

# Changing Consumer Demand for Meat: The U.S Example, 1970 - 2000

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**Abstract:** U.S. beef consumption has declined, while poultry consumption has increased significantly over the past three decades. Preference changes, relative prices, and available leisure time are important determinants shaping U.S. consumer demand for meat products.

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## Introduction

The positive correspondence between income levels and meat consumption is an accepted theoretical result that appears to hold empirically, both within and between countries. Between-country comparisons of food budget shares allocated to meat consumption using the World Bank consumption data indicate that consumers in high-income countries tend to allocate larger shares of their food budget to meat expenditures compared with consumers in low-income countries (Chapter 2). The intuition underlying this observation is straightforward: consumers in high-income countries face less restrictive budget constraints, and (typically) lower relative meat prices than consumers in low-income countries. Figure 2 in the introduction section of this report shows a comparison of 1996 budget share allocations between food items made by consumers in the United States and Kenya. American consumers spent 27 percent of their food budgets on meat products, while Kenyan consumers allocated just 6 percent of food expenditures to meats.

The income level/meat consumption correspondence appears to hold within countries as well. Recent U.S. Consumer Expenditure Studies suggest that in the United States, high-income consumers allocate greater proportions of their food budgets to meat products than lower income consumers (USDA, 2001). At the next level of disaggregation, however—consumers allocating budget shares between meat varieties—

income levels don't tell the whole story. Such factors as preference changes, relative prices, and available leisure time may drive consumers' allocation of their meat budgets between beef, chicken, and pork.

What follows is a brief presentation of how U.S. meat consumption patterns have changed over the past 30 years. Clearly, the substitution of poultry meat in place of beef by U.S. consumers is the most significant change that has occurred since 1970. While the changed dynamics of U.S. meat demand are not themselves at issue, identification of factors that cause American consumers to eat less beef now than in the past continues to be a source of controversy among economists.

The ongoing analysis of U.S. consumer demand for meat products is a constructive exercise, for several reasons. Foremost among them are the important implications that changed U.S. meat consumption patterns hold for the dynamics of international meat trade. Moreover, the economic and cultural changes that drive meat consumption in the United States are likely to be more or less duplicated by what are now, low- and middle-income countries. Study of U.S. meat consumption patterns therefore, may provide useful insight into how consumer choices are likely to change as economies expand, consumer incomes grow, and meat budgets increase.

## Background

American meals have traditionally centered around the consumption of meat. Today it is common to observe

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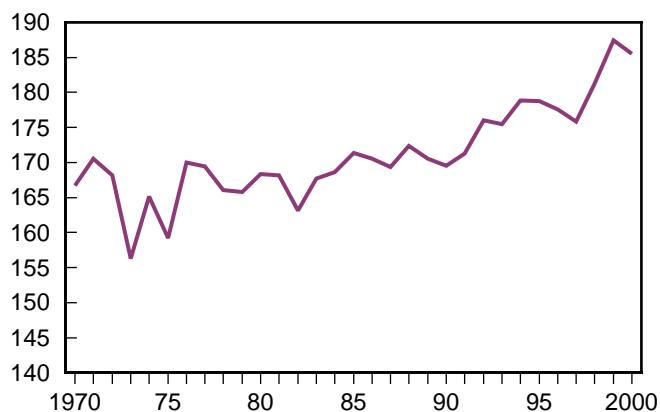
meat and meat products being served at each daily meal: ham, bacon, and sausage at breakfast, a meat sandwich at lunch, and a cut of red meat or poultry at dinner. Fortuitously, American consumers' revealed tastes and preferences for meat are well accommodated by the ample resource base of the United States. The extensive U.S. landbase supports production of feedgrains and protein crops necessary for the manufacture of livestock/poultry feed, as well as pastures and rangelands to graze cattle and sheep.

At the beginning of the 21<sup>st</sup> century, Americans are consuming greater quantities of meat products than in the past. United States Department of Agriculture statistics indicate that U.S. per capita meat consumption increased more than 11 percent from 1970-2000 (fig. E-1). However, data also show that significant within-category changes have occurred since the mid-1970s (fig. E-2). U.S. per capita consumption of poultry products has increased dramatically, while per capita beef and veal consumption have declined.

Economists have proposed numerous hypotheses to explain changes in U.S. consumer substitution of poultry in place of beef. Applied analysis has focused on such factors as lower relative poultry prices and consumer preference structures altered by health concerns. But, binding time constraints of increased numbers of women in the workforce may also direct meat consumption toward categories in which poultry products predominate—those that favor quick preparation and fast food choices.

Figure E-1  
**Total U.S. per capita consumption of red meat and poultry**

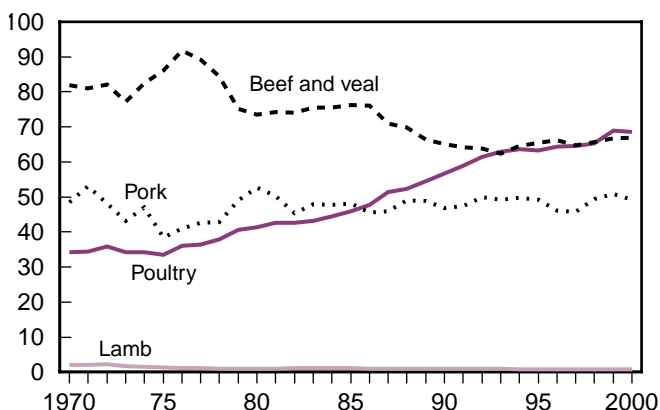
Mil. lb, boneless retail equivalent



Source: Economic Research Service, USDA.

Figure E-2  
**U.S. per capita consumption of red meats and poultry**

Mil. lb, boneless retail equivalent



Source: Economic Research Service, USDA.

### Per Capita U.S. Meat Consumption, 1970 - 2000

On a per capita basis, Americans consumed 19 more pounds (lb) of red meat (beef, veal, pork, lamb and mutton) and poultry (chicken and turkey) in 2000, than in 1970. Poultry consumption accounts for almost all of the increase (+34 lb), while beef and veal consumption declined by 15 lb. Slight increases in pork consumption (+1 lb) balanced small declines in lamb and mutton (-1 lb). Figure E-3 shows how Americans re-allocated their meat consumption-set over the 30-year period. Comparison of the consumption percentages in the graph indicates an unambiguous shift from red meats to poultry. In 1970, red meat constituted 79 percent of total meat consumption and poultry 21 percent. Thirty years later, red meat accounts for 64 percent of meat consumption and poultry 37 percent, on a pound per capita basis.<sup>2</sup>

### Less Beef, More Chicken: Why?

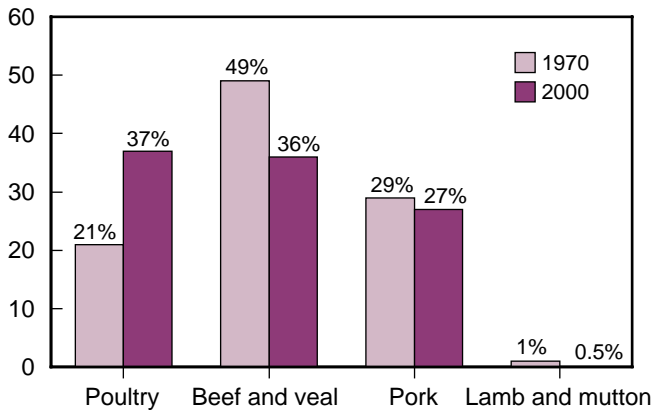
Numerous hypotheses exist to explain why Americans are currently eating more poultry and less beef than 30 years ago. Most explanations approach the problem from either a demand or a supply perspective. Demand-side arguments fall into one of two categories: (1) American consumers' preference structures have changed, or (2) relative price changes explain substitution between beef and poultry. Supply-side

<sup>2</sup> The shares of red meat and poultry do not add up to 100 due to rounding.

Figure E-3

**U.S. per capita meat consumption**

Mil. lb, boneless retail equivalent



Source: Economic Research Service, USDA.

arguments are less direct, focusing on either (1) the supply factors that may have caused relative poultry prices to fall; or (2) explicit inclusion of supply factors in demand analysis models. It has been shown that models excluding supply factors can yield results falsely indicating changed consumer preferences.

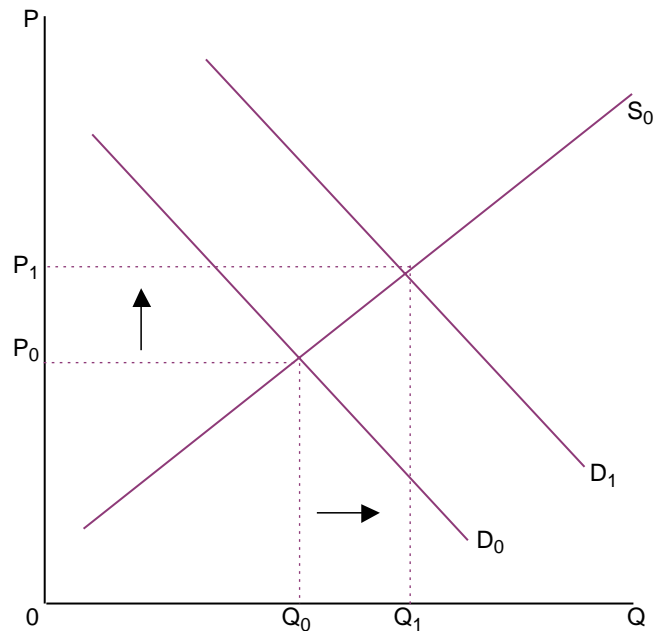
One demand-side explanation of changing U.S. meat consumption patterns focuses on consumer preference structures.<sup>3</sup> Many economists argue that the long-term secular decline in beef consumption reflects a fundamental change in American consumers' preference structures. That is, preferences today reflect a different set of likes and dislikes than in the past. Increased consumption of poultry in place of beef is an expression of consumers' (new) preference for meat products possessing desirable health characteristics, such as low(er) saturated animal fats, and low(er) cholesterol levels (Moschini and Meilke, 1989).

Greater poultry consumption caused by changed consumer preferences can be illustrated with simple demand and supply analysis. In figure E-4, aggregate U.S. demand and supply for poultry are depicted in price-quantity space, with linear functions labeled  $D_0$  and  $S_0$ , respectively. Changed consumer preference structures for meat, in favor of poultry, causes the aggregate demand curve to shift outward to  $D_1$ , where

<sup>3</sup> Economists hypothesize that consumers possess unique preference structures, which are sets of prioritized "likes" and "dislikes". Consumers base consumption/expenditure decisions on their preference structures.

Figure E-4

**Greater poultry consumption caused by changed consumer preferences**



Source: Economic Research Service, USDA.

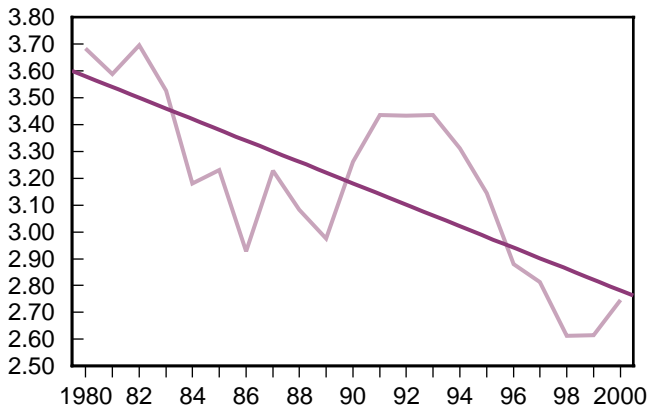
consumers consume a greater quantity,  $0Q_1$ , than previously, when  $0Q_0$  was consumed.

Another demand-side argument favored by some economists assumes that consumer preferences exhibit stable properties over time, and that in fact, changes in relative meat prices explain consumption substitution dynamics (Chalfant and Alston, 1993). This argument essentially claims for example, that Americans consume more poultry than in the past because its price in terms of beef has declined. Figure E-5 illustrates this view, in part. The graph depicts the relationship between the price of whole chickens in terms of round roast beef. In 2000, fewer units of beef were necessary to exchange for a unit of whole chicken, than in 1970. In this context, increased consumption of poultry and lower beef consumption is simply an application of the microeconomic axiom, which states that when (poultry) prices decrease, quantity demanded increases. Consumer response to lower poultry prices is depicted in figure E-6, as a movement along a curve,  $D_0$ , that represents aggregate U.S. consumer demand for poultry. At the lower poultry price  $P_1$ , consumers are willing and able to consume  $0Q_1$ . This quantity is greater than  $0Q_0$ , the quantity demanded at the higher poultry price  $P_0$ .

Figure E-5

**Relative U.S. retail price of whole chicken in terms of round roast beef**

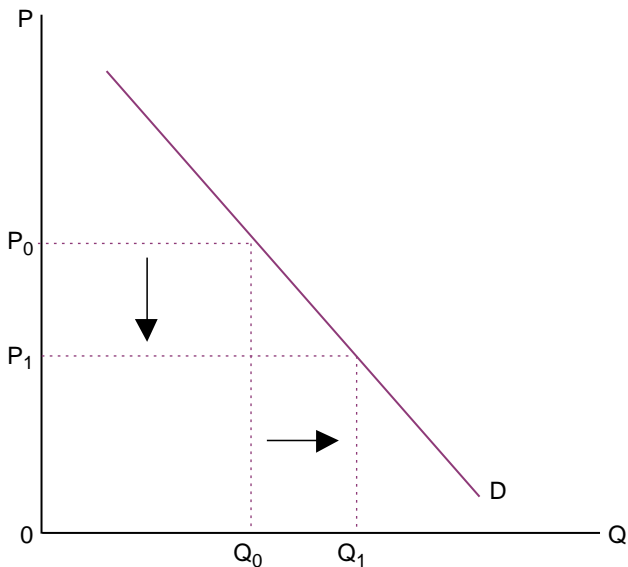
\$/lb round roast beef / \$/lb whole chicken



Source: Bureau of Labor Statistics, USDC.

Figure E-6

**Change in quantity of poultry demanded by U.S. consumers in response to lower poultry prices**



Source: Economic Research Service, USDA.

Related to the relative price argument, is an extension of Becker’s (1976) time value model to explain American’s increased consumption of poultry. The substance of this view focuses on the movement of women into the U.S. workforce, which reduces the typical family’s supply of leisure time (typically, by more than 40 hours per week), thus increasing its value. With almost 60 percent of American women working outside the home—up from 40 percent in 1970—the value of reduced family leisure time increases (U.S. Department of Commerce, 2001).

Consequently many families allocate their (more) valuable leisure time by substituting away from time-intensive meal ingredients, and toward consumption of products that require less time to prepare. Because many traditional American beef dishes require significant preparation time, it is reasonable to conclude that families are substituting away from beef, whose relative price has increased when the value of preparation time is factored in, toward the many recently developed poultry products, which require less time to prepare.

Indeed, the U.S. poultry industry has been highly proactive in development of products requiring less preparation time. Examples include skinless, boneless chicken breasts, pre-marinated cuts, and micro-waveable chicken dishes. Another related innovation is the chicken nugget, which was first available in fast-food restaurants. Nuggets, together with chicken-based sandwiches, are an acknowledgment by the poultry industry of the importance of away-from-home meal consumption.

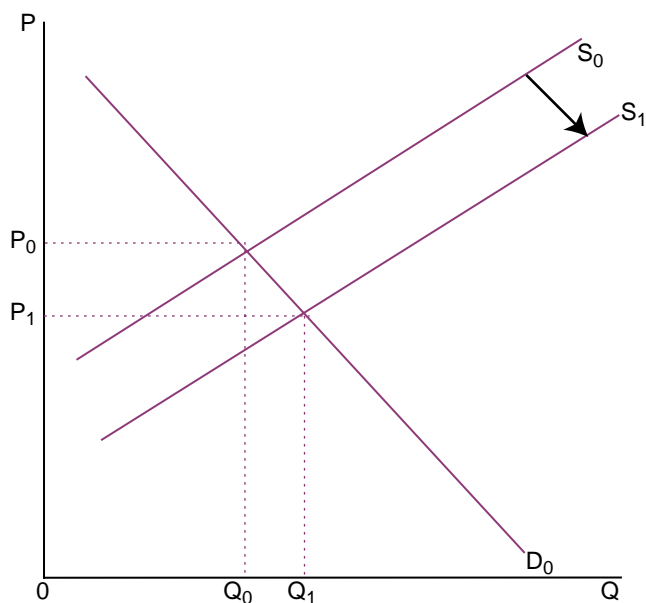
**Supply-side Factors May Also Be Important in Understanding Changing Meat Consumption Patterns**

The results of some research that focuses on supply variables as explanatory factors of increased U.S. poultry consumption provides support for the relative price argument, over the changed preference structure hypothesis. Fulginiti (1976) identifies higher adoption rates of new technology by the U.S. poultry industry, relative to the U.S. red meat industry, as the cause of lower poultry prices. In figure E-7, new poultry production technology shifts the aggregate U.S. poultry supply curve outward to  $S_1$ . She thus argues that greater poultry consumption ( $0Q_1$ ) is the outcome of lower equilibrium prices ( $P_1$ ) generated by greater supplies of poultry, rather than changed consumer preferences as depicted in figure E-4.

Unlike many demand studies, Eales and Unnevehr (1993) take explicit account of supply-side variables in their model of U.S. meat demand. They found that inclusion of factors such as livestock production costs and technical change indicators eliminate evidence of preference structure changes in U.S. beef demand. At the same time they note that evidence of changed consumer attitudes toward meat consumption exists, and that the “answer” to the problem of changing U.S. patterns of meat consumption likely lies in the dynamics of simultaneous shifts of aggregate supply and demand curves for meat.

Figure E-7

**New poultry production technology shifts aggregate U.S. poultry supply outward**



Source: Economic Research Service, USDA.

**Beef Industry Response to Lower Consumption Levels**

Lower beef consumption levels in the early 1970s induced the cattle industry to accede to consumer advocate group claims that heavy marbling in U.S. beef cuts (i.e., relatively high levels of intra-muscular fat, and/or large amounts of external carcass fat trim) was causing health-conscious consumers to reduce beef consumption. The cattle industry supported changes to U.S. beef grade standards, whose purpose was to better meet perceived consumer demands, at prices acceptable to beef producers. The new set of U.S. grade standards for beef essentially made it easier for carcasses with less marbling to qualify for higher grade categories. That is, some carcasses that would grade “Select” (at that time, termed “Good”) on the basis of marbling (or, fat content) under the old grade standard, would grade “Choice” or above, under the new set of grade standards instituted in 1976.

Research suggests that the availability of leaner beef, in general, had no effect on consumer demand. Nelson (1977) found that, “overall demand for beef has not been affected” by the revised set of U.S. grade standards. In fact, 24 years later, industry perceptions of consumer preferences appear to have rotated 180 degrees. The industry, together with beef retailers, now

perceive that U.S. consumers want consistently flavorful, tender, and juicy beef—characteristics associated with a relatively high degree of marbling. To meet consumer demands for a specific set of beef characteristics, an increasing number of U.S. beef producers and retailers have instituted their own “branded products” line of beef. Branded product lines of beef involve some degree of identity preservation of animals bearing specified attributes, from the producer level of the marketing chain, through to the retailer. Branded beef product lines are rapidly supplanting U.S. grade standards.

In a further effort to lure consumers back to beef, processors are attempting to duplicate the success of the poultry industry by developing and marketing beef products that economize on preparation time. Marinated, spiced, partially cooked cuts of beef are becoming more readily available at retail outlets. The beef industry has also recently engaged in generic advertising campaigns (“Beef: It’s What’s For Dinner”), in parallel with the pork industry’s “Pork: The Other White Meat” campaign. The returns to generic advertising are difficult to assess, however.<sup>4</sup>

**Trade Implications of Increased U.S. Poultry Consumption**

The pronounced preference of American consumers for poultry parts that yield white meat—as expressed by the ongoing popularity of the skinless, boneless chicken breast—is a key component in the development of the U.S. poultry export industry. In 2000, the United States exported poultry parts valued at almost \$2 billion. In 1975, the value of poultry exports was less than \$50 million.

Prior to the 1970s, poultry was largely retailed on a “whole bird” basis. Chicken meat sold as parts was a small component of the domestic U.S. market. Chicken meat retailed as parts came about largely as a consequence of the inspection process at the slaughterhouse level; that is, the carcass of a whole chicken that failed inspection, would undergo a cutting process for removal of the part of the whole bird that caused inspection failure. The remainder of the bird was then further broken down and marketed as chicken parts.

Price signals and disappearance rates began to indicate to processors that consumers preferred particular

<sup>4</sup> Special Symposium on Commodity Promotion Research, 1999.



chicken parts rather than whole birds. To satisfy consumers, processors began to break whole chickens into parts for retail sales. Trays of whole birds broken into constituent parts evolved into packages/bags of drumsticks, wings, breasts, etc. Technology and consumer research yielded the skinless, boneless breast product in the early 1990s (Fulginiti, 1996). The popularity of this particular cut represents a clear industry success in developing and marketing a product bearing a set of desirable characteristics—fast cooking white meat with perceived health benefits—at a price that consumers are willing and able to pay.

The popularity of skinless, boneless chicken breast meat in the United States gave rise to enormous quantities of poultry parts less desirable to U.S. consumers—dark meat, primarily leg-quarters. Large supplies of low-cost, dark U.S. chicken meat coincided however, with the relaxation of selected policy constraints to international meat trade, and, to growing incomes in a part of the world where consumers prefer dark poultry meat: Asia and Russia. The preference of Asian consumers for dark poultry meat is captured in figure E-8, which contrasts the relative price of (dark) leg meat in terms of (white) breast meat, in Japan and in the United States. In the Russian case, import demand for U.S. leg-quarters is the result of the breakdown of trade restrictions previously imposed by the Communist government, and of the ability of the highly efficient U.S. poultry industry to significantly under-price other animal protein produced in Russia.

U.S. trade statistics graphed over time in figure E-9 indicate that Asia and Russia together provide an

important outlet for U.S. dark meat parts, which might otherwise be rendered or used as an ingredient in lower valued food products. Breast-meat driven poultry production, and limited U.S. consumer demand for dark meat parts imply that Asian and Russian buyers effectively face an elastic (excess) supply of U.S. dark meat poultry parts.<sup>5</sup> Domestic prices for dark meat parts would likely be lower in the absence of Asian and Russian excess demand.

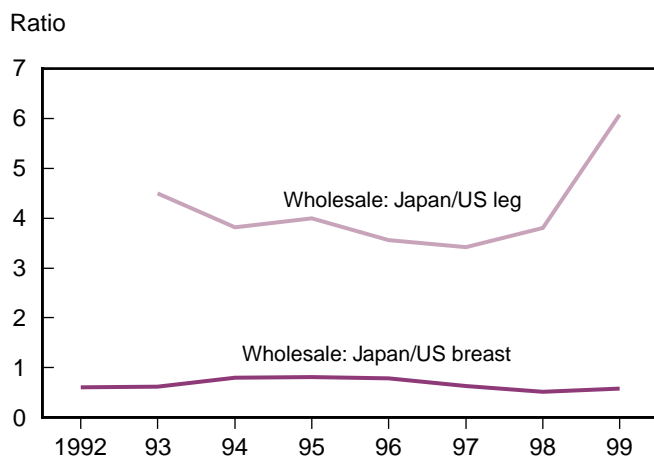
### White Meat and Dark Meat Prices: What Comes First, the Chicken Or the Egg?<sup>6</sup>

Identifying the relationship between dark and white meat prices is difficult because leg-quarters and breasts are joint products. That is, white and dark meats are produced in relatively fixed proportions from the whole bird: for every chicken slaughtered there are always two leg-quarters and two breasts. As demand expands in one market, the meat price in that market rises and more birds are slaughtered. Thus, outputs of both white and dark meat are higher, implying that the

<sup>5</sup> 1994-1995 price series for domestic leg-quarters indicate that strong U.S. exports of dark meat products to Russia increased the leg-quarter prices, and induced higher U.S. poultry production. Increased production in turn increased the quantity of breast-meat products supplied to the domestic U.S. market, and lowered equilibrium prices of U.S. breast-meat products. Lower priced breast-meat products likely intensified competition between poultry and beef for U.S. consumers' food dollar during this period.

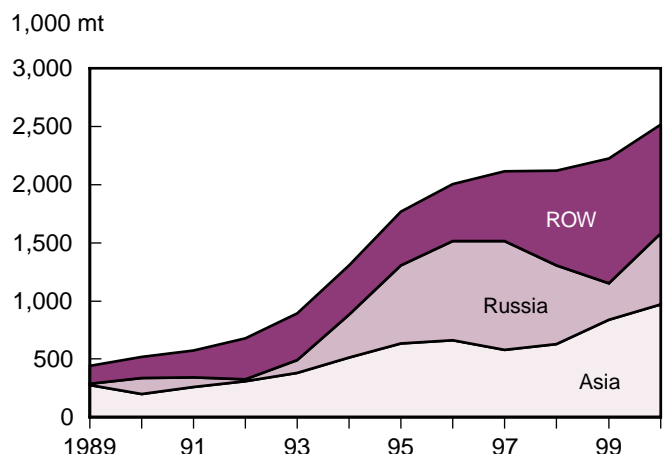
<sup>6</sup> This section based on extensive comments from Philip L. Paarlberg, Professor of Agricultural Economics, Purdue University, West Lafayette, Indiana 47907.

Figure E-8  
Ratio of Japan / U.S. broiler part prices



Source: Dyck and Nelson, 2000.

Figure E-9  
Country shares of U.S. chicken exports



Source: Economic Research Service, USDA.

price of the meat not experiencing a demand expansion would decline.

In the case of poultry meat, demand for both white and dark meat have expanded at roughly the same time. As discussed above, the demand for white meat in the United States expanded rapidly in the late 1980s and throughout the 1990s. Over the same period, export demand expanded due to income growth overseas and reduced import barriers in key Asian nations and in Russia. The U.S. demand expansion for white meat increases breast prices, and exerts downward pressure on the dark meat price. Lower dark meat prices help to boost U.S. leg-quarter exports. In domestic U.S. markets, the export demand expansion raises the dark meat price and puts downward pressure on the price of breast meat. Lower white meat prices benefit U.S. consumers.

## Conclusions

Most Americans continue to center meals around meat consumption. U.S. consumption data indicate that per capita consumption of red meat and poultry has increased since 1970. Most of the increase is accounted for by poultry consumption, while consumption of beef has decreased. Economists have posited a number of hypotheses to explain the substitution of poultry in place of beef consumption. Changes in consumers' preference structure based on health concerns could explain part of the substitution. Moreover, increased numbers of women in the U.S. workforce may cause many families to switch to more timesaving poultry dishes in place of more time/labor intensive preparation often necessary with beef. Another explanation for increased poultry consumption focuses on higher beef prices relative to poultry, and the simple tendency for consumers to choose greater quantities of lower priced goods.

The beef industry has responded to lower consumer demand by attempting to re-align beef more closely with the characteristics desired by consumers. Changes supported by the industry in 1976 U.S. grade standards made leaner beef more available. More recently, the industry has reversed its course, turning back toward more highly marbled products marketed under private labels. The U.S. beef industry has also taken steps recently to emulate the poultry industry in its efforts to develop more timesaving products to accommodate changed U.S. lifestyles.

Given the complexity of the dynamic changes that currently characterize the U.S. meat industry, it is very difficult to attach a single explanation for recent changes in U.S. consumers' demand for meat. It is more likely that some combination of such changing factors as tastes, time preferences, and relative prices together explain why U.S. consumers will likely consume 97 lb of poultry meat and 67 lb of beef in 2001, rather than 34 and 80 lb, as they did in 1970.

The evolved preference of U.S. consumers to consume chicken as white meat yielding parts, instead of as whole birds, has had dramatic implications for U.S. poultry exports to regions of the world where consumers prefer dark chicken meat. U.S. consumer demand for larger quantities of white chicken meat generates huge quantities of chicken parts yielding dark meat. Changes in trade policies, and growing incomes—particularly in Asia and Russia, have created excess demand for dark chicken meat. The United States is expected to export nearly 3 million metric tons of poultry products—mostly dark meat parts—in 2001, thus remaining the world's largest exporter of poultry products.

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