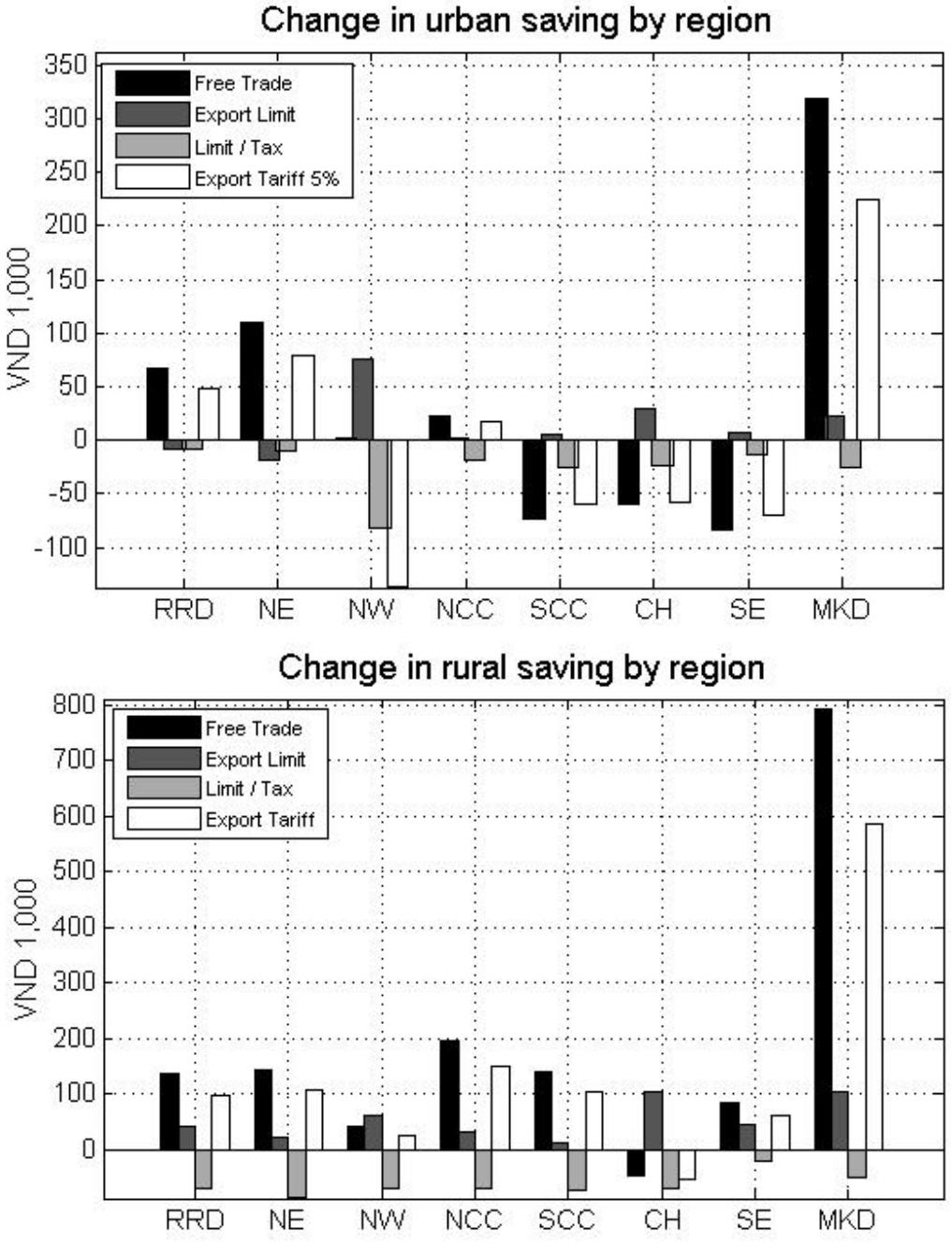
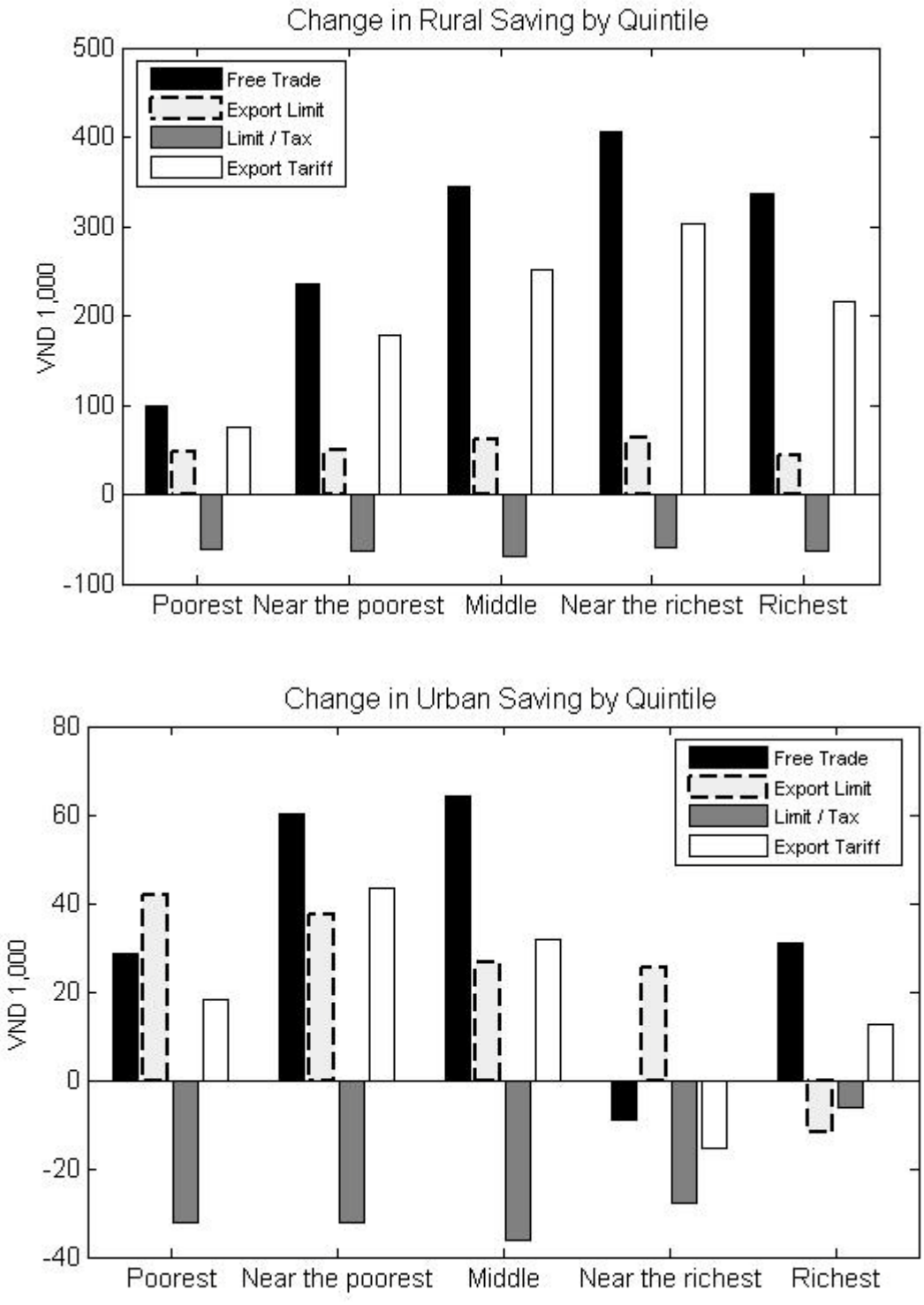


Figure 3: Change in household yearly per capita saving against their benchmarks by regions



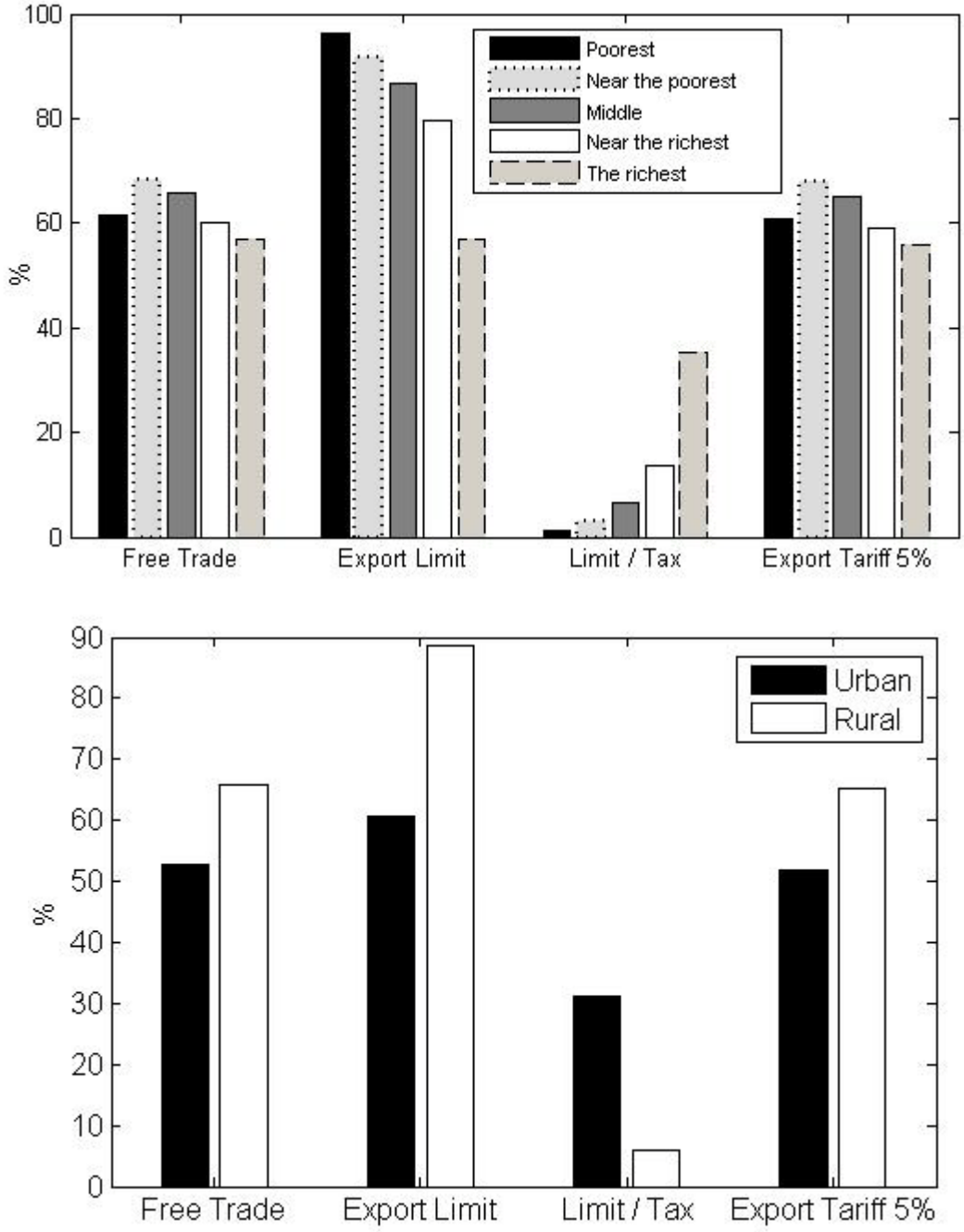
Source: Own calculation using the 2006 VHLSS

Figure 4: Change in household yearly per capita saving against their benchmarks by quintile



Source: Own calculation using the 2006 VHLSS

Figure 5: Proportion of households 'better off' by quintile and urban-rural



Source: Own calculation using the 2006 VHLSS

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Appendix: List of 28 Industries and Commodities

	Industry – Commodity descriptions	Element of set C
1	Paddy	Paddy
2	Other crops	OthCrops
3	Livestocks & Poultry	Liv_Poultry
4	Forestry	Forestry
5	Fish Farming	FishFarming
6	Fishery	Fishery
7	Oil & gas	OilGas
8	Mining	Mining
9	Processed seafood	ProcSeafood
10	Processed Rice	ProcRice
11	Other Agricultural Processing	OthAgriProc
12	Textiles	Textiles
13	Paper	Paper
14	Wood	Wood
15	Rubber	Rubber
16	Non-Metallic Mineral Products	NonMetMin
17	Transport Equipment	TransEquip
18	Metal Products	MetalProd
19	Other Manufacturing	OthManu
20	Electricity & Water	ElecWater
21	Construction	Construction
22	Transport (Margin)	Transport
23	Communication	Communication
24	Trade (Margin)	Trade
25	Financial services	FinServies
26	Public Administration	PublicAdmin
27	Hotels & Restaurants	HotelsRest
28	Other Services	OthServices