Impacts of Rising Food Prices on Poverty and Welfare in Vietnam

Linh Vu and Paul Glewwe

In 2007 and 2008, international prices of rice and other grains sharply increased, raising fears that poor households in developing countries would become poorer. Yet, these fears often ignored that many of these poor households were food producers. This study examines the impact of rising food prices on welfare in Vietnam. Our results show that, overall, higher food prices raised the average Vietnamese household's welfare. However, higher food prices made most households worse off. Average welfare was found to increase because the average welfare loss of households whose welfare declined (net purchasers) was smaller than the average welfare gain of those whose welfare increased (net sellers).

Key Words: food prices, poverty, rice prices, Vietnam, welfare

Introduction

In 2008, world food prices rose sharply; the Food and Agriculture Organization (FAO) food price index increased by 24% and the cereal price index increased by 43%. At their peak in the middle of 2008, international prices of wheat and maize were three times higher than in early 2003, and the price of rice was five times higher (von Braun, 2008). This raised fears that the poor in the developing world could fall deeper into poverty and experience increased malnutrition. These fears often overlooked the fact that most poor households in developing countries are in rural areas and are producers, not just consumers, of food. Thus, the impact of rising food prices on poor households in developing countries depends on those households' characteristics and will vary both across countries and across households within each country. Although food prices fell somewhat since their peak in 2008, food prices in early 2011 are rising and are close to the peak levels of 2008, so there is still an urgent need to assess the impacts of rising food prices on poor, and nonpoor, households in developing countries.

This paper focuses on Vietnam, a poor developing country with a per capita GDP of only $1,051 in 2008. Food prices in Vietnam increased by 18.9% in 2007, and by 32.7% from January to September of 2008 (Vietnam General Statistics Office, 2008b, 2009). Higher food prices may have very large effects on household welfare in Vietnam, since the average Vietnamese household spends about half its income on food. Higher food prices almost always reduce the welfare of urban households because they are net purchasers of food. In contrast, most rural households produce some food items, so the effect of changing food prices on their welfare will depend on whether they are net purchasers or net sellers of food.

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Of particular interest is the impact of food prices on poverty, which is determined by the location of net buyers and net sellers of food in the distribution of income.

Several researchers have studied the impact of higher food prices on poverty and household welfare in low-income countries. Deaton (1989) used nonparametric methods to examine the impact of a hypothetical change in rice prices on Thailand's income distribution and found that higher rice prices benefit all rural households, but especially middle-income households. Ravallion and van der Walle (1991) report that a 10% increase in food prices raised the rate of poverty in Indonesia. Also using nonparametric techniques, Barrett and Dorosh (1996), observed negative impacts of higher rice prices on the welfare of the rural poor in Madagascar because the gains to net rice sellers were concentrated among higher income rice farmers. Ivanic and Martin (2008) examined nine low-income countries and concluded that increased staple food prices would increase poverty in most, but not all, of those countries.

Two recent studies have assessed the effect of food prices on household welfare and poverty in Vietnam. Using data from the 1992–93 Vietnamese Living Standards Survey, Minot and Goletti (2000) estimated that a 10% rise in rice prices would increase the average household's real income, since most Vietnamese households cultivate rice. However, they also note that these higher rice prices would slightly increase the rate of poverty. Ivanic and Martin (2008) examined household surveys conducted in 1998 and 2004, and found that increased commodity prices in Vietnam, particularly rice prices, would have reduced poverty in both 1998 and 2004.

This paper extends these two earlier studies in several ways. First, Minot and Goletti studied only rice and used out-of-date food consumption patterns from the early 1990s, while we study the impacts of both rice prices and overall food prices, using data from 2006. Second, Ivanic and Martin used international food prices to simulate welfare changes in Vietnam, but the impacts of global food price changes may vary across countries due to variation in transport costs, domestic policies, and market structures. Here, we employ domestic, rather than international, prices. Moreover, our approach allows consumer and producer prices to rise at different rates, while Ivanic and Martin assumed that these prices rise at the same rate.

Methods and Data

It is useful to distinguish between food consumption and food purchases, as well as between food production and food sales. In developing countries, many farm households consume only a portion of the food they produce and sell the rest, and they often purchase food items to supplement consumption from their own production. Consequently, there are sizeable differences between their food production and food sales, and between their food consumption and food purchases. This is especially true for rice, which is both produced and consumed by most rural households in Vietnam. To understand the impact of higher food prices on poverty and welfare, one must focus on households' food sales and food purchases, rather than their food production and consumption. More specifically, the most important variable for assessing changes in household welfare is a household's net food sales, defined as (gross) food sales minus food purchases.

To assess the impact of changes in food prices on household welfare, this paper uses a methodology introduced by Deaton (1989). The impact of price changes on household welfare is measured by the compensating variation—the amount of money required to keep a household's utility at the utility level it enjoyed before the change in prices. A household profit function can be used to represent the household's production activities, and an indirect utility

function can be used to measure its level of welfare. When food prices increase, the (implicit) profits increase for all households that produce food. However, each household must also increase its food expenditure to maintain its previous utility. The change in any household's welfare due to an increase in food prices is calculated as the increase in the household's profits minus the increase in food expenditure needed to maintain its previous utility. We consider three distinct impacts of food price changes on household welfare. The first is the immediate impact, before any changes in consumption or production patterns. The second is the short-run impact, which allows for changes in consumption, such as switching away from food items for which prices have increased. The third is the long-run impact, which allows for changes in both consumption and production in response to changing prices.

Following Deaton (1989), consider the following indirect household utility function:

(1) $$U_h = \phi(\omega T + b + \pi; \mathbf{p}_c),$$

where U_h is the utility of household h, which is a function of (full) income and the consumer prices of all goods $\mathbf{p}_c$ (a vector). In this expression, ω is the wage rate, T is total time (including leisure time) available to all household members, b is nonlabor income, and π is the household's profit from its agricultural or nonagricultural household businesses.

Profits (π) in equation (1) are, by standard microeconomic theory, a function of the prices of both the inputs used and the outputs produced by the household's production activities. A standard property of the profit function (Hotelling's lemma) is that small changes in the prices of the goods produced change profits in proportion to the amount sold:

(2) $$\Delta\pi = y_i \Delta p_{pi}, \text{ which implies } \Delta\pi / \Delta p_{pi} = y_i,$$

where p_{pi} is the producer price of good i, and y_i is the amount sold by the household. Equation (2) shows the immediate change in profit for a one-unit change in the price of good i. The intuition is clear: if the household currently produces y kilograms of rice, then a 1,000-Vietnamese Dong increase in the price of rice raises its profits by y thousand Dong (1,000 Vietnamese Dong equal about 7 U.S. cents).

Next, consider the impact on profits from a change in the consumer price of good i:

(3) $$\Delta\pi / \Delta p_{ci} = \Delta\pi / \Delta p_{pi} \times \Delta p_{pi} / \Delta p_{ci} = y_i \Delta p_{pi} / \Delta p_{ci}.$$

The term $\Delta p_{pi} / \Delta p_{ci}$ denotes the change in the producer price relative to the change in the consumer price. Many authors (e.g., Deaton, 1989) assume that $\Delta p_{pi} / \Delta p_{ci}$ equals one, but it can differ from one (for example, if the government imposes controls on consumer and/or producer prices).

Let q_i be the household's (gross) purchase of commodity i. Roy's identity implies:

(4) $$q_i = -(\Delta\phi / \Delta p_{ci}) / (\Delta\phi / \Delta b).$$

The assumption that the household maximizes its utility yields the following first-order condition, which shows the impact of an increase in the consumer price of good i on household utility:

(5) $$\frac{\Delta U_i}{\Delta p_{ci}} = \frac{\Delta\phi}{\Delta b} \times \frac{\Delta\pi}{\Delta p_{ci}} + \frac{\Delta\phi}{\Delta p_{ci}} = \frac{\Delta\phi}{\Delta b}\left(\frac{\Delta\pi}{\Delta p_{ci}} - q_i\right) = \frac{\Delta\phi}{\Delta b} \frac{(y_i \Delta p_{pi} - q_i \Delta p_{ci})}{\Delta p_{ci}},$$

where the second equality uses (4) and the third uses (3). As implied by equation (5), if p_{ci} rises, utility is unchanged only if the household has a change in income, denoted by ΔB_i,

sufficient to offset the change in welfare shown to the right of the last equality in (5). Thus, when the price of good i changes, (5) implies that ΔB_i can be expressed as $q_i \Delta p_{ci} - y_i \Delta p_{pi}$. Intuitively, the money required to maintain utility is the difference between the change in the cost of maintaining current consumption and the change in income from current production.

Summing this expression for ΔB_i over all goods yields the change in income needed to maintain previous utility after a change in the prices of n goods:

$$(6) \qquad \Delta B = \Delta C - \Delta Y = \sum_{i=1}^{n} \left(q_i \Delta p_{ci} - y_i \Delta p_{pi} \right) = \sum_{i=1}^{n} \left[p_{ci} q_i \Delta \ln(p_{ci}) - p_{pi} y_i \Delta \ln(p_{pi}) \right],$$

where ΔC is the change in expenditure and ΔY is the change in production value due to price changes for all n food items if no changes are made in consumption and production patterns.

Finally, the change in income (ΔB) as a fraction of household expenditure (X) can be expressed as:

$$(7) \qquad \Delta B / X = \sum_{i=1}^{n} \left[w_i \Delta \ln(p_{ci}) - (p_{pi} y_i / X) \Delta \ln(p_{pi}) \right],$$

where w_i is the budget share of good i and $(p_{pi} y_i / X)$ represents the sale of i as a fraction of household consumption expenditures. For estimation, w_i is the household's budget share of good i, excluding self-supplied consumption. Equation (7) is similar to a result in Deaton (1989), but it is more flexible because it allows the changes in the consumer and producer prices to differ.

Equation (7) measures only the immediate effect of price changes. The income needed to maintain the household's level of utility after food prices increase is lower if it can substitute away from goods whose prices have risen the most. A second-order Taylor's expansion of the expenditure function allows for substitution behavior, yielding the following expression for the change in expenditure needed to maintain utility after a change in prices:

$$(8) \qquad \Delta C = \sum_{i=1}^{n} q_i \Delta p_{ci} + \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} s_{ij} \Delta p_{ci} \Delta p_{cj},$$

where s_{ij} is the Slutsky derivative.[1] One can also express (8) using budget shares and log prices:[2]

$$(9) \qquad \Delta \ln(C) = \sum_{i=1}^{n} w_i \Delta \ln(p_{ci}) + \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} w_i \varepsilon_{ij} \Delta \ln(p_{ci}) \Delta \ln(p_{cj}),$$

where ε_{ij} is the compensated price elasticity of good i with respect to the price of good j.

Thus, from equations (6) and (9), the effect of an increase in prices becomes:

$$(10) \qquad \Delta \ln(B^{sr}) = \sum_{i=1}^{n} \left[w_i \Delta \ln(p_{ci}) - (p_{pi} y_i / X) \Delta \ln(p_{pi}) \right]$$
$$+ \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} w_i \varepsilon_{ij} \Delta \ln(p_{ci}) \Delta \ln(p_{cj}),$$

where *sr* indicates that equation (10) measures the short-run impact. Finally, to assess the impact of a change in the price of a single good i, such as rice, (7) and (10) simplify to:

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[1] The Slutsky derivative is $s_{ij} = \partial q(\mathbf{p}_c, b) / \partial p_{ci} + q(\mathbf{p}_c, b) \times \partial q(\mathbf{p}_c, b) / \partial b$, where $q(\mathbf{p}_c, b)$ is the Walrasian demand function.

[2] For more detailed derivation of this expression, see Friedman and Levinsohn (2002).

(11) $$\Delta \ln(B_i) = w_i \Delta \ln(p_{ci}) - (p_{pi} y_i / X)\Delta \ln(p_{pi})$$

and

(12) $$\Delta \ln(B_i^{sr}) = w_i \Delta \ln(p_{ci}) - (p_{pi} y_i / X)\Delta \ln(p_{pi}) + \frac{1}{2}\sum_{j=1}^{n} w_i \varepsilon_{ij} \Delta \ln(p_{ci})\Delta \ln(p_{cj}).$$

To summarize, equations (7) and (11) show the immediate (direct) impact, while equations (10) and (12) show short-run (second-order) impacts. Similar procedures have been used by Friedman and Levinsohn (2002) and Minot and Goletti (2000).

A final issue is that food producers may change their production in response to higher food prices, e.g., by producing more of food items whose prices rise. Incorporating production responses yields long-run impacts. Recent studies of rice production in Vietnam have yielded supply elasticities ranging from 0.10 to 0.34. Khiem and Pingali (1995) found a supply elasticity of 0.22. The International Food Policy Research Institute (IFPRI, 1996) estimated elasticities of rice production of 0.29 in the South and 0.37 in the North. Minot and Goletti (2000) estimated elasticities of 0.31 in the South, 0.38 in the North, and a national average of 0.34. Danh (2007) reported supply elasticities between 0.10 and 0.34.

Our study uses data from the 2006 Vietnam Household Living Standards Survey (VHLSS) to assess the impact of changing food prices on poverty and household welfare. The VHLSS is a nationally representative household survey with detailed data on household activities and characteristics. It includes 9,189 households, of which 75% live in rural areas and 25% reside in urban areas.[3] Seventy-five percent of these households are engaged in farming, and 53% grow rice. The 2006 VHLSS collects data on household consumption of 55 different food items, including two kinds of rice (ordinary and glutinous).[4]

Food Production and Consumption in Vietnam

Table 1 shows the extent of farming and rice-farming in Vietnam. About 86% of rural Vietnamese are farmers, and two-thirds grow rice.[5] Poorer households are more likely to be farmers, and to be rice farmers, than better-off households. In the poorest quintile (the poorest 20% of the population), 90% of households are farmers and 76% are rice farmers, while in the richest quintile (wealthiest 20%), only 40% are farmers and just 18% are rice farmers. Ethnic minorities, who constitute 15% of Vietnam's population and tend to live in remote rural areas, are very likely to be engaged in farming; 94% are farmers and 81% are rice farmers.

In a 2008 study of the economics of food consumption and production in Vietnam, Vu reports that food constitutes 50% of households' real expenditure—about 47% for the non-poor population and 67% for the poor.[6] The percentage of household expenditures devoted to food is largest for the poorest quintile, at 65%, and smallest for the richest quintile, at only 37%. For the population as a whole, food purchases represent 72% of total food consumption, and self-produced food constitutes the remaining 28%. The poorest households depend least on purchased food (52%), while the richest rely on it the most (88%).

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[3] The full sample for the 2006 VHLSS was about 45,000 households, but only 9,189 of these were asked detailed questions on consumption expenditures, which are used in this paper to measure household welfare.

[4] For further information on the survey, interested readers are referred to Vietnam General Statistics Office (2008a).

[5] Vietnam is divided into eight regions. To conserve space, we do not present results that compare different regions. See Vu (2008) for detailed comparisons across Vietnam's eight regions.

[6] The poverty line is defined as the level of expenditure that supplies a person 2,100 kcal/day plus an allowance for essential nonfood goods. In 2006, about 15.9% of the Vietnamese population was poor according to this definition.

Table 1. Distribution of Farming and Rice Farming Households in Vietnam

Description	Percentage of Households Engaged in Farming	Percentage of Households Engaged in Rice Farming
All Vietnam	71.9	52.5
Rural	86.2	66.0
Urban	29.3	12.3
Quintile 1	89.8	75.6
Quintile 2	84.8	69.4
Quintile 3	79.5	59.0
Quintile 4	66.2	41.5
Quintile 5	39.9	17.9
Ethnic Majority	68.0	47.4
Ethnic Minority	94.3	81.1
Nonpoor	68.5	48.1
Poor	90.4	76.7

Source: 2006 Vietnam Household Living Standards Survey.

The Impact of Food Prices on Household Welfare and Poverty in Vietnam

Food Prices and Household Welfare

We consider three hypothetical scenarios to examine the impacts of changing food prices on household welfare, as measured by real household expenditure, and poverty. Scenario [1] examines the direct impacts on household welfare and poverty of a hypothetical 20% increase in the prices of all food products, assuming consumer and producer prices increase at the same rate. However, the assumption that consumer and producer prices change uniformly may be unrealistic, ignoring the complexity of Vietnam's rice market. Indeed, the increase in producer food prices may be lower than the increase in consumer prices, especially for small farmers. One reason for this divergence is that Vietnam's rice export market is dominated by two large state-owned enterprises. While over 200 rice-exporting companies operate in Vietnam, Vinafood 1 and Vinafood 2 held over 55% of the market share in 2008. Many small trading companies complain that the Vietnam Food Association (VFA), the semi-government organization that sets rice-exporting policies (including establishing minimum export prices), gives preferential treatment to these two corporations. Another explanation is that small farmers are less able to store their harvest and may need to sell it at lower prices immediately after harvest.

The average welfare benefit could be much lower if producer prices increase more slowly than consumer prices. Accordingly, we consider two additional scenarios. Scenario [2] assumes that producer prices increase faster: consumer prices increase by 20% while producer prices rise by 24%. Finally, scenario [3] assumes that consumer prices increase by 20% while producer prices increase by only 16%.[7] We also examine the effects of the price increases that actually occurred in 2007 and 2008, which are of a similar magnitude.

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[7] See Vu (2008) for analogous hypothetical scenarios with much larger increases (i.e., consumer prices rise by 50% while producer prices rise by 40%, 50%, or 60%).

Because consumer prices of all food items are assumed to rise at the same rate, there is no substitution effect in consumer demand. The impacts of all scenarios on household welfare are reported in table 2. A uniform food price increase of 20% would raise the real annual expenditure (money metric welfare) of an average household by 3.4%. If producer prices rise faster than consumer prices, the rise in welfare would be larger. For example, if producer prices increase by 24% (and consumer prices by 20%), average welfare would increase by 5.6%. However, if producer prices increase by only 16%, welfare would increase by only 1.3%.

These scenarios have different impacts on urban and rural areas. On average, rural households' welfare increases while the welfare of urban households decreases. For example, in scenario [1] (uniform 20% increase), an average rural household enjoys a 6.0% increase in welfare, while an average urban household suffers a 4.4% reduction in welfare.

On average, middle-income groups gain the most (in percentage terms) from increased food prices. The average welfare of households in quintiles 2, 3, and 4 rises from 4.1% to 4.6% in scenario [1]. In contrast, the richest quintile has almost no gain, and even loses in scenario [3]. The poorest quintile gains from food price increases, but this gain is smaller (in percentage terms) than those of the middle-income groups. Similarly, the welfare of both poor and nonpoor households increases when food prices rise, but the relative increase is slightly higher for the latter. For example, in scenario [1], the poor's welfare increase (3.4%) is slightly less than that of the nonpoor (3.6%). The rural nonpoor gain more than the rural poor, while the urban nonpoor lose more than the urban poor. These results differ from past findings, which reported that higher food prices in developing countries hurt the rural poor because most of them are net food buyers (Deaton, 1989; Ravallion, 1990; Ivanic and Martin, 2008). The results reported by previous studies hold if staples are grown mostly by well-off farmers and not by poor farmers. However, because rice is grown by many poor farmers in Vietnam, increased prices benefit both poor and nonpoor households.

The impacts reported thus far are group averages, but it is also useful to examine *within*-group variation in welfare changes. These impacts are reported in the second set of columns in table 2, which show the percentages of households whose welfare declines. These percentages are the same for any proportional price change. For example, the results for a 50% increase in both producer and consumer prices would be the same as the results for scenario [1], and an increase of 40% in consumer prices and 48% in producer prices would give the same results as scenario [2]. Overall, between 53% and 61% of Vietnamese households would suffer welfare declines if food prices increase. Nearly 90% of urban households would have lower welfare, as would 42% to 51% of rural households.

Grouping households by welfare quintiles, the poorest quintile has the lowest percentage of households whose welfare falls (37% to 48%), while the wealthiest has the highest (over 80%). Categorized by poverty status, 36% to 47% of poor households would experience lower welfare, compared to 56% to 64% of nonpoor households.

Almost all nonfarmers (95%) experience lower welfare under all scenarios. The 5% who do not are those engaged in fishing who also sell more food than they purchase. Among farmers, 37% to 48% have lower welfare than before. These are small-scale producers who produce less food than they consume. For them, the welfare improvement from higher producer prices does not offset the negative effect of higher consumer prices.

Finally, the impact of rising food prices on poverty is also presented in table 2. A 20% increase in both consumer and producer food prices would reduce Vietnam's poverty rate by 0.8 percentage points. Rural poverty falls and urban poverty rises in all three scenarios. A uniform 20% food price increase reduces rural poverty by 1.4 percentage points, but raises urban poverty by 0.8 percentage points.

Table 2. Percentage Change in Household Welfare and Poverty Impacts Due to Food Price Increases

	Welfare Change (%)			Percentage of Households Who Are Worse Off (%)				Poverty Impacts		
Consumer Price Increase:	20%		16%	20%		16%	0%	20%		16%
Producer Price Increase:	20% [1]	24% [2]	16% [3]	20% [1]	24% [2]	16% [3]	0%	20% [1]	24% [2]	16% [3]
All	3.4	5.6	1.3	56.2	53.1	61.0	15.9	15.1	14.6	15.8
Rural	6.0	8.6	3.4	45.5	41.8	51.3	20.3	18.9	18.3	19.8
Urban	-4.4	-3.6	-5.2	88.1	86.9	89.7	3.8	4.6	4.5	4.9
Quintile 1	3.6	5.7	1.5	40.4	36.7	47.5	—	—	—	—
Quintile 2	4.5	6.9	2.1	45.8	41.9	51.8	—	—	—	—
Quintile 3	4.6	7.1	2.2	51.4	47.4	56.1	—	—	—	—
Quintile 4	4.1	6.5	1.8	61.3	58.9	66.0	—	—	—	—
Quintile 5	0.2	1.6	-1.3	81.3	80.1	83.0	—	—	—	—
Nonfarmer	-5.2	-4.5	-6.0	94.9	94.6	95.2	5.0	6.6	6.5	6.6
Farmer	6.8	9.5	4.1	41.1	36.9	47.6	20.4	18.5	18.0	19.6
Not Growing Rice	-1.5	-0.1	-3.0	82.6	81.2	84.6	7.5	8.7	8.6	8.9
Growing Rice	7.9	10.6	5.1	32.3	27.7	39.6	23.4	20.7	20.0	21.9
Poor	3.4	5.5	1.2	39.4	35.9	46.6	—	—	—	—
Nonpoor	3.6	5.7	1.5	59.2	56.3	63.6	—	—	—	—
Rural Poor	4.0	6.1	1.9	37.4	33.8	45.0	—	—	—	—
Rural Nonpoor	6.5	9.2	3.8	47.4	43.7	52.9	—	—	—	—
Urban Poor	-3.3	-2.1	-4.6	73.4	72.2	74.7	—	—	—	—
Urban Nonpoor	-4.4	-3.6	-5.2	88.6	87.4	90.2	—	—	—	—

Table 3. Changes in Food Prices and Their Impacts on Food Expenditure, 2007 and 2008

PANEL A. Changes in Consumer and Producer Food Prices

	2007	2008 (Jan.–Sept.)
Consumer Prices:		
Food	18.9	57.8
of which:		
Staples	15.4	78.1
Nonstaples	21.2	50.1
Drinks	6.8	18.1
Producer Prices:		
Food	18.1	56.7
of which:		
Staples	15.9	78.9

PANEL B. Percentage Increase in Food/Rice Expenditure Due to Food/Rice Price Increases

	2007		2007–08	
	Immediate	Short-Term	Immediate	Short-Term
Food Price	18.9%	18.9%	57.8%	57.8%
Rice Price	15.4%	15.6%	78.1%	77.5%

Impacts of Food Price and Rice Price Changes in 2007–2008

The above discussion has focused on hypothetical increases in food prices. Here, we present estimates of the impact of food and rice price changes that occurred from January 2007 to September 2008, using price data from Vietnam's General Statistics Office (2008b, 2009). This time period is chosen because food prices peaked in Vietnam in the summer of 2008, and did not start to decline until September 2008. The 2008 producer price index is not available, so producer prices are assumed to increase at the same rate as consumer prices in 2008. The price changes are shown in Table 3. The unusually sharp increase in the prices of staples in (the first nine months of) 2008 reflects the fact that rice is by far the most important staple crop in Vietnam, and that rice prices rose sharply in international commodity markets starting in late 2007. The export price of Vietnam 5% broken rice almost tripled in one year, from $303/ton in April 2007 to $875/ton in April 2008. The increase in domestic rice prices was less dramatic, but still considerable.

The following analysis considers 11 food categories: rice, other staples, pork, poultry, other meats, fish and seafood, vegetables, fruit, other foods, drinks, and food away from home (FAFH). Because monthly price indices exist only for staples (mainly rice), nonstaple food-stuffs, and drinks and tobacco, the 11 food items are matched to the available price data as follows. First, the staples price index is applied to rice and other staples. Second, the non-staples index is used for pork, poultry, other meats, fruit, vegetables, and other foods. Third, the drink and tobacco index is used for drinks. Finally, the general food price index is used for FAFH. These price indices are used to calculate the first- and second-order (with and with-out demand adjustment, respectively) effects on household welfare [equations (7) and (10), respectively].

Table 4. Estimated Compensated Price Elasticities

	With Respect to the Price of:										
	Rice	Staples	Pork	Poultry	Other Meats	Fish	Vegs.	Fruits	Other Foods	Drinks	FAFH
Rice	−0.72*	0.01*	0.11*	0.02*	0.03*	0.05*	0.07*	0.02*	0.06*	0.02*	0.32*
Staples	0.12*	−0.72*	−0.01	0.02	−0.03	−0.01	0.13*	0.05*	0.11*	0.01	0.32*
Pork	0.22*	0.00	−0.68*	0.02	0.03*	0.14*	−0.03*	0.01	0.19*	0.06*	0.04
Poultry	0.11*	0.01	0.05	−1.01*	0.09*	0.07*	0.16*	0.04*	0.18*	0.05*	0.25*
Other Meats	0.26*	−0.03	0.14*	0.17*	−0.90*	0.28*	0.15*	0.10*	0.26*	0.10*	−0.52*
Fish	0.14*	0.00	0.19*	0.04*	0.08*	−0.88*	0.01	0.04*	0.12*	0.04*	0.21*
Vegs.	0.29*	0.06*	−0.06*	0.13*	0.07*	0.02*	−0.94*	0.03*	0.12*	0.06*	0.23*
Fruits	0.14*	0.04*	0.05	0.06*	0.09*	0.11*	0.05*	−0.90*	0.20*	0.08*	0.08
Other Foods	0.11*	0.02*	0.17*	0.07*	0.05*	0.08*	0.06*	0.05*	−0.87*	0.07*	0.20*
Drinks	0.10*	0.01	0.15*	0.06*	0.06*	0.08*	0.08*	0.06*	0.20*	−0.93*	0.14*
FAFH	0.89*	0.10*	0.05	0.15*	−0.16*	0.22*	0.16*	0.03	0.30*	0.07*	−1.81*

Source: Vu (2008).
Note: An asterisk (*) denotes statistical significance at the 5% level.

　　The compensated price elasticities used to calculate the second-order welfare effects are reported in table 4. Estimation is based on equations (11) and (12), using the compensated own- and cross-price elasticities estimated by Vu (2008). The demand system was estimated using Deaton and Muellbauer's (1980) almost ideal demand system (AIDS) for the 11 food categories. Nonfood expenditure was excluded due to lack of data on nonfood prices, which can be justified by assuming that utility is weakly separable in food and nonfood items.

Results

The estimated second-order effects are very small. In all cases, their impact on welfare is less than 1% of the welfare change induced by the first-order effect. More specifically, table 5 reports the immediate (first-order) and short-term (combined first-order and second-order effect) impacts of higher food/rice prices on welfare, measured as the money needed (in percentage terms) to maintain household welfare after food/rice price increases. Our finding that the second-order effect is negligible differs from results reported by Friedman and Levinsohn (2002). They found large differences between the immediate and short-term impacts in Indonesia during the 1997–98 financial crisis. One possible explanation for this difference is that the food price data used here lack detailed information about how the prices of different food items changed. In contrast, Friedman and Levinsohn had detailed price data with considerable variation; the substitution effect may be more important if the price increases of different foods differ substantially. Moreover, this study, unlike that of Friedman and Levinsohn, does not include nonfood in the demand system; inclusion of nonfood items could also lead to larger second-order effects.

　　Since differences between the immediate (first-order) and short-term (second-order) effects are small, we report results only for the former. Table 5 presents changes in welfare over the 2007–2008 period. Average household welfare rose by 2.8% from January 2007 to December 2007, and by 9.2% from January 2007 to September 2008, due to increases in food prices.

Table 5. Household Welfare Changes Due to Increases in Food and Rice Prices, 2007–08 (percent)

| | Food Price Change | | Rice Price Change | | | | | |
| | | | No Supply Response | | Supply Elast. = 0.10 | | Supply Elast. = 0.34 | |
Description	2007	2007–08	2007	2007–08	2007	2007–08	2007	2007–08
All	2.8	9.2	1.0	5.0	1.1	5.8	1.2	7.6
Rural	5.2	16.7	1.6	7.6	1.6	8.6	1.7	10.9
Urban	−4.3	−12.9	−0.6	−2.8	−0.5	−2.6	−0.5	−2.2
Quintile 1	3.0	9.9	0.4	1.8	0.5	2.5	0.5	4.1
Quintile 2	3.8	12.3	1.5	7.3	1.6	8.3	1.7	10.6
Quintile 3	3.9	12.7	1.9	9.2	2.0	10.3	2.1	12.9
Quintile 4	3.4	11.2	1.1	5.3	1.2	6.0	1.2	7.8
Quintile 4	−0.1	0.1	0.3	1.3	0.3	1.7	0.4	2.5
Nonfarmer	−5.1	−15.3	−1.3	−6.5	−1.2	−6.4	−1.2	−6.4
Farmer	5.9	18.8	1.9	9.4	2.0	10.5	2.1	13.0
Not Growing Rice	−1.7	−4.8	−1.5	−7.7	−1.4	−7.7	−1.4	−7.7
Growing Rice	6.9	21.9	3.3	16.5	3.4	17.9	3.5	21.4
Nonpoor	2.7	9.1	1.2	5.7	1.3	6.6	1.3	8.5
Poor	3.0	9.9	0.2	0.8	0.3	1.4	0.3	2.8
Rural Nonpoor	5.6	18.0	1.9	9.1	1.9	10.2	2.0	12.7
Rural Poor	3.4	11.0	0.3	1.3	0.4	2.0	0.4	3.4
Urban Nonpoor	−4.4	−13.0	−0.5	−2.7	−0.5	−2.4	−0.4	−2.0
Urban Poor	−3.4	−10.0	−1.5	−7.8	−1.4	−7.5	−1.4	−6.8

Rice prices alone raised average household welfare by 1% in 2007, and by 5% from January 2007 to September 2008. While rural households benefited from these food price increases, urban households were worse off. Middle-income groups gained more from food price increases than lower and higher income households. In rural areas, nonpoor households gained more than the poor, while in urban areas, the nonpoor lost more than the poor.

Table 5 also shows how higher rice prices affect welfare when one allows for production responses from the 53% of Vietnamese households who grow rice. Of course, removing the implicit constraint of no production response will lead to higher levels of welfare; the goal is to see how large these impacts are. To study the effect of rice prices alone, assume that other food prices are unchanged. This permits an investigation that accounts for both the immediate and short-run effects of changes in rice prices, where the latter allows consumers to substitute to other foods.

Assuming a lower supply response (elasticity of 0.10), production responses lead to slightly higher welfare increases for the country as a whole: a 1.1% increase versus a 1.0% increase for the price changes that occurred in 2007, and a 5.8% increase versus a 5.0% increase for the price increases from January 2007 to September 2008. Assuming a higher price elasticity response (0.34) results in a slightly larger impact (1.2% compared to 1.0%) for price changes in 2007, and a modestly higher impact (7.6% compared to 5.0%) for price increases from January 2007 to September 2008. Overall, allowing for a supply response leads to a some-what more positive impact, but does not change the main results.

Table 6. Changes in Poverty Due to Increases in Food and Rice Prices, 2007–08 (percentage points)

Description	Food Price Change		Rice Price Change	
	2007	2007–08	2007	2007–08
All	−0.6	1.1	−0.2	0.3
Rural	−1.2	−0.1	−0.4	−0.1
Urban	0.8	4.4	0.3	1.3
Nonfarmer	1.5	7.9	0.5	2.9
Farmer	−1.5	−1.7	−0.5	−0.8
Not Growing Rice	1.2	6.8	0.7	4.2
Growing Rice	−2.3	−4.0	−1.1	−3.1
Nonpoor	1.5	6.0	0.5	3.0
Poor	−11.9	−25.0	−4.0	−13.7
Rural Nonpoor	1.7	6.4	0.6	3.6
Rural Poor	−12.3	−25.7	−4.2	−14.4
Urban Nonpoor	1.1	5.2	0.3	1.6
Urban Poor	−5.9	−14.8	−0.5	−4.5

Table 6 presents the impacts on poverty from higher food and rice prices. In 2007, food price increases reduced the poverty rate by 0.6 percentage points, but the sharp price increases in 2008 led to higher poverty. Hence, the total impact of the food price increases from January 2007 to September 2008 was to raise the poverty rate by 1.1 percentage points. The increase in rice prices alone during 2007–08 raised the poverty rate by 0.3 percentage points. The intuition for higher poverty when food prices increase more sharply is straightforward. When food prices increase moderately, rural poverty falls significantly and urban poverty rises moderately; thus, the net effect is to lower the national poverty rate. When food prices increase dramatically, urban poverty rises sharply, raising the national rate.

Summary and Conclusion

This study demonstrates that the impacts of recent food price increases, especially rice price increases, on Vietnamese households are complex. About 44% of Vietnamese households are net food sellers and 30% are net rice sellers. In rural areas, 54% of households are net food sellers and 38% are net rice sellers. These households will benefit from higher food prices. If consumer and producer prices increase at the same rate, higher food prices will increase average household welfare. When food prices increase by 20%, average household welfare rises by 3.4% and poverty falls by 0.8 percentage points. When only rice prices increase by 20%, average welfare increases by 1.3% and the poverty rate falls by 0.2 percentage points. However, all of these impacts are sensitive to differences between the changes in producer and consumer prices. If consumer prices increase less than producer prices, welfare benefits are higher and the reduction in poverty is greater, but if consumer prices rise faster than producer prices, the positive impacts of higher prices on welfare and poverty reduction are smaller. Examining the actual price changes that occurred in 2007–2008, average household welfare increased by 9.2% from January 2007 to September 2008, but poverty increased by 1.1

percentage points during the same period. Similarly, increases in rice prices alone raised average household welfare by 5% in 2007–2008, but also raised poverty by 0.3 percentage points.

Finally, it is important to note that benefits and costs are not spread evenly across the population. A uniform increase in both consumer and producer food prices would make 56% of households worse off, and a uniform increase in the price of rice would make 64% of households worse off. In particular, increases in rice prices alone lead to welfare reductions for most households; a uniform increase in the price of rice would reduce the welfare of about 54% of rural households and 92% of urban households.

Examining Vietnam's eight regions, Vu (2008) shows that the South East and Central Highlands would be impacted the hardest, with 80%–90% of those regions' populations experiencing lower welfare. Overall, in rural areas, middle-income households gain the most while the poorest households gain the least from higher rice prices. In urban areas, the poorest households lose the most (in percentage terms) from an increase in rice prices. This finding suggests that support programs should target the poorest quintile, especially the poor in the regions hit hardest by higher prices, such as the South East and the Central Highlands. Although the Mekong River Delta (which produces about 90% of Vietnam's marketable rice) gains much from higher rice prices, Vu concludes that only about one-third of the households in this region are made better off. This indicates some kind of assistance to the poor is needed even in those regions that, on average, gain much due to higher food prices.

While this paper has provided substantial insights into the impact of increased food prices on household welfare and poverty in Vietnam, there are two directions in which future research on this topic could extend the analysis presented here. First, data limitations do not allow us to fully explore the relationship between consumer and producer prices in different regions. Based on our analysis, the welfare and poverty effects are sensitive to differences in increases across consumer and producer prices, and the effects are more beneficial if producer prices rise faster than consumer prices. Yet, producer prices of food are often unavailable or updated less often than food consumer prices.[8] Future research should use more sophisticated analysis, based on reliable and up-to-date regional consumer and producer price data. Second, more detailed price data would allow more scope for substitution effects between various food commodities, and between food and nonfood commodities, which could lead to short-run welfare effects that are substantially higher than the immediate effects.

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[8] The Vietnam General Statistics Office publishes an annual producer price index (PPI), while the consumer price index (CPI) is published monthly. The available PPI and CPI data do not have indices for specific food items, such as rice, maize, and pork. On the other hand, the Ministry of Agriculture and Rural Development publishes the local market price for several food items, but does not publish the producer (farm-gate) prices of those items.

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