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PREVIEW

**THE ECONOMIC IMPACTS OF INFORMATIONAL BIAS
ON CONSUMER PORK DEMAND**

by

Mark A. Wade

A DISSERTATION

**Presented to the Faculty of
The Graduate College at the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy**

Major: Agricultural Economics

Under the Supervision of Professor Dennis M. Conley

Lincoln, Nebraska

December, 1998

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DISSERTATION TITLE

The Economic Impacts of Informational Bias on Consumer

Pork Demand

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GRADUATE COLLEGE
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THE ECONOMIC IMPACTS OF INFORMATIONAL BIAS ON CONSUMER PORK DEMAND

Mark A. Wade, Ph.D.

University of Nebraska, 1998

Adviser: Dennis M. Conley

The main objective of this research was to estimate the impact of informational bias on U.S. producers and consumers of pork. A specific definition of bias was formulated which could be used to objectively evaluate print media. Focus group data provided evidence that allowed for testing two hypotheses. First, consumers were found to be concerned about food safety and health attributes of pork, beef, poultry and fish consumption. Second, it was concluded that consumers have the ability to distinguish biased information from unbiased information, and that they respond to each type of bias differently. General consumer magazines and newspapers, 1989 to 1997, were evaluated by a panel of trained, independent judges and were determined to have a level of bias which was statistically significant. Primary data from this evaluation provided information which was used in the estimation of pork demand. Supply and demand equations were estimated simultaneously and price elasticities of supply and demand were estimated to be consistent with those obtained in previous research. Welfare

economic analysis, along with assumptions regarding changes in the supply of and demand for pork, provided an estimate of the impact food safety information might have on U.S. swine producers and consumers.

The results reported in this study suggest that given the assumptions, pork consumers are made better off on a per capita basis by \$0.49. Swine producers are made better off on a per capita basis by \$316.17 per 1997 swine producer, given positively biased information.

PREVIEW

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In this section, it is appropriate to acknowledge the assistance that made this research possible. It is also an opportunity to reflect on the education of which this research is a part, and thank those who have made that education more than the accumulation of knowledge.

First, I thank my wife, Karen, who has given me love, encouragement and support all of these years, and our children, Allen, Andy and Kasie, for their patience and understanding when time was scarce. If it were not for their dedication, this study could not have been completed.

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1. INTRODUCTION AND OBJECTIVES

1.1. Introduction

A study conducted by the United States Department of Agriculture's (USDA) Economic Research Service (ERS) concluded that consumers are interested in improving the healthfulness of their diets. Consumers reported that they are changing what they eat and the ways they prepare meals (Frazao and Allshouse, 1996). According to a 1995 survey by the Food Marketing Institute, 63 percent of respondents reported they were eating more fruits and vegetables, 34 percent reported eating less fats and oils, and 43 percent reported eating less meat to ensure their diet was healthy (Frazao and Allshouse, 1995).

In a 1993 ERS report, changes in per capita food expenditures were estimated for the next two decades. In real terms, All Food expenditures were projected to increase 31.1 percent, while Away From Home expenditures would increase 37.4 percent. Beef, pork and poultry spending is expected to increase 21.4, 19.9 and 23.7 percent, respectively, in the At Home consumption category. At Home expenditures on fruits and vegetables are expected to increase 29.6 and 25.4 percent, respectively. It should be noted that 14.9 percent of the projected increase in All Food expenditures, and 24.2 percent of the projected increase in Away From Home expenditures, is expected to come from increases in income (Blisard and Blaylock).

These projections are supported by trends that include the increase in dual-income families, single-parent households, higher levels of disposable income, small (1-3 percent) increases in the Consumer Price Index for food (Elitzak), and improved access to informational product labeling. In the first three quarters of 1995, there were more than 3,000 claims made about the improved nutrient content of new food products, nearly three times the number of claims made in all of 1988. Volume share of nutritionally

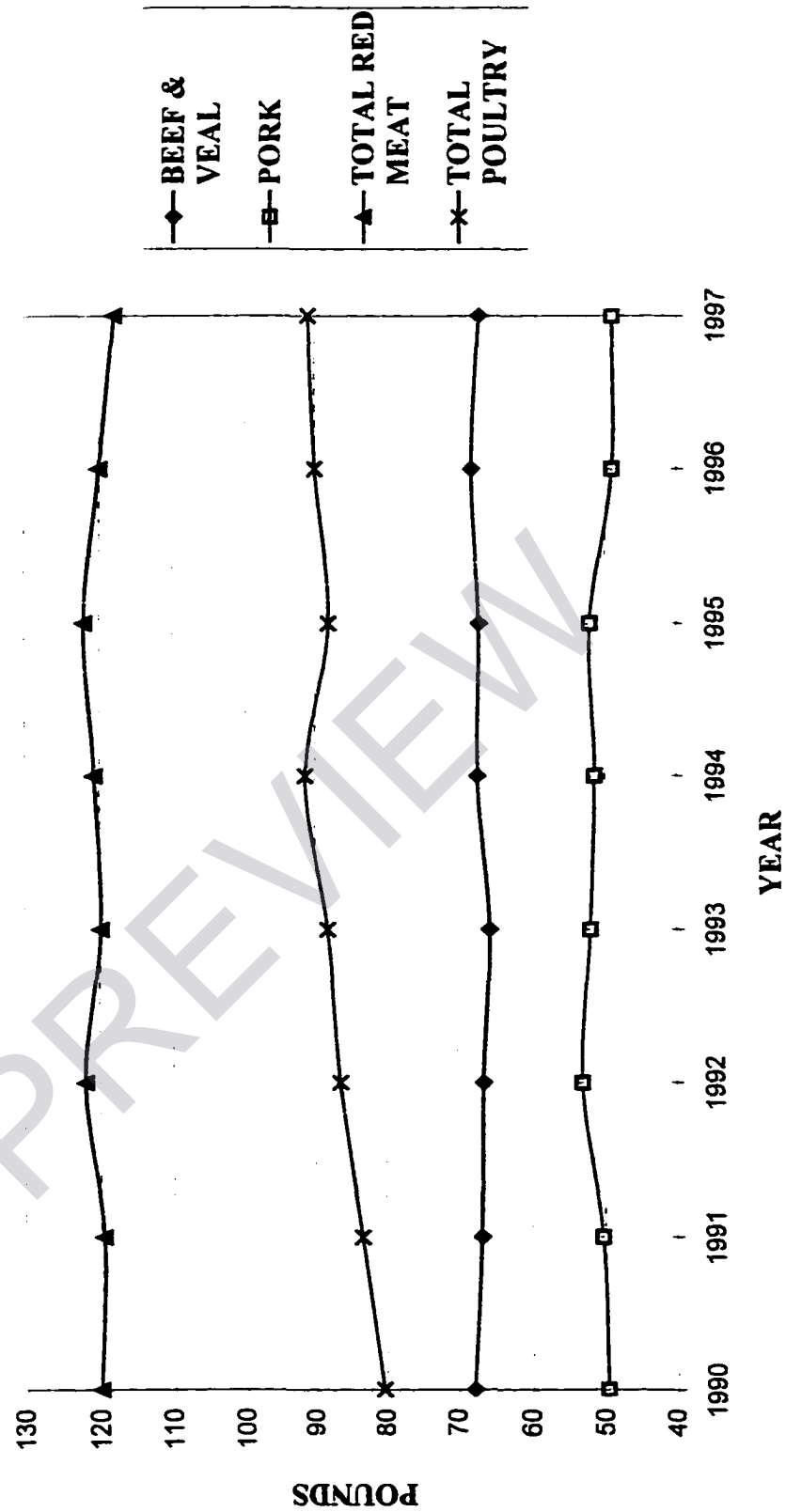
improved versions of foods grew from 36 percent in 1989 to 39 percent in 1993, with dollar share increasing from 26 percent in 1989 to 30 percent in 1993 (Frazao and Allshouse, 1996).

Yet, the pace of dietary change has been slow, with many changes offsetting other changes. One explanation of the slow rate of change is that it is difficult to change consumption habits or patterns. Although many consumers believe that their diets could be healthier (research by Blisard, Blaylock and Smallwood found that 59 percent of those surveyed thought that their current diets were healthy), many feel they lack the information to change their dietary behavior.

As consumers have become more removed from the farm, they must look to the food industry to help them achieve healthier diets, universities and scientific agencies to evaluate the safety and benefits of those dietary changes, and the government to enforce and regulate food safety and consistency standards. In a majority of instances, information associated with this process is transmitted from those in the scientific and enforcement community to consumers through the media. Whether the message is “nutritionally improved,” “light,” “low fat,” “low sodium,” “packed in water,” “cholesterol free,” or “organic,” consumers receive a variety of messages in their efforts to consume a healthy diet. The consumption of meat items is no exception.

Figure 1.1 illustrates the consumption of total red meats (pork, beef and veal) and poultry (broilers, mature chickens and turkey) between 1990 and 1997. Total per capita poultry consumption increased from 80.5 pounds to 91 pounds during this time period, while red meat consumption has decreased two pounds per person. Items such as turkey bacon, poultry-based hot dogs, and turkey bologna have replaced more traditional pork and beef based cuisine. All the while, changes based upon nutrient content and dietary health concerns such as cholesterol, sodium, saturated fat, calories and fiber are being replaced with possibly greater public concerns about pesticide and drug residues, and foodborne pathogens, like E-coli and salmonella.

**Figure 1.1. Per Capita Meat Consumption, U.S.
(1990 - 1997)**



Source: United States Department of Agriculture, *Agricultural Outlook* (Jan. 1989-1998) Table 10.

Consumers have become even more concerned about the safety of the U.S. meat supply, including pork, and the government's ability to guarantee a consistently safe product. Well-publicized incidents, such as the contamination of hamburgers with E.coli bacteria, sulfa residues in pork, the pesticide Alar on apples, and salmonella growth in under-cooked pork, are widespread. Yet, conflicting media reports may leave consumers uninformed and confused.

Food safety information can be costly to gather and difficult to understand and relay to readers. Scientific studies are often complex, contradictory and open for interpretation. The public frequently relies on the media for information regarding their food purchases and consumption. The nation's media agenda may not be strictly informational in nature because most media organizations are profit-seeking entities. As informational reliance on the media has grown, concerns over possible misinformation, or bias, toward food and agricultural commodities have also grown (Jones; Foster). As stated by Jones, "There is a tendency for consumer concerns about food safety issues, however, to be exaggerated by the popular press."

1.2. Objectives

The general objective of this analysis was to estimate the economic impact of informational bias in print media on consumer demand for pork. This analysis is important because of the major role information plays in efficient market operations. Even under the assumption that consumers behave rationally, a lack of information, or misinformation regarding the safety of pork consumption will lead to market failure and a reduction in public welfare.

The specific objectives of this study were:

- (1) formulate a specific definition of “bias” that can be used to consistently and objectively evaluate print media;
- (2) examine consumer consumption responses to perceived informational bias in print media;
- (3) determine the incidence of informational bias regarding pork consumption in print media;
- (4) investigate the role of information in determining the level of consumer demand for pork; and
- (5) estimate the economic impacts of informational bias on U.S. producers and consumers of pork using welfare analysis.

1.3. Structure of This Study

The organization of this study is as follows. Chapter Two provides a brief overview of the swine industry. Chapter Three examines consumerism and the economic and informing functions of the media. A definition of media bias is offered. Chapter Four reviews previous literature that has been used as a basis for the estimation and methodological approach to this study. Chapter Five contains a discussion of the data that was used in this study and the econometric and empirical procedures employed in the analysis. Primary data generation via focus group questionnaire and content analysis is included.

In Chapter Six, estimated model parameters, and pork supply and demand elasticities were reported using quarterly data for the period 1989-1997. These estimates were used to calculate the level of consumer and producer surplus given the presence of informational bias. Consumer and producer surpluses were calculated with and without media bias, and a comparison was made between the two cases. Finally, summary and concluding remarks are provided in Chapter Seven.

PREVIEW

2. THE SWINE INDUSTRY

This chapter provides an overview of the swine industry and structural changes that have occurred in the past twenty years. Food safety and its influence on the supply and demand for pork are discussed.

2.1. Swine Industry Structure

In 1900, 93 percent of all farms, some 4.3 million, had swine (Russell, p. 13). Three million farms still raised hogs at mid-century. Then came the commercialization of hog production. In 1984, 4,264 farms produced 3,000 or more hogs, accounting for 25 percent of the market (Russell, p. 13). In 1997, 1,520 hog operations produced 5,000 or more hogs, accounting for 35 percent of the market (Agricultural Statistics). Hog numbers remained fairly stable throughout the period 1950 to 1984, and steadily increased from 14,721 million head in 1985 to 17,244 million head in 1997. According to 1986 USDA projections, by the year 2000, 80% of all market hogs would be produced by 10,000 operations (Russell, p. 13).

From 1965 to 1985, there was an average decline of 31,250 farms per year that produced hogs. The number of operations with hogs has continued to decline, decreasing from 309,700 in 1989 to 138,690 in 1997. It is apparent that the family hog farm represents a majority of this decrease. For every 50,000 sow unit added, roughly 1,000 50-sow herds vanish, as diversified hog and grain farms give way to specialized pork units. Most attrition is among small Corn Belt herds. This also helps to explain the

decline in pork production from top producing states like Iowa, Illinois, and Indiana, and an increase in production from states like North Carolina. In 1974, only 374 farms reported hog sales of over 5,000 head per year (Russell, p. 13). Today, one industry definition of a large hog farm begins at 10,000 hogs marketed per year, and 50,000 is the standard for the "corporate hog farm." In 1989, the ten largest U.S. swine producers sold over 3.2 million market hogs, or about four percent of total U.S. marketing of barrows and gilts in that year (Houghton and McMahon, pp. 16-17). By the end of 1998, the 50 largest producers, with 2.6 million sows, will market half of the pigs in the U.S (Freese, p. 20). Commercial hog slaughter totaled over 88 million head in 1997, 81 million head in 1987 and 78 million in 1977 (*Agricultural Outlook*).

The producer group with over 10,000 head marketed annually segment is the fastest growing segment in the swine industry today. This trend is expected to continue. The largest operations are leading the race for survival as they try to capture the market for a consumer who increasingly demands uniformly lean pork and emerging export markets. Figures 2.1 and 2.2 provide a more detailed look at the shifts in operation size that have occurred since 1989.

Large producers gain economic advantages over smaller ones through two basic avenues. First, they may have knowledge and ability to get more output from their physical resources. For example, they may use fewer pounds of feed to produce a pound of gain, produce more hogs per unit of labor, raise more hogs per unit of housing, or save more pigs per litter. These efficiencies would give them economic advantages even if input prices were the same for operations of all sizes. Second, prices may not be the