

# **The Economic Implications of Proposed Changes in the Retail Meat Pricing Series**

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## **(ABSTRACT)**

The Bureau of Labor Statistics (BLS) has historically collected retail meat prices from various supermarkets to use in its calculation of the Consumer Price Index. The Economic Research Service (ERS) of the U.S. Department of Agriculture is responsible for reporting retail meat prices, which it acquires from the BLS. The Mandatory Price Reporting legislation of 1999 mandated that the ERS develop and report a more extensive set of retail meat prices. The legislative initiative of 1999 came about due to the absence of prices for some species and classes of meat as well as the growing and pervasive belief that BLS price series were incorrect, inaccurate, or were at the very least not accounting for the large volume of meat sales at special and/or discounted prices. The main purpose of this thesis project was to identify some of the major data shortcomings of the current retail meat price series that should be addressed in the restructuring of a new price reporting system. A survey was administered to retail meat price users to establish which shortcomings in the historical retail meat price series they consider to be the most significant. The other aspect of this study was concerned with analyzing weekly retail scanner meat price data for five beef cuts to establish the impact of quantity-weighting on the mean and variance of the retail meat price series, as well as the own-price elasticity parameter.

*For Johan, Emile, and Stella*

*It is good to have an end  
To journey towards,  
But it is the journey  
That matters in the end.*

- Ursula Le Guin

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## **CHAPTER I: *Introduction***

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### **1.1. Background of the Study**

The Bureau of Labor Statistics (BLS) has historically collected retail meat prices from various supermarkets and food stores to use in its calculation of the Consumer Price Index (CPI). The BLS gathers regular and sale prices during the first three weeks of every month and analyzes the data during the fourth week. BLS analyzes the data without considering the quantities sold at each price. Prices are collected for both branded and non-branded meat products, but delicatessen meat items are not included. The BLS then weights the prices it has collected by the percentage of the consumer (market) basket that the particular meat item constitutes as well as by the relative population of the geographic area to other areas. In the instances where the retail price series for meats (such as beef, chicken, and pork) are considered to provide representative samples, they are published as separate price series. But for those meats where sales are too small to provide adequate samples (such as lamb and veal), no separate price series are published.

Two USDA agencies, the Agricultural Marketing Service (AMS) and Economic Research Service (ERS), are responsible for reporting live animal (cattle, hog, and poultry) and meat (beef, pork, and chicken) prices. AMS collects and reports daily and weekly live animal and wholesale meat prices to provide current price and sales information to farmers and packers and to aid in the orderly marketing and distribution of animals and meat products. This price information is used, in turn, by farmers and packers as an indication of current market conditions. ERS acquires retail meat prices from the Bureau of Labor Statistics and uses these data together with AMS data to determine the differences between the prices that farmers receive, wholesale prices, and the prices that consumers pay. The difference between the prices that farmers receive for

their livestock and the prices that consumers pay for the associated meat products is known as the farm-to-retail price spread.<sup>1</sup>

The ERS's methods for collecting and reporting livestock and retail meat prices have not kept abreast of changes in the meat industry due to funding priorities and a lack of access to data. Their retail meat price data are, therefore, not necessarily an accurate reflection of prices. Accurate prices are important, as they are a source of information that farmers may use to base their production and marketing decisions. At the retail level, the meat prices that the ERS reports using the BLS series do not reflect the actual purchases made by consumers. Only the total number of pounds of product sold at a given price level is obtained and reported; no attempt is made to record the number of transactions corresponding to that price level. This practice results in a farm-to-retail price spread that is not always accurate. In addition to not reflecting the actual sales volumes of meats, the ERS's methodology does not take into consideration the changes that occur in the product mix purchased by consumers at different times of the year, such as more hams at Easter and more steaks, chops, and ribs for grilling in the summer. In lieu of this, what the ERS does is to calculate an overall average beef, pork, and chicken price by weighting a fixed mix of prices for individual meat cuts (obtained from the BLS) by the average percentage that each cut comprises of a representative carcass.

Therefore, given the random nature of BLS's collection of prices, the in-store observation may be a special price, but BLS makes no attempt to capture that special price data information or to capture quantities sold. This is a major concern as survey information and anecdotal evidence seems to indicate that more than 50% of fresh meat cuts are sold at prices that are considered to be "specials." Furthermore, the traditional method of collecting and disseminating prices does not account for the influence on price of coupons, in-store discounts, and other discount factors that determine the final price paid by the consumer.

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<sup>1</sup> Resources, Community, and Economic Development Division. 1999. *Pork Industry: USDA's Reported Prices have not Reflected Actual Sales*. General Accounting Office (GAO). Washington, D.C., USA.

These shortcomings of the traditional price series have led to a long and growing concern by the users of meat prices (especially the beef and pork price series) that the traditional price series, as reported by the BLS, are an inaccurate and incomplete representation of what is really happening in the different meat sectors. For this reason, the Livestock Mandatory Reporting Act of 1999 requires improved methods of collecting the retail prices of pork, beef, veal, chicken, turkey, and lamb. The purpose of this new mandatory price reporting legislation is to ensure not only the reporting of quantities of meat, but also the collection of retail meat prices that are as accurate and representative as possible.

Academic researchers use retail meat price data to study a broad range of policy issues and their impacts on the meat industry across beef, pork and other meats. This research is, however, concerned primarily with the beef industry, types of uses of retail beef prices, and associated policy issues.

Restructuring the current collection system for retail meat prices will not be an easy task. It is a task fraught with difficulties as the weights of meat cuts are not standardized. Also, due to differences in product packaging, value-addition, and name branding, no standard industry product serves as a reference when collecting and reporting prices. Furthermore, although the increasing use of scanner data does provide some of the needed information and detail, the data are often proprietary. The collectors of these data do not necessarily generate the data that researchers need to solve the problems created by the traditional methods of retail meat price collection.

## **1.2. Problem Statement**

Improved and more precise retail meat prices are essential to many public organizations and institutions and various interested parties. Accurate measurements of retail meat prices and quantities and statistically valid samples are essential to researchers who analyse consumer demand. These researchers use the price data to calculate elasticities (cross and own-price) that are, in turn, widely used by policy makers, various

federal program administrators, trade associations, and retail food store managers. Investors, when evaluating the market potential for various meat cuts, need to know that the price-quantity data they use to determine market share and to make private investment decisions and policy decisions when public dollars are at stake are accurate and reliable. Price-quantity data are necessary to calculate market shares as such analyses are determined by disaggregating total meat expenditures. Representative and accurate prices, therefore, become important if they are to be a true reflection of expenditures.

A direct link also exists between retail prices and certain performance measures that are used in regulatory market and public policy decisions and legislative initiatives. An example of such a link would be price spreads as published by the USDA. These price spreads are used to measure performance and competitiveness at the retail and processing levels. Reliable retail prices are important because they are used as inputs in the calculation of retail equivalents, which are, in turn, used to determine farm-to-retail spreads.

Clearly, then, the retail meat price series are used extensively by many different groups to meet their varying research and analysis needs. The problem, however, is that the historical retail meat price series are considered flawed in that certain important price information is lacking in detail or is simply missing. Therefore, the flaws in the historical meat price series are postulated to have given rise to statistically significant errors in research findings and analyses and to have complicated policy and market regulation decisions.

### **1.3. Objectives**

The historical price series for meats are lacking in detail or are missing data. More accurate and more useful research results will be possible only if the retail meat price series are modified and improved. The objective of this study is to identify any, or all, flaws in the retail meat price series that have arisen due to the historical price

reporting and dissemination process. In addition, this study will seek to quantify the extent of the actual and perceived impact that data flaws have on the validity, accuracy, and reliability of the retail meat price series as an input in demand analysis, policy analysis, and pricing strategies by private firms. In analysing the implications of the flaws in the retail meat price series on research and analysis findings, this study will be concerned mainly with the impacts of these flaws on the issue of price determination and the calculation of important parameters involving prices.

Demand elasticities are parameters used in the estimation of the impact of supply changes on the price of beef. The empirical data analysis in this study will focus on the impacts that flaws in the historical meat price series have on own-price demand elasticity estimates.

Elasticities are important tools used in demand analysis, policy analysis, and pricing strategies. Any inaccuracies in these elasticities due to flaws in the input prices used to determine them will have widespread implications for the research results. Knowing the extent of deviations from the true parameters is necessary in order to make adjustments.

In short, the objectives of this study are as follows:

1. To specifically identify the perceptions that retail meat price data users have regarding the impacts of data shortcomings in meat price data, such as the lack of quantity weighting, the frequency of reporting, the lack of detail on various cuts, on various aspects of the elasticity parameter estimators;
2. To determine which data shortcomings the users of retail meat price data would like to see addressed and what changes they would like to see implemented in the restructuring of the current price reporting and collection process;
3. To establish if correlations exist between the applications of retail meat price data in research, policy decisions, demand analysis, etc. and the type of changes that the users of retail meat price data are advocating;

4. To determine and quantify the extent of the deviations in the elasticity parameter estimators from the true estimators as a result of the data shortcomings; and
5. To advise the ERS, based on the results of this study, on how they should restructure and revise the current process whereby retail meat price data are collected and reported and to make recommendations on which are the most important data shortcomings that need to be addressed to lay the basis for a more accurate and reliable price reporting system

#### **1.4. Methodology**

Of the possible weaknesses that have been identified in the historical meat price series, three seem to have introduced significant errors in research efforts aimed at estimating own-price, cross-price, and income elasticities. These three data shortcomings are

1. Lack of quantity weighting in the average prices reported for the composite price series of beef, chicken, pork, etc.;
2. The frequency with which composite prices are collected and reported; and
3. Prices are missing or inadequate for the various cuts of meat.

To achieve the objective of establishing what the users of retail meat price data perceive to be the most significant shortcomings in the historical retail meat price series and to ascertain what they think the impact of these shortcomings have been on the accuracy and relevancy of their research, a survey was administered to retail meat price users in the academic research community and in various governmental agencies. The survey, discussed in more detail in Chapter IV, asks questions that focus on the three main data shortcomings listed above. The survey also provides the respondents a platform from which to voice other concerns with and shortcomings in the historical retail meat price data that they feel need to be addressed. These responses are important because they will give the ERS a better idea of how and where to adjust and restructure their current

method of collecting and reporting prices, as well as providing the users of retail price data a chance to influence the changes made to the historical prices series.

Administering the survey and evaluating the results covers one aspect of this research study. The other aspect of this study is concerned with the processing and analyzing of actual retail meat price data as collected by a vendor to establish the consequences of the perceived shortcomings in the data on parameter estimation, with specific reference to the own-price, cross-price, and income elasticity parameters. Store level scanner data<sup>2</sup> collected over a 52 week period<sup>3</sup> for five cuts of beef. Select boneless ribeye steak, Select boneless top loin steak, Select boneless top round steak, Select porterhouse steak, and ground beef (75% lean) are used to conduct this portion of the analysis.

Quantity weighting is the data shortcoming of primary concern. Using the 52-week retail meat price data series, a quantity weighted monthly retail price series was generated for each of the meat cuts and for each of the stores. (The method involved will be explained in greater detail in Chapter IV). Price-quantity models were applied to both the simple average price series and the quantity weighted price series to compare the values of the means, own-price elasticities, and variances of the own-price elasticity estimators calculated for each of the price series. The results were compared across cuts and across stores and were used to support the results obtained from the survey as well as the inferences made about the shortcomings regarding quantity weighting in the historical meat price data as they pertain to the value and accuracy of the elasticity parameter estimators.<sup>4</sup>

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<sup>2</sup> For each meat cut, weekly price (\$/lb) and quantity (lbs) information was obtained for the overall chain of stores as well as for two individual stores. The identity of the chain and the individual stores from which the data were collected as well as the region of the country in which the stores are located were not supplied to protect the proprietary nature of the data.

<sup>3</sup> For all five cuts of beef, the 52-week period for which data are available starts on 09/10/00 and runs through 09/02/01.

<sup>4</sup> Although two other data shortcomings, the frequency of price reporting and lack of prices for various meat cuts, have been identified as being important in influencing the accuracy and reliability of the historical retail meat price data, they will not be examined empirically in this study.

## **1.5. Thesis Outline**

This thesis consists of five chapters. The purpose of this first chapter is to familiarize the reader with the background of the study and to introduce the purpose and overall objectives of the study. Chapter II provides the reader with a review of the literature relevant to this study. Chapter III looks at the historical retail meat price data over the past 30 years and the trends in the data. Chapter III also explains some of the theoretical concepts associated with the issues discussed in this study such as the own-price, cross-price, and income elasticity parameters. Chapter IV outlines the method used in this study both in regard to the survey and the empirical analysis of 52-week store-level meat price data. The fifth chapter covers the reporting of the results obtained from the analyses described in Chapter IV as well as the associated conclusions that can be drawn from the results. Chapter V will also highlight recommendations to be made to ERS as they apply to restructuring the way in which historical retail meat price data are collected and reported to improve the overall accuracy and reliability of the meat price data.