

Impact of Quality Characteristics on Demand for Chicken in Viet Nam

Jennifer Ifft, David Roland-Holst, and David Zilberman

We estimate the demand for different varieties of chicken in Viet Nam. We find that higher incomes are linked to consumption of traditionally produced free-range chicken; and that, in general, there is price substitution between different varieties of chicken. These findings indicate that quality plays a large role in demand for chicken in Viet Nam.



Informal or open air markets account for 95% of chicken purchased in Hanoi.

The difference between traditional, extensive and modern, intensive livestock production systems has several economic and environmental dimensions, and the debate over these two systems covers issues of global concern. The growing demand for meat will have major implications for crop systems, environmental quality, and food security. Livestock systems can generate large negative side effects such as diseases like highly pathogenic avian influenza (HPAI) that can be passed to humans.

Gaining a better understanding of consumers' preferences that are driving not only demand for meat quantity but also meat quality in Asian

countries, can improve predictions of the dynamics of the livestock sectors and policies to affect them to improve human and environmental health.

The growth of intensive livestock production can be largely attributed to income and population growth increasing demand for protein. However, demand for quality characteristics can also impact the development of livestock production systems. The differences between livestock production systems can have a significant impact on meat quality. In several wealthy countries, the past growth of intensive livestock systems has been followed by a current trend of growing demand for meat that is produced in systems similar to traditional livestock systems, such as free-range, local, and organic. Consumer meat choices are often motivated not only by demand for environmental sustainability, but also demand for food quality. Demand for meat quality in Viet Nam is often linked to the type of production system, with a strong preference for meat from more traditional, or less intensive, production systems.

Food demand research in Asia often focuses on a trend toward increasing demand for food from modern production systems. Modern foods have largely been defined as those that are more processed or closer to "ready-to-eat" form, or foods that are purchased in modern retail outlets such as supermarkets. Many researchers have observed that increased income levels were associated with significant increases in the demand for such food types in developing countries in Asia, including Viet Nam. Along with increasing demand for protein, this has led to the idea that consumers in Asian countries are shifting consumption to modern food products, or that preferences are being "westernized." Although

this certainly is the case for several types of food, we have found evidence from Viet Nam that small-scale poultry production systems, which often support poor rural households, produce differentiated products that command a significant premium in urban areas.

Addressing demand for quality in chicken is especially relevant for Viet Nam. Viet Nam has experienced several HPAI outbreaks, and HPAI is now endemic in local wild and domestic poultry populations. The major quality difference in chicken (as well as other types of poultry), as perceived by consumers in Viet Nam, is related to the variety of chicken. Native breeds that are produced free-range on a scavenging diet (backyard chickens) have a 100% retail premium in Hanoi, the capital and second largest urban area in Viet Nam. As evidenced by the price differential, backyard chickens are considered to be superior in terms of flavor and texture to exotic varieties that are raised on concentrate feed (translated as "industrial chicken"). A third variety of chicken is "crossbred chicken," which is a cross between backyard and industrial varieties, both in terms of breeding and production methods. Industrial chicken is sold in a more processed form, while backyard chicken is generally sold with minimal processing and is rarely available in supermarkets.

Production characteristics of all these types of chicken are directly linked to quality characteristics for which urban consumers have demonstrated a large willingness to pay. Backyard chickens are more resistant to disease, but are also more likely to be exposed to wild birds that carry HPAI viruses. Industrial chickens might be more protected from the spread of viruses due to being raised in a confined environment, but that confined environment (crowding,

Table 1. Impact of Chicken Characteristics on Average Prices per Kg, in U.S. Cents

	Backyard Chicken	Crossbred Chicken	Industrial Chicken
Purchased at Supermarket	0.1	0.09	0.3**
Purchased in Countryside	-0.3***	-0.03	0.09
Purchased Live	-80.1***	3.3	
Purchased in Cuts	-7.9*	-21.7***	
Purchased Whole			14.2**
Weekly Total Food Expenditure	0.5	1.0	0.7**

* significant at 10%, ** significant at 5%, *** significant at 1%

dampness, and lack of sunlight) also can contribute to the multiplication and spread of HPAI viruses.

Awareness of how different breeds of chickens are raised is high amongst urban households, with consumers (correctly) linking breed and production environment to desired meat quality characteristics. Supermarkets have grown in Hanoi, but are still not popular places to purchase meat. The vast majority of households prefer to consume fresh meat that is purchased daily in small markets near their home. Little research on chicken demand has been undertaken in Viet Nam, although avian influenza outbreaks have led to increased interest in the development of the poultry sector in Vietnam.

Data

Most existing market-level datasets available for Viet Nam are not appropriate for measuring chicken demand. Open air or informal markets account for 95% of chicken purchased in Hanoi, so household survey data is essential for demand analysis. Census and living standards (LSMS) surveys tend to group together all types of poultry consumption, or do not distinguish between different types of chicken. To estimate a demand for chicken that takes quality into account, we utilize a unique survey undertaken for a Food and Agricultural Organization (FAO) project in 2007. This survey has 1,200 observations, and used spatial and systematic sampling to obtain a sample that is representative of all households living in the urban districts of Hanoi.

Households were surveyed for demographic characteristics, attitudes toward chicken, shopping habits, chicken consumption habits, and willingness to pay for safety-guaranteed chicken.

The survey differentiated between consumption of backyard, crossbred, and industrial chicken, which together make up most of the quality-related variation in chicken in Viet Nam. Households indicated average weekly consumption and average prices paid for each type of chicken. Although chicken is a relatively homogeneous product in Hanoi, a few additional characteristics were also collected. Households also indicated their weekly expenditure on all types of food eaten both inside and outside of the home, which is a good measure of income. Because a large portion of households in our sample consume more than one type of chicken, we are able to estimate a demand system for different types of chicken, and separating varieties of chicken will control for a large source of quality in chicken consumption.

Empirical Analysis

Our demand system analysis covers the factors influencing chicken prices, choice of chicken variety, and quantity of chicken purchased. Analysis of reported prices indicates that whole chicken, which is the least processed of all slaughtered cuts, is the most expensive. Likewise, buying chicken cuts decreases price. Industrial and crossbred chickens are rarely purchased live, but purchase of live backyard chickens appears to significantly lower the price.

Although slaughter costs are reflected in prices, whole chicken is more valuable than chicken parts. Wealth and family structure are not correlated with price, which indicates that chicken is a fairly homogenous product. Otherwise, differentiated meat characteristics marketed toward specific age groups or wealth levels would be reflected in prices. Processed chicken parts appear to be the least valuable of all forms of chicken being sold, which indicates that households on average have not shifted preferences to more processed chicken.

Although household size and age structure appear not to impact choice of chicken variety—preferences, attitudes, and wealth have a large impact. Households that indicate a greater concern for taste are more likely to purchase backyard chicken, and less likely to purchase industrial chicken. Households that report being concerned about prices are more likely to purchase industrial and crossbred chicken, and less likely to purchase backyard chicken. Vietnamese households, on average, clearly prefer backyard chicken as long as they can afford it.

Households were also surveyed on their attitudes toward different factors related to food safety of chicken, but the results regarding choice of variety are somewhat ambiguous. Households that are more concerned about marketplace hygiene are more likely to buy backyard chicken, which is almost exclusively sold in open air markets. These households are also less likely to purchase crossbred and industrial chicken. This might reflect a belief that backyard chickens are healthier than other varieties. Households that report buying privately labeled chicken are less likely to buy backyard chicken and more likely to purchase crossbred chicken, which indicates that private companies tend not to work with backyard chicken farmers. A multiplicative index for risk, which gave greater weight to households that were highly concerned

about safety risks across several categories, was also used to predict the type of chicken purchased. Households with a higher score are slightly more likely to purchase crossbred and industrial chicken, and less likely to purchase backyard chicken, although all coefficients were of relatively low magnitude.

We estimate a demand system for chicken that allows us to calculate the impact of price and income on quantity of chicken purchases. The results of the demand-system estimation are contained in Table 2, which reports own-price, cross-price, and expenditure (income) elasticities of demand for the alternative chicken products available to Vietnamese households. Each elasticity measures the percent change in chicken consumption associated with a 1% increase in the explanatory factor. Thus, the own-price elasticities (indicated in italics in the table) represent the estimated percent change in consumption for a 1% increase in price, and the cross-price elasticities estimate the percent change in consumption of product X for a 1% increase in the price of product Y. For example, an increase of 1% in the price of industrial chicken is predicted to increase demand for backyard chicken by 1.4%. Finally, the expenditure elasticities in the bottom row indicate that Vietnamese consumers purchase more backyard and crossbred chicken at higher income levels, but buy less industrial chicken.

We proxy education for total food expenditure in a different specification, as a robustness check for any potential endogeneity issues, and find consistent results. Although unlikely, it might be possible that households that like chicken will increase food expenditure. Education is highly correlated with total food expenditure in our sample. We also address potential remaining quality variation in prices as a further robustness check. This is done by identifying the portion of prices that is related to quality factors, and removing this amount to calculate “quality-adjusted prices.” With

Table 2. Results of Systems Demand Estimation, % Change (Elasticities)

	Backyard Chicken	Crossbred Chicken	Industrial Chicken
	-----Kg/Week-----		
<i>Backyard Chicken Price</i>	-1.4***	0.7***	0.5***
<i>Crossbred Chicken Price</i>	1.3***	-6.1***	0.7
<i>Industrial Chicken Price</i>	1.4***	1.1	0.9**
<i>Total Food Expenditure</i>	0.93***	1.18***	-0.48*
	* significant at 10%, ** significant at 5%, *** significant at 1%		

this quality adjustment, income effect and cross-price effects maintain a similar sign and magnitude, but own-price effects become statistically insignificant.

The loss of significance in own-price coefficients is likely due to our quality adjustment procedure, or the discreteness of chicken in Hanoi as well as overall consumption. Households above a certain minimum income would likely consume a certain amount of protein in each meal. For whatever meat (or protein) is selected, a certain quantity would be necessary. If this type of behavior pattern is true, then we may see more of a substitution effect than an own-price effect. This is especially true for chicken, which is often either purchased whole or in half. Further, our quality adjustment of price may net out within-variety quality substitution. The robustness of our model is strengthened by the persistence of income and cross-price effects.

Conclusion

Our results indicate that households regularly differentiate between different varieties of chicken, and that consumption of backyard chicken is correlated with higher incomes. Backyard chicken is prepared in a “traditional” manner in Viet Nam, and tends to be sold in a less processed form. It is also rarely purchased at grocery stores or other formal outlets. Most households in Hanoi have refrigerators, and it is common for women to work outside of the home. This contradicts findings that “modern” and more convenient foods from more formal supply chains are

more income elastic, and also indicates that the trend of increasing demand for protein and convenient and “modern” foods may not apply to all types of foods.

Our findings also indicate that incorporating small poultry producers into modern supply chains is necessary for ensuring safe movement of poultry. The chicken from these producers is a premium product, and any price increases could lead to increasing informality. The private sector might also be interested in finding ways to cost-effectively procure and market higher quality chicken. Chicken from smallholders already controls a large market share due to its quality advantage. Like fair trade, organic, and other food labels, a credible labeling scheme in Viet Nam could take advantage of an existing market to increase rural incomes and improve public health.

Jennifer Ifft is a Ph.D. candidate, David Roland-Holst is an adjunct professor, and David Zilberman is a professor, all in the Department of Agricultural and Resource Economics at UC Berkeley. The authors can be contacted by e-mail at jiff@are.berkeley.edu, dwrh@are.berkeley.edu, and zilber@are.berkeley.edu, respectively.