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Do the Urban Poor Face Higher Food Prices?
Evidence from Vietnam

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Abstract

Whether the poor face higher food prices is unsettled in the literature after more than four decades of study. While unit values from household surveys suggest higher prices for the poor, outlet surveys typically find food prices varying with store type but not with neighborhood income. Most outlet surveys are from rich countries, with just one spatially limited study from a developing country. In this paper we use especially collected food price data from metropolitan areas of Vietnam to test whether the urban poor face higher food prices. We also link the price surveys to a household survey to examine whether household survey and outlet data both give the same answer to the question of whether the poor face higher prices.

Keywords

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JEL Classification

D12; R10

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I. Introduction

It is often claimed that it costs the poor more than the non-poor to participate in many markets, including the food market (Mendoza, 2011). If this claim of a 'poverty penalty' is correct, it has the important implication for economic policy that improving the functioning of markets may simultaneously help both efficiency and equity (Muller, 2002). This double dividend from improved market performance may occur because as the prices paid by the poor converge to the prices paid by everyone else, real inequality would fall while resources would be more efficiently allocated.

At least three reasons are suggested in the literature for why the poor may pay more. It may be more expensive to serve the poor, either because they live in remote areas so that transport costs are higher or because they live in informal environments, such as urban shanty towns, where poor infrastructure and weak legal rights make it risky for retailers to set up and so a price premium is charged to recoup these extra costs (Mendoza, 2011). A second reason is that the poor may be liquidity constrained and so are forced to buy very small quantities on each purchase occasion, preventing them from capturing any pecuniary economies from bulk buying (Rao, 2000). More generally, search costs may be U-shaped in income so that it is middle-income consumers who pay the lowest prices (Frankel and Gould, 2001). For example, the rich may have the wherewithal, such as personal transport and in-home storage, to both search for and benefit from lower food prices but they have a high opportunity cost of time so they do not search intensively. In contrast, the poor may have more time to search for lower prices but may lack access to transport and food storage so that they are captive to their local outlets while the non-poor are freer to search for bargains outside their immediate area.

In addition to policy implications for equity and efficiency, a measurement issue arises if the prices paid by the poor exceed the prices paid by the rich, since real inequality may then be higher than nominal inequality. Indeed, Rao (2000) finds that the poor in India pay more for the same foods than do the rich and that after adjustment for this effect the Gini coefficient for real income is from 12-23 percent higher than the Gini for nominal income. Similarly, Muller (2008) uses finely detailed local price data for Rwanda to show that poverty monitoring and anti-poverty targeting can be badly affected when nominal living standards data are deflated by inaccurate measures of prices. In particular, when price indexes are calculated for too large of a spatial area, such as a region, they do not correspond to the prices actually paid by local residents.

Another reason for interest in whether the poor pay more for food is that several outbreaks of inflation for staple foods since 2007 have reawakened policy concerns about food security. While these concerns are often expressed through national self-sufficiency policies and interventions in export markets so as to lower domestic prices for consumers, considerable attention is also paid to micro-level food security. Despite two decades of rapid economic growth in much of Asia, there are still major nutritional concerns; for example, it

appears that average calorie consumption in India is falling (Deaton and Dr□ze, 2009). If the urban poor face higher prices for food it may exacerbate these food security concerns, especially because the urban poor are only consumers whereas the rural poor may benefit from higher food prices if they are net producers (Linh and Glewwe, 2011). Perceptions of nutritional vulnerability for urban consumers may motivate rice market interventions by Asian governments, which contribute to world food market instability (Timmer, 2009).

In this paper we use especially collected food price data from metropolitan areas of Vietnam to test whether the urban poor face higher food prices than do other urban residents. The main analysis compares prices of identical food items across different outlets in rich and poor neighborhoods. This type of outlet-survey is more typically carried out in rich countries, with just one spatially limited, and dated, outlet study from a developing country, by Musgrove and Galindo (1988). In order to contribute to the literature from developing countries that uses other data sources, and also to make a methodological point, the price survey is linked to a household survey carried out at the same time. The advantage of having both outlet data on prices and household survey data on unit values (expenditures on a food group divided by the quantity purchased) is that it allows an examination of whether both types of data give the same answer to the question of whether the poor pay more. The only existing comparison finds that the two types of data do not give the same answers (Kaufman, MacDonald, Lutz and Smallwood, 1997), which is also what is found in the data for urban Vietnam. Unit values appear to be a misleading proxy for market prices and so do not provide reliable evidence on whether the poor face higher food prices.

II. Previous Literature

Whether the poor pay more for food remains unsettled in the economics and geography literature after more than four decades of study.[1] In this time, two broad approaches have been used; store surveys (more generally, outlet-based samples) that compare the prices of identical goods in rich and poor neighborhoods, and household surveys that compare unit values (the ratio of expenditure to quantity) across rich and poor households. While both approaches have their strengths, to date just one study, by Kaufman et al (1997) for the United States, applies both methods in the same setting in order to learn about the consistency of their findings.

Outlet surveys have the advantage of ensuring that like is compared with like, by choosing a representative specification (size, quality, brand and any other distinguishing feature) for each selected food. This approach is used most frequently in the United States, where the literature finds that prices vary with store type (supermarkets are cheaper than convenience stores) and location (suburbs are cheaper than rural and central city areas). However, prices do not vary with neighborhood income, given location (Hall, 1983;

[1] Early studies include Goodman (1968) and Kunreuther (1973).

MacDonald and Nelson, 1991). Moreover, even if store mix and location are not held constant, the gradients are sufficiently flat that prices facing poor households for the *same* food items are likely to be less than one percent more than those facing non-poor households (Kaufman et al, 1997, p.8).

A similar conclusion is reached in a developing country context by Musgrove and Galindo (1988), who survey prices of 14 different foods in 19 towns and cities in Northeast Brazil. These prices were reported for standard quantities, although it is not discussed if they were also for standard brands or if other indicators of quality were held constant. Prices for the same item were largely the same across the various urban areas, and also across the various store types in the survey, leading to the conclusion (1988, p.101):

> 'Overall, there is no evidence that the poor pay more than their non-poor neighbors simply because of where they live or where they shop…'

This finding from Brazil is notable because it is the only example of a study based on an outlet survey in a developing country. All other developing country evidence comes from household survey data, for which it is not possible to maintain the like-with-like comparison since households adjust both the quantity and the quality of their purchases in response to price changes (McKelvey, 2011).

A drawback of outlet surveys is that the characteristics of purchasers are not known, and have to be proxied by neighborhood characteristics such as average income level or the share of poor households in the community. Conversely, household surveys capture buyer characteristics but lack the fine detail on purchases needed to compare like with like, as the following quotation from Prais and Houthakker (1955, p.110) indicates:

> 'An item of expenditure in a family-budget schedule is to be regarded as the sum of a number of varieties of the commodity each of different quality and sold at a different price.'

Thus the average price actually paid for a category of food consumption in a household survey depends not only on the same-item prices that poorer households face but also on the various economizing choices they make over the particular items within the category that they purchase. These choices include buying lower quality and unbranded varieties, buying larger package sizes that are cheaper per unit weight, and using coupons and shopping for sale items. As an example of the combined effect of these strategies, Kaufman et al (1997) calculate that in the United States low-income households typically pay only 90 percent of the cost per unit that is paid by the average household. Similarly, in Argentina during the 2002 economic crisis, consumers reacted to this real income shock by both downgrading the quality of their purchases and by increasing the frequency of their shopping in order to search for lower prices (McKenzie and Schargrodsky, 2011).

Despite the potential interpretation problems caused by using household survey data that reflect endogenous economizing choices, most evidence about whether the poor in developing countries face higher food prices uses unit values from such surveys. For example, Rao (2000) reports unit value evidence from rural Karnataka in India which suggests that there is a 7.4 percent decrease in the price index for food purchased by households, as household income doubles. The hypothesized mechanism for this effect is that liquidity constraints force poor households to buy smaller quantities in each transaction, and this failure to capture any bulk discount economies forces them to pay a higher average price per unit weight. Similarly, Attanasio and Frayne (2006) report that in Colombia the unit values for rice, beans and carrots are up to 27 percent higher when households purchase the smaller units typically used by the poor.[2]

The difficulty with these unit value studies is that both the unit quantity and the quality of what is purchased may not be the same for rich and poor households, so comparisons are not of like-with-like and do not reveal if the poor face higher prices for the same items. Moreover, the reference period for household surveys is sufficiently long (typically anywhere between one week and one month for foods) that reported quantities and expenditures may aggregate over several different purchase occasions, making it impossible to determine if any discounts were achieved on a particular purchase – whether from bulk buying, downgrading quality or from seller discounting. It is for this reason that carefully conducted outlet studies in developing country contexts may be valuable.

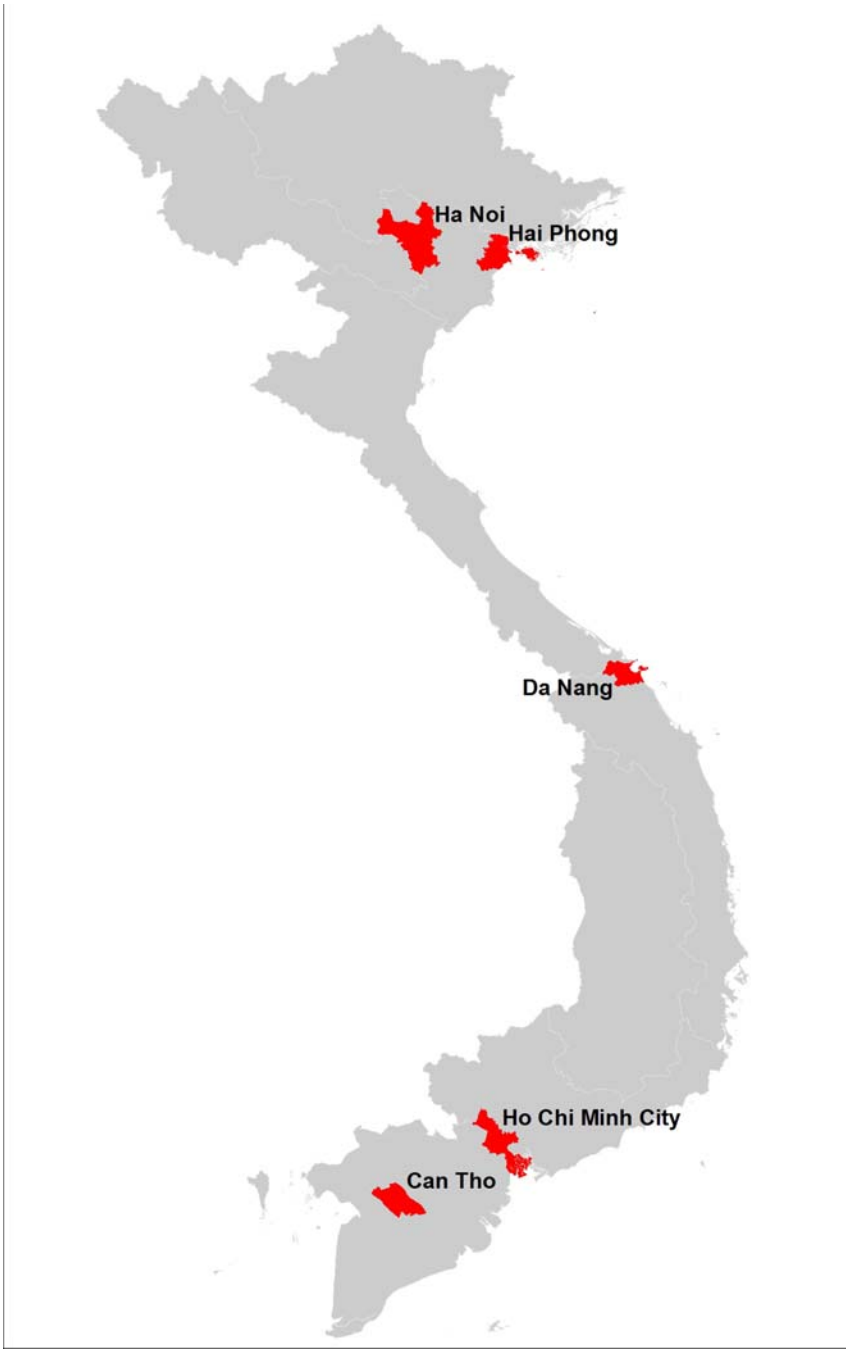
III. Data and Methods

3.1 The Price Survey

In 2010 the lead author designed a price survey for 44 foods in 210 urban locations that was fielded by the General Statistics Office (GSO) of Vietnam. These locations were selected from within the five centrally-controlled municipalities, which are large metropolitan areas with the equivalent status of a province. These five municipalities are Ha Noi and Hai Phong in the north of Vietnam, Da Nang in the central region, and Ho Chi Minh City and Can Pho in the south of the country (Figure 1). Two of these municipalities – Ha Noi and Ho Chi Minh City – are much larger than the others, with approximately seven million residents each while the other three each have between 1-2 million residents.

[2] Beatty (2010) reports evidence from a developed country (the United Kingdom) on the importance of quantity discounts, but contrary to the developing country evidence finds that these discounts lead to the poor paying less, on average, because they spend a greater share of their food expenditures on foods with quantity discounts.

Figure 1: Location of the Study Sites in Vietnam



The survey was designed to compare the cost of living between each of these five metropolitan areas and also between rich and poor neighborhoods. Given the paucity of information available, it was not known whether variation in food prices was mainly geographic, which is especially plausible in Vietnam because of the long narrow shape of the country, or economic due to the mix of retail outlets and the level of competition differing between rich and poor areas within cities. The smallest unit for which pre-existing information could be used to stratify into rich and poor areas is the District, of which there are more than 80 within the five centrally-controlled municipalities; however, these include both rural districts (essentially counties, *Huyện*) and urban districts (*Quận*) since metropolitan areas expand by annexing land from neighboring provinces.[3] The population density in the rural districts is typically below 1000 persons per square kilometer whereas densities are typically 10,000/km^2 in the urban or inner districts and it is only these which correspond to usual city living conditions.[4]

A sample of 21 of the urban districts was drawn, using probability-proportional-to-size (PPS) selection from within 'rich', 'medium' and 'poor' strata that were based on average incomes and land rentals as the two factors most likely to affect retail prices. This sampling method yielded seven districts from each stratum, and these are balanced across the five metropolitan areas (two each from Ha Noi and Ho Chi Minh City and one from each of the others). Comparisons of average food prices across income strata will therefore be balanced in terms of geography, which is the other main factor that could cause average prices to differ.

Within each of these selected urban districts, a stratified random sample of ten outlets was drawn. The three strata were: modern retail stores, such as supermarkets, that are distinguished by fixed prices rather than bargaining; registered outdoor markets that are under district and/or ward control; and informal, unregistered markets that meet in the early morning on street corners. A sampling frame for the stores and registered markets was already held by the GSO, since they survey a selection of these up to every ten days for the Consumer Price Index (CPI); this was used to draw a random sample of five stores and six markets in each selected district. The unregistered markets are not covered by the CPI so these were listed with a rapid reconnaissance (using a motor scooter and GPS recorder) and one was chosen at random from each district.

The share for each type of outlet in retail sales is likely to depend on the type of product, with supermarket sales typically being highest for processed foods, then for semi-

[3] Another reason to use districts rather than (smaller) wards as primary sampling units is that outlets for many foods are highly clustered within Vietnam's cities (e.g. 'sugar street' for sweets). Area-based sampling of smaller units, as occurs with household surveys, would miss this clustering, so the required prices would be either unobserved or would not reflect competitive prices from the clustered areas where consumers travel to make their purchases.

[4] By way of comparison, a *Quận* would be equivalent in size to a borough of Inner London.

processed (diary, meats and poultry) and lowest for fresh produce.[5] These market shares are also changing rapidly, with Vietnam one of a group of Asian countries where supermarket sales are growing far faster than either national or urban GDP, at about 30-50 percent per year (Reardon and Gulati, 2008). The sample design was based on a prior study from urban Vietnam that predicted supermarkets to have 25 percent of the fresh vegetable market by 2010 (Mergenthaler et al, 2009); therefore a quota was set whereby three of the five selected supermarkets would be used for pricing fresh produce, four of the five for pricing semi-processed items and all five for pricing the processed foods, branded items and dairy products. The remaining price readings came from the selected registered and unregistered markets, up to a maximum of ten readings per district.

The survey covered both branded and unbranded foods, and included items that are typically not quantified by household surveys and price surveys, such as street meals.[6] To maintain consistency of item specification across areas and across income strata, enumerators used detailed photographs of each of the 44 items whose price was required. Figure 2 presents examples of these photographs for two foods: fresh fish (carp) and outdoor meals (breakfast). The instructions required enumerators to find examples in the market that were of similar size and quality to what was pictured (with a matchbox in the picture used as a scale indicator), and then to weigh them so that prices per metric unit were recorded (unless the item was in standard packaging of known weight or volume). For outdoor and restaurant meals the prices were per serving. The description of each of the 44 foods, the target brand or specification and the unit of measurement are reported in Appendix Table 1, along with the achieved sample sizes.

In total, 90 percent of the item-outlet combinations had prices observed, with the items most frequently missing being restaurant meals, bottled water (a 19 litre container was the target specification), bread, freshwater shrimp and bottled beer. There was no difference across the neighborhood income groups in the rate that prices were unobserved, supporting the assumption that these are missing at random. Three of these frequently missing items are sold in a restricted set of outlets (restaurant meals, beer and household-sized water bottles) while bread is often sold by specialist street vendors (along with accompaniments for urban workers to make their own meal) so it would have taken some deviation from the outlet-based sample to obtain more observations on prices of these items and it was undesirable to allow enumerators to have this degree of discretion in case they violated other aspects of the sampling plan.

[5] The supermarket share for semi-processed foods in Vietnam may exceed the typical pattern for developing countries due to the large shift in consumer poultry purchases away from traditional wet markets after concerns about avian influenza (Reardon et al, 2007).

[6] The nearest vendor to the selected store was surveyed for meals not available from the sampled outlet.

Figure 2: Examples of Photographs Used to Ensure Consistent Price Collection for Unbranded Items

Panel A: Fish (Fresh Carp) of approximately 500 grams each

Panel B: Outdoor meals (breakfast), Pho, with rare and cooked beef, medium-sized bowl

3.2 The Household Survey

We obtain unit values from the 2010 Vietnam Household Living Standards Survey (VHLSS) which was fielded at the same time as the price survey. The VHLSS sample of 9,000 households includes 759 that are from the urban districts in the five centrally-controlled municipalities, and these are the ones we use to compare with the results of the price survey. The VHLSS consumption questionnaire uses a 30-day recall, for purchases and consumption from own-production and gifts. Amongst the 53 food and beverage groups distinguished in the recall list, 39 groups have quantities reported (in either kilograms or litres) and this enables unit values to be calculated.[7] The definitions of the consumption recall groups, and their concordance with the specifications used in the price survey are reported in Appendix Table 2.

Amongst the 39 food groups with unit values available there is a one-to-one mapping with items from the price survey for 26 foods. Another four consumption recall groups (rice, pork, beef, and chicken) each have two specifications in the price survey and two groups (seafood and non-alcoholic beverages) each have three items in the price survey. We average across these multiple price specifications for the same food group to allow a mapping to the unit values. It will be these 32 food groups with both unit values and surveyed prices that will be used in the comparisons. The remaining consumption recall groups with unit values have no matching items in the price survey, and these are mainly residual categories like 'other fruit' or minor items that are consumed mainly in rural areas, such as cassava.

The VHLSS uses a lightly clustered sample, with just three households per enumeration area (EA) given the consumption recall questionnaire.[8] The sample of 759 urban households therefore corresponds to 253 urban EAs from within the five centrally-controlled municipalities that, potentially, have average unit values available for each food group. In fact, just 81 percent of the expected number of 8,096 (=32*253) food group--enumeration area combinations are observed since not every cluster had at least one household making a purchase from within each food group.[9] This missing data issue is one of several problems that unit value methods face, since households endogenously choose whether to purchase from within each group and prices will influence this decision (that is, unit values are only available for a self-selected sample).

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[7] The quantity data were carefully checked for outliers, trimming any observations whose unit value was more than five standard deviations from the mean.

[8] A larger VHLSS sample from the same surveyed EAs is given an income-only questionnaire.

[9] The proportion of households with a unit value is even lower, at 64 percent, for the food group - household combinations since even a single purchasing household in an EA is enough to allow an EA-average unit value.

IV. Results

The average price of each of the 44 foods in each of the three neighborhood income strata are reported in Table 1, in terms of thousands of Vietnam Dong.[10] The units for each food are reported in Appendix Table 1, and most of the prices in Table 1 are per kilogram. The comparisons that will be made are all between strata or between geographic areas for the same foods, so converting to prices per kilogram for all foods (which would be difficult for items like meals, where the unit is per serving) is unnecessary. Any aggregation across foods will be in terms of unit-free quantities, such as price relativities.

For 18 of the 44 foods studied, which account for 27 percent of the average urban household's food budget, average prices are lower in the low income neighborhoods than they are for the same items in middle income neighborhoods. For the remaining 26 foods the average prices are lower in the middle income neighborhoods, although the differences are statistically significant for just three of these foods. If the ratio of the average price in the middle income neighborhood to the average price in the lower income neighborhood for each food is averaged across all foods (using budget shares as weights), food prices in the poorest areas are seen to be an average of 2.5 percent higher than prices in the middle income neighborhoods.

However, if the comparison changes to lower income versus upper income neighborhoods, a clear picture emerges that the poor face lower prices for the same items. For 35 out of the 44 foods, which account for 91 percent of the food budget for the average urban household, average prices are lower in the low income neighborhoods and for nine of these foods the difference is statistically significant. The weighted average of the price relativities suggests that food prices are 4.5 percent lower in the poor neighborhoods than they are for the same items in the upper income neighborhoods. Finally, if the middle income and upper income strata are combined, to compare with prices in the lower income neighborhoods, it appears that average prices are 1.4 percent lower in the poor neighborhoods than in the combined middle-upper income neighborhoods. Thus there is little evidence here to support the claim that the poor face higher prices for food when a like-with-like comparison is undertaken.

The next empirical exercise with the price data was to decompose the observed variation in the price of each item at each outlet into location effects and income strata effects. The first two columns of Table 2 report the proportion of the variation in prices that is explained in a regression by either four dummy variables for the province-level municipality that the prices come from (with Ha Noi as the reference group) or by two dummy variables for the income strata of the district where the prices were gathered (with low-income districts as the reference group). While the reported decompositions come from regressions on price levels the results are almost identical if the logarithm of prices is used instead.

[10] The exchange rate at the time of the survey was approximately 19,300 Dong per US dollar.

Table 1: Mean Prices by Income Strata for Each Food ('000 VN Dong)

Food	Lower	Middle	Upper
White rice #1 (lower quality)	9717	9679	9998
White rice #2 (premium variety)	13682	13981	14514 *
Sticky rice	20475	20653	19051
White bread	12780	12885	14133 **
Instant noodles	2836	2532	2868
Fresh rice noodles	7702	7583	7685
Pork: Rump	59141	58625	60040
Pork: Belly	56996	55827	58077
Beef	130749	132691	137206 *
Fresh beef rib	102648	86159	94087
Battery chicken	50893	51529	51374
Live free range chicken	97467	102600	107634 ***
Whole local duck	56321	57174	58548
Pork- pie	97440	88326 ***	98231
Cooking oil	32860	33264	34576
Carp	44136	43225	45017
Salt-water shrimp	132629	126775	134022
Fresh-water shrimp	105224	104673	119711 **
Salted fish	374037	300869	320053
Chicken eggs	26175	25945	26556
Tofu	13376	12671	13932
Fresh pea	13283	13394	15043
Water morning glory	5971	5984	6968 **
Cabbage	8354	8758	8889
Tomato	10265	10506	10851
Orange	24348	22682	24045
Banana	9022	9411	10013
Mango	36580	36354	37192
Fish sauce	14691	14835	14868
Salt	5351	5576	5681
White sugar	20143	20428	21129 **
Fruit candy	4385	4287	4296
Condensed milk	16597	16936	17011
Liquid milk (UHT) carton	5403	5332	5582
Vodka	27289	27102	26976
Bottled beer	7494	7603	7450
Soft drink	7466	6582	8838
Fruit juice	6199	6188	6213
Bottled water	35313	29726 **	34752
Powdered coffee	24239	24228	24719
Dried tea	118484	115144	136414 *
Outdoor meals - breakfast	15800	15262	16600
Outdoor meals - lunch/dinner	14763	13885 *	15383
Restaurant meals	101541	101098	157400 *

Source: Author's calculations from survey data provided by Vietnam General Statistics Office (GSO).
***, **, * denote different from mean price for lower income strata at 1%, 5% and 10% significance.

Table 2: Decomposition of Price Variation into Location and Income Effects

	Contribution to explained variance		*F*-test for excluding fixed effects from combined model	
Food	Province	Strata	Location-effects	Income-effects
White rice #1 (lower quality)	0.246	0.018	19.70 ***	2.22
White rice #2 (premium variety)	0.552	0.020	66.99 ***	3.88 **
Sticky rice	0.042	0.002	79.55 ***	0.41
White bread	0.466	0.056	38.94 ***	4.33 **
Instant noodles	0.010	0.005	0.69	0.98
Fresh rice noodles	0.442	0.007	87.03 ***	0.99
Pork: Rump	0.361	0.009	31.46 ***	1.17
Pork: Belly	0.463	0.011	53.30 ***	1.88
Beef	0.030	0.025	7.03 ***	6.36 ***
Fresh beef rib	0.026	0.013	6.29 ***	3.33 **
Battery chicken	0.128	0.002	7.20 ***	0.08
Live free range chicken	0.391	0.050	86.47 ***	4.35 **
Whole local duck	0.535	0.014	40.86 ***	1.31
Pork- pie	0.308	0.072	28.79 ***	8.05 ***
Cooking oil	0.026	0.017	29.79 ***	1.99
Carp	0.224	0.011	32.65 ***	2.66 *
Salt-water shrimp	0.441	0.009	57.06 ***	1.93
Fresh-water shrimp	0.392	0.050	30.44 ***	5.85 ***
Salted fish	0.065	0.021	75.57 ***	0.88
Chicken eggs	0.468	0.005	43.14 ***	1.81
Tofu	0.392	0.017	52.78 ***	1.88
Fresh pea	0.761	0.014	106.89 ***	3.95 **
Water morning glory	0.197	0.029	31.20 ***	3.43 **
Cabbage	0.042	0.012	6.48 ***	1.76
Tomato	0.705	0.006	158.14 ***	1.14
Orange	0.757	0.005	407.14 ***	1.30
Banana	0.191	0.011	37.75 ***	1.27
Mango	0.629	0.001	261.83 ***	0.09
Fish sauce	0.168	0.010	14.83 ***	3.29 **
Salt	0.166	0.009	6.27 ***	1.20
White sugar	0.013	0.036	2.17 *	3.16 **
Fruit candy	0.220	0.002	69.03 ***	0.29
Condensed milk	0.365	0.007	40.32 ***	1.76
Liquid milk (UHT) carton	0.095	0.002	2.62 **	0.13
Vodka	0.081	0.001	12.47 ***	0.65
Bottled beer	0.201	0.012	11.00 ***	1.09
Soft drink	0.011	0.006	0.59	1.01
Fruit juice	0.087	0.000	7.34 ***	0.11
Bottled water	0.415	0.045	74.29 ***	4.32 **
Powdered coffee	0.279	0.016	62.19 ***	1.34
Dried tea	0.045	0.033	6.03 ***	2.22
Outdoor meals - breakfast	0.142	0.047	8.44 ***	4.69 **
Outdoor meals - lunch/dinner	0.399	0.045	40.67 ***	6.69 ***
Restaurant meals	0.157	0.051	24.47 ***	2.54 *
Average (budget-share weighted)	0.293	0.027		

Note: F-tests from regressing price on location and strata fixed effects use heteroscedasticity-robust variance-covariance matrix, ***, **, * denote significance at 1%, 5% and 10% level

The share of price variation explained by location effects ranges from 76 percent (for fresh peas, and oranges) to just one percent (for soft drinks, sugar and instant noodles). The three foods with almost no location effects in their prices are all packaged goods for which transport costs would be a low share of their value, making them plausible candidates for the law-of-one-price to hold nationally.[11] Amongst the most important foods (defined in terms of their average budget shares), those where a high share of price variation was due to location effects included outdoor meals (lunch/dinner), shrimp, ducks and free-range chickens, pork belly, fresh noodles, bread and high quality rice. Across all foods, an average of 29.3 percent of price variation was due to these location effects.[12]

In contrast to the importance of location effects, very little of the variation in food prices was explained by the income strata of the district that the prices were surveyed from. The regressions on the income strata dummy variables had an average R^2 of just 0.027, and the highest proportion of the variation that was due to income effects was just seven percent (for pork-pie, a kind of processed meat). Furthermore, there was just one food – sugar – where the proportion of the variation explained by income strata dummy variables was more than the proportion explained by location dummy variables. Hence it appears that variation in food prices in urban Vietnam is mainly of a geographic nature – perhaps due to the long narrow shape of the country that spans 15 degrees of latitude. On the other hand, economic factors that are captured in neighborhood income differences seem to play a much smaller role in food price determination. Moreover, the results in Table 1 show that even in the cases where there are price differences across income-strata, they are in the direction of the richer neighborhoods having slightly higher food prices than for the same food items in lower-income neighborhoods.

The next empirical exercise, whose results are described in the last two columns of Table 2, was to combine the location effects and the income strata effects into a single regression model, and then to test whether each type of effect was (jointly) significantly different from zero. Only two foods had statistically insignificant location effects (instant noodles and soft drink), another two foods had effects that were significant only at the five or ten percent level (sugar and long-life milk) and for the other 40 foods the location effects were statistically significant at the one percent level. In contrast, only four foods had income strata effects that were statistically significant at the one percent level (beef, pork pie, fresh-water shrimp and outdoor lunch/dinner) and another ten foods had effects significant at the five percent level. For 28 of the foods, the hypothesis that the coefficients on the income strata dummy variables were jointly zero would not be rejected, even at the ten percent

[11] Since there are no time series data, it is not possible to test if markets are integrated, and there are also no data available on freight prices between the five municipalities to examine price differentials net of transport costs.

[12] This is a weighted average, using each food's average budget share amongst the urban households in the five province-level municipalities as the weight. The unweighted average is 27.6 percent.

significance level. The findings from these two empirical exercises suggest that there is not much variation in food prices between rich and poor neighborhoods of the same urban area in Vietnam, but there is considerable variation in prices between urban areas.

Since the variation in food prices is primarily geographic, we next combine the relative prices of all 44 foods with average budget shares from the household survey data to calculate a Törnqvist food price index for each metropolitan area:

$$T = \exp\left[\sum_{j=1}^{J}\left(\frac{S_{kj} + S_{ij}}{2}\right)\ln\left(\frac{P_{ij}}{P_{kj}}\right)\right]$$

where s_{ij} is the average share that item j has in the consumption basket in region i, and s_{kj} is the average budget share in region k, which is the base region, while P_{ij} and P_{kj} are the prices of item j in region i and in the base region. The Törnqvist index uses the arithmetic average of the budget shares in the base region and in region i to weight the logarithm of the price relativities between those two regions. These weighted price relativities are then summed over all J items that comprise the food budget. To see whether the spatial pattern in the food price index differs by income strata, the calculations are carried out four times; first using the average prices in each metropolitan area and then calculating these metropolitan-level average prices separately for each of the three income strata.

The results in Table 3 suggest that the geographic differences in the food price index are largely the same, irrespective of whether prices are from lower, middle or upper income neighborhoods. The lowest food price index is for Can Tho, in the Mekong Delta, where the price index is from 16-18 percentage points below that for Ha Noi (the base region). The second lowest food price index is for Da Nang in the central coast region, at 14-17 percentage points below Ha Noi, and then for Hai Phong in the North, at eight percent below Ha Noi. There is no difference in the food price index between the two major metropolitan areas of Ho Chi Minh City and Ha Noi.

Table 3: Törnqvist Food Price Index Using Prices from Each Income Strata

	All Income Strata	Lower Income	Middle Income	Upper Income
Ha Noi	100.0	100.0	100.0	100.0
Hai Phong	91.8	91.9	92.2	92.1
Da Nang	84.3	83.1	86.2	83.7
Ho Chi Minh City	100.4	101.5	99.7	99.7
Can Tho	82.2	81.8	83.5	81.8

None of the rankings of metropolitan areas in Table 3 would differ if income strata-specific food prices were used to calculate the index. There is slightly more variability in the value of the index across areas when using prices from the lower income strata, due to the price index in Ho Chi Minh City appearing slightly higher than when prices from the other income strata are used. However this is only a small effect and does not weaken the

conclusion that any policy concerns about differences in the cost of living in urban Vietnam should concentrate on the location component and not on any perceived poverty penalty whereby the urban poor face higher food prices than do other urban residents.

4.1 Unit Value Evidence

The evidence presented above is atypical of what is available in developing countries, where outlet-based samples are rare. We therefore turn to unit values from the VHLSS in order to see what these type of data say about food prices. This unit value evidence is what is typically used for developing countries in the literature on whether the poor pay more (Rao 2000; Attanasio and Frayne 2006) and is also used for food demand estimation in developing countries more generally (Deaton 1990).

There are 32 VHLSS food groups with unit values available and also with market prices for one or more specifications that come from within the food group. To provide a parallel to the analysis of market prices reported in Table 1, lower-, middle- and upper-income terciles were formed in terms of per capita household total expenditure. These terciles were formed within each metropolitan area, so the geographic price differences already shown to exist do not determine the composition of each tercile. In this respect, this exercise mimics the way that the neighborhood income strata were formed for the outlet-based sample.

In the first empirical exercise the terciles were formed at the EA level and in the second exercise they were formed directly at the household level. The average unit values for each of the 32 food groups in each of the income terciles were then calculated; in the first exercise it was averages of EA-level averages, and in the second exercise the tercile averages were formed directly from the household-level unit values. Both approaches yield similar results, most probably because with only three surveyed households per EA the initial averaging by cluster makes less difference than it typically would.[13]

The ratios of average unit values in the middle-income and upper-income terciles relative to the average for the lower-income tercile are reported in Table 4, for each of the 32 food groups. A weighted average across the food groups (using budget shares as weights) is also reported at the bottom of the table. The first two columns report the results where the data are at EA-level and the last two columns make comparisons of household-level data. For 26 of the 32 food groups, the average unit values are lower in the low income EAs than they are for the same food groups in middle income EAs. When the comparison is of the high income EAs versus the low income ones, 31 out of the 32 food groups show higher average unit values in the richer EAs, and for 17 of these groups the difference is statistically significant.

[13] Household consumption surveys typically sample at least ten households per cluster. Moreover, demand studies that use unit values from household surveys to proxy for market prices will typically use medians for each cluster, in order to reduce the impact of outliers that come from measurement errors in either quantities or expenditures.

Table 4: Unit Value Evidence on Apparent Price Differences Between Income Groups

	Using EA-level Unit Values		Household-level Unit Values	
VHLSS Food Group	Middle/Low	Upper/Low	Middle/Low	Upper/Low
Plain rice	1.048 **	1.192 ***	1.096 ***	1.223 ***
Sticky rice	1.110 **	1.171 ***	1.035	1.154 ***
Bread, flour	1.082	1.118	1.068	1.120 **
Instant noodles	1.016	1.153 **	1.082	1.139 **
Fresh rice noodle	1.011	1.075	0.962	1.006
Pork	1.022	1.066 ***	1.028 **	1.065 ***
Beef	0.970	1.026	0.999	1.035 *
Chicken	1.033	1.138 ***	1.051	1.150 ***
Duck and other poultry	1.015	1.132 **	1.056	1.120 ***
Cooking oil	1.005	1.047 *	1.023	1.055 ***
Fresh shrimp, fish, seafood	1.202 ***	1.384 ***	1.174 ***	1.441 ***
Dried shrimp and fish	1.209	1.656 ***	1.218	1.837 ***
Eggs	1.023	1.034	1.001	1.022
Tofu	0.982	1.004	0.984	1.023
Fresh peas	0.987	1.061	0.968	0.996
Water morning glory	1.033	1.071	1.002	1.038
Cabbage	1.000	1.003	1.018	0.998
Tomato	0.985	1.026	0.998	0.981
Orange	1.025	1.148 *	1.031	1.072
Banana	1.021	1.060	1.041	1.044
Mango	1.159 **	1.293 ***	1.011	1.198 ***
Fish sauce	1.020	1.178 ***	1.081 **	1.205 ***
Salt	1.008	1.032	1.003	1.076 *
Sugar	0.947 **	0.970	0.993	0.995
Confectionery	1.184 *	1.484 ***	1.063	1.333 ***
Condensed milk	1.208	1.137	1.285 **	1.317 **
Liquid milk	1.063	1.057	1.027	1.037
Alcohol	1.675 ***	3.028 ***	1.440 *	2.154 ***
Beer	1.227 **	1.339 ***	1.231 ***	1.421 ***
Bottled/canned soft drink, water	1.228	1.160	1.013	1.199
Instant coffee, coffee powder	1.359 **	1.487 ***	1.067	1.253
Instant tea powder, dried tea	1.178 **	1.210 **	1.087	1.142 **
Weighted average (unit values)	1.080	1.184	1.082	1.191
Weighted average (prices)	0.990	1.034	0.990	1.034

Note: Weighted averages use budget shares as weights, ***, **, * denote statistically significant differences in average unit value, between middle income and lower income, or upper income and lower income groups.

Averaging across all of the food groups, the unit values are eight percent higher in middle income EAs compared with low income ones, and 18 percent higher in high income EAs compared with low income ones. The results in the last two columns of Table 4, where the comparisons are made using household level unit values without first averaging them to EA level, reveal a very similar pattern; the middle income group of households have average unit values that are eight percent higher than for the low income group, and for the richest group of households the average unit values are 19.1 percent higher than for the poorest group. These differences in unit values across the income groups are much larger than what the outlet-based price survey revealed; the last row in Table 4 contains the mean price relativities between middle-income and lower-income, and between upper-income and lower-income neighborhoods, just for the foods in the price survey that match to the 32 food groups in the consumption survey with unit values available. According to the outlet survey, the prices observed in middle income neighborhoods average one percent lower than those in low income neighborhoods while those in upper income neighborhoods are just three percent higher than in low income neighborhoods.

The reason for the unit value evidence differing from the results of the outlet price survey is because quality is income-dependent and unit values do not hold quality constant. In unreported results, the logarithm of the unit values for each household and each food group were regressed on the logarithm of per capita total household expenditure, the logarithm of household size and dummy variables for each urban area (to control for differences in price level and any other factors that vary between the areas). This double-log specification gives the elasticity of the unit value with respect to total expenditure which Deaton (1990) calls a 'quality elasticity' because it shows how richer households tend to buy higher quality items within a food group, driving the unit value higher for a given level of prices. The regressions show that the quality elasticity is statistically significant and positive for 28 out of 32 of the food groups, with an (budget share-weighted) average value of 0.136. In other words, as household income doubles the unit value would go up by 14 percent holding everything else constant. Therefore comparisons of unit values between rich and poor households, or between rich and poor areas, are not able to make a like-with-like comparison in the way that outlet-based price surveys are.

If unit values had been relied upon as the primary form of evidence in the current study, we would have erroneously concluded that the urban poor in Vietnam faced substantially lower food prices than do other urban dwellers and that therefore real inequality was much less than nominal inequality. We would also wrongly conclude that the differences in the cost of living within urban areas were of a similar magnitude to the differences between urban areas. In fact, the evidence from the price surveys shows that the variation in food prices in urban Vietnam is primarily geographic and that there is almost no difference in the food prices faced by rich and poor within the same urban area. Consequently, calculations of real inequality need to take account of inter-area price differences but not intra-area price differences.

V. Conclusions

In this study the question of whether the poor face higher prices for food has been answered in the specific context of urban Vietnam. A comprehensive outlet-based price survey indicates that there is no evidence that the urban poor are forced to pay more for food than their non-poor neighbors just because of where they live. On average, food prices in the poorest neighborhoods are just 2.5 percent higher than in middle income neighborhoods and 4.5 percent lower than in the upper income neighborhoods of the metropolitan areas studied. If middle-income and upper-income neighborhoods are combined, it is seen that food prices are an average 1.4 percent lower in the poor neighborhoods than elsewhere in these metropolitan areas. These flat price gradients are consistent with the results of previous outlet-based surveys in the United States (Kaufman *et al*. 1997) and also with the only previous evidence from outlet surveys in developing countries (Musgrove and Galindo, 1988).

While there was very little variation in average food prices across rich and poor neighborhoods, there is considerable variation in prices between metropolitan areas. The food price index in the cheapest area – Can Tho in the Mekong Delta – was almost one-fifth less than that in the most expensive areas (Ha Noi and Ho Chi Minh City) and these geographic differences in food prices were the same, irrespective of whether prices were from lower, middle or upper income neighborhoods. Consequently, measurement of real inequality for urban Vietnam requires careful deflation for spatial price differences. But there is no need for spatial deflators to consider income-related price differences in this setting. Similarly, any attempt at income-specific temporal deflation, such as a CPI for the urban poor, simply requires reweighting a given set of price observations to reflect the budget shares of poor households; there is no need to have a separate price collection exercise for a poverty-CPI since food prices facing rich and poor in urban areas appear to be largely the same.

The final conclusion that can be drawn from the results reported here is a methodological one – the question of whether the urban poor face a different set of food prices than do other urban dwellers would get a rather different answer if the analysis had relied primarily on unit values from household surveys. According to unit values, food prices for the richest households appear to be almost one-fifth higher than what the poorest households pay. If it were erroneously concluded that this reflected price differences in the market, rather than the different quality choices made by rich and poor households, analysts might infer that real inequality in urban Vietnam was much less than nominal inequality, and that the differences in the cost of living within urban areas were of a similar magnitude to the differences between urban areas. It is this scope for potentially wrong inferences that leads us to conclude that while unit values may be useful for analyses of household demand responses along the quality margin (McKelvey 2011), they are a misleading proxy for market prices and so do not provide reliable evidence on whether the poor face higher food prices.

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Appendix Table 1: Description of the Items and Target Specifications in the Price Survey

Code	Description of specification	Target brand/specification	unit	Sample size
1011	White rice #1 (lower quality)	Khang Dan, Tap Dao, IR50404, etc	1 kg	197
1012	White rice #2 (premium variety)	Bac Huong, Tam Xoan, etc	1 kg	205
1021	Sticky rice	Nep Nhung, 5-7% broken	1 kg	201
1062	White bread	local brand, not packaged	500g loaf	129
1071	Instant noodles	Hao Hao brand	75 gram packet	208
1081	Fresh rice noodles		1 kg	196
1101	Pork: Rump	Boneless, not pre-packaged	1 kg	208
1102	Pork: Belly	Boneless, not pre-packaged	1 kg	206
1111	Beef	Boneless, not pre-packaged	1 kg	202
1112	Fresh beef rib	Boneless, not pre-packaged	1 kg	194
1131	Battery chicken	Whole body, offal removed, fresh	1 kg	196
1132	Live free range chicken		1 kg	179
1141	Whole local duck		1 kg	173
1161	Pork- pie		1 kg	188
1172	Cooking oil	Neptune	1 liter bottle	207
1181	Carp	Approximate size: 2 carp per kg	1 kg	162
1183	Salt-water shrimp	Head-to-tail length 7-10cm	1 kg	174
1184	Fresh-water shrimp	Head-to-tail length 3-5cm	1 kg	159
1191	Salted fish		1 kg	171
1211	Chicken eggs	Approximate size: 65 grams per egg	10 eggs	205
1221	Tofu		1 kg	194
1251	Fresh pea		1 kg	200
1261	Water morning glory		1 kg	204
1281	Cabbage	Size: 500 grams per cabbage	1 kg	205
1291	Tomato	Size: 100-125 grams per tomato	1 kg	204
1311	Orange	Local (green); 200-250 grams each	1 kg	200
1321	Banana		1 kg	196
1331	Mango	From south of Vietnam; 250g each	1 kg	190
1351	Fish sauce	Nam Ngu - Chinsu	500 ml bottle	204
1361	Salt	MS brand	1 kg	202
1391	White sugar	Bien Hoa brand	1 kg	208
1401	Fruit candy	Hai Ha	100 gram packet	199
1411	Condensed milk	Ong Tho	380 gram can	205
1431	Liquid milk (UHT) carton	Vinamilk	180 ml	206
1441	Vodka	Ha Noi	300 ml bottle	171
1451	Bottled beer	Ha Noi or Sai Gon brand	450 ml bottle	159
1461	Soft drink	Coca Cola	330 ml can	200
1471	Fruit juice	Twister	300 ml can	186
1481	Bottled water	La Vie	19 litre	121
1511	Powdered coffee	Trung Nguyen	250 gram packet	187
1531	Dried tea	Thai Nguyen	1 kg	194
1561	Outdoor meals - breakfast	Pho, beef, medium bowl	serving	186
1562	Outdoor meals - lunch/dinner	Rice, fried meat, vegetables	serving	185
1563	Restaurant meals	6-seat, 6-dish meal (excl. drinks)	serving	130

Source: Author's calculations from survey data provided by Vietnam General Statistics Office (GSO).

Appendix Table 2: Concordance Between Foods in Price Survey and Groups in Consumption Survey

Code	Price survey item	Consumption survey food group	Code	UV	Mapping
1011	White rice #1 (lower quality)	Plain rice	101	1	2
1012	White rice #2 (premium variety)	Plain rice	101	1	2
1021	Sticky rice	Sticky rice	102	1	1
1062	White bread	Bread, flour	106	1	1
1071	Instant noodles	Instant noodles	107	1	1
1081	Fresh rice noodles	Fresh rice noodle	108	1	1
1101	Pork: Rump	Pork	110	1	2
1102	Pork: Belly	Pork	110	1	2
1111	Beef	Beef	111	1	2
1112	Fresh beef rib	Beef	111	1	2
1131	Battery chicken	Chicken meat	113	1	2
1132	Live free range chicken	Chicken meat	113	1	2
1141	Whole local duck	Duck and other poultry	114	1	1
1161	Pork- pie	Processed meat	116	0	1
1172	Cooking oil	Cooking oil	117	1	1
1181	Carp	Fresh shrimp, fish	118	1	3
1183	Salt-water shrimp	Fresh shrimp, fish	118	1	3
1184	Fresh-water shrimp	Fresh shrimp, fish	118	1	3
1191	Salted fish	Dried shrimp and fish	119	1	1
1211	Chicken eggs	Eggs	121	1	1
1221	Tofu	Tofu	122	1	1
1251	Fresh pea	Fresh peas	125	1	1
1261	Water morning glory	Morning glory	126	1	1
1281	Cabbage	Cabbage	128	1	1
1291	Tomato	Tomato	129	1	1
1311	Orange	Orange	131	1	1
1321	Banana	Banana	132	1	1
1331	Mango	Mango	133	1	1
1351	Fish sauce	Fish sauce	135	1	1
1361	Salt	Salt	136	1	1
1391	White sugar	Sugar	139	1	1
1401	Fruit candy	Confectionery	140	1	1
1411	Condensed milk	Condensed milk	141	1	1
1431	Liquid milk (UHT) carton	Fresh milk	143	1	1
1441	Vodka	Alcohol	144	1	1
1451	Bottled beer	Beer	145	1	1
1461	Soft drink	Bottled and canned water, soft drinks	146	1	3
1471	Fruit juice	Bottled and canned water, soft drinks	146	1	3
1481	Bottled water	Bottled and canned water, soft drinks	146	1	3
1511	Powdered coffee	Instant coffee, coffee powder	148	1	1
1531	Dried tea	Instant tea powder, other dried tea	150	1	1
1561	Outdoor meals - breakfast	Outdoor meals	153	0	2
1562	Outdoor meals - lunch/dinner	Outdoor meals	153	0	2
1563	Restaurant meals	Other food and drinks	154	0	1

Source: Vietnam Household Living Standards Survey and Spatial Cost of Living Survey, GSO, Vietnam. "Mapping" is the number of price survey items mapping to each consumption survey group, "UV"=1 if unit value available, 0 if not.