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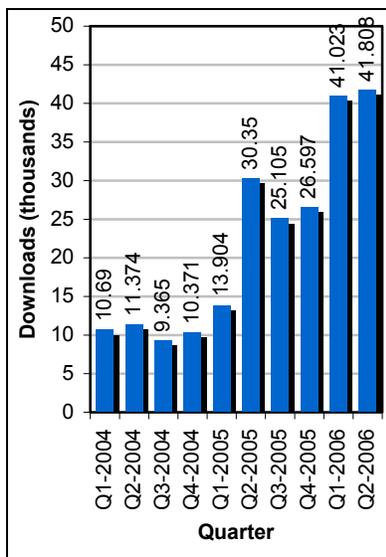
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A Statement from the Editors

Welcome to our eighth issue of *Choices*.

- We encourage you to submit thematic proposals and single articles for the “Grab Bag” section of *Choices*. For submission requirements, see <http://www.choices-magazine.org/submissions.htm>.
- If you have an idea for a thematic proposal and were wondering whether we already have someone committed to a theme in the area, you can check out the calendar at <http://www.choicesmagazine.org/themes.htm>.
- We continue to have substantial improvements in downloads and visits to the site. We have developed several graphs that summarize quantitative measures of impact. Three appear below and are drawn on data available as of April 12, 2006.



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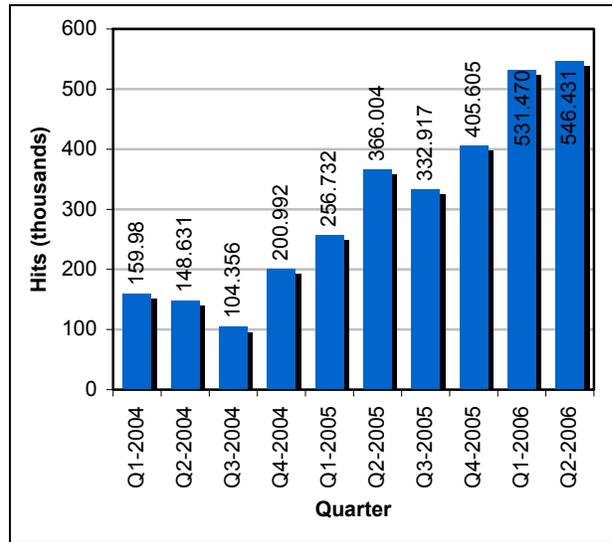
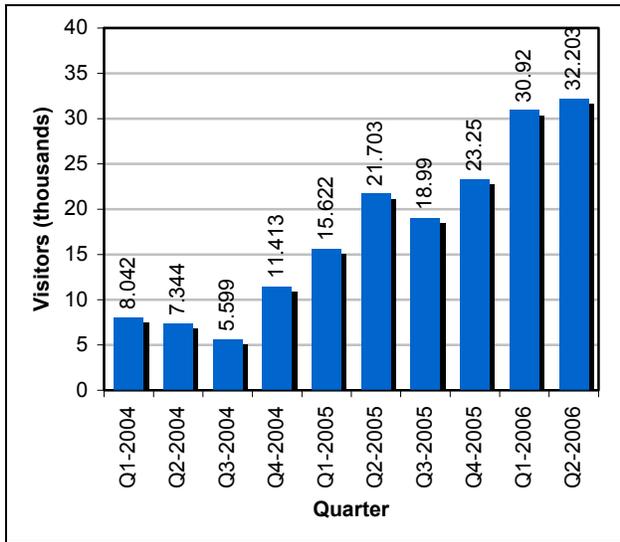
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Choices is the outreach vehicle of the American Agricultural Economics Association (AAEA) and is designed to provide current coverage regarding economic implications of food, farm, resource, or rural community issues directed toward a broad audience. *Choices* publishes thematic-oriented groupings of papers and individual papers. The broad themes we will repeatedly visit in *Choices* are agriculture and trade, resources and the environment, consumers and markets, and agribusiness and finance. Submitted manuscripts are subject to peer review for publication consideration.

Choices is published at the end of each quarter of the year by the American Agricultural Economics Association. Visit our web site at <http://www.choices-magazine.org>.

Editorial Communications

Potential manuscripts, thematic proposals, and comments can be submitted through <http://www.choicesmagazine.org/submissions.htm> or directly emailed to the editors at Choices@ag.tamu.edu. Editorial communications can be sent to Choices@ag.tamu.edu.





Washington Scene

Coordinated by Joe L. Outlaw, Co-Editor, *Choices*

For an election year, 2006 has certainly seen a wide array of issues being discussed and debated in Washington D.C. In addition to normal legislative activities, recently there was also a key announcement from EPA and an Executive Order from President Bush, all of which are detailed below.

Doha Round

Trade ministers from around the world convened in Geneva at the end of June intent on moving Doha Round negotiations along. Negotiations have stagnated with the blame apparently being shared by many. U.S. Trade Representative Susan Schwab has held fast to the need for increased access if the previous U.S. offer to reduce domestic agricultural subsidies is to stay on the table – otherwise, the U.S. will have to retract the offer. Recently, the leadership of the Agricultural Committees of Congress have stated that they are not interested in offering any more without commensurate concessions from our trading partners. On the other hand, the leadership of the E.U., along with the leadership of a large number of developing countries, have stated that they do not want to put their domestic producers at risk by granting additional access to their markets.

Farm Bill

Over the past few months, both the Senate and House Agriculture Committees have been holding Farm Bill hearings across the country. In March, USDA released a summary of the public comments submitted verbally and in writing during USDA's Farm Bill Forum listening tour. More recently, USDA has begun releasing a series of analysis papers to serve as the foundation for farm bill deliberations. The first three analyses papers are on rural development, conservation and the environment, and risk management. It is not clear how much the Congress will utilize these papers, but what is clear is that the Secretary intends to be more involved in Farm Bill discussions than

some have been in the past. The real farm bill debate is not likely to occur until after the November elections.

BSE and Beef Trade

Canada recently found its 6th case of BSE since 2003 in an older cow raised in Manitoba. The reaction from USDA was that trade was resumed with Canada with the assumption that more cases of BSE would be found and that U.S. officials have a high level of confidence in the safeguards and mitigating measures in place in the U.S. and Canada.

In an effort to satisfy themselves with the risk measures in place at U.S. packing plants, Japanese officials have been inspecting each of the 35 plants that intend to export to Japan. Japanese senior vice ministers of agriculture and health have indicated that U.S. meatpackers are making progress in their efforts to ensure no risk materials are included. Japan's policy calls for allowing U.S. facilities certified as safe to resume exports, possibly by the end of July. Members of the Senate have grown tired of the perceived feet dragging by Japan and have introduced legislation that would impose import tariffs on Japanese exports if they do not re-open their markets to U.S.-produced beef by August 31st.

Energy

In response to high prices at the pump and encouragement to do something prior to November elections, there has been a push to move a number of energy related bills through Congress. To date none of the new pieces of energy legislation appear on track to be passed by both chambers and differences rectified in conference committee before the end of the year.

CAFO Regulations

EPA recently announced their response to a court order with proposed revisions to the 2003 proposed rule that would revise the National Pollutant Discharge Elimination

System (NPDES) and Effluent Limitation Guidelines for Concentrated Animal Feeding Operations (CAFOs). In 2003, several agricultural groups challenged the 2003 CAFO rule, which would allow EPA the authority to regulate actual and potential discharges. In 2005, the Second Circuit Court of Appeals ruled EPA only had the authority to regulate actual discharges, not the potential to discharge in the event of a rare, heavy storm. Key changes in this rule include:

- CAFOs with the potential to discharge will not be required to get a permit, only CAFOs that actually discharge or propose to dis-

charge will need to obtain an NPDES permit.

- The CAFO's Nutrient Management Plan (NMP) must be incorporated in the permit and reviewed by the permit authority.
- EPA proposes to clarify its selection of best conventional technology for fecal coliform bacteria.
- CAFOs land applying manure or processed wastewater may not need NPDES permits if the only discharge from those facilities is agricultural stormwater.

Initial reaction to the EPA announcement from livestock groups has been favorable.

Eminent Domain

President Bush recently issued an executive order restricting the federal government from seizing private property unless it's for a purely public use. This order was issued on the one year anniversary of the "Kelo" eminent domain decision issued by the Supreme Court. Since the Kelo decision, there have been an estimated 5,700 properties threatened or taken by eminent domain for private development.



Overview: Commodity Checkoff Programs

Gary W. Williams, Guest Editor and Oral Capps, Jr., Editor

Currently, there are a number of advertising and promotion programs associated with agricultural commodities. 'Got Milk?' 'Pork. The Other White Meat,' 'Cotton: The Fabric of Our Lives,' 'Beef. It's What's for Dinner,' and 'American Lamb from American Land' are examples of messages from various commodity boards who are attempting to impact the demand for their agricultural products. These messages typically are labeled as generic advertising and promotion and the institutional structure for funding them is referred to as commodity checkoff programs. This theme centers attention on why checkoff programs were instituted initially, how program benefits are measured, the costs associated with various programs, the evidence to support their existence, and the legal challenges surrounding checkoff programs.

Commodity checkoff programs are primarily cooperative efforts by groups of suppliers of agricultural products intended to enhance their individual and collective profitability. Virtually every agricultural commodity has some type of organization dedicated to promoting the economic welfare of its producers funded through some form of fee on sales by producers and often others in the marketing chain. The term "checkoff" refers to the collection of a fee and comes from the concept of checking off the appropriate box on a form, like a tax return, to authorize a contribution for a specific purpose, such as the public financing of election campaigns, or, as in this case, the financing of programs to enhance producer welfare.

The funds collected by checkoff groups are used primarily to expand demand (both domestic and foreign) through both generic advertising efforts and the development of new uses of the associated commodities. Although many checkoff programs also fund research intended to reduce production costs and/or enhance yields, the share of their total budgets spent on research is generally much smaller than the share spent on demand-enhancement activities.

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Contributions to the earliest check-off programs were voluntary. These voluntary programs, however, were plagued by the problem of free-riders, which motivated the supporters of some programs to pressure state, and later federal, legislators to provide them with legislative authority for mandatory checkoff contributions. Currently, federal checkoff programs are in effect for beef, pork, soybeans, eggs, cotton, dairy, mushrooms, honey, peanuts, popcorn, potatoes, watermelon, cultivated blueberries, Haas avocados, and mangos. In addition, federal marketing orders for a wide variety of primarily fruits, vegetables, and nuts are authorized to conduct promotion and research programs. Other checkoff organizations operate under state authority. Also, organizations of commodity producers and/or processors, like the Sugar Association, operate generic promotion programs independent of any state or federal authority.

In this issue of *Choices*, several authors explore the purpose, impact, effectiveness, and legal status of commodity checkoff programs. Ward describes the purpose of checkoff programs, as well as the functions and benefits of these programs. Crespi and McEowen subsequently examine the constitutionality of generic advertising and promotion programs. Additionally, they focus on the repercussions of the Supreme Court ruling in May 2005 regarding the beef checkoff program. Wohlgenant deals with the importance

of retail-to-farm price transmission, the nature of checkoff assessments, the effect of supply response, the role of input substitution, the effect of government intervention, the presence of market power, and the industrialization of agriculture in evaluating the economic impacts associated with generic advertising and promotion. Williams and Capps discuss the

issues of defining and measuring the effectiveness of checkoff programs. They also center attention on communicating the measurement results to program contributors and stakeholders. Finally, Chung, Norwood, and Ward investigate the degree of producer support for the beef checkoff program.

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Commodity Checkoff Programs and Generic Advertising

Ronald W. Ward

JEL Classification: Q13

“Beef. It’s What’s for Dinner.” “Got Milk?” “Pork. The Other White Meat.” “Flowers. Alive with Possibilities.” We have all heard and seen these and similar promotional messages over the years on television, over the radio, and in magazines. Often labeled *generic advertising*, these messages are government-sanctioned but producer-funded efforts to enhance the demand for farm commodities. As opposed to advertising for specific brands of a product by particular producers, generic advertising is generally a cooperative effort of a large group of producers (suppliers) to promote the demand for the homogeneous (similar) product. These advertising messages are funded through an institutional structure known as commodity checkoff programs. Why do the checkoff programs exist? What are the major functions of checkoff programs? What are the economic issues associated with these programs? Have they generated any economic benefits?

The Purpose of Commodity Checkoff Programs

Generic advertising is all about information -- information about a specific commodity and its underlying attributes. Consumers already have a reasonable amount of information about most foods, fibers, and other goods they buy along with some history of use. So even without any additional generic advertising, most checkoff commodities would still be consumed at some level. For example, some amount of milk would still be purchased if all “Got Milk” commercials were stopped! The purpose of advertising, of course, is to generate additional purchases of the product being advertised. How advertising affects consumer purchasing, however, depends on the type of advertising to which the consumer is exposed. Brands and brand advertising messages are intended to direct consumers to a specific product identified within a particular commodity cat-

egory. To the extent that brands have common attributes and are substitutable, brand messages may increase the total demand for a commodity. Brand messages are intended to highlight differences among product forms making up the commodity group rather than their similarities.

Generic advertising and promotions, on the other hand, focus on those attributes common to the group and those attributes that may not be readily judged without assistance (e.g., nutritional content, origin, or quality assurance). Brands exist when real and/or perceived differences can be achieved. For example, the successful promotion of Angus Beef as a brand requires that consumers perceive the unique attributes of the beef from that breed of cattle. The result is some level of brand identification. A celebrity endorsement may create a perceived difference that translates into brand identity whether or not such a difference actually exists. Within many commodity sectors there is limited product differentiation from producer to producer so that achieving substantial growth in demand through branding generally is not feasible. In this case, demand growth is more readily achieved through enhancing the total demand for the commodity through generic advertising. Of course, demand growth does not assure profitability but is an essential component.

Goods that cannot be differentiated are referred to as *cooperative goods*. For cooperative goods, generic advertising may potentially enhance total demand but should not change the underlying market shares among producers or suppliers. For some goods, consumers may be willing to search out the attributes they desire in a product before making a purchase. Alternatively, they may be willing to experiment with goods to gain a greater understanding of the products attributes (Forker & Ward, 1993.) These

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search and *experience* categories provide considerable insight into how receptive and responsive potential consumers may be to an advertising message. Additionally, some products have credence attributes such that consumers must rely on external information to judge a particular product attribute. Claims about antioxidant benefits are a good example of a credence attribute.

Many, if not most, foods, fibers, and goods purchased for their aesthetic value, such as flowers, fit within the *cooperative* and/or *experience* goods categories. Such products lend themselves more to the promotion of the commodity itself (generic advertising) than to the promotion of a specific form or particular attributes of the commodity (brand advertising). For commodities that do not fit well into the *cooperative* and/or *experience* categories, both generic and brand promotional activities are common. The relative intensities between generic and brand promotion for those products then depend on consumers' need for information in general and the ability of the product to achieve some level of brand identity. The meat industry is a good example of this concept where about 80% of beef is non-branded, while more than 80% of poultry is branded (Ward & Ferrara, 2005).

If a product is not differentiable and information is needed, why do producers tend to promote their commodities collectively? The answer is relatively simple: free-riders and the cost of advertising. When advertising of a generic product by any specific producer increases total demand for that commodity, the gains from one producer's advertising may be partially captured by other producers who do not share in the cost of the advertising. These producers get a "free-ride" in terms of

increased demand from the promotional efforts by individuals or small groups of producers. This is the classic "free-rider problem" in which everyone shares in the benefits but only a few pay the costs. Also, the cost of sufficient advertising to have a perceptible effect on total demand is generally beyond the means of individual producers. Commodity checkoff programs were designed to deal with these two problems - minimizing the effect of free-riders and creating sufficient resources to pay for expensive media advertising. Removing potential free-riders and creating a pool of funds earmarked for generic advertising messages is precisely the intent of the national legislation for supporting commodity checkoff programs and an important objective of many federal and state marketing orders. Commodity checkoff authority granted through the federal enabling legislation provides the vehicle for collecting assessments to fund generic advertising programs.

Currently, there are 17 active national generic promotion programs for agricultural goods and an additional 35 or more operating under federal market orders (AMS-USDA, 2005). Also, there are many additional state programs designed to promote agricultural commodities. Similar programs are also in operation for many nonagricultural goods ranging from tourism to propane. Common characteristics among most of these programs include efforts to maintain product identity through the supply chain from producer to consumer and the need to provide information to existing and potential consumers continually. A number of these generic advertising programs require mandatory participation by all producers of the commodity through an assessment on those producing and supplying the product

and are subject to close government oversight.

The Functions of Commodity Checkoff Programs

While checkoff programs are diverse and the goals dependent on the situations for each commodity, there are several common functions found across the generic advertising programs. As indicated in Figure 1, all checkoff programs must: (1) entail an administrative structure, (2) have a precise message and focus, (3) show economic benefits, and (4) exhibit fairness and equity in setting the program focus and resulting distribution of benefits. A problem within one or more of these four functions is a signal for failure.

Organization and Administration. Nearly all commodity checkoff programs are funded through a unit or value assessment on producers and first handlers (top box of Figure 1). Assessments are generally in the range of less than one percent of the value of the good. Most assessments are on a unit basis with pork being a notable exception. While the day-to-day administrative structures are similar to those of many Boards of Directors, they differ in that either state or federal governments closely monitor the policies and administrative activities. The government's role is essential when individual producers are required to pay assessments based on state or federal enabling legislative authority. Clearly, the authority to impose assessments on producers in an industry must be accompanied by direct governmental oversight. Administrative structures range from very large Boards such as found with the beef checkoff to Boards made up of a few elected or appointed Directors. In every case, the Directors have the authority to

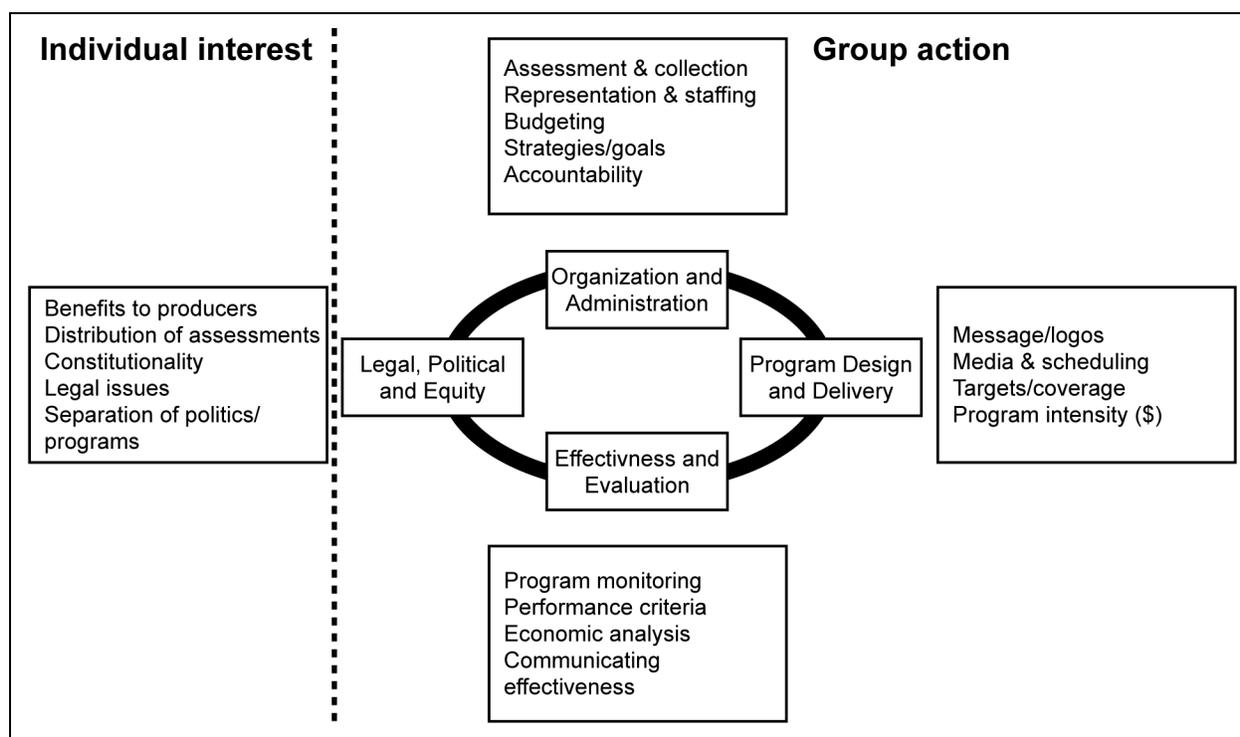


Figure 1. Functions of commodity checkoff programs.

set policies, govern the administrative staff, and set the focus and intensity of the various advertising and promotion programs. Yet, as long as a program is mandatory, actions by a commodity checkoff Board may be subject to governmental veto.

Program Design and Delivery. Advertising messages of the various checkoff organizations are as diverse as the commodities they represent and are closely tied to the attributes of the product, the target audience, and the media used (the right box in Figure 1). Most, if not all, checkoff programs have logos and strap-lines like those at the beginning of this article that convey the intended messages. Usually, the product is for consumption at the retail level and the raw product is easily identifiable throughout the distribution channels. For example, fluid milk or beef at the retail level are directly associated with the farm-gate goods. Messages, target audiences, and the intensity of the

promotions are initially developed in close coordination with various advertising agencies. Even so, in many cases, the federal or state-level governments have veto power over the fundamental message(s) being considered. The media used are functions of the available resources and the need for local, regional, or national coverage. Complexities with the message and focus often are associated with the diversity among groups within industries like citrus, where both fresh and processed products are important, and beef and soybeans, where both domestic and export market promotions are funded. Competing interests within a commodity sector often create a challenge in designing and delivering generic advertising messages.

Effectiveness and Evaluation. Moving clockwise around Figure 1, the box at the bottom relates to the economic impact of the generic advertising. To determine the effectiveness of a

checkoff program requires the development of criteria for judging performance and methods and data for measuring the impact on demand usually involving some form of statistical analyses. Many commodity groups have turned to econometric modeling as the instrument for determining if their generic advertising messages have had a numerical and statistically significant impact on demand. Most of these models account for the effects of advertising on demand in terms of the dollars spent over an appropriate time interval. They frequently include delayed demand responses and measure both short-term and long-term impacts. These models usually show numerical measures of the advertising impacts on demand and calculate benefit-cost ratios at different levels in the distribution system. Some models first measure demand changes at the retail level and then attempt to determine how gains are distributed through the vertical mar-

ket system back to producers. The measurement of the distribution of gains through the supply chain is a contentious issue and is considered in more detail in the article by Wohlgenant in this issue of *Choices*.

Legal, Political, and Equity Concerns.

Referencing back to Figure 1, the top, right, and bottom boxes reflect the collective efforts by a commodity sector to achieve demand changes through an administrative structure that designs and delivers the generic message. In contrast, the last box on the left represents the interests of the individual producer. If a producer feels that his or her share of the gains is not proportional, an equity problem potentially exists and that producer may oppose the program. Equity concerns may relate to the distribution of benefits among producers and the distribution of benefits up and down the vertical market system for the commodity. Opposition to a program may be expressed through administrative and legal channels. Evaluations of these programs are particularly important when addressing equity concerns since it is at the evaluation stage where the benefits and the distribution of the benefits are measured.

Checkoff programs are all about the dissemination of information, and in the last decade, many of these commodity programs have been challenged, not on the equity, but on the constitutionality of the programs relating to speech. Some have argued that mandatory assessments for speech purposes violate the individual's right to freedom of speech under the 1st Amendment to the Constitution. These legal challenges based on the freedom-of-speech premise have worked their way through the court system for many years. A recent Supreme Court ruling on the beef

checkoff program basically concluded that the program is government speech and, hence, not subject to the 1st Amendment argument. More details on this and other legal issues related to checkoff programs are highlighted in the article by Crespi and McEowen in this issue of *Choices*. Time will tell if the beef checkoff ruling is the end of the legal challenges to commodity checkoff programs. Historically, the record would suggest that it is not.

Figure 1 reflects the functions common to all checkoff programs, as well as group action versus individual interest. The functions in each box must work for a program to succeed. Because information is always needed, there will always be potential conflicts between the individual's interest and the interest of the industry. One argument is that protecting the individual's rights in terms of speech may prohibit everyone else from speaking. Allowing some individuals not to participate in the cost of checkoff-funded generic advertising to protect their individual rights to free speech, however, gives rise to free-riders. The free-rider problem always occurs as long as consumers cannot differentiate between the goods supplied by producers who pay the assessment and those supplied by producers who opt not to pay. In most cases, consumers probably cannot make the distinction when buying the commodity. At this point, the legal and legislative systems must intervene since relying on economic pressures to support a voluntary program have proven difficult, although possible. The current Flower Promotion Program is a notable case where the industry has moved from a mandatory to a voluntary program.

The Economics of Commodity Checkoff Programs

All generic advertising programs are intended to either enhance or lessen the erosion in the demand for a commodity. Demand is influenced by many factors, including checkoff program advertising and promotion activities. Most of the factors that affect demand, however, are completely outside the control of the industry. Consequently, declining demand does not mean a promotion program has failed because so many factors can work against the best efforts of the industry to promote its products. The evaluation task is to measure the effects of generic efforts in an environment where many demand drivers are changing demand all at the same time. Economists most often turn to statistical models to estimate and isolate the specific effects of different demand drivers and their impacts on the commodity market. Many of the major checkoff programs have developed statistical models that show the demand effects attributable to their generic advertising activities. In fact, checkoff programs established under federal authority are required to periodically measure the economic impact of their programs using appropriate statistical procedures.

While most models used to measure the effectiveness of commodity checkoff programs are tied to the uniqueness of the respective commodity analyzed, they all include some measure of demand, frequently at the retail level. Demand depends on prices, purchasing power, buyer characteristics, product attributes, market conditions, information, and many other factors. Generic advertising and promotion efforts, usually measured with checkoff expenditures, enter these models as a variable

expected to enhance demand over some time period. If consumers respond to the message, some positive increase in demand attributed to the advertising should eventually occur. No consumer response would indicate that the messages have had little to no impact. Determining this advertising response is the single most important step in the evaluation process. Of course, getting to that response level requires an understanding of the checkoff programs, data collection, and careful analysis. With these things in place, individuals responsible for doing the evaluation can usually draw inferences about changes in demand attributable to the checkoff efforts and those attributable to other factors. Shifts in demand may lead to higher prices in the short run and, hence, greater revenues for the industry. Depending on the characteristics of production, storage, and trade flows, supplies may also change. Then any checkoff gains are expressed recognizing both shifts in demand and any changes in supply. The underlying analytics for measuring this process are not easy! As Wohlgenant demonstrates in another article in this issue of *Choices*, the problem is complicated further by determining where in the distribution system these shifts in demand and supply are measured.

By definition, generic advertising should be brand or market share neutral. In other words, generic advertising may increase total demand, but should not result in one firm or group of firms gaining market share over another. For example, generic promotions of flowers should not favor one type of retail sales outlet such as florists over another outlet like supermarkets. Major brands of commodities like Florida orange juice (Tropicana, Minute Maid, and Florida's Natural) would not be

expected to lose or gain shares from the generic advertising of Florida oranges or orange juice. If a generic message enhances or reduces one brand share or outlet share relative to others, then a major equity problem occurs, as suggested in Figure 1 (left box). The program is no longer brand (or other segmentation) neutral and support for the program may well eventually decline because of the underlying inequity. Furthermore, if a firm is sufficiently large to effectively promote its own brand and capture the gains, that firm will argue that their contribution to generic promotions could more effectively be used to promote its own brand. In an industry driven by a few major brands, generic promotion programs usually play less prominent roles than brand advertising. In general, the level of concentration and the competitive structure within a commodity sector are major factors determining the usefulness of generic advertising. A few commodity checkoff programs, particularly almonds, provide advertising credits to major brand suppliers who can demonstrate that their own advertising programs enhance demand.

The Benefits of Commodity Checkoff Programs

The literature on economic benefits of commodity checkoff programs is growing and increasingly technical. Every commodity checkoff group struggles with the measurement of benefits and performance of their generic advertising programs and how to best communicate those benefits back to those who are "paying the bills." Economic modeling continues to be the instrument of choice for gaining insight into the economic impact from generic promotion programs. As a rule, benefit-to-cost

ratios for generic advertising programs reported by researchers across a broad range of commodities are in the range of 4:1 to 6:1, indicating that for each dollar of promotions at least 4 to 6 times that amount is generated in new revenues, profit, or "economic surplus" to the industry, depending on how the "benefits" are defined in the associated study. This rule seems to be reasonably robust with a reported benefit-to-cost ratio for beef of 5.6:1; pork, 4.8:1; dairy, 4.6:1; flowers, 6.6:1; prunes, 2.7:1; eggs, 4.7:1; and processed oranges between 2:1 to 4:1, depending on the models and time period of analysis (AMS-USDA, 2005; Capps, Bessler, & Williams, 2003; Alston et al., 1998; FPO, 2005; Kaiser, 2005; Reberte, Schmit, & Kaiser, 1996; Ward, 2004).

In nearly every one of these studies, econometric models are used to predict demand with and without the generic advertising efforts, which yields the change in demand attributable to generic advertising. Once the generic-advertising-induced change in demand is estimated, the associated gains or losses in revenues, profit, or "economic surplus" (the "benefits") are expressed relative to the advertising effort (the "costs") and reported as benefit-cost ratios. The issue of measuring the benefits to checkoff programs is considered in more detail in the article by Williams and Capps in this issue of *Choices*.

Moving Forward

Checkoff programs have gone through a period of considerable uncertainty in recent years primarily because of conflicting legal rulings related to an increasing number of court challenges to the checkoff system. Now that a final legal ruling on the constitutionality of the beef

checkoff has been handed down by the Supreme Court, many of the legal uncertainties may have been removed. New challenges will likely arise, however, and may well relate to the overall effectiveness and efficiency of the programs and the equity questions. Those types of challenges are more readily addressed with the types of economic models usually used for measuring advertising responses than has been the case for the legal challenges related to constitutionality.

Information is a key ingredient when making buying decisions. Commodity checkoff programs provide a marketing tool for producers to have a voice to inform potential buyers about the attributes and uses of their commodity. Most checkoff issues are not about the need for communicating, however, but about “what is said” and “who says it.” Checkoff messages compete for the consumer’s attention with the intent to influence buying behavior. Future challenges to checkoff programs most likely lie in the creativity of the message and the delivery process with more targeting to specific potential consumers. The promotion of fresh flowers is an excellent example of a change in strategy from a broad approach with “Mr. Buzz . . . the flower spokesperson or spokes-bee” to now focusing on selected demographics.

For More Information

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The Constitutionality of Generic Advertising Checkoff Programs

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JEL Classification: K10, Q18

Until recently, the legal status of generic advertising programs seemed questionable. After an initial victory for generic advertising proponents in 1997 in *Glickman v. Wileman Brothers & Elliott, Inc.* (521 U.S. 457 (1997)), the U.S. Supreme Court ruled four years later in *United States v. United Foods, Inc.* (533 U.S. 405 (2001)) that the federally-mandated mushroom advertising program was not part of a larger regulatory scheme (as was present in the 1997 case), and was, therefore, unconstitutional as compelled private speech. To many, the marketing of mushrooms under the checkoff statute at the heart of the *United Foods* case seemed no different from the way in which other commodities promoted through checkoff programs, like beef and pork, were marketed. After the *United Foods* case, it seemed only a matter of time before all mandatory checkoff programs would be ruled unconstitutional as well.

The Supreme Court did not address in either the 1997 or 2001 cases, however, whether the checkoff-funded generic advertising programs at issue were government speech and, therefore, not subject to challenge as an unconstitutional proscription of private speech under the First Amendment. That question was answered in 2005 when the Court upheld the Constitutionality of the beef checkoff on government speech grounds. The checkoff industry was immediately re-invigorated.

What does this new ruling mean for other checkoff programs? This article reviews recent commodity promotion litigation, speculates on what opponents of compelled support for generic advertising may be planning next, and considers some potential fallout from the recent decision.

The Agricultural Marketing Agreement Act of 1937 (7 U.S.C. § 601 *et seq.*) and several “stand-alone” acts (such as the Beef Promotion and Research Act of 1985, 7 U.S.C. §

2901 *et seq.*) establish the federal statutes for checkoff programs. These mandated, grower-funded programs are used for a variety of industry enhancement programs including research, market development, and marketing strategies. The most controversial strategies surround the use of industry funds for generic advertising. Since the 1980s, the generic advertising portion of these checkoffs has been challenged constitutionally on the basis that the mandated programs violate the freedom of speech of producers. Courts have long held that advertising is a form of private speech protected under the First Amendment and that the right to freedom of speech also includes the right not to subsidize a private message with which an individual disagrees (see, for example, *Keller v. State Bar of California*, 496 U.S. 1 (1990)). The programs may be challenged on freedom of association grounds. Like the speech issue, opponents of generic advertising claim that the mandatory assessments compel industry participants to be associated with a particular message (the advertising) with which they do not agree. Over the last two decades, nearly every commodity promotion program in the country has been challenged.

After years of wrangling over the constitutionality of mandated producer-funded generic advertising programs, a case finally reached the U.S. Supreme Court. In 1997, the Supreme Court ruled in *Glickman* that a federally mandated checkoff program for California tree fruits was constitutional. The main issue in the case concerned the amount of regulation that already existed in the California tree-fruit industry. Writing for the Court, Justice Stevens repeatedly stressed the statutory context within which the generic promotion program had arisen and that generic campaigns had to be viewed in light of the regulatory scheme that Congress had put forward:

“California nectarines and peaches are marketed pursuant to detailed marketing orders that have displaced many aspects of independent business activity that characterize other portions of the economy in which competition is fully protected by the antitrust laws. The business entities that are compelled to fund the generic advertising at issue in this litigation do so as a part of a broader collective enterprise in which their freedom to act independently is already constrained by the regulatory scheme” (*Glickman*, at 457).

The Court then pointed out that there were four characteristics of the California nectarine and peach marketing orders’ regulatory schemes that distinguished the orders from other laws that had been found to violate the First Amendment. First, the checkoff programs did not prevent producers from communicating any message to any audience. Second, the programs did not compel handlers to engage in any actual or symbolic speech. Third, the programs did not compel the handlers to endorse or to finance any political or ideological views. Fourth, the programs had antitrust exemptions. The Court stressed that the regulatory nature of the marketing orders for the industries in question required that the generic advertising be judged in a different light from that of other commercial speech cases. Congress had made a regulatory decision that, right or wrong, certain commodities should be marketed jointly. Justice Stevens, writing for the majority, stated:

“In sum, what we are reviewing is a species of economic regulation that should enjoy

the same strong presumption of validity that we accord to other policy judgments made by Congress. The mere fact that one or more producers ‘do not wish to foster’ generic advertising of their product is not a sufficient reason for overriding the judgment of the majority of the market participants, bureaucrats, and legislators who have concluded that such programs are beneficial” (*Glickman*, at 477).

To many, the issue of mandated promotion seemed to have been decided with the *Glickman* case. However, in November of 1999, the Sixth Circuit Court of Appeals ruled that the Mushroom Promotion Act of 1990 (7 U.S.C. § 6101 et seq.) was unconstitutional because, unlike the marketing orders in *Glickman*, the Mushroom Act was not in the same spirit as the broader, collective regulation that the Supreme Court used to uphold the tree-fruit order (*United Foods, Inc. v. USDA*, 197 F.3d 221 (6th Cir. 1999)). *United Foods, Inc.*, a Tennessee food processor, had challenged the 1990 Mushroom Act on the grounds that the assessments were compelled commercial speech and that the marketing of mushrooms was distinct from the marketing that existed in the California tree-fruit industry in the *Glickman* case.

The attorneys for *United Foods* used a very interesting argument to distinguish the mushroom industry from the tree-fruit industry. Focusing on the language of Justice Stevens’ opinion concerning regulation and compelled association, they emphasized that the regulatory environment that justified the tree-fruit order was almost completely absent in the mushroom industry. The Court of

Appeals found this limited-regulation argument persuasive. Writing for the majority, Judge Merritt stated: “The Court’s holding in *Glickman*, we believe, is that nonideological, compelled, commercial speech is justified in the context of the extensive regulation of an industry but not otherwise” (*United Foods, Inc. v. USDA*, 197 F.3d 221 (6th Cir. 1999), at 224). In other words, without the extensive regulation present in the tree-fruit marketing orders, there was no justification for any further limits on compelled speech.

On appeal, the U.S. Supreme Court upheld the Sixth Circuit’s ruling in 2001. Writing for the majority, Justice Kennedy pointed out the differences between the 1997 tree-fruit case and the mushroom case: “The program sustained in [*Glickman*] differs from the one under review in a most fundamental respect. In [*Glickman*] the mandated assessments for speech were ancillary to a more comprehensive program restricting marketing autonomy. Here, for all practical purposes, the advertising itself, far from being ancillary, is the principal object of the regulatory scheme” (*US v. United Foods, Inc.* 533 U.S. 405 (2001), at 411-412). Thus, as long as the generic advertising is part of a broader regulatory scheme (like the marketing orders for fruit), the assessments pass constitutional muster. However, if generic advertising is the primary purpose for collecting the assessments, the assessments then violated the First Amendment. It did not take long for opponents of other mandatory checkoff programs, including the beef checkoff program, to adopt the strategy that was successful in the *United Foods* case. The Beef Promotion and Research Act (“Beef Act,” 7 U.S.C. § 2901 et seq.) was passed by Congress as part of the Food Security Act of 1985 (16

U.S.C. §§ 3801-3862). Under the Beef Act, the Secretary of Agriculture is directed to issue a Beef Promotion and Research Order and appoint a Cattlemen's Beef Promotion and Research Board which imposes a \$1 per head checkoff on all sales or importation of cattle. This assessment then is used to fund such things as beef promotional activities, which are designed by the Operating Committee of the Beef Board and approved by the Secretary of Agriculture.

Citing *United Foods*, the trial court ruled in 2001 that the beef checkoff program was unconstitutional (*Livestock Marketing Assoc. (LMA) v. USDA*, 132 F. Supp. 2d 817 (D. S.D. 2001)).¹ In this case, the government's argument that the beef checkoff was government speech was rejected by the trial court. On appeal, the United States Court of Appeals for the Eighth Circuit affirmed (*LMA v. USDA*, 335 F.3d 711 (8th Cir. 2003)). The U.S. Supreme Court subsequently agreed to hear the case.

Meanwhile, another case against the Beef Act was winding its way through the federal courts. In November 2002, the Federal District Court for Montana held that the beef program "creates programs where the government utilizes private cattlemen

to disseminate a single message, a message prescribed by Congress and the USDA" (*Charter v. USDA*, 230 F. Supp. 2d 1121 (D.Mont. 2002)). In the *Charter* case, the District Court held that the government is making the speech *through* the cattlemen rather than *for* the cattlemen and, as such, the speech was government speech, not individual or private, commercial speech. Thus, the advertising did not implicate the plaintiffs' First Amendment rights. The *Charter* case was appealed to the U.S. Court of Appeals of the Ninth Circuit.

Before the Ninth Circuit ruled on the *Charter* appeal, the Supreme Court rendered its opinion in the *LMA* beef case. In a 6-3 ruling, with the majority opinion written by Justice Scalia, the Court upheld the beef checkoff on the grounds that the program was government speech (*Johanns, et al. v. LMA*, 544 U.S. 550 (2005)).

Why the change? In the majority's opinion, the beef checkoff case revolved around the question of whether the statutory language of the Beef Act created an advertising program that could be classified as government speech. Thus, as Justice Scalia explains, "We have not heretofore considered the First Amendment consequences of government-compelled subsidy of the government's own speech."

While the government speech doctrine is fairly new and not well developed, prior Supreme Court opinions (not involving agricultural commodity checkoffs) indicated that to constitute government speech, a government mandated program must pass three tests. First, the government must exercise sufficient control over the source of the message to be deemed ultimately responsible for the message. Second, the main purpose of the message and the program must

be identified as the government's. Finally, the source of the assessments must come from a large, nondiscrete group. It was believed by many that the beef checkoff would have a hard time overcoming this last test because the source of the funding, cattle producers, seemed to be a rather discrete, identifiable group. The rationale behind this third test is that courts have ruled that greater care needs to be taken when the government seeks to tax individuals or groups to pay for messages. The broader the source of the financing, the more diluted is the governmental infringement on individual rights.

Justice Scalia, writing for the majority, opined that the first two tests were satisfied because Congress has provided the rationale for a compelling state interest and instructed the Secretary of Agriculture to both impose the order, as well as oversee the actions of the Beef Board and the program's Operating Committee. While the opponents of the beef advertising program had argued that the Operating Committee was a non-governmental entity and, thus, the advertising cannot be considered government speech, the Court rejected this premise: "The message of the promotional campaigns is effectively controlled by the Federal Government itself. The message set out in the beef promotions is from beginning to end the message established by the Federal Government.... Congress and the Secretary have set out the overarching message and some of its elements, and they have left the development of the remaining details to an entity whose members are answerable to the Secretary.... Moreover, the record demonstrates that the Secretary exercises final approval authority over every word used in every promotional campaign" (125 S.Ct. 2055 at 2063 (2005)).

1. In October 2002, a U.S. district judge in Michigan, Richard Enslin, also citing *United Foods*, ruled that similar legislation for the pork checkoff program was not only unconstitutional but "rotten" as well (*Michigan Pork Producers Association v. Campaign for Family Farms*, 229 F. Supp. 2d 772 (W.D. Mich. 2002)) and struck down the entire pork checkoff, including the portions for research and education.

As to the final test regarding the source of the assessments, Justice Scalia argued that the compelled assessments, in fact, are unaffected by whether the funds are raised through general or targeted assessments. The dissent argued that this final test was key to the Act's being unconstitutional as the Act did not establish sufficient democratic checks. With this majority ruling, however, the Court eliminated this last test entirely. As Scalia opined, "Citizens may challenge compelled support of private speech, but have no First Amendment right not to fund government speech. And that is no less true when the funding is achieved through targeted assessments devoted exclusively to the program to which the assessed citizens object."

One First Amendment issue that was not addressed was the association issue. Most beef checkoff advertisements are credited to "America's Beef Producers," which may give the impression that the objecting cattle producers endorse the message. The majority examined only the language of the Act and concluded that because the statute does not require this attribution, the Act is not invalid on its face. However, the Court did note that they could not determine whether association rights were being violated because the record before them did not contain evidence that the ads were being associated with the plaintiffs. Such an argument was not part of the beef challenge, but is part of a pending challenge of the similar pork checkoff. In the pork case, the challenge is whether the government can compel producers to belong to a particular group. Previous rulings by the Supreme Court have held that Freedom of Association includes the right not to associate. As this question was not part of the beef checkoff case, the Court never

ruled on it. So, a checkoff program that is found to constitute government speech could still be found unconstitutional on freedom of association grounds.

An interesting question is whether the majority opinion was, in reality, a minority opinion as far as the government speech argument goes. Two of the six Justices who formed the majority, Justice Ginsburg and Justice Breyer, concurred with the majority opinion as an acceptable decision, though they disagreed with the rationale. Justice Ginsburg wrote separately that the Act was constitutional, but did not agree that the beef checkoff constituted government speech. Justice Breyer joined the majority, but wrote separately that the checkoff was an acceptable form of government regulation; hence the government speech issue was not pertinent for its constitutionality.

What are the implications of the Supreme Court decision on the beef checkoff program for commodity checkoff programs in general? In one sense, it could be argued that neither *Glickman* nor *United Foods* are relevant anymore in determining the constitutionality of a checkoff program. After the *United Foods* ruling, supporters of generic advertising tried to argue that their industries were more like that of the California tree-fruits, while their opponents argued that the industries were more like those of the mushroom industry. Because of this new ruling on the beef checkoff, deciding whether a program is pertinent based upon the degree of regulation in an industry no longer seems important *if* the advertising funded can be considered government speech. However, the fact that only four of the Justices actually saw the checkoff programs as government speech and that two of

these, Chief Justice Rehnquist and Justice O'Connor, are no longer on the Court, makes the relevance of the earlier decisions a bit murky.

Another implication of the beef case ruling is that, since checkoff messages may be considered government speech, much more regulatory oversight by the Secretary of Agriculture over all programs may be inevitable because failure to sufficiently monitor the programs may lead to lax oversight over promotional messages. Claims that a program is not being run as a government program would most likely blossom into further legal battles as to whether a program is in line with Congress' intent and whether or not the operating committee is sending an approved message. Generic advertising done by a program operating without sufficient oversight, therefore, may be seen as infringing on some participants' First Amendment rights.

Finally, for those thinking that the ruling will be limited to checkoff programs, a 2006 opinion of the United States Court of Appeals for the Sixth Circuit is worth watching. In 2003, the Tennessee legislature authorized sales of a specialty license plate with a "Choose Life" logotype with half of the profits going to a private organization, New Life Resources, Inc. At the same time, the legislature denied authorizing a pro-choice specialty license plate at the request of Planned Parenthood of Tennessee. Consequently, the American Civil Liberties Union of Tennessee sued, challenging the Act as unconstitutional. The Trial Court agreed but, based on the LMA beef case, the Appellate Court reversed (*ACLU of Tennessee, et al. v. Bredezen*, 441 F.3d 370 (6th Cir. 2006)). Citing the Supreme Court's beef checkoff decision, the Appeals Court noted that the "Choose Life" license plate

was a government-crafted message where the legislature, like the Secretary of Agriculture in the checkoff program, had retained the right to approve the message even though the design and message itself was developed by a private organization. The Court also cited the beef case in holding that dissemination of a government-crafted message by a private organization did not require the views expressed to be neutral. The U.S. Supreme Court has declined to hear the case. Clearly, the government speech doctrine set in motion

by the Supreme Court's recent beef checkoff ruling may very well have repercussions far beyond the scope of agricultural enterprises.

For More Information

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Retail-to-Farm Transmission of Generic Advertising Effects

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JEL Classification: Q11, Q13

The efficacy of commodity checkoff programs, especially the effects of generic advertising programs, on producers' welfare has received much attention by agricultural economists, commodity groups, and legal observers. At the center of the debate has been the question of whether producers are better off under a voluntary or mandatory checkoff program. Allocation of checkoff funds for generic advertising under a voluntary program often is characterized as a free-rider problem because producers have an incentive not to participate and free ride on those who choose to contribute, thereby resulting in failure of the program to produce enough funds to support advertising that benefits all producers. Opponents of mandatory checkoff programs generally have argued that such programs violate the principle of economic freedom. Not surprisingly, adjudication has, and continues to this day, to surround many of these programs. While some proponents of checkoff programs believe the argument for eliminating free-ridership is necessary to mandatory programs, whether in fact individual producers are better off under a mandatory program is still an open question.

There is much debate in the agricultural economics literature about the relative importance of generic advertising compared to other factors influencing demand for commodities. Cross-commodity effects (the so-called "spillover" effects) of generic promotion, for example, are frequently ignored in analyses of the effectiveness of commodity promotion. These effects can be important because increased beef promotion, for example, can reduce poultry consumption; in turn, reduced poultry demand can cause the demand for beef to decline, thus subtracting from any direct effect of beef promotion on beef demand (Brester & Schroeder, 1995). Piggott, Piggott, and Wright (1995) derive the economic determinants of cross-com-

modity impacts and show specifically how returns in an isolated market are dependent upon cross-commodity effects. Other market characteristics also can determine how generic advertising affects the demand for a commodity. For example, Kinnucan et al. (1997) show that the effects of generic advertising on meat demand are highly sensitive to health effects. They conclude that if variables accounting for health information about cholesterol and other information about red meats are included in a regression analysis to measure the demand effects of generic advertising, the measured impact of the advertising on meat consumption is smaller. Brester and Schroeder (1995) find that accounting for brand advertising also leads to smaller measured effects of generic advertising on meat consumption. Whether or not the measured effects of advertising are statistically significant also has not been adequately addressed (Alston, Chalfant, & Piggott, 2000; Davis, 2005). However, a review of the literature does indicate generally high point estimates of the return to generic advertising, ranging from 2:1 to 10:1 for each dollar invested in advertising.

Even with generally high estimated rates of return to advertising, a number of producer groups in recent years have expressed dissatisfaction with checkoff programs and have called for either new referendums or legal action to eliminate mandatory programs (Becker, 2004). If rates of return to commodity advertising are really so high, why do we see dissatisfaction among producers about mandatory checkoff programs? It may be that the published rates of return to generic advertising are overstated because some critical factors important for understanding how farmers' returns are affected by generic advertising have been neglected.

The Importance of Retail-to-Farm Price Transmission

For the most part, research has not focused on one very important aspect of estimating the rates of return to advertising - the retail-to-farm price transmission. Usually aggregate disappearance data are used to estimate advertising elasticities and price elasticities of demand which are then used to calculate how much of a change in retail price can be attributed to a one dollar increase in advertising, holding the quantity of the commodity produced fixed. A critical assumption usually made in such analyses (either implicitly or explicitly) is that there is a one-to-one transmission of changes in prices at the retail level back to the farm level so that returns in dollars at the retail level measure the same return as at the farm level. An additional assumption usually made is that producers do not have enough time to alter production decisions in response to an advertising-induced price increase so that supply can be regarded as fixed. Certainly both of these assumptions are questionable and can have serious consequences for the measuring the returns that producers can expect to receive from spending money on generic advertising.

Conceptually, whether or not the farm-level response to retail-level generic advertising is likely to be the same as the retail-level response depends primarily on the nature of the retail-to-farm price transmission occurring in those markets (Forker & Ward, 1993, p. 55). There are at least six reasons why the farm-level effects of retail-level generic advertising may differ from those that may occur at the retail level: (a) non-uniform checkoff assessments; (b) non-zero supply response of producers; (c)

input substitution between raw product and marketing inputs; (d) government intervention; (e) market power; and (f) the influence of contracting and/or vertical integration.

The Nature of Checkoff Assessments

In part, the farm-level response to generic advertising depends on how the checkoff assessment is levied. If the assessments are uniform across producers, then the net farm-level price effects resulting from advertising-induced demand shifts at the retail level will be the same across producers, assuming the commodity produced is homogenous and producers are price takers (Forker & Ward, 1993). However, if the assessments are not uniform or qualities of the product differ across producers, then per unit benefits will not necessarily be equally distributed across producers. Indeed, most commodities are produced where producers receive either premiums or discounts for their products. Thus, a constant per unit assessment (e.g., \$ per cwt produced) can shift the distribution of advertising gains from low-quality to high-quality product suppliers, or vice versa.

The Effect of Supply Response

The retail-to-farm price transmission of advertising can be sensitive to the length of time required for producers to respond to higher farm prices induced by additional generic advertising. Most agricultural commodities have demand curves that are inelastic. The percentage change in market price resulting from a one percent increase in advertising is equal to the advertising elasticity divided by the sum of the supply elasticity and the absolute value of the elasticity of demand. If the absolute value of the elasticity of demand is 0.5 and the supply curve is upward

sloping with an elasticity of, say, 0.5 rather than perfectly inelastic as is often assumed, then the percentage increase in price from a one percent increase in advertising would be half what would have been calculated. With a supply elasticity of 1, the percentage price increase would be cut by a factor 3. Therefore, it is not hard to see how a calculated rate of return to generic advertising of, say, 2:1 could actually be 1:1, or even less if the supply response to the advertising-induced price increase is taken into account.

The preceding analysis assumes that the checkoff assessment is a lump sum tax. If the assessment is a per unit fee, which is frequently the case, then the effect of the supply elasticity is mitigated to some extent because a per unit assessment offsets, at least partially, the direct effect of increased industry output on output price by shifting the tax onto consumers. Indeed, Kinnucan and Myrland (2000) show that these two effects just offset one another in the single product case when determining the optimal checkoff rate. However, with multi-product industries, the indirect and direct effects may not be equal. Thus, the sensitivity of the retail-to-farm price transmission to the magnitude of the supply elasticity depends on the nature of the checkoff; that is, whether the assessment is a lump sum or a per unit fee.

The Role of Input Substitution

Another potentially important parameter affecting the retail-to-farm price transmission of generic advertising is input substitution between the raw agricultural product and marketing inputs in producing the final composite food product. The input substitution issue is important first of all because a small degree of substitutability can lead to a substan-

tial reduction in the retail-to-farm transmission of advertising effects (Wohlgenant, 1993). Second, input substitution has been found to be significant and important for a wide variety of agricultural commodities (Wohlgenant, 1989). Often the assumption is made that the final retail product (beef, for example) is produced using fixed proportions of the raw material (cattle in this case) and marketing inputs which may be reasonable for an individual firm in the short run. However, firms differ in their “recipes” for producing products from raw materials. A higher relative raw material price will induce firms with technologies using less of the raw material to produce a larger share of industry output, causing the amount of the raw material per unit industry output to decline. In addition, many final products we analyze (like beef) are really composites of disaggregated products (steaks, roasts, ground beef), so that product substitution may occur in response to advertising even when there is no substitution between the raw material and marketing inputs in producing a single good (Wohlgenant, 1999). If no provision is made for the possibility of such product substitution, but rather the product (beef) is treated as a single composite good, then what we observe as input substitution may really be a combination of substitution between the raw product and marketing inputs and changes in the composition of the composite retail commodity produced (Wohlgenant, 1999). Higher cattle prices, for example, induced by increased generic advertising, lead the marketing sector to produce higher-value products; that is, products containing less of the now relatively more expensive raw product. For some commodities like dairy, this change in product composition may

be quite extensive because of the wide variety of dissimilar commodities produced from milk (fluid milk, cheeses, butter, yogurt, frozen dairy products). The bottom line is that because of the relatively inelastic supply of the agricultural raw material, an increase in demand for the end product induced by generic advertising increases the relative price of the agricultural raw material and induces substitution away from the raw material toward marketing inputs so that the net effect on farm price may be less than would be the case if there was one-to-one transmission of retail demand increases to the farm level.

To demonstrate the importance of input substitution, I have calculated the retail-to-farm price transmission coefficients for beef, pork, poultry, and dairy presented in Table 1. These coefficients are calculated by dividing retail own-price elasticities by own-price elasticities of derived demand for the same commodities, and then multiplying these numbers by average values of the farmer’s share of the retail dollar as demonstrated in Wohlgenant (1993). If the coefficients were to equal 1, there would be a one-to-one transmission of the price effects of generic advertising from the respective retail markets down to the farm level. However, because the coefficients are actually all less than 1 for all these commodities, a one cent increase in retail price translates into less than a one cent increase in farm price, holding the supply of the farm product fixed. In the case of beef, for example, a one cent increase in retail price from advertising translates into a 0.67 cent increase in the farm price. The very small transmission elasticity of dairy, 0.16, suggests that factors other than input substitution may be at work.

Why don’t more studies of generic advertising make the distinc-

Table 1. Estimates of retail-to-farm transmission of generic advertising for beef, pork, poultry, and dairy.

Commodity	Increase in farm price from one cent increase in retail price from advertising
Beef	0.67
Pork	0.69
Poultry	0.90
Dairy	0.16

Note: Estimates assume fixed supply and are calculated from Wohlgenant (1989).

tion between retail and farm level effects if transmission effects are so much different than one? The answer, in part, is that many analysts fail to appreciate the limitations of the disappearance data published by the USDA. These data, while derived very carefully and useful for many purposes, are best viewed (as the name implies) as production data rather than as consumption data. The apparent consumption data are derived as production plus adjustments made for net exports and changes in inventories. The resulting numbers are multiplied by fixed input-output coefficients, reflecting loss in processing, to arrive at figures to estimate the amount of the raw material “disappearing” into the marketing channel that ultimately is consumed. The main problem with using these numbers to represent consumption is that one has to assume that, for example, a pound of hamburger is valued the same as a pound of steak to the consumer which obviously is not the case. A preferable estimate of consumption would be a constant dollar measure where each component of the composite quantity is weighted by a fixed price (Nelson, 1991). The error in using simple sum quantities of meat can be quite large (Brester and Wohlgenant, 1993). Researchers using disappearance data may come closer to

estimating the true elasticities by specifying and estimating wholesale level or farm level demand functions, rather than consumer demand functions.

The Effect of Government Intervention

Government intervention in commodity markets can also affect the retail-to-farm price transmission of advertising. The dairy industry is a case in point where the dairy price support program occurs in wholesale markets, causing derived demand for milk at the farm level to follow one regime if the price is set by the wholesale market for manufactured goods or another regime if the price is set by the support prices for cheese and/or butter. The effect of government intervention in dairy markets is to cause derived demand overall to be more elastic (Wohlgenant & Clary, 1993). On average, we would expect the retail-to-farm price transmission from advertising to be reduced as a result of government intervention. Therefore, the small coefficient observed empirically (Table 1) may be explained in large part by government intervention in dairy markets. Another example might be cotton (Murray et al., 2001) where the interaction of agricultural policy, international trade, and markets has led to situations during some time periods in which the farm price has been unaffected by demand shifts, including any increases from generic advertising.

The Presence of Market Power

The presence of market power in the processing/marketing sector can affect retail-to-farm price transmission of advertising. If there is a wedge between price and marginal cost caused by market power and this wedge (which would be positive and larger than 1) is constant, then mar-

ket power acts much like the effect of input substitution. The overall effect in this case is to cause the derived demand elasticity for the agricultural raw material to be larger in absolute value (Wohlgenant and Piggott, 2003). Therefore, the effect of market power in this case would be to lessen the retail-to-farm price transmission of advertising. An important question is how significant does market power have to be to have an economically important effect on retail-to-farm price transmission? A simulation analysis conducted by Wohlgenant and Piggott suggests that market power is not as important in the retail-to-farm price transmission of advertising as other more fundamental market determinants. In particular, they show that the impact of advertising on retail-to-farm price transmission assuming some level of market power is indistinguishable from that obtained assuming price-taking behavior. In fact, the simulation results show that the results are most significantly affected by supply response and input substitutability between the raw product and marketing inputs. Kinnucan, extending the analysis to market power in both the output and agricultural raw material markets, arrives at a similar finding that optimal advertising intensity is extremely sensitive to input substitution but not to market power.

The Industrialization of Agriculture

In recent decades, the agricultural processing and marketing sectors have undergone unprecedented organizational and structural changes. Increased vertical coordination through contracting and increased vertical integration upstream into agricultural production have been pervasive in livestock and fruit and vegetable industries and may affect

the retail-to-farm price transmission of advertising. In particular, increased contracting and ownership of livestock by processors (so-called “captive supplies”) allegedly has created market power for livestock processors in procurement of animals from the spot market. If true, then the transmission of generic advertising to producers may have been affected, although how and in what way are questions that have not been addressed.

One way in which the transmission of advertising may have been affected by the industrialization of agriculture is through its distributional effects on producers. Vertical integration and contracting are characterized by much more quality differentiation than one might find on the spot market (Goodhue and Rausser, 2003). Moreover, some companies are not only integrating upstream into production but downstream into retail outlets with branded products so that generic advertising in some instances may work against these firms. Thus, movement toward branded products and increased vertical integration downstream may lead to less support for commodity checkoff programs that fund generic advertising.

Conclusions

The evaluation of the economic effects of generic advertising on prices and producer welfare is an area of research that has occupied a lot of attention. Despite the amount of econometric research indicating high rates of return to generic advertising, there is disenchantment and disbelief among some producers and commodity groups as to whether producers actually benefit from generic advertising. More accurate measurement of the farm-level effects of

retail-level generic advertising must account for various factors that influence the transmission of retail demand changes from advertising to the farm level. Six of the potentially most important of these factors are: (1) non-uniform assessment of the checkoff program, (2) non-zero supply response of producers, (3) input substitution between raw product and marketing inputs, (4) government intervention, (5) market power, and (6) influence of contracting and/or vertical integration. Which of these different factors is most important cannot be determined conclusively because the answer depends upon the particular commodity under investigation. However, research to date suggests that input substitution, government intervention, and contracting and vertical organization are generally the factors with potentially the most important effects on the transmission of the retail-levels effects of advertising down to the farm level. The importance of input substitution in estimating returns to advertising suggests that an understanding of the nature of the production process for converting raw food materials into the myriad of final consumer products is essential to understanding how generic advertising is transmitted from retail markets back to the farm level. Future research will need to focus on the issues related to retail-to-farm price transmission if more accurate measures of the return to producers from generic advertising are to be developed.

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Measuring the Effectiveness of Checkoff Programs

Gary W. Williams and Oral Capps, Jr.

JEL Classifications: Q13, M31, M37

Introduction

All federal and many state checkoff organizations are required to perform evaluations of the effectiveness of their programs periodically. Although some program managers conduct evaluations primarily to satisfy legislative requirements, most recognize the importance of accurate and detailed evaluations of the effectiveness of past promotional activities for successful management of their programs.

Program evaluation usually is thought of as the measurement of program effectiveness; that is, the “metrics” needed to determine how much “bang for the buck” has been generated by the promotion and research, as well as other programmatic activities funded by the commodity organization. In essence, the “metrics” are an after-the-fact assessment of whether the organization funding the program has been “doing things right;” that is, whether the activities in which the organization has invested have been successful in achieving their objectives.

Evaluation also includes an assessment of whether the organization is “doing the right things;” that is, whether the program goals and objectives and the process designed to meet those goals efficiently and effectively lead to the optimum allocation of the program funds. Even if all promotion expenditures are found to generate positive returns, the evaluation results may suggest some reallocation of funds among alternative activities to maximize the returns to the available funds.

Evaluation also has proven to be important in recent court challenges to checkoff programs. As Crespi and McEowen discuss in another article in this issue of *Choices*, the constitutionality of many legislatively-mandated commodity programs has been challenged by some who are required to pay as a violation of their First Amendment

rights to freedom of speech. Implicit in the arguments is the question that program evaluations are designed to answer whether the promotion and advertising programs funded by checkoff funds are effective in securing the anticipated benefits for those who pay for the programs.

Defining Checkoff Program Effectiveness

The first step in measuring program effectiveness is to clearly define what “effectiveness” means to the checkoff organization. Whether or not a promotion program can be judged to be effective depends on the objectives of the program. Even though the overall mission or goal of checkoff programs is to enhance the profits of program contributors, most programs define intermediate objectives that serve as indicators of program effectiveness, such as changes in: (1) industry sales, (2) industry prices, (3) industry market share, (4) industry profits, or (5) consumer awareness of a product or of positive product attributes.

Measurement Methods

Once specific indicators of effectiveness are identified, the next step is selecting the appropriate measurement method to match the indicators identified. The mechanism by which a promotion program ultimately impacts the profits of those who pay for the program often is thought to begin with enhancing consumer awareness of the product or product attributes, which is expected to change consumer buying behavior and impact sales and prices which only then will impact contributor profits. In schematic terms:

Promotion → *Consumer Awareness* → *Sales/Prices* → *Contributor Profits*

Consequently, typical approaches to measuring the effectiveness of check-off programs generally fall into one of three categories: (1) consumer awareness studies, (2) retail sales impact studies, and (3) contributor profit studies. Effectiveness in one category does not necessarily imply effectiveness in other categories. For example, the organization may increase consumer awareness, but not increase either retail sales or profits. By the same token, increases in retail sales may not necessarily lead to increases in industry profits.

Consumer Awareness Studies

A primary metric of program effectiveness for many checkoff programs, and particularly those in the early stages of development, is the extent to which promotion activities affect consumer attitudes and awareness concerning their commodities. Most of what is known about consumer attitudes/beliefs regarding specific agricultural commodities has come from "tracking" studies done by market research firms for the corresponding commodity promotion organizations. Consumer attitudes/beliefs regarding specific characteristics of the commodity of interest are "tracked" over time through periodic surveys of consumers. Improvements in attitudes and changes in beliefs consistent with the promotion messages over time are taken as evidence that the promotion program is effective in boosting sales and, ultimately, industry profit.

One problem with these types of studies is that attitudes can be influenced by several factors other than the promotion program so that changes in consumer attitudes/beliefs, as indicated by "tracking studies," cannot always be confidently attributed to the promotion program. For example, even though

the "Other White Meat" message of the U.S. pork industry by itself may have had a positive effect on consumer attitudes about pork, consumer surveys might indicate no change or even a negative change in those attitudes/beliefs if public health messages have simultaneously conveyed concerns about the health risks of eating meat.

Even if the promotion successfully changes attitudes, there is no guarantee that the attitude change will translate into increased sales. As a consequence, many researchers have preferred to analyze the direct relationship between promotion expenditures and sales without considering whether the promotion had any impact on consumer awareness or attitudes.

Retail Sales Impact Studies

Early efforts to measure the sales impact of commodity promotion programs relied largely on anecdotal evidence and simple comparisons of gross investments in promotion and gross changes in sales. During periods of rapidly expanding markets and rising prices, this approach can yield some persuasive stories and even more impressive upward-sloping graphical relationships between promotion expenditures and sales. The problem with this approach is that various factors other than the promotion program affect the volume and value of commodity sales, such as relative price changes, agricultural policies, changes in incomes, population growth, competition from other products, and consumer health concerns and demographics, just to name a few. The problem becomes all too apparent in years when markets turn down and prices drop. Program managers find that taking credit for rising demand and prices in good years forces them to take the blame

for declining demand and prices in bad years.

Over the years, increasingly sophisticated statistical methods have been developed to isolate and measure the unique contribution of promotion programs to the performance of commodity sales and the profitability of the farm sector. Most common has been the use of econometric models to statistically disentangle the effects of promotion program activities on commodity sales and demand from those of other market forces. Even if the analysis indicates that promotion programs have had a positive and statistically significant effect on market sales, however, the question remains as to whether the increase has been greater than the cost of the program. For that reason, most checkoff organizations are more interested in some measure of return on investment (ROI) rather than the effects of promotion on the level of sales. Consequently, what most studies provide is some Aggregate Measure of the Effectiveness (AME) of checkoff program activities. Unfortunately, the AMEs estimated for checkoff programs often are presented in different forms and calculated in different ways for different commodities, which causes confusion among researchers, as well as among checkoff program managers and stakeholders.

The most commonly reported AME is the benefit-cost ratio (BCR), which is typically calculated in retail sales impact studies as the dollar increase in sales per promotion dollar spent (retail BCR). Because promotion expenditures occur over time and have different effects over their life cycles, the increase in retail sales generated by the program over time often are discounted to present value before dividing by the cost of the program to account for the time

value of money. However calculated, if the BCR is greater than one, the promotion program is deemed “effective” because more than one dollar in sales is generated for every dollar spent. On the other hand, if the calculated BCR is less than one, the program is deemed “ineffective.”

Because they provide measures of the “average” return to promotion activities, the usefulness of BCRs for making promotion funding allocation decisions is limited. Thus, some studies report a marginal rate of return (MRR) as a more appropriate ROI concept than a BCR as a measure of the advertising and promotion effectiveness. A retail sales MRR is usually calculated as the percentage increase in sales revenues from a 1% increase in promotion expenditures. Thus, an MRR provides a more accurate indication of the change in total returns that might be expected from a reallocation of funds among competing promotion activities.

While BCR and MRR measures provide some sense of whether a checkoff program has effectively increased retail demand and sales, they provide no clear criteria for judging whether the benefits of a particular advertising program have exceeded the costs sufficiently to warrant continuation of the program. How high must a BCR or MRR be in order to justify a conclusion that the program is “effective”? How high is too high and how low is too low?

Reported BCRs for checkoff programs typically range from about 2:1 to 10:1 (Williams & Nichols, 1998; Kaiser et al., 2005). Does that mean that a checkoff program with an estimated BCR of 10:1 is 5 times more effective than a program with a BCR of 2:1? Are BCR estimates of 50:1 or 100:1 unreasonably high or are those programs just that much more effective than programs with more typical

BCRs? How are we to interpret a BCR for a checkoff program at the bottom of or below the typical range? Beyond indicating that the cost of a checkoff program is greater than the returns generated, is there any meaningful difference between a BCR between 0 and 1 and a negative BCR?

The problem is that a typical benefit-cost analysis of a checkoff program’s effectiveness fails to address whether or not the program is a “good” investment for those who pay for the program. Even if the estimated BCR from a particular advertising program is estimated to be positive and even higher than those estimated for other advertising programs, what program contributors want to know is whether they could do better with the funds they contribute by investing in other common investment opportunities and realizing an even higher return. If so, then it would likely make little difference to them if the BCR from the advertising program is “positive” if they could keep their money and invest it in other investment opportunities and realize a higher return.

For economists, this issue implies that the fundamental concern in measuring the effectiveness of checkoff programs probably should be the opportunity cost of the checkoff program funds from the collective group. This issue has received relatively little attention in the literature. For program managers, the implication is that more relevant information might be provided by economic evaluations if researchers treated checkoff programs as investment alternatives and calculated how well the various programs fare compared to other investment opportunities available ... like buying land or investing in Treasury Bills, etc.

The standard business method for determining the highest yielding investment opportunity is to calculate the internal rate of return (IRR) of the investment over time. In analyzing alternative business investments, the IRR often is referred to as the discounted rate of return, the marginal efficiency of capital, and the yield of an investment. For measuring the effectiveness of a commodity promotion program, the IRR is calculated as the *change* in the future value of the estimated returns to the promotion expenditures over time divided by a *change* in the present value of advertising expenditures expressed in percentage terms. Consequently, the IRR is a dynamic return on investment measure that expresses the estimated *marginal* returns to promotion expenditures (i.e., the percent change in returns from a 1% change in promotion).

In a recent study of the Florida orange juice promotion program, the IRR to Florida orange growers was calculated to be 14.4% over the life of the program (Williams, Capps, & Bessler, 2004). In other words, for Florida orange growers to have done better with the funds they invested in the orange juice promotion program, they would have had to have found an investment alternative that yielded more than 14.4% on average annually over the entire 33-year period of the program. Curiously, we tend to use the IRR method for evaluating investments in research that shift the supply curve, but not for investments, like advertising, that shift the demand curve.

Contributor Benefit Studies

A particular limitation of the retail sales BCR and MRR measures is that they are calculated assuming that nothing, including prices, changes when promotion expenditures

change. Unless one is willing to assume that all the benefits generated in terms of increased retail sales are captured dollar for dollar by producers who pay for the program, an unlikely possibility, such measures are not particularly meaningful as measures of the benefits of checkoff program expenditures to those who pay for the program. Thus, the relevant questions are: (1) what portion of any benefits from shifting the retail demand curve accrues to those who pay for the program? and (2) are those benefits greater than the costs of promotion? For this reason, some studies of checkoff program effectiveness calculate BCRs in terms of additional industry profits (i.e., the increase in industry sales or cash receipts net of additional production costs) or producer surplus generated per dollar invested in advertising and promotion (i.e., a profit BCR or surplus BCR).

Sales impact analyses are designed to determine whether or not past promotion expenditures have effectively shifted out the demand and, therefore, sales. If such analyses conclude that promotion expenditures have not shifted out demand, then it is likely from a statistical perspective that the program has not benefited those who have paid for the program.

However, even if such studies indicate a positive demand impact, the related increase in sales may or may not translate into increased profits of those who pay for the programs for a variety of reasons as discussed by Wohlgenant in another article in this issue of *Choices*. Most importantly, the benefits of the program may be captured by wholesalers, distributors, processors, importers, foreign producers, or others along the commodity supply chain or even in closely related markets that do not contribute to the costs of the pro-

gram. For example, in an analysis of the Florida orange juice promotion program, the increase in orange juice demand and price generated by the program prompted an increase in orange juice imports, which benefited foreign orange growers and limited the benefits of the program to Florida orange growers who pay for the program.

Measuring the benefits of promotion programs to those who pay for them requires a more sophisticated and dynamic type of commodity market model than used for demand and sales impact analyses. Because most products pass through several stages of processing before reaching the final consumer, the markets associated with these different stages are interrelated at some level. In *vertically related markets*, what happens in one market or processing stage affects all other markets or stages. Furthermore, product processing often results in by-products or joint products that sell in entirely different markets. In *horizontally related markets*, products that are not directly in a processing chain may be considered close substitutes for products in the chain. At the same time, some markets include foreign components. Market supply may include imports and market demand may consist of both domestic and export demand.

The intricacy of the interrelationships among and between markets means that a myriad of factors can affect the transmission of the retail-level effects of checkoff program activities back to those who pay for the program. Once the market for the product has been accurately modeled and the relative roles of the promotion program activities and other market forces at the various levels along the supply chain have been accounted for and incorporated into the model, the process of measuring

the benefit of the promotion expenditures to those who pay for the program is done through scenario analysis. This process is accomplished by simulating the model over the historical period *with* and then *without* the promotion expenditures included in the model. The actual historical data are taken to represent the “with promotion” scenario. For the “without promotion” scenario, the level of promotion expenditures is first set to zero in the model in each year over the historical period. The model then is simulated over that period to generate changes in the levels of the production, consumption, trade, and prices that would have existed over time in the absence of any promotion program. The simulated differences between the values of model variables in the “with” and “without” promotion scenarios provide direct measures of the historical effects of the program on the market of the commodity being promoted. The results are used to calculate a BCR or an IRR to represent the estimated change in the aggregate profits of the contributors that is attributable to the checkoff promotion program.

Beyond Measurement

Regardless of how program effectiveness is defined and measured, checkoff programs often face the difficult challenge of “selling” the results to their stakeholders. Despite positive measures of effectiveness, producers and other contributors often find it difficult to understand or believe the results. The primary problem in convincing program contributors that positive evaluations of a checkoff program are meaningful is that, while the *cost* of checkoff programs to each contributor is eminently observable by them, the *benefits* of the programs are not. While contributors can

clearly see the effects of assessments on their bottom lines, they have no way of seeing the portion of their revenues that are directly attributable to programmatic activities.

Evaluations of checkoff programs specifically are intended to measure the portion of revenues at various levels in the industry that can be directly attributable to the checkoff programs. But in doing so, researchers must compare actual revenues or sales over some time period to nebulous, intangible concepts like "what might have been earned or sold in the absence of the program." In other words, the results imply that \$2, \$5, or \$10 for every dollar they were assessed are in their pockets, but they just don't know it because their earnings would have been lower if the checkoff program had not existed. This concept has proved extremely difficult to communicate to producers.

Compounding that problem is the tendency of many checkoff program staffs and boards to oversell the actual and potential impacts of their programs to insure a positive outcome from producer referenda and otherwise justify continuation of their programs. Contributors come to expect large impacts on prices and profits because of the anecdotes they have been told about how successful various activities have been and how large the benefits to them are from contributing to the program. Estimated BCRs much in excess of 1:1 often are taken to imply large absolute impacts of a checkoff program on the market. Nothing could be less true. A BCR of 5:1 results by dividing a \$5 billion industry profit benefit by a \$1 billion checkoff investment or by dividing a \$5 benefit by a \$1 investment. For most commodity promotion programs, the value of the expenditures in research and promo-

tion activities is extremely small in comparison to the total value of industry sales. Commodity promotion expenditures generally amount to a fraction of 1% of the total industry sales each year. With such a low level of investment compared to sales, the overall impact of a commodity promotion program could hardly be expected to be significant in a practical sense in its effects on production, prices, sales, and market share even if the impact could be said to be statistically significant.

When producers and other contributors fail to see the large impact on their returns that they have been led to expect, they tend to disbelieve the measured effectiveness of the checkoff program. One potential solution for checkoff program boards and their staffs is to spend more time educating producers on the true potential of their programs. Perhaps checkoff programs would be better sold to contributors as tools to help reduce downside pressure on prices and profits in bad years and contribute to higher prices and profits in good years rather than as panacea to the financial problems they face.

Another potential solution is to focus on appropriate measures of "effectiveness" that more readily convey the success or failure of checkoff programs in meeting their objectives to program contributors. Benefit-cost ratios as measures of effectiveness have often proved to be less than successful in that effort. Further development of the internal rate of return (IRR) methodology could lead to a measure of effectiveness that might be more easily interpreted by program contributors. Strong arguments also can be made for simple price effects. In a competitive industry, producers relate well to changes in prices as a result of intervention.

Summing Up

Measuring the effectiveness of a commodity checkoff program begins with understanding the promotion objectives and then adopting an appropriate measurement technique. For checkoff organizations primarily concerned with positively impacting consumer attitudes and awareness concerning their products, consumer attitude and awareness studies are sufficient for measuring program effectiveness. New checkoff organizations often begin with this objective believing that changing consumer attitudes is the key to changing consumer behavior, positively influencing retail sales, and eventually enhancing the profitability of their industry.

Eventually, however, checkoff organizations must determine whether their promotional efforts have gone beyond any change in consumer attitudes to actually shifting out the demand for their commodities. Sales/demand impact studies are designed to measure the retail level impact of checkoff promotion programs. Such studies often report aggregate measures of effectiveness such as benefit-cost ratios or marginal rates of return. Sooner or later, however, someone is going to ask: "What am I getting for my checkoff contribution?" The answer to such questions requires more complex and in-depth analyses to track the retail level impact of advertising and promotion programs back through the supply chain to producers to measure the effectiveness of retail-level promotion programs in enhancing the profitability and economic welfare of producers and other contributors.

Once the effectiveness of the program has been measured, however, the checkoff program still faces the challenge of communicating the

results to contributors. Even if the program is deemed to be highly effective, contributors are often skeptical of the magnitude of the results. While they can readily observe the costs of the program to them, the benefits generated are an unobservable component of their total revenue stream. Checkoff program boards and staffs often compound the problem by overselling the potential impacts of their programs on demand, prices, and profits, and by implying that high estimated rates of return imply large program impacts on the market. One solution may be for checkoff program managers to sell their programs as collective efforts to enhance positive market pressures and moderate negative market pres-

ures rather than always shifting out demand and boosting prices. Another solution is for researchers to focus on developing measures that more readily convey the effectiveness of checkoff programs such as the internal rate of return.

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Producer Support for Checkoff Programs: The Case of Beef

Chanjin Chung, F. Bailey Norwood, and Clement E. Ward

JEL Classification: Q13

Agricultural producers have generated approximately \$750 million annually in mandatory checkoff contributions and have invested a majority of these funds in various generic advertising and promotion programs. Over the past decade, a number of economists have studied the economic impacts of checkoff-funded generic advertising programs and found, in most cases, positive net benefits for producers. Nonetheless, as Crespi and McEowen discuss in another article in this issue of *Choices*, mandatory checkoff programs have faced constitutional challenges on the grounds that they violate the individual contributor's right to free speech because the checkoff fees are used for collective advertising and promotion efforts. Even though the recent Supreme Court ruling on the beef checkoff program has apparently settled that question in favor of checkoff programs, the future of all checkoff programs, mandatory or otherwise, depends critically on the support of producers. Under current legislation, the Agricultural Marketing Service (AMS), the USDA division responsible for overseeing commodity checkoff programs, must conduct a national referendum on a checkoff program whenever there are enough petitions from producers, and can terminate programs whenever such referenda find insufficient support from producers.

Support for checkoff programs may vary across farm settings and producers with different attitudes towards such programs. An understanding of the extent to which the support may be affected by various producer characteristics and attitudes should be useful for managing their programs and communicating with stakeholders. A successful checkoff program requires an effective public relations campaign to convince producers that the checkoff is a profitable investment. If program managers could identify producers (by their characteristics and organization

affiliation) who are less likely to support checkoff programs, they could better target those groups to enhance support. Eliciting producer attitudes towards the current checkoff could also help improve producer support of checkoff programs. Why do some producers not support the current checkoff? Is a lack of support due to insufficient information about the checkoff? Do producers feel most checkoff benefits are captured by processors, retailers, or foreign exporters?

To answer these questions and other questions about producer support for checkoff programs, a mail survey was conducted using a stratified sample of Oklahoma cattle producers from the United States Department of Agriculture's National Agricultural Statistics Service, (USDA-NASS, 2002). A total of 2,950 Oklahoma cattle producers were selected for the mailing list, ultimately providing 670 usable responses (a reasonable 23% response rate). Producers were grouped by their demographics, organization affiliation, and attitudes. In the survey, a series of questions were asked to collect information about the differences in producer support rates for the beef checkoff program by farm demographics (producer type, size, and affiliation with producer organizations) and producer attitudes toward the current checkoff. The survey procedures followed and the statistical methodology used to analyze the survey results are discussed in detail in Norwood et al. (2004).

Do Farm Demographics Affect Producer Support for the Beef Checkoff Program?

Producer types were categorized in the survey into three groups according to the similarity of production inputs: (1) weaned calf, feeder cattle, or purebred cattle producers (WFP producers), (2) fed cattle producers, and (3) veal

producers. The WFP producers rely heavily on pasture and grazing, while fed cattle producers typically use concentrated grain rations. Veal producers are different from WFP and fed cattle producers due to their use of liquid feed and small calf pens. As summarized in Figure 1, 79% of surveyed producers were categorized as WFP producers, 15% as fed cattle producers, and only 6% as veal producers. The distribution represents overall Oklahoma cattle producers. Support for the beef checkoff program differed somewhat across these three groups (Table 1). Although 52% of both WFP and fed cattle producers indicated support for the checkoff program, a smaller share of veal producers (37%) indicated support.

Respondents were also asked to indicate their farm size by selecting a range of the average number of cattle sold each year. A total of 12% of respondents were categorized as large producers (sales of over 500 weaned calves or 1,000 stocker calves) and the rest were considered small producers (Table 1). The checkoff support rate by large producers was 47%, six percentage points less than that of small producers. This difference, however, was not found to be statistically significant.

About 17% of all respondents were members of the National Cattlemen's Beef Association (NCBA) and 38% were members of the Oklahoma Cattlemen's Association (OCA) (Table 1). The NCBA has a close working relationship with the Cattlemen's Beef Board (CBB), which is responsible for managing the beef checkoff program. In fact, the two organizations are located in the same building, and the CBB hires the NCBA to perform many of its checkoff activities. Therefore, as expected, the support for the beef

Table 1. Projected support rate of beef checkoff by farm type, size and organization affiliation (N = 670).

		% of total	Support rate
Farm type	Weaned calf, feeder cattle, or purebred cattle producers	79%	52%
	Fed cattle producers	15%	52%
	Veal producers	6%	37%
Farm size	Large cow-calf or stocker production	12%	47%
	Small cow-calf or stocker production	88%	53%
Organization membership	National Cattlemen's Beef Association	Yes: 17%	63%
		No: 83%	50%
	Oklahoma Cattlemen's Association	Yes: 38%	62%
		No: 62%	45%

Table 2. Projected support rate of beef checkoff by producer attitudes (N = 670).

	% of respondents	Support rate
Were you aware of the recent litigation and court ruling on the beef checkoff before this survey?		
Yes	64%	55%
No	36%	44%
Who do you feel benefits the most from checkoff funding on advertising?		
Cattle producers	10%	76%
Beef processors and retailers	35%	30%
Both benefit equally	42%	76%
Who do you feel benefits the most from checkoff funding on research?		
Cattle producers	18%	73%
Beef processors and retailers	26%	25%
Both benefit equally	37%	73%
How much do you feel the beef checkoff funds benefit cattle and beef producers outside of the U.S.?		
More than U.S. producers	7%	24%
Less than U.S. producers	37%	67%
Equal to U.S. producers	17%	53%

checkoff was significantly higher among NCBA members than nonmembers (13 percentage points). Not surprisingly, the result was similar for OCA members and nonmembers, suggesting that the national beef checkoff organization works closely with state and national producer affiliate groups. Membership perhaps means more awareness, which translates into more support for checkoff programs among members.

Do Producer Attitudes Affect Their Support for the Beef Checkoff Program?

Producers were also asked about their awareness of the recent litigation and court rulings on the beef checkoff program (Table 2). Only 64% of respondents answered "yes," suggesting that about one-third of the respondents are likely to be detached from current checkoff issues and activities. Are these less informed producers also less willing to support

a checkoff program? The estimated support rates in Table 2 confirm this hypothesis. Support rates among the uninformed were 11% lower than those who were informed. The implication is that the more information producers receive about checkoff programs, the more likely they are to support them.

Next, the survey posed three questions seeking to elicit producers' perceptions of how checkoff benefits are passed down the beef marketing channel to the producer. First, producers were asked "who benefits the most from checkoff funding of advertising (cattle producers or beef processors and retailers)?" Only 10% of the respondents believed cattle producers benefit the most, while 42% believed they benefit equally (Table 2). However, a large percentage of respondents (35%) believed most checkoff benefits are captured at the retail, wholesale, or processing stage. Surprisingly, those who believed producers share equally in checkoff benefits were just as likely to support the checkoff as those who believed producers benefit the most (76%). When the same question was asked regarding checkoff funding on research, the results were similar, though more producers believed producers benefit the most (18%) and fewer believed processors and retailers benefit more (26%). The other 37% indicated a belief that the benefits are equally distributed. The result for support rate was similar for the question on checkoff funding of research. For those who believed processors and retailers benefit the most from checkoff-funded research, support for the beef checkoff was the lowest at 25%. Those who believed producers benefit the most were as likely to support the checkoff as those who believed producers share equally in checkoff benefits (73%).

These results present an opportunity for checkoff managers. A major reason producers apparently abstain from supporting checkoff programs is that they believe most of the benefits accrue to others. Because checkoff-funded generic advertising is intended to enhance demand at the retail level, retailers, wholesalers, and processors likely benefit to some degree from checkoff programs. On the other hand, many studies in the generic advertising literature have shown that changes in retail demand do indeed impact farm prices (e.g., Chung & Kaiser, 1999; Marsh, 2003). Our findings clearly indicate that checkoff managers can improve support for their programs among producers through active producer communication programs, emphasizing the price transmission of advertising from retailer to producer, and the share of benefits that are passed down to producers. Another application of these findings might be to encourage processors and retailers to join producers' efforts in increasing retail demand. A good example can be found in fluid milk promotion programs. Producers and processors work together to expand retail demand of fluid milk. While producers contribute \$0.15/cwt, processors also pay \$0.20/cwt of milk they market.

Finally, producers were asked how they perceived checkoff benefits are distributed between U.S. and international cattle and beef producers. Only 7% of respondents stated they believed U.S. producers benefit less than international producers, 37% that U.S. producers benefit most, and 17% that both groups benefit equally (Figure 2). Support rates differed predictably by such perceptions. Those who perceived that the beef checkoff program benefits foreign producers less than U.S. pro-

ducers showed a much higher level of support for the checkoff (67%) than those who perceived that the program benefits foreign producers more (24%). However, the support rates were not significantly different between respondents who believed the U.S. producers benefit more than foreign producers and those who believed they benefit equally. The results may have reflected that to some extent the survey respondents were made aware of the fact that international beef producers exporting to the United States pay into the checkoff.

Conclusions

This article provides some insights on demographic and attitudinal factors that may affect the extent to which producers support a checkoff program. Using the beef checkoff program as the example, we found that the support rates among producers tended to differ across farm size, farm type, organizational affiliation, and producer attitudes toward ongoing checkoff programs. Veal producers indicated lower support for the beef checkoff program than cow-calf, feeder cattle, pure-bred cattle, and fed cattle producers. Large cow-calf and stocker producers indicated less support than smaller producers. Members of the national and state cattle and beef associations indicated higher support for the beef checkoff program than nonmembers. As for the difference in support rates by producer attitudes, producers aware of ongoing checkoff litigation problems indicated a higher level of support than those unaware of the ongoing legal battles. Most importantly, perceptions regarding how checkoff benefits are passed down the beef marketing channel made the largest difference in support rates. Only

about 25%-30% of the responding producers who believed processors and retailers capture a majority of beef-checkoff-induced advertising benefits indicated support for the checkoff. However, about three quarters of those who believed producers either share benefits with or obtain more benefits than retailers and processors from checkoff-funded advertising and research programs indicated support for the beef checkoff program. Perceptions regarding the international allocation of checkoff benefits also play a role in determining the level of producer support for the beef checkoff program. While only about a quarter of those who believed foreign exporters benefit more from the beef checkoff program than U.S. producers indicated support for the program, over half of those who believed that U.S. and foreign producers benefit equally and about two-thirds who believed that U.S. producers benefit more than foreign producers indicated support for the program.

Producer support is essential to manage successful checkoff pro-

grams. In terms of program management and producer communication, this study suggests that checkoff managers should work closely with producer affiliate organizations and make continuous efforts to increase producers' access to checkoff-related information to maximize producer support of their programs. Also, checkoff program managers should maintain active producer communication programs promoting the producer benefits of checkoff programs because producers tend to abstain from supporting checkoff programs when they believe most of the benefits accrue to others.

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Overview: Tilling Latin American Soils

Peter Goldsmith, Guest Editor

Latin America has emerged as a significant force within the global agri-food system. Agricultural production in the region is growing 3% per year, or 1.5 times the global rate. At the same time, modern food and energy now involve industrialized systems of production. Larger farming units, greater coordination across the food chain, and global integration operate within a context of greater social and environmental expectations. Meeting these social and environmental expectations is especially challenging in a developing country context where public and private institutions are weak.

One of the themes of this issue of *Choices* is the challenge for Latin America to balance the world's increasing demand for food and fuel and their own ambitions for development, with society's expectations as to the way food and energy are produced and natural resources are used. Such complexities create new strategic challenges not only for Latin America's agricultural industries and policy makers, but also nongovernmental organizations and outside stakeholders who have an interest in the region's practices and development.

The objective of this theme is to provide readers with examples that highlight this difficult balancing act. There are two general messages to be gotten from this set of articles. The first is how the interconnectedness of the modern agri-food system across the globe makes optimal policy development difficult. Suppliers, consumers, and stakeholders are increasingly located in different regions of the world. Each has an interest in how foreign agricultural development takes place, as well as how their domestic producers and consumers are affected. For example, in the article written by Carlos Steiger, European consumers are increasingly eating Brazilian beef and valuing the healthiness of the region's grass-based diet for cattle. But, increased demand for Brazilian beef causes land use changes from a native state to pasture in the environmentally sensitive northern and western parts of the country.

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The second message communicated by these articles is how Latin American agricultural development is a very modern phenomenon involving industrial production systems, greater coordination along the value chain, and much larger units of production. These modern agricultural systems have different economic, social, and environmental impacts compared with the idealized notion of a traditional small family farm. Domestic policymakers struggle in an environment of weak public and private institutions to balance environmental stewardship and the needs of small and landless farmers, with expectations for economic growth and development. For example, the article by Chaddad and Jank conveys the challenge for the Brazilian government to enact policies that lead to greater agricultural competitiveness within the global economy, while simultaneously shifting resources to support landless and small farmers.

There are four articles focused on these issues. The first article, by Fabio R. Chaddad and Marcos S. Jank, is entitled: "The Evolution of Agricultural Policies and Agribusiness Development in Brazil." The authors trace the history of agricultural policy in Brazil. Farm policy evolved from initially emphasizing food security and self-sufficiency to a focus on deregulation and trade in the late 1980s and 1990s. Recently though, policy has taken a reactionary bent focused on small farms and land reform. The authors

explain the implications of the recent shift in policy direction.

The second article, by Joao Martines-Filho, Heloisa L. Burnquist, and Carlos E. F. Vian, is entitled: "Bioenergy and the Rise of Sugarcane-Based Ethanol in Brazil." This paper documents the forces and challenges for Brazil as it has risen to global leadership in bioenergy. Key issues discussed are appropriate government policy and the importance of market forces within a developing country context, strategic investments in R&D, and the competition for inputs between the food and energy sectors.

The third article, by Peter Goldsmith and Rodolfo Hirsch, is entitled, "The Brazilian Soybean Complex." This paper covers the story of the Brazilian soybean complex as the classic rise of an industry due to natural resource abundance and strategic investments in agricultural technology. But, it is also a story about the challenges facing developing countries as they become the dominant suppliers of the world's foodstuffs.

The final article, by Carlos Steiger, is entitled: "Modern Beef Production in Brazil and Argentina." This paper tells how the dynamic demand and supply factors in the

beef industry have directed attention to Brazil and Argentina as critical global suppliers. In recent years, Mercosur countries have doubled their share of world exports to over 42%. This increasing dependence on Latin America for beef has important social, environmental, and economic implications.

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The Evolution of Agricultural Policies and Agribusiness Development in Brazil

Fabio R. Chaddad and Marcos S. Jank

JEL Classification: Q18, O54, O13, Q15

In the late 1980s, Brazil started to adopt liberal and market-oriented policies, which significantly impacted the performance of its food and agricultural (henceforth agrifood) sector. The agrifood sector is now among the most dynamic in the Brazilian economy. Grain production doubled from 58 to 120 million metric tons (MT) and meat production surged from 7.5 to 20.7 million MT between 1990 and 2005. The agrifood economy generated R\$534 billion (US\$183 billion) in 2004, which is equivalent to 30% of the country's GDP. In addition, it represented 35% of total employment and 40% of total exports in 2004.

Agricultural production growth and agribusiness development in Brazil are largely dependent on exports, which account for 31% of agricultural production. Total agricultural exports more than doubled from US\$13-32 billion in the 1990-2005 period. Brazil is now the world's third agrifood exporter – following the European Union (EU) and the United States (US) – and surpassed the US as the country with the largest surplus in agricultural trade, with US\$29 billion in 2005.

The growing competitiveness of the Brazilian agrifood sector is attributed to a number of factors, including investments in tropical agricultural research and availability of agricultural credit, which caused significant productivity gains since the 1970s. The technologies that made the expansion into the *cerrado* region in the Brazilian Central-West – in soils that are distinctly inferior to those in Argentina, the US Corn Belt and Southern Brazil – resulted from public investments in agricultural research. The average annual growth rate of total factor productivity in Brazilian agriculture was estimated at 3.3% for the period 1975-2002 and at 5.7% between 1998 and 2002, which are above the 1.8% growth rate achieved by US

agriculture between 1948 and 2002 (Gasques et al., 2004). Other factors also contributed to the competitiveness and growth of the agrifood sector in Brazil, such as relative macroeconomic stability after 1994 and the significant reductions in government intervention and trade barriers (Jank, Nassar, & Tachinardi, 2004).

Despite these favorable developments and the availability of labor and natural resources, agrifood growth in Brazil faces significant internal and external constraints. In the external environment, trade barriers and subsidies to domestic producers and exporters, especially in developed countries, significantly impact Brazilian agrifood exports. As a result, Brazil adopted a more aggressive position in international trade negotiations at the World Trade Organization (WTO), bringing three high-profile dispute cases against developed countries and taking leadership in the formation of a coalition of developing countries known as the G-20.

In the domestic arena, agricultural producers in Brazil face uncertainties related to exchange rate volatility, the lack of clearly defined property rights to land, the regulatory framework concerning research and marketing of genetically modified organisms (GMOs), poor infrastructure causing logistical bottlenecks, and the decline in government spending in important areas such as food safety, animal and plant health inspection, agricultural extension, irrigation, and other traditional agricultural policy instruments. The recent reemergence of foot-and-mouth disease, which led more than 50 countries to close their borders to beef exports from Brazil, is one recent example of the policy challenges to the development of the Brazilian agrifood economy. This article discusses the evolution of agricultural policies in Brazil and how they impact the competitiveness of the agrifood sector.

Table 1. The evolution of agricultural policy in Brazil.

	1965-1985	1985-1995	1995-2005	Proposed Agenda
Macroeconomic conditions and policy	- High inflation - Controlled exchange rate - High growth rate - Increased government expenditures in farm policy	- Uncontrolled inflation and low growth (stagflation) - Heterodox plans - Debt crisis - Land as real asset - Decreased government expenditures in farm policy	- Control of inflation - Volatile exchange rate - High real interest rates - Modest growth rate - Privatization	- Low inflation - Structural reforms and fiscal balance - Less volatile exchange rate - Lower interest rates - Sustained growth - Investments in infrastructure
Agricultural policy goals	- Food security	- Deregulation - Liberalization	- Land reform programs - Family farming and social inclusion	- Competitiveness - Sustainability (economic, social, and environmental)
Price support and government storage	- Massive intervention: public agencies, government purchases and storage, price controls - Commodity price support	- Decreased intervention - Agricultural commodity market deregulation	- Modest and selective intervention	- Modest and selective intervention
Rural credit	- Government supply of credit financed by Treasury (SNCR) - Negative real interest rates	- Decreased government supply of credit - Interest rates less subsidized	- Credit lines targeted to family farms (PRONAF) - Specific programs for investment credit (BNDES) - Agricultural credit crisis and debt rescheduling	- Crop insurance - Private instruments for agricultural finance - Targeted credit lines to family farms - Credit cooperative development
Agricultural trade policy	- Closed economy - High tariffs - Import Substitution model - Export taxes on primary commodities	- Unilateral openness to trade - International integration (Mercosur) - Elimination of export taxes	- Aggressive policy against agricultural trade barriers - WTO dispute panels - Leadership in G-20 - Negotiation of regional agreements (FTAA, EU-Mercosur)	- Aggressive trade policies: negotiations, litigations - Increased emphasis on NTBs: technical, sanitary, and social barriers - Conclusion of regional and bilateral trade agreements
Agricultural research and extension	- High investment in public research (Embrapa, federal and state universities) - Development of public extension service network	- Leveling-off of public investment	- Crisis of public research and extension services	- Renewed public commitment to agricultural R&D, including GMOs - Increased role of public-private partnerships - Intellectual property rights
Social policies (family farms and land reform)	- Minimal	- Initial stage (Extraordinary Ministry of Land Reform)	- Ministry of Agrarian Development (MDA) - Distributive programs: land reform, "Bolsa Família," rural retirement, PRONAF	- Policy evaluation and monitoring - Retarget programs to different types of family farms - Farm cooperative development and modernization

The Evolution of Agricultural Policies in Brazil

Agricultural policy goals and programs in Brazil have changed significantly (Table 1). The period between the mid 1960s to early 1980s was characterized by massive government intervention in agricultural commodity markets primarily by means of subsidized rural credit and price support mechanisms, including government purchases and storage of excess supply (Figure 1). At that time, the

agricultural sector in Brazil was in general not competitive (except in tropical products such as coffee and sugar), and was characterized by highly skewed distributions of farm income and land ownership with large, unproductive landholdings known as "latifundios." It was in the 1960s and 1970s that the country started to urbanize as many rural poor migrated to large cities. During this period, agricultural policy had the objective of promoting food secu-

rity of an increasingly urban population, while compensating the agricultural sector for the anti-export bias of the import substitution model that was common in developing countries at the time.

The debt crisis of the late 1980s forced the Brazilian government to decrease support to farmers and to review agricultural policy goals. Economy-wide structural reforms introduced in the early 1990s further decreased the distortion of agricul-

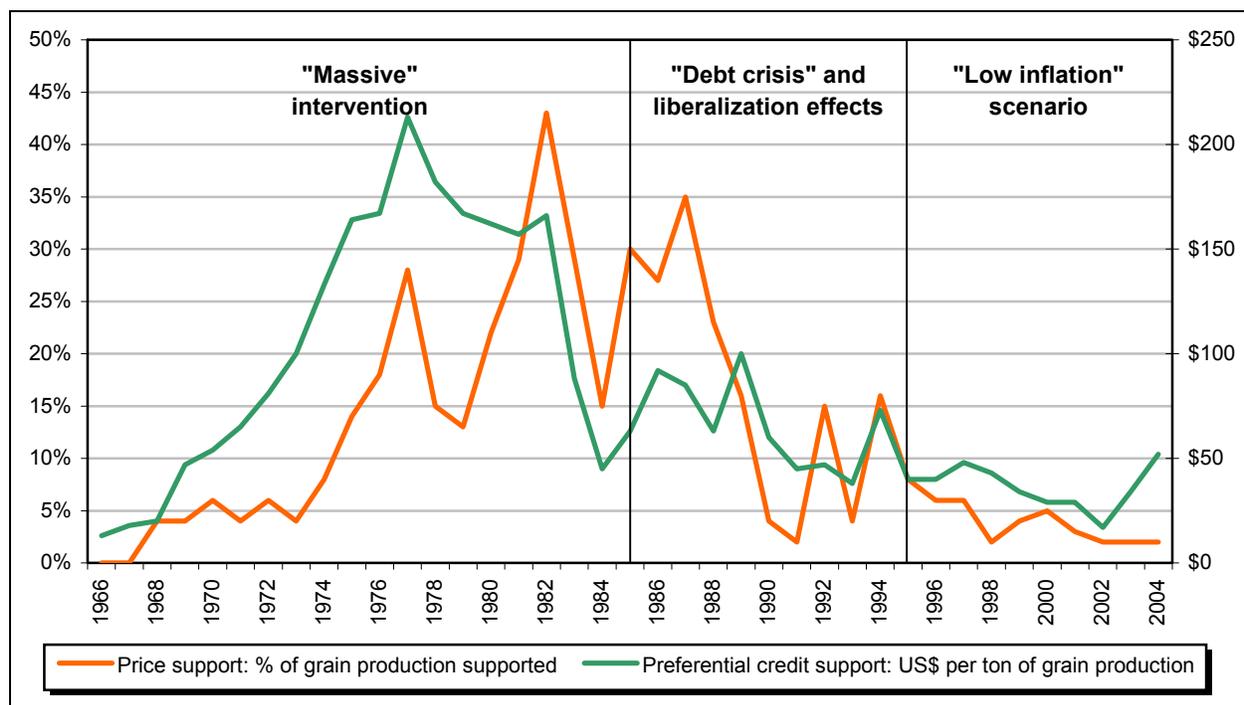


Figure 1. Commodity price and preferential credit support in Brazil.

Note: Before 1965, there was price support for coffee, sugar cane, milk, and grains. Source: Ministry of Agriculture, Livestock and Food Supply (MAPA), 2005.

tural policy in Brazil by eliminating export taxes and price controls, deregulating and liberalizing commodity markets, unilaterally reducing trade barriers (today the average applied tariff on agrifood products is 12.5%), and introducing private instruments for agricultural financing. As a result of these changes, government support currently represents 3% of farm receipts in Brazil, compared with 2% in New Zealand, 4% in Australia, 8% in China, 18% in the US, and 34% in the EU (OECD, 2005).¹

1. These numbers refer to producer support estimates (PSE) that measure the value of supports from all forms of public policies, including domestic support and border measures relative to gross farm receipts between 2002 and 2004. The highest percentage PSE levels in Brazil are for rice (17%), cotton (13%), and wheat (6%).

Government expenditures on agriculture-related programs in Brazil have decreased over the last five presidential administrations (Table 2). The annual average amount spent in the Sarney administration (1985-1989), in real values, was R\$20.9 billion (roughly US\$9 billion), which represented 5.6% of total government expenses. The average amount spent on agricultural programs decreased to R\$10.7 billion (or about US\$5 billion) per year in the current administration, representing 1.8% of total government expenses in 2003-2005.

Not only have government expenditures on farm policy decreased by half in real terms since the late 1980s, they were also used in an increased number of programs by the last two administrations. According to Gasques (2004), the number of agriculture-related programs increased from 30 before the year 2000 to 100 programs in 2003, 84 under the function "agriculture," and

16 programs under the function "agrarian organization."² The performance of many of these programs is difficult to evaluate and, in general, expenses are quite variable or even arbitrary and do not contribute to intended goals. Additionally, some programs are stretched to the limit and cannot survive with continued budget reductions. Public services such as animal and plant health inspection, public research, and infrastructure improvements have been receiving fewer resources, despite the strong private and public

2. Brazilian government expenditures are organized in functions and programs. A function represents the higher level of aggregation of federal government expenses, including health, education, social security, and the two agriculture-related functions (agriculture and agrarian organization). A program comprises a group of government actions towards a specific policy goal.

Table 2. Brazilian government expenditures in farm programs by administration and function.^a

Period	Average Annual Expenditures with Agricultural Policies			Agriculture/ Total (A/C)	Agrarian Organization/ Total (B/C)	(A+B)/Total Government Expenditures
	Agriculture (A)	Agrarian Organization (B)	Total (C)			
Sarney 1985-1989	19,549	1,330	20,879	94%	6%	5.6%
Collor-Itamar 1990-1994	17,510	1,229	18,739	93%	7%	2.8%
Cardoso 1 1995-1998	15,273	3,342	18,615	82%	18%	3.4%
Cardoso 2 1999-2002	8,712	3,290	12,002	73%	27%	2.0%
Lula 2003-2005	5,901	4,809	10,710	55%	45%	1.8%

^a Expenditures are measured in R\$ millions corrected for inflation by IGP-DI (base year is 2005). Agrarian Organization expenditures include family farm programs. Source: Ministry of Finance (2005). Elaboration: Gasques (2004) and ICONE.

efforts that were made in the 1990s to include Brazil as one of the world's leading agrifood export countries.

Significant changes in agricultural policy goals were introduced by the first Cardoso administration in 1995, which shifted priority to land reform and family farming in an attempt to alleviate rural poverty. This shift in agricultural policy goals is reflected in government expenditures in a new focus area called the "agrarian organization" (Table 2). Agrarian organization programs are primarily related to land reform. Under the Cardoso administration, approximately 500,000 new family farms were settled in expropriated land. In addition to land reform, the government adopted a set of policies targeted to "family agriculture" in 1995 – known as PRONAF – including subsidized credit lines, capacity building, research, and extension services.

Interestingly enough, the Brazilian government created a new ministry in 2000 to run programs targeted to family farms and land reform – the Ministry of Agrarian Development (MDA). Brazil is probably the only country in the world with two ministries of agriculture. This reflects a

supposed duality of farming in the country – related to the skewed distribution of rural income and land ownership – and the misleading perception that agribusiness development necessarily leads to small farmer exclusion. According to the 1995 Census of Agriculture, farms with less than 10 hectares (24.7 acres) represent 49.7% of all farms in the country and hold 2.2% of all landholdings. With more than 500 hectares (1,235 acres), the largest farms represent only 2.2% of all farms, but own 56.5% of all landholdings.

More recently, MDA officials became more vocal about the country's agricultural trade policy. In the Hong Kong Ministerial meeting of the WTO, the Minister of Agrarian Development openly defended the right of "food sovereignty" for developing countries by means of direct subsidies and additional border protections. During the same meeting, the Brazilian Minister of Agriculture, Livestock and Food Supply (MAPA) was asking for substantial improvements in market access for both developed and developing countries.

Federal government expenditures on agrarian organization programs

increased from 6% in the Sarney administration to 45% of total expenditures on farm programs in the Lula administration (Table 2). Not only did total government expenditures on agricultural policy decrease both in relative and absolute terms, but traditional agricultural policy functions were also sacrificed to support agrarian organization programs. For instance, government expenditures on land reform increased from R\$1.84 billion (US\$836 million) in 2000 to R\$2.4 billion (US\$1.1 billion) in 2004, while expenditures on support of family farming (PRONAF) doubled from R\$1.4 billion to R\$2.8 billion. At the same time, expenditures on government purchases and storage of agricultural commodities were substantially reduced from R\$1.32 billion (US\$600 million) to R\$0.53 billion (US\$241 million). Other traditional policy programs, such as agricultural research, extension, and plant and animal health, also suffered budget cuts during the last five years.

The Modernization and Globalization of the Brazilian Agrifood Sector

Concurrent with these significant institutional and policy changes, the Brazilian agrifood system transitioned from a traditional to an increasingly global and industrial model. Fostered by rising incomes, urbanization, economic liberalization, and access to competitive raw materials, multinational food processors and retailers entered or increased their investments in the Brazilian market during the 1990s. Increased foreign direct investment (FDI) by large, private agribusinesses in Brazil displaced domestic competitors, increased industry concentration, and eliminated many medium and small companies. As a result, the market share of multinational corporations in the domestic food market increased. For instance, Brazilian affiliates of multinational agrifood companies generated 137,000 jobs, almost US\$5 billion in exports, and sales of US\$17 billion in 2000. Given the total value of food industry shipments in Brazil of US\$58 billion, the aggregate market share of foreign companies reached 30% in 2000. Among the top ten food processors in the country, eight are multinational firms with foreign headquarters. Recent official data show that FDI inflow in the Brazilian agrifood processing industry totaled US\$8.2 billion between 2001 and 2004. The top-three food retailers in the country are now controlled by two French supermarket chains (Casino and Carrefour) and one US-based company (Wal-Mart), with a combined market share of 39%.

Concomitant to these structural changes in the post-farm gate stages of the agrifood system, agricultural production also modernized and

became increasingly capital intensive and integrated with upstream and downstream supply chain participants. Tightly coordinated agrifood supply chains have been developed by the private sector – in particular, large multinational food processors, fast-food restaurant chains and retailers – to cater to increasingly differentiated domestic and export markets. Farmers in Brazil are increasingly exposed to markets that are much more demanding in terms of food quality and safety, more concentrated and vertically coordinated, and more open to international competition.

According to the last census of agriculture conducted in 1995, the total number of farms reached 4.8 million (IBGE, 1995), but just a small share of the farms account for the majority of output and exports. Many of the small farms involve subsistence production and are resource poor. One of the structural changes of recent agrifood development in Brazil is the growth of commercial agriculture characterized by economies of scale and capital intensity. The spread of commercial agriculture occurs even in sectors that have traditionally been dominated by small-scale farmers such as dairy and corn. The dairy sector is illustrative, as the number of dairy producers supplying milk to the top 12 processors decreased from 175,000 in 1997 to less than 70,000 in 2004.

Taking Stock and Looking Ahead

The agrifood sector in Brazil underwent significant changes in the last decade. First, it was exposed to a dramatic “competition shock” as a result of economic liberalization, industry deregulation, and dismantling of the safety net provided by massive government expenditures in traditional agricultural policy programs. Subse-

quently, it experienced significant modernization and industrialization induced by private sector strategic responses to these institutional and policy changes. The development of a global agrifood model in Brazil resulted in structural changes in all stages of the agrifood value chain, significant export-led growth, and apparent small farmer exclusion.

Since the end of the military dictatorship in the late 1980s, there has been significant political and social pressure for the government to tackle the issue of the historical unjust land distribution in the country. In response to these pressures, the Sarney administration created the Extraordinary Ministry of Land Reform, but it was not until the first Cardoso administration in 1995 that the land reform program became a reality. The necessary impetus for the agricultural policy goal of land reform and the associated shift in government expenditures was the result of continued pressure from the landless workers movement (MST) in the form of land invasions, the Catholic Church, and many NGOs, combined with persistent poverty, income inequality, and small farmer exclusion from the expansion of the agricultural sector.³

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3. *With the technological modernization of agriculture, the end of investment in land just as a real asset to protect against high inflation, and after hundreds of thousand of new settlements in expropriated land, the number of unproductive landholdings (“latifundios”) sharply declined in Brazil. This is the main reason why the new targets of MST today are the “agribusiness sector” as whole and “multinational companies,” more specifically.*

Given the central role of the agri-food sector in the Brazilian economy, however, it is important that policies aimed at poorer farmers do not hold back further investments in public goods that will contribute to productivity gains and market access of all types of farms and the country's agri-food competitiveness. The recent reemergence of the foot-and-mouth disease and the logistical bottlenecks caused by underinvestment in rural infrastructure in the Central-West clearly show how lack of investment by the government in critical services can have broad impacts for an economy increasingly dependent on exports. Brazilian efforts in international trade negotiations will not contribute to agrifood growth and economic development if the country does not continue to invest in important programs such as agricultural research, public infrastructure, animal and plant health inspection, and measures to protect the environment. If Brazil continues to trade off economic development with support to small-scale farmers, it will suffer the consequences of the "visibility curse." As the country has progressed as a global economic force it has greater influence, but at the same time comes under greater scrutiny. Increased market share and activity in global agrifood trade requires that the country be increasingly vigilant as to how it comports itself. Resorting back to subsidy programs and import barriers of a bygone era in order to help small farmers survive could affect the country's ability to negotiate for freer markets and gain access to important foreign markets. A

heightened presence in markets also behooves exporters to be increasingly quality sensitive as market opportunities increase and the global logistics system becomes oriented to an active South American supply network.

In retrospect, farm policies in Brazil have evolved in the last three decades from a food security and self-sufficiency emphasis before 1985, to deregulation and openness to trade between 1985 and 1995 and, since then, in a reactionary bent focused on the small family farm and land reform.⁴ Looking ahead, Brazilian policy makers should develop farm policies to balance competitiveness with social and environmental sustainability goals. The policy agenda which we outline in the last column of Table 1 should comprise social inclusion goals and programs targeted to different types of family farms, but also programs and services that are essential to agrifood competitiveness. The real challenge confronting policy makers in the future is to provide agricultural producers of any scale the necessary tools to assist them in integrating with the global agrifood economy.

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Bioenergy and the Rise of Sugarcane-Based Ethanol in Brazil

Joao Martinez-Filho, Heloisa L. Burnquist, and Carlos E. F. Vian

JEL Classification: Q42, O54, 013

Introduction

“This is something that, every time I think about it, I imagine how could human kind become dependent on something that is going to finish some day? This is stupidity. I can’t understand why. How could, in less than 50 years, because it was in the first half of the 20th century, the whole human kind became dependent on something that is going to be eliminated....Each country can (now) have its own ‘oil deposits.’”

(Hon. R. Rodrigues, Minister of Agriculture, Brazil 2006.)

Brazil’s rise to be the world’s preeminent bioenergy producer provides three important lessons. The first lesson is about the complex task for developing countries balancing government intervention with market forces as they try to develop an industry. The second is how critical research and development (R&D) is for lowering costs to allow for market entry of an infant industry. The third is about the new challenges for bioenergy as it increasingly competes with the food industry for the same raw materials.

The Industry

Increases in petroleum prices and demand are creating pressure to develop new sources of renewable energies. Biofuel will represent 30% of the global energy used by 2020 compared with only 2% today (International Energy Agency, 2005). In 2004, the global ethanol market was US\$30-40 billion, of which \$4 billion involved international trade. Brazil, China, India, Malaysia and South Africa, the United States (US), and the European Union (EU) are important players in the burgeoning global market. Brazil is one of the world’s most competitive biofuels producers because of its comparative advantage in produc-

ing ethanol and soybeans. The US, the 2nd leading ethanol producer in the world, has variable costs of production of corn-based ethanol of US\$0.96 per gallon. Fixed costs range from US\$1.05 to US\$3.00 per gallon. While in Brazil the total cost of production was approximately US\$1.10 per gallon during the 2005 crop year, with variable costs of US\$.89 per gallon and fixed costs of US\$.21 per gallon. In early 2006, the wholesale price paid to the mills for anhydrous ethanol was US\$2.05 per gallon, while the retail price at the time for ethanol-gasoline blends was US\$3.41 (including taxes).

Total world ethanol production (all grades) in 2005 was 12.2 billion of gallons, with 70% of this total produced by the US and Brazil (Figure 1). Other significant producers are China, the EU, and India. Production in the

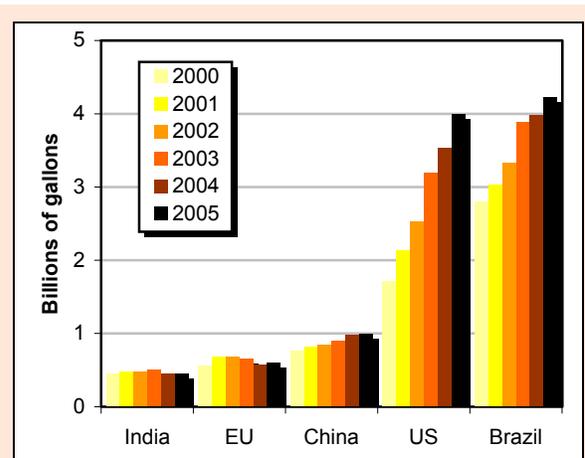


Figure 1. Leading ethanol producing nations, 2000 – 2005.

Sources: Renewable Fuels Association. Ethanol Industry Outlook 2006. Available online: <http://www.ethanolrfa.org/>.
F.O. LICHT. (2006). International sugar & sweetener report. Several Reports. UNICA, União da Agroindústria Canavieira de São Paulo. (2006). Estatísticas. Available online: <http://www.unica.com.br>.

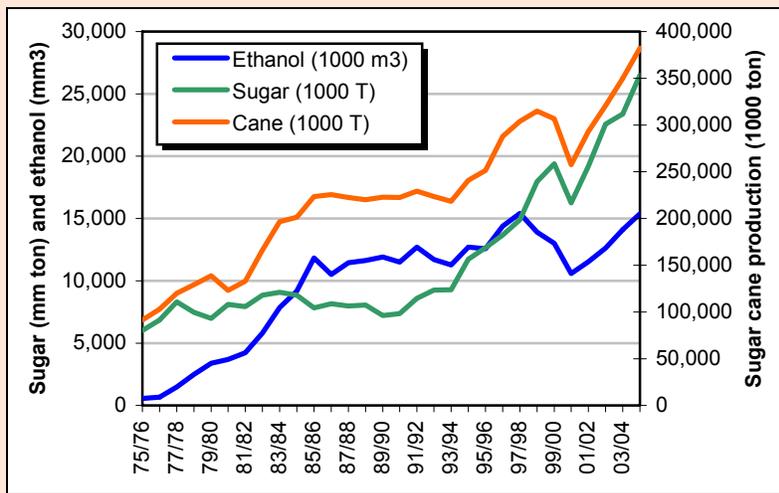


Figure 2. Sugarcane, sugar, and ethanol production in Brazil, 1975/76-2004/05. Source: UNICA, União da Agroindústria Canavieira de São Paulo. (2006). Estatísticas. Available online: <http://www.unica.com.br>.

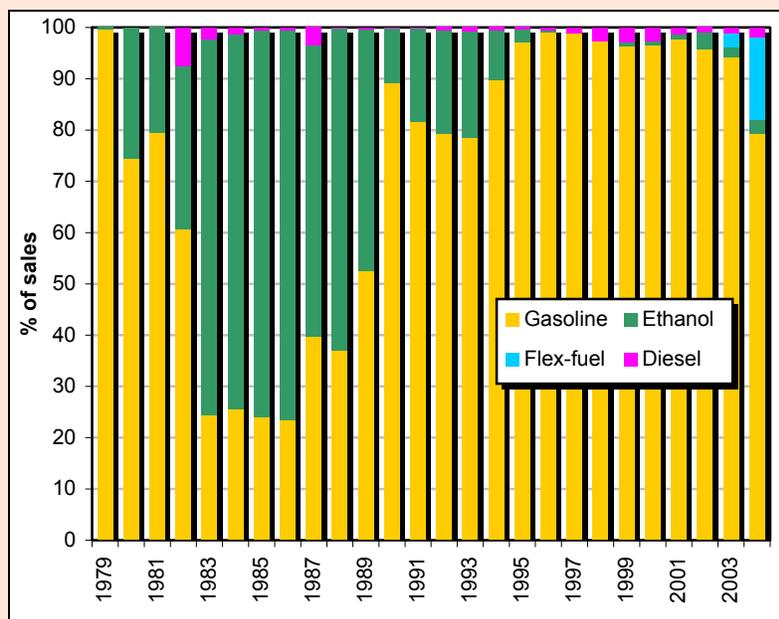


Figure 3. Fuel type of Brazilian car sales (1979-2004). Source: ANFAVEA, Associação Nacional dos Fabricantes de Veículos Automotores. (2006). Available online: <http://www.anfavea.com.br/>.

US started to grow rapidly in the mid 1990s, while expansion in Brazil has been most active since 2000 (Figure 2). Between 2000 and 2005, world production has grown at a rate of 13% per year. In 2004/05, Brazil was the world's largest producer of sugarcane, sugar, and ethanol with 34%, 19%, and 37%, respectively, of world production. Today, real ethanol

prices in Brazil are less than one-third of what they were in 1975.

In 2004, over 350,000 flex-fuel cars were sold in Brazil (ANFAVEA, 2006) (Figure 3). This amounted to 16.1% of the market, a 500% increase from 2003. In 2005, flex-fuel car sales jumped again to approximately 800,000, or 38% of the cars sold.

In 2005, the EU started to require a 2% blend of ethanol in their gasoline. This proportion will increase to 5.75% by 2010. Sweden, an importer of Brazilian ethanol, now offers consumers a 20% tax break to purchase flex-fuel cars, special parking privileges, and no congestion charge for urban flex-fuel drivers. New laws to be passed in Japan will require that 3% of ethanol will be added to the gasoline. This means that a new market of 0.45 billion gallons/year will be created if this Japanese law is passed. Germany intends to add 2% in its gasoline. Negotiations are also evolving with China for ethanol exports from Brazil.

This tremendous export potential has stimulated investment in infrastructure for transporting ethanol from the production areas to major ports in Brazil. A US\$200 million ethanol pipeline from the interior of the State of Sao Paulo to Rio de Janeiro (1,000 miles) is currently under construction for export purposes by the Brazilian oil company, Petrobras.

There are currently around 330 operating mills producing ethanol, with another 89 planned (Unica, 2006). In Brazil during the 2005 crop year, more than half of the total sugarcane production was used for ethanol production. Use of 10% ethanol blends reduces greenhouse gas emissions by 12-19% compared with conventional gasoline and reduces tailpipe carbon monoxide emissions by as much as 30% (Wang, Saricks, & Santini, 1999). Since 2002, regular gasoline has contained 25% anhydrous ethanol, but in March, 2006 the percentage was decreased to 20% due to short supplies and strong domestic demand.

All agribusiness exports, including ethanol and sugar have grown significantly as Brazil liberalized its

trade policy. Brazil exports more than 50% of its sugar, oranges, coffee, and soybeans. Ethanol exports have increased rapidly to over 15% of production. For many nations, the size and stability of domestic consumption has been critical in the development of export markets. The rise of the ethanol industry in Brazil may be due to the reverse. Its long history as a leading sugar producer and exporter has led to the development of a dynamic domestic cane-based ethanol industry. A new found domestic demand for ethanol complements the scale and global competitiveness of Brazil's sugar industry. This gives the sugar complex a solid domestic and international market foundation by which to grow and develop.

In March 2006, the country's fuel blenders (e.g., BR (Petrobras), Shell, Exxon, Ipiranga) had to cut the ethanol content to 20% of its blended fuel because of ethanol shortages. Sugar prices were at their highest levels in five years, as was the ratio between sugar and ethanol prices. The competition for inputs between energy and food sectors is wonderful news for processors as they now are able to sell into either of two very high demand markets, sugar and ethanol. But, the competition raises important public policy issues if energy demand limits critical food or feedstuffs.

Supply is responding, but mostly in the eastern part of the country. Poor transportation and infrastructure, longer distances to export terminals, and smaller local markets in the Center-West region make investment less appealing. The State of Sao Paulo though is in a unique situation to benefit from the country's commitment to ethanol. It has a long history of being a leader in sugarcane production, fuel processing, and

automobile manufacturing. Special sugarcane varieties have been developed and perform well in Sao Paulo's climate. The topography is conducive to mechanized harvesting. Finally, Sao Paulo benefits from some of the best infrastructure in the country. Because of the tremendous interest to build mills in Sao Paulo, the value of land has risen considerably. A 1.5mmt sugar mill will need around 27,000 hectares of sugarcane no more than 40 kilometers from the mill. In the western part of the State of Sao Paulo, land in June 2002 was selling for US\$1,350/hectare. By June 2005, land was selling for US\$3,070/hectare.

Brazilian consumers have added to the problem of short supply as they have aggressively purchased the flex-fuel cars. Consumers only buy ethanol if the pump price is 30% below gasoline blends. For the first quarter of 2006, retail pump prices for ethanol and gasoline approached parity in Sao Paulo, forcing some consumers back to gasoline. Technology allows consumers to be very astute about their purchases and adapt consumption very quickly. The challenge is for the distribution system to match the dynamics of the market.

History

The first investment in ethanol dates back to the 1920s. The Instituto do Açúcar e do Alcool (IAA) was established in the 1930s and state intervention regulated sugarcane activity in Brazil until the 1980s. Ethanol production though was a minor activity in Brazil until the 1970s when the sharp rise in oil prices threatened the military dictatorship's ability to rule. At the time 90% of the gasoline was imported, causing fuel shortages, inflation, current

account deficits, and diminished hard currency reserves. By 1975, sugar prices fell sharply in the international market. At the same time, oil importing countries suffered from significant price hikes (from US\$2.91/barrel in September 1973 to US\$12.45/barrel by March 1974). Brazilian imports and balance of payments accounts were strongly impacted by this oil price increase, leading the government to launch the Proalcool program at the end of 1975. The purpose of the new program was to stimulate domestic fuel ethanol supply obtained from cane biomass by means of aggressive market intervention through quotas, marketing orders, price setting, and subsidized interest rates.

The second oil shock in 1979 brought about new Proalcool activities focused on demand expansion for hydrated ethanol. A system of tax exemptions for buyers of ethanol cars and consumer pricing fixing that pegged ethanol to gasoline prices were put in place. Additional activities integrated ethanol production for the first time into its energy planning process. Brazil's National Energy Commission expanded the ethanol production target to 3.8 billion gallons as a result of growing domestic needs.

Throughout much of Latin America sweeping market-based reforms, called the Washington Consensus, occurred in the mid 1980s as a result of the deteriorating financial state and hyperinflation that had overrun the region. In Brazil, government spending controls were needed because of the high level of accumulated national debt. The need for ethanol became less compelling as oil prices declined.

In 1987 Petrobras, the state-owned oil and gasoline company, was no longer obliged to buy all the fuel

ethanol produced by the sector. In 1988, the Brazilian Constitution fundamentally changed the State's economic planning role from being normative to indicative. In 1990 the IAA, the public institution through which government intervention had been executed for about 60 years, was eliminated (MP - Medida Provisória no. 151, March 15, 1990). In 1993, the government passed a law in which all gasoline marketed in Brazil would be blended with 20% to 25% of ethanol.

Sugarcane prices, including freight to mills and distilleries, and all ethanol prices were deregulated and determined by market forces starting January 1, 1997 (Portaria no. 64, March 1996). Producers are now paid through a formula based on the sugarcane's end use, either sugar or ethanol. The Organização dos Plantadores de Cana do Estado de São Paulo – ORPLANA (producers) and the União da Agroindústria Canavieira de São Paulo – UNICA (mills) agreed in 1999 on a voluntary, non-profit sugarcane payment system called CONSECANA-SP (Conselho dos Produtores de Cana-de-Açúcar, Açúcar e Alcool do Estado de São Paulo-Consecana).

In 1997, the Cane, Sugar, and Ethanol Official Harvest Plan was published for the last time by the Brazilian government (Portaria no. 46, May 1997). The 40% tariff quotas for sugar exports were eliminated and market-based prices for anhydrous ethanol became effective May 1, 1997. By 1999, price deregulation for cane and hydrated ethanol was also in place. In 2003, the Brazilian automobile industry launched the first flex-fuel car. Consumers now could decide the mix proportion at every fill-up: pure gasoline, pure ethanol, or a blend. The tax rate at the retail level in January 2006 for pure

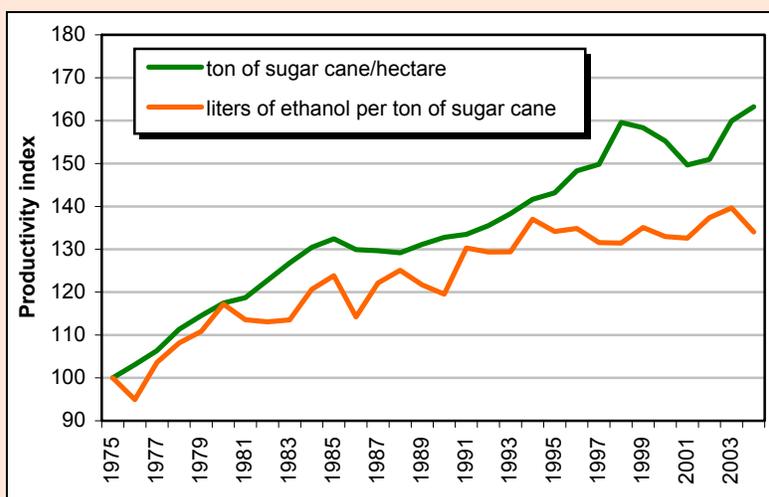


Figure 4. Sugarcane and ethanol productivity in Brazil, 1975-2004. 1975=100. Source: Centro de Tecnologia Canavieira, 2006 and authors' calculations.

gasoline was 52.12%. This was 58% higher than the tax on pure hydrated ethanol. The anhydrous ethanol, which is used to blend with gasoline, is untaxed. Thus, the gasoline blended with 13% or more anhydrous benefits from a lower tax level when compared to hydrated ethanol. An 80:20 blend would have an effective tax rate of 22%.

R&D Investment

The sustained capacity to improve and diversify its production by investing in R&D is one of the most important factors underlying the success and growth of Brazil's sugar/ethanol complex. Sugarcane productivity has risen steadily at a 2.3% growth rate between 1975 and 2004. Yields are now over 80 tons/hectare. Industrial productivity growth is not as brisk, increasing on average 1.17% since 1975.

This growth rate is the result of new variety development, biological pest control introduction, improved management, and greater soil selectivity. These efforts were initiated by the São Paulo state government's the Instituto Agrônomo de Campinas

(IAC) and Instituto Biológico. By 1970, Copersucar, a private cooperative of sugar and cane producers, created a Center for Technological Research. This research center was instrumental in the expansion of sugarcane production and the industrial development of the sector. In 1971 the federal government created the Programa Nacional de Melhoria da Cana-de-Açúcar (Planalsucar) with a particular focus on the development of new sugarcane varieties. Planalsucar was created to reduce the technology growth rate difference between industry and production within the Brazilian cane sector (Figure 4). With industry developing faster, an agricultural production lag could eventually result in bottlenecks for sugar and ethanol producers. In the 1990s though, the Brazilian government decided to close Planalsucar, as part of its adjustment plan to reduce the size and role of government.

Copersucar (now the Center for Sugarcane Technology (Centro de Tecnologia Canavieira)) invested about 1% of its total revenue back into research related to sugarcane and its final products through the 1980s

and 1990s. The State of Sao Paulo made substantial investments in basic research and molecular genetics (ONSA - SUCEST genome project) and a US\$8 million investment in a sugarcane breeding improvement project (FAPESP – Fundação de Amparo a Pesquisa do Estado de São Paulo). Work with transgenic sugarcane is also being conducted, but the legislation necessary for greater commercialization has not been evolving at the same pace as the research.

Government's Current Role

The government's current role is not only much smaller, but quite different as well. Most of the government's efforts today are to ensure that the transformation to a market-driven sector proceeds smoothly and to help improve the industry's environmental performance.

Some minor traditional interventionist policies remain. For example, cane producers in the North-Northeastern (NNE) states are still paid a subsidy (R\$5.7 or 19%) to offset their higher cost of production. This transfer is maintained to equalize costs and slow migration to the Center-South (CS) states.

Government indirectly affects cane, sugar, and ethanol prices received by producers through excise taxes. The ICMS (Imposto sobre Circulação de Mercadorias e Serviços) tax is an interstate tax that varies by state and serves to generate state revenue. ICMS taxes are levied when production and utilization occur in different states. Excise tax differences cause illegal tax avoidance as sales are "booked" to a low tax state (e.g., Minas Gerais), but actually sold in a higher tax state (Sao Paulo). As a result, states have an incentive to homogenize their excise tax rates to keep sales "in-state."

The IPI (Imposto sobre Produtos Industrializados) is a federal excise tax applied to industrialized products. It is currently set at 5% of sugar prices received by producers and has not been considered a factor that causes resource reallocation between regions or states.

Two new market-oriented institutions are CIMA (Conselho Interministerial do Açúcar e do Alcool) established in August 1997 and ANP (Agência Nacional do Petróleo) established in August 1997. CIMA involves representatives from ten federal government secretaries who monitor and evaluate the deregulation process as the sector moves to a free market. ANP serves as overseer of the new oil derivatives market.

The most active area for the government has to do with regulating the industry's environmental impact and helping the industry develop energy co-products from waste material (bagasse). Activities that are controlled include: sugarcane field burning; bagasse (post-processing residual material) management; soil quality; herbicides and insecticides storage and usage; liquid waste application for fertilizer, forest preservation, surface and ground water quality, ethanol storage; water usage; sugarcane transport (weight and volume); and noise pollution.

One of the most harmful environmental effects from sugarcane production is the burning of fields to facilitate manual harvesting. Burning is conducted prior to harvesting to eliminate pests and remove weeds. This makes movement through the field safer and easier, but produces significant quantities of greenhouse gases, ash, and other airborne particulates. Absolute elimination of burning has proven difficult so a schedule was established to gradually reduce the burning over the next 20 years in

Sao Paulo, the largest production region. In 2000, additional steps were taken to eliminate burning and shift practices over to mechanized harvesting (Law no. 10.547, March 5, 2000). The new law specifically established where burning was prohibited and mechanization in turn would be used; about 55% of production. It also established rules where burning would be allowed; 45% of production. Burning is still permitted where the ground is sloped 12% or more, making mechanized harvesting impossible; or where small landholders were involved and had no other means of harvesting.

Two controversial outcomes of these environmental policies are the immediate unemployment of over 100,000 of the nation's 1.2 million seasonal sugarcane workers and the creation of incentives for producers to relocate their farms to avoid regulation. The loss of jobs is important because the sugarcane workers are some of the most at-risk elements of rural Brazil. Politically it is difficult for Brazil's president, Luiz Inacio Lula da Silva, who came to office as a very strong advocate for the country's disenfranchised workers.

The sugarcane harvest area in Brazil is around 5.2 million hectares (UNICA, 2006) and employs 1.2 million workers (Parra, 2005). With the new burning law, approximately 2.9 million hectares (55% of total cane acreage) will be mechanically harvested. Each combine harvests around 1,300 hectares per year and replaces 60 seasonal workers. This means that the 2,231 combines will displace about 134,000 workers, or 11% of the sector's labor force.

Production migration too is of great concern because land is plentiful in Brazil and regulatory oversight is weak. So, environmental regulation may be having the perverse effect of

increasing pollution in the short run as production expands in new regions where environmental regulations are weak and monitoring is difficult.

The Brazilian energy sector is undergoing a restructuring process due to deregulation that has evolved since the beginning of the 1990s. One important implication for the sugarcane sector came about in September 1996, when Decree no. 2003 allowed independent producers to commercialize co-generated electric energy.

In the Brazilian sugarcane sector, the energy generated by bagasse burning is used for cane processing. However, many sugar mills, particularly in Sao Paulo, have the capacity to produce energy above their own needs that can be sold in the market. An analysis presented by the Secretaria de Energia of Sao Paulo suggests that approximately 28% of the sugarcane weight in the form of bagasse can be transformed into ethanol (Souza and Burnquist, 2000; Queiroz, and Ribeiro, 2002). The processing of one ton of sugarcane produces about 260kg of bagasse, with 13% dry fiber and 50% average moisture. About 5kg of steam is obtained from each kg of burned fiber. The current price paid for energy obtained from this source is low relative to the cost of new construction.

The current installed capacity to produce co-generated energy by the sugarcane sector in the Brazilian Southeast is estimated at 619MW with another 205MW of expansion capacity. This would be enough power to provide electricity to 700,000, or 2% of the State's residential needs. The overall energy generation by the sugarcane sector represents a total of 995MW, which corresponds to only 1.32% of the overall installed energy capacity in

the country. An important advantage for the energy supplied by the sugarcane sector is that its seasonal production matches the countries' needs. During the "dry" months (June - August) sugarcane production and processing is at its peak when water reservoirs are at their lowest levels and the nation's hydro-electric system is least efficient. There is the potential using existing technology to produce 4.02GW if value added taxes (ICMS) could be reduced and electricity prices were allowed to approach market levels (Eletrobras, 2004).

Conclusion

The opening quotation by Brazil's agricultural minister, Mr. Rodrigues, captures the enthusiasm and commitment to bioenergy. Investment and expansion will continue as supply tries to catch up with demand. Brazil's leading airplane manufacturer, Embraer is reported to be exploring the use of ethanol as a substitute for jet fuel. Brazil's global strategy is focused on building basic demand in Asia and Europe. Enticing customers in Asia to switch to ethanol would give significant credibility to the fuel. It would help entice other large sugar producers, both within and outside of Brazil, to shift their mills over to ethanol processing. Also of importance are potential new opportunities for low-latitude underdeveloped countries to expand exports.

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The Brazilian Soybean Complex

Peter Goldsmith and Rodolfo Hirsch

JEL Classification: Q13, O54, Q56, O13

Introduction

The rise of the Brazilian soybean complex simultaneously tells two important stories. The first story is the classic rise of an industry due to natural resource abundance (the Cerrado) and strategic investments in agricultural technology (low-latitude soybeans). Brazil is now the second leading producer of the fastest growing broad-acre crop in the world, has unparalleled arable land reserves, and has the technology to efficiently employ those reserves.

The second story is about the different challenges facing developing countries in the post-modern world. Norms and standards for land use are not the same as when the United States, Canada, and Europe were being settled. Technology and scale economies have redefined a “family farm on the frontier.” Environmental and social stakeholders are now actively involved in land use and policy decisions affecting agriculture. And, the Media now plays an important institutional role in development settings communicating the activities of firms and governments to the public.

Whereas agricultural productivity and growth historically were the central objective for economic advancement, policy makers and industry leaders are increasingly cognizant of new and important environmental and social expectations. This heightened social consciousness and very effective communications environment require Brazil’s agriculture to develop very differently than its forbearers in North America and Europe.

To explore these themes, this article presents the soybean complex from three perspectives: as an agro-industrial complex; as an ecosystem; and as the nexus between infrastructure, institutions, and development.

Background

The story of the Brazilian soybean industry begins within the broader context of the rise of soybeans as a key protein

source for livestock and a key oil source for the food industry. Few soybeans were grown world-wide before WWII. The original genetics come from China and were adapted to the United States as a feedstuff for a fast industrializing poultry industry. For example, in 1960 world soybean production was only 12% of today’s production and the United States represented 70% of that total (Figure 1). The success of soybeans in the United States, combined with the rise of the poultry sector in the Southern U.S., created research interest in Brazil for developing a soybean that could be grown at lower latitudes. Researchers quickly developed varieties adapted to the longer growing season and warmer climates by focusing on the role of the nighttime photo-period in soybeans’ growth and development.

These new varieties became the opening for the Brazilians. Researchers took the low-latitude technology and developed germplasm that could be deployed in the Southern three states of Brazil, Rio Grande do Sul, Santa Catarina, and Parana, a growing climate similar to the Southern U.S. (Schnepf, Dohlman, & Bolling, 2001). Brazil’s soybean industry began in the South of the country in the late 1960s, supporting both soybean processing and poultry production.

By the 1980s, the federal agricultural research institute (Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA)) had advanced the photo period line of research even further. EMBRAPA successfully adapted soybeans to grow in the tropics at even lower latitudes. Developing this technology opened up the West and North regions of the country that lies between 15 degrees south latitude and 5 degrees north latitude to soybean production. Of greatest potential was the Cerrado region encompassing over 200 million hectares¹ of low brush-like forest that was easy to clear and had predictable rainfall. The development of the lowest-latitude varieties begins

the real story of the Brazilian soybean complex.

Compared to the Southern region of Brazil, Cerrado farming could take advantage of huge economies of scale. U.S. agricultural development and land privatization began before the age of mechanization. The U.S. Midwest was settled using the concept of a section, where 80 acres was sufficient to support a homesteading family. Brazil's Cerrado region has none of that social, political, or normative legacy as to what is an appropriate unit of production. The rapid expansion of soybean production in the 1980s arose because of the availability of large tracts of arable land, soybean technology that produced yields equal to the United States, mechanization that allowed operational efficiency and the lowest operating costs per hectare in the world (Figure 2). Cerrado farming also has great challenges. The infrastructure is underdeveloped, markets are distant, soils are relatively poor, and environmental concerns exist.

The Soybean Complex as an Agro-industrial Complex

Latin America has wrestled for many years with effective policies to create growth and economic prosperity. Initial attempts by Brazil in the 1970s and 1980s employed policies of import substitution and government market intervention to foment agricultural development. As a result of government incentives, there was significant investment in soybean processing. Then in the 1990s the pendulum of government policy shifted to market-based tools, aggressive

1. *This is equal to the combined land areas of the 12 Midwestern states stretching from Ohio to North Dakota.*

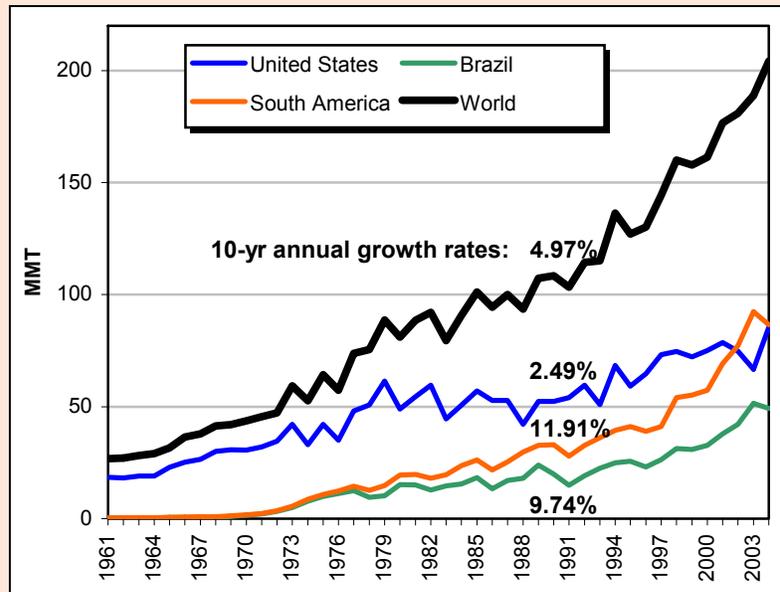


Figure 1. World soybean production.

Source: FAO and Authors' calculations.

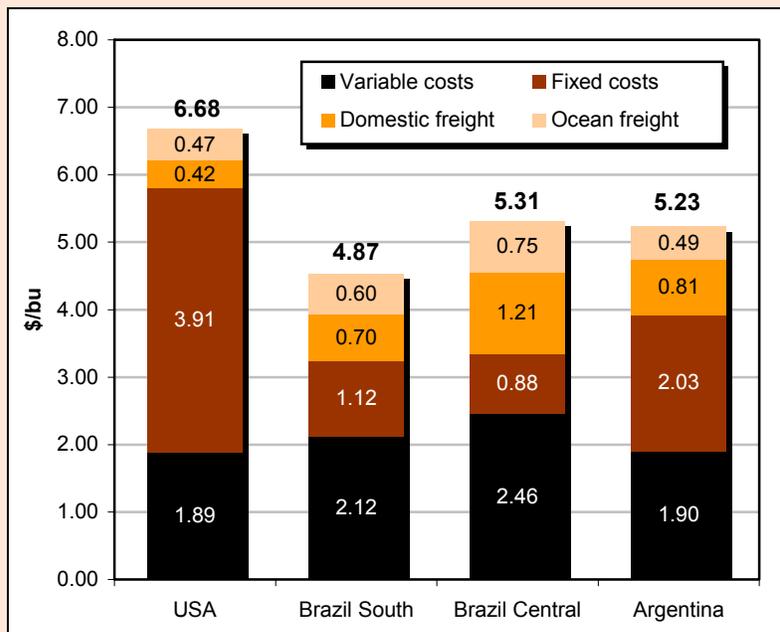


Figure 2. Average cost^a of soybean production.

^a Average across six studies that looked at one or more aspects of the cost of soybean production in Brazil, Argentina and the United States.

^b OF = ocean freight; DF= domestic freight; FC= fixed costs; VC=variable costs.

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inflation fighting, and export development (Schnepf, Dohlman, & Bolling, 2001). Brazil was no longer a preferred location in which to process soybeans. Soybean processing capital was now better placed in Asia and Argentina (Goldsmith et al., 2004). While Brazil has a tremendous capacity to produce some of the least expensive soybeans in the world, it still lacks the transportation infrastructure and domestic industrial cluster to make inland processors globally competitive.

Brazil is second only to the United States in producing soybeans, and Brazilian production is growing twice the global rate. Brazil is the third leading soybean processor² behind the United States and China, with a 7% annual growth rate from 1992-2002. Though, over that same period, other major countries were increasing crush capacity at much faster rates: China 41% per year; Argentina 15%; and India 14%. Brazil's story as a leader in soybean production has been more as an exporter of soybeans, not an exporter of processed products (i.e., Argentina, or a domestic user, like the United States). Since the 1980s, there has been a steady reduction in the ratio of soybean meal: soybean exports. For example, in the last 15 years the ratio has fallen from 4:1 to 1:1.

Expansion of soybean production to the West Central and North regions pushed the grain supply far

2. *Soybeans cannot be fed directly to livestock. They need to be processed ("crushed") in an industrial facility using heat, mechanical pressure, and chemical extraction. The output is a high protein meal for livestock and oil used in food manufacturing.*

from traditional crushing and consumption regions and the well-developed transportation infrastructure of the East. Crushers were challenged to invest in the center of the continent far from livestock and export markets.

Brazil has a crush capacity of 113,000 tons per day (2002) (Goldsmith et al., 2004), second only to the United States. Fifty-five different companies own facilities and the largest five firms produce 45% of the nation's output. The biggest processors are Bunge (18%), Cargill (11%), ADM (7%), and Coinbra (a Brazilian subsidiary of Louis Dreyfus) (6%). Cooperatives own 9% of the crushing capacity and 4% of the soybean oil refining capacity, and are responsible for 29.4% of the Brazilian soybean trade.

Brazil's industry, due to the legacy of government intervention in the 1970s-1980s, is comprised of much smaller processing plants, than the United States or Argentina. Argentina has the largest plant³ in the world and the capacity to process 12,000 tons of soybeans per day, while the largest plant in Brazil can process only 3,800 tons per day (Hinrichsen, 2000; Oleofar, 2002; Soya & Oilseed Bluebook, 2003).

Most of the national soybean crush (51.62%) is still located in the Southern region out of position as southern agriculture switches away from soybeans and the West Central and North regions rapidly expands (IBGE.a, 2003; Oleofar, 2002). Mato Grosso, the largest soybean producing state in Brazil produced 13.4 mmt in 2003 but only had crushing capacity to process 38% of the crop. Alternatively, the southern state of

3. *By 2005 the figure was closer to 16,000 mt/d.*

Parana is 16% over capacity (Oleofar, 2002; IBGEa, 2003).

The strategic implication for crushers is that current crushing infrastructure is old, small, and out of position. Making inland investments close to production is difficult because the agro-industrial cluster, especially in livestock and meat production, is small and transportation infrastructure is poor. As a result, there are relatively few marketing opportunities for processors and the cost of transport to markets is high.

Soybeans are an intermediary (industrial) input and have numerous food, feed, industrial, energy, and textile uses. They are also easy to transport, store, and process. Their widespread use and favorable logistics characteristics make soybeans very conducive to trade. As a result, the geographic location and the associated economic impact of the industrial cluster into which raw soybeans flow may be distant. For example, China has shifted its policies towards raw soybean importation rather than domestic production.⁴ It now imports 125% of domestic production and absorbs 38% of world exports.

This issue of the location of the industrial cluster and geography is important in the case of Brazil's soybean complex. Of importance for continued development is how to create and capture greater value through the production and exportation of higher valued goods and services rather than simply exporting raw soybeans. Most government policy interventions affecting the soybean complex over the last 30 years has targeted specific industries (Schnepf, Dohlman, & Bolling,

4. *Interesting because soybeans originated in China.*

2001). Differential taxes were often the tool of choice and resource extraction the result. These short-term and narrowly focused policies resulted in significant levels of uncertainty and arbitrariness. In turn, development of the agro-industrial complex in the interior part of the country was negatively affected.

The state of Mato Grosso, in the West Central of Brazil produces a similar quantity of soybeans as the U.S. state of Illinois. The Illinois soybean cluster⁵ though has a value eight times the value of its soybean crop, while the Mato Grosso cluster is significantly smaller, producing .78 the value.

While such comparisons, especially within a regional context are imprecise, the inference is important. The 1995 IFPRI study on the *Future of Latin American Agriculture* stated that the most important need for Latin America to reduce poverty was for the expansion of, and improvement in, resource utilization. The tremendous growth in Brazil's soybean harvest would be consistent with such goals. But, an additional need as Latin America attempts to alleviate poverty is not simply harvesting and exporting raw agricultural goods, but developing an agro-industrial sector that produces higher-valued export goods and services, and offers better domestic employment opportunities. For example, a comparison of trade between China and Brazil reveals how Brazil is essentially a raw commodity supplier (soybeans and ore),

5. This is the ratio of direct, induced and indirect output of soy-consuming livestock production and soybean, meat, and dairy processing to the output from soybean production. The data are from 1999.

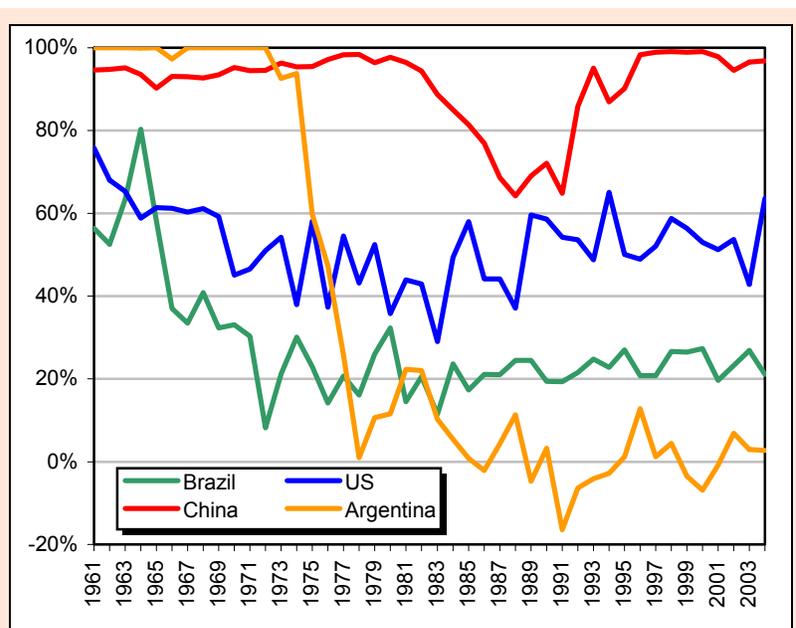


Figure 3. Soybean domestic use levels. Source: FAO and authors' calculations.

and a higher-valued processed and manufacturer goods importer (*Economist*, 2005).

One of the best examples of distortionary policy is the case of the Kandir Law (1996) and the ICMS tax. ICMS is a state-run, value-added tax that is incurred when production and utilization occur in different states. Resource flows occur at the state, not the national, level. As a result, interstate commerce and exports of value-added goods like soybean meal are discouraged, technology adoption is slowed, and the operating size of firms is reduced. The ICMS tax is one of the most effective tools for state governments to generate revenue, and thus is difficult to reign in (Schnepf, Dohlmán, & Bolling, 2001). The Kandir Law attempts to mitigate some of the distortionary effects of the ICMS tax. It focuses on the national interests of export expansion and foreign exchange inflows. The Kandir Law exempts exports of raw and semi-elaborated products, electric energy, and goods of capital assets from the

ICMS tax (interstate trade tax). In effect, the law eliminated the difference in the export ICMS tax between the different products in the soybean complex. Before the law, the export ICMS taxes were 13% on soybeans, 8% on soybean oil and 11.1% on soybean meal. The differential favored domestic crushing and resulted in an over-investment in Brazilian crushing capacity (Haffers, 2003). Soybean exports represent about 40% of production after (1996) the law's enactment versus around 18% before its enactment. The Kandir Law was also responsible for increasing the idle capacity of the soybean crushing sector, as firms shifted from exporting soybean meal and oil to exporting raw soybeans.

Brazil's soybean domestic level has remained around 25% since the mid 1980s, with about half of the exports being in the form of raw soybeans (Figure 3). Argentina has an even lower domestic use rate of around 3%, but 80% of Argentina's exports are in the form of higher-valued soybean meal, rather than raw

soybeans. Argentina is a leading soybean meal exporter because most of the country's immense soybean production region lies within 300 kilometers of a deep water port. This helps make Argentina one of the lowest cost soybean meal processors in the world.

The Soybean Complex as an Ecosystem

There are 91.4 million hectares planted to soybeans in the world. Soybeans now occupy 6% of the world's arable land and are the fastest growing major agricultural crop. Land used for soybeans is increasing at a rate of 5.36% per year over the last five years, more than three times world GDP growth per capita during the same period. The demand for soybeans is essentially a derived demand for meat. Meat consumption is already very high in developed countries and is growing rapidly in developing countries, especially Asia and South America, as incomes increase. Feeders and manufacturers are switching to soybeans as their protein and oil source of choice because of its wide availability across the globe, high value:cost ratio, and its versatility as an input.

Of the 19.3k square kilometers of new soybean land every year, 75% are in two countries, Brazil and Argentina. They are expanding their soybean lands 8.4k and 6.1k square kilometers per year, respectively. Argentina's expansion mostly involves switching among crops. Land used for agricultural purposes has only increased at a rate of 790 sq kilometers per year since 1990. Brazil though has brought 14k sq kilometers a year of new agricultural land into production.

In 2003, Brazil produced soybeans on 18.4 million hectares. Soybeans are grown annually, double cropped with a grain such as corn,

sorghum, or milo, or even triple cropped with a green cover crop. Estimates are imprecise, but the potential land available for future field crop expansion in Brazil is between 57 million and 170 million hectares (GEIPOT, 1999; Hirsch, 2004). There are over 160 million hectares of native and planted pasture both inside and outside the Cerrado region that services the world's largest beef herd, and which can be switched over to crop production easily (IBGE.b). As a result, soybean production in Brazil is forecasted to stabilize at almost double the 2003 levels (Hirsch, 2004). Using the most conservative estimate and current yield trends, Brazilian production should level out at 90MMT; adding 20% to the world's 2003 supply. Asian Rust, a devastating fungal disease, has slowed expansion in the low latitude regions in recent years. Resistant varieties are due on the market in 2008 (Calvo, 2005).

The rapid expansion of the soybean production region in response to the world's demand for food and energy is causing dramatic shifts in land use in Brazil as native savannahs, dryland forests, and even certain rain forest sub-regions became potential areas for soybean cultivation. The governance over the land essentially changes from public to private. Correspondingly, the goals and objectives for the land change too.

The interests and practices of agriculture may not always be consistent with broader societal goals. Tillage practices, chemical use, and the management of set-aside lands are important not only for farmer profitability, but for the numerous stakeholders actively involved in the debate over development of Brazil's interior. For example Asian Soybean Rust has meant the spraying of millions of hectares with fungicides on

lands that may have never had previously known fungicides.⁶

One policy response is that the law requires that farmers preserve 80% of the land in its native vegetation, while cultivating 20% in the Legal Amazon region. The percentage allowable for cultivation increases as one moves away from the most environmentally sensitive and higher rainfall areas. While the law is fairly explicit, weakly specified property rights, limited government budgets for enforcement, and strategic private land selling practices make enforcement of such laws difficult. Local government is also conflicted because they desire greater economic growth in the region, want to help meet the world's increasing need for foodstuffs, and want to expand social programs.

The Soybean Complex: A Force for Infrastructure Development

Traditionally, the transportation issue has not been strategic to the industry, as soybean production was concentrated in Southern Brazil, near the ports and consumption regions. It was also not as a critical an environmental issue because transportation was consistent with historical population centers of the country. As a result, 74% of the soybeans still travel by road, 23% are transported by railways, and 3% by waterways. As a comparison, waterways carry 61% of U.S. soybeans, and roadways transport only 16%. The roadways though, which serve to link the new soybean production regions, are two-lane roads in very poor condition that cover great distances. This gives

6. *In 2003, 14.8 million hectares (148 thousand square kilometers) received two fungicide treatments (Yorinori, 2003).*

interior Brazil producers significantly higher domestic freight costs than either Argentina or the United States.

Recently the Ferronorte railway was constructed linking Southeast Mato Grosso state to Santos port. The Carajas railway links the interior with the Northeast port of Sao Luis and the Madeira waterway brings soybeans by barge from the western river terminal of Porto Velho (Roraima state) to the deep water port of Itacoatiara in Amazonas State. These changes have significantly improved the competitiveness of the new production regions (Schnepf, Dohman, & Bolling, 2001; Hirsch, 2004). Inland port soybean price differentials have fallen 13% per year as transportation has improved, supply has become more regular, and transactions have formalized.

The West Central region also holds opportunities for extending the Santos rail to the North and West, and increasing barge transport utilizing the Araguaia, Tocantins, Teles Pires, and Tapajos rivers. Simulation results showed only moderate improvement in the efficiency of the soybean complex from such infrastructure improvements (Hirsch, 2004). One effect that limited significant changes in the system's overall competitiveness is the increased competition that would result among the various alternative routes.

Brazil plans future transportation corridors as part of a Brazilian Government project called *Avanca Brasil*. Transportation access in the North is strategically important to serving markets in Asia and Europe because of cost advantages due to shorter distances. As a result China has expressed significant interest in helping to finance improvements in infrastructure in the North and West (*Economist*, 2005). These projects

include the paving of a major Federal south-north highway that links Mato Grosso with the city of Santarem at the mouth of the Amazon. There has been significant livestock and meat processing investment (Carrolls, Perdigao, and Sadia), as well as soybean crushing investment (Bunge, ADM, and Cargill) along the corridor because of the corridor's potential for exports.

The implementation of the Araguaia-Tocantins waterway and the BR-163 pass through remote regions of the country that are of both environmental and cultural interest. As a result, both projects have met significant opposition from governmental and non-governmental interests outside of the agriculture community. Stakeholders are concerned not only that infrastructure will accelerate resource extraction and change the sensitive ecosystems forever, but that the infrastructure development would be premature given Brazil's fragile institutional environment. The region affected is enormous, and enforcing regulations and ensuring due process would take significant resources. Thus, land degradation may be accelerated if infrastructure were improved without a commensurate ability to curtail illegal activities.

Conclusion

As one stands on the main north-south Federal highway in Mato Grosso, the most impressive feature is the constant drone of the trucks... hundreds of trucks moving up and down the route day after day. No matter the rain, the choking dust, unstable bridges, negative exchange rate moves, or soybean price weakening, the trucks keep rolling, just like they have for the last twenty years. The market forces at work that keep the trucks moving are able to sur-

mount any of the challenges offered by contrarian government policies, new environmental awareness, or institutional reform efforts.

There are broad economic, social, and environmental implications specifically for Brazil, in particular and modern agricultural development, in general. Economic growth and development continues to be vital for improving the standard of living in developing countries. The soybean industry is a very efficient supplier of protein and oil. The growing demand for soybeans is exciting and new uses for soybeans are expanding rapidly. At the same time, a new social and political reality exists that questions how the industry should develop. Developing countries are increasingly becoming the supplier of the world's food. Many parties, including the government and industry, are trying to find ways to improve agriculture's social and environmental stewardship.

The Brazilian soybean industry in Mato Grosso takes very seriously the challenge of balancing the need to help meet the world's ever increasing demand for food with enlightened ecosystem management (Hirimoto, 2005). The challenge for Mato Grosso, in particular, but agricultural development, in general, is how to achieve the correct balance that keeps their producers and processors profitable, keeps food and feedstuffs flowing, and provides effective social and environmental stewardship.

It is also important to think beyond simply the development of Brazil. Africa's food needs are great and Brazil has developed technologies that could be applied in the savannahs of Africa. Society will struggle balancing the need to produce more food to alleviate Africa's persistent food shortages with pre-

serving important lands in a natural state.

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Modern Beef Production in Brazil and Argentina

Carlos Steiger

JEL Classifications: Q54, Q13, O13

Perspectives in the demand for meat products look promising because of increasing incomes around the world and changes in consumer preferences favoring meat and dairy products. Within that context, Mercosur countries seem to be in a good position to take advantage of this favorable scenario.

Brazil is a leading player in the beef, poultry, and pork world markets. Focused attention has now been placed on dairy production as well, in order to improve productivity to attain self-sufficiency, or even become a net exporter.

Argentina too has been a leading player in the world beef market, but has been losing ground because of domestic policies that favored domestic consumption, and avoiding inflation, over exports. Argentina has historically been a very minor poultry producer and a net importer, but recently has been able to use favorable exchange rates to become a net exporter. Dairy continues to be an active industry with strong exports. The pork sector is neither efficient nor large, and remains a minor activity.

The goal of this paper is to present an analysis of two of South America's leading livestock economies, Brazil and Argentina. The analysis will focus on recent trends and future scenarios related to factor endowments, economic policies, and the behavior of the micro economy.

Trends

Meat consumers have benefited from the increasingly liberal trade environment and the globalization of meat markets (Figure 1). Within a more free trade environment, the most important variables that will shape the global meat complex in near term will be positive macroeconomic growth and market disruptions from disease outbreaks (USDA, 2005a,b,c). Macro growth will spur new investments that expand and modernize production, while con-

sumer demand will provide new and growing markets for a variety of meat and dairy products. At the same time, red meat and poultry meat prices for major exporters will continue to be influenced by disease-related trade disruptions.

Livestock diseases such as Avian Influenza (AI) (Asia and Europe), foot and mouth disease (FMD) in Brazil and Argentina, and bovine spongiform encephalopathy (BSE) (Europe, North America, and Japan) continue to impact global trade and are cause for great concern. Nevertheless global meat consumption continues to climb spurring increased production and growth in exports (Figure 2).

Brazil and Argentina only accounted for 16% of the global beef trade in 2001, but are forecast to account for over 35% of that beef trade in 2006. Beef exports from 2001 to 2005 have increased 25% or 1,280,000 metric tons (Table 1). Brazil's exports have grown over 1 mmt, as a result of the fall in United States (US) exports due to the BSE problem.

In relative terms, Mercosur countries (Brazil, Argentina, Uruguay, and Paraguay) have also shown a noticeable increase in market share. In year 2001 these countries represented 19% of world exports, while in year 2005 the share reached 42% of the market.

Brazil

Brazil has expanded its national herd 24% since 1994, with consumption per capita rising 13% over the same period. The dramatic story though has been the expansion of exports, up over 450% in volume and 385% in value. Brazil is now the world's leading exporter. This dramatic change has occurred because of the continued availability of natural resources, a favorable exchange rate, and subsidized credit. The credit program is designed to promote

investment in genetics, pasture, machinery, and cold storage capacity.

Major factors that explain the improvement of the productivity of the cattle industry in Brazil were:

- Improvement in animal genetics mostly through the use of cross breeding programs in the Center-West region. The adoption rate by beef producers of artificial insemination is about 50% greater than the adoption rate by dairy farmers in Brazil. Cattlemen are using imported bull semen, such as Red Angus, Angus, Simmental, and Limousin, to cross with the domestic Nelore breed.
- Higher enrollment in the program MODERAGRO, which replaced the program PRO-PASTO. MODERAGRO includes funds for soil erosion and conservation of lands and is expected to reach approximately US\$390 million at a subsidized interest rate of 8.5% per year. (Commercial rates are more than 14%.) Each producer may borrow up to US\$50,000.
- The Agriculture and Livestock Plan expects to allocate US\$19.2 billion of rural credit, of which US\$5.1 billion is designated for the beef sector.
- The program MODERINFRA allows producers to build or rebuild silos and warehouses on their farms and can also be used to modernize irrigation. This fund is limited to US\$43,000 per livestock producer.
- MODERFROTA is a program aimed at the modernization of farm machinery. US\$2.4 billion has been allocated to this program.

Also significant has been the aggressive marketing efforts of ABIEC

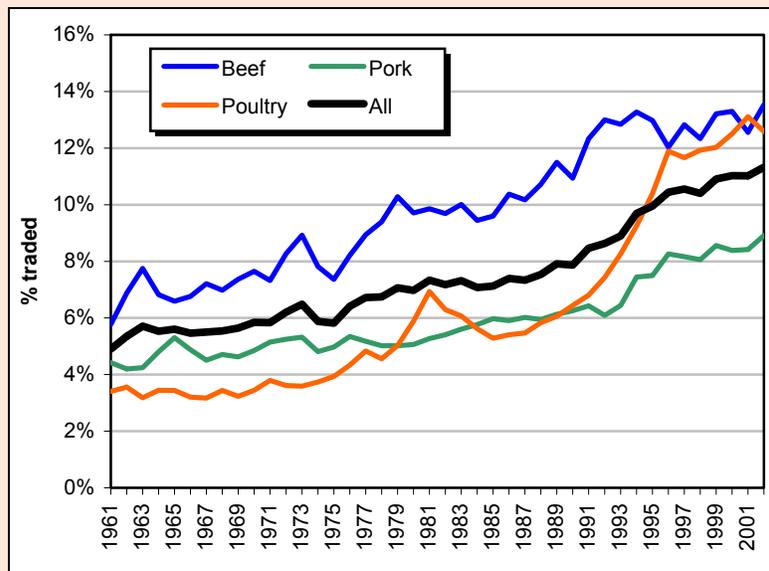


Figure 1. Evolution of global trade of key meat commodities.

Source: Goldsmith, P.D., and Cordier, J. (2006). Managing non-linear risk: Is distance an advantage or a liability? Presented at the workshop Multi-functionality: Implication for Market, Trade, and Environment. University of Illinois at Urbana-Champaign, March 1-3.

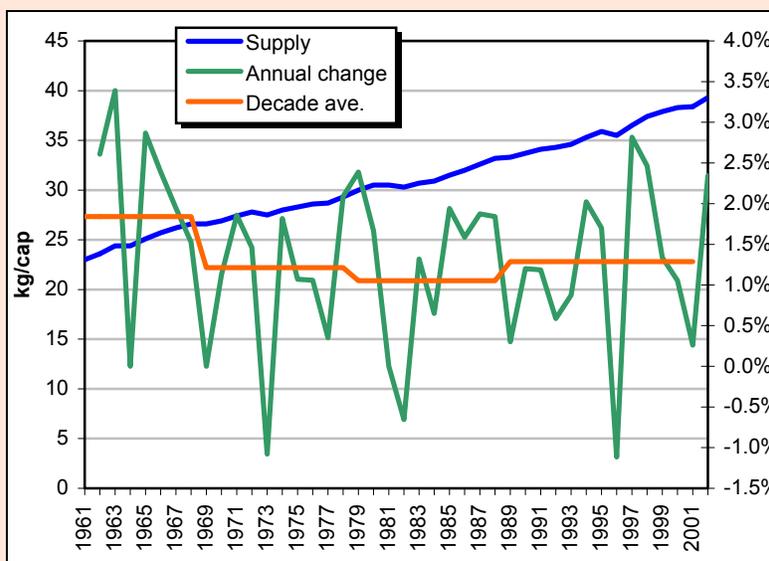


Figure 2. Global meat supply.

Source : FAS/USDA Livestock and Poultry: World Markets and Trade.

(Brazilian Beef Processors and Exporters Association), an association of the largest beef processors, packers, and exporters. Since 2001, ABIEC initiated an aggressive promotion program approved by the National Export Promotion Agency (APEX) to promote the brand: Brazilian Beef. They emphasize the

product as natural (grass-fed beef as opposed to grain-fed beef), environmental, and healthy. ABIEC has an agreement with APEX valued at US\$1.6 million for market promotion, 50% of which are APEX funds.

ABIEC targets markets worldwide, but their primary focus is the

Table 1. Beef exports of selected countries.

	2001	2002	2003	2004	2005(p)	2006(f)
Brazil	748	881	1,175	1,628	1,800	1,800
Argentina	169	348	386	623	680	720
Australia	1,399	1,366	1,264	1,394	1,470	1,480
India	370	417	439	499	620	675
Canada	575	610	384	559	615	640
New Zealand	496	486	558	606	575	615
Uruguay	145	262	325	410	460	470
European Union	502	485	388	358	250	220
China	60	44	43	61	75	90
Ukraine	98	181	202	108	85	90
United States	1,029	1,110	1,142	209	285	290
Other	81	85	34	43	37	48
Total	5,672	6,275	6,340	6,498	6,952	7,138

Source : FAS/USDA Livestock and Poultry: World Markets and Trade (2001-2004), Annual Issues.

European Union (60% of Brazilian exports.) Other markets include the Middle East, Russia, Asia, Chile, and the United States.

For the last two decades, the cattle industry has moved towards the Center-West region. It is now home to over one-third of Brazil's herd. But recently, cattle production has begun to move North because of the expansion of soybean production, which has raised land prices in the Center-West. Raising cattle in the North is 10% more profitable than in other regions in Brazil because of lower land prices. Once timber is harvested, there is competition from other land uses such as crop production.

In 2006, production is forecast to reach 8.85 million metric tons (mmt) and surpasses the current record production of 8.7 million metric tons. The increase in production is pulled from the demand side due to continued expansion of the export market because of BSE outbreaks in North America; aggressive marketing efforts by Brazilian packers; competitive export prices due to favorable exchange rates; and an increase in

domestic demand as incomes rise. The average slaughter age has fallen from 54 months to 38 months of age as a short-term response to brisk demand. If the herd is unable to expand, either due to competition with other crops such as sugar and soybeans and the associated higher land prices, there will be pressure on domestic inflation because of the inelasticity of beef demand.

There is still room for production and export growth. For example, the majority of Brazilian cattle are traditional breeds, with a fraction being improved cross-breeds. Despite improved genetics, Brazil produces predominantly lower-value, slower-growing, and less well-musclad grass-fed beef.

Brazil recognizes the need to not just increase quantity, but also quality of its beef products, especially in specialty and niche markets. While Brazil is the world leader in beef exports by quantity, Australia is the world's leader in beef exports by value. Australia is able to sell into some of the premium markets.

While Brazil has capitalized on the perceived minimize risk on BSE

by leveraging its grass-fed production model, it is still vulnerable to supply shocks. The industry is still challenged by periodic outbreaks of foot and mouth disease. The most recent event occurred in October 2005 in the Paraguayan border State of Mato Grosso do Sul. Only with Brazil achieving FMD free status without vaccination will it be possible for exporters to access higher-value markets such as the United States.

Argentina

Argentinean beef production has showed a stable but sometimes erratic production pattern. There has been export volatility during the 1990s, the financial crisis of 2001, and an outbreak of FMD in 2003 and 2006. Exports in 2006 are expected to be up 325% over 2001 levels because of a competitive rate of exchange after the devaluation of the peso, the change in sanitary status after the World Organization for Animal Health identified Argentina as a country with an FMD zone without vaccination, and the increased demand in world markets. The early 2006 outbreak of FMD in the prov-

ince of Corrientes will dampen the demand somewhat.

There is no accurate stock number in Argentina, and most sources estimate the national herd to be between 50-55 million head. Recently, crop production was very profitable as a result of the devaluation, high world grain and oilseed prices, and the efficiency of producing and processing Roundup Ready® soybeans. Soybean production is up over 400% since 1996, while agricultural land has increased less than 1%. Though farmers shifted much pastureland to crop production, they did not reduce the size of their herds. Cattle production methods had to adjust. Feeder cattle production became more intensive by utilizing higher energy rations. However, cow-calf production became less intensive as brood cows were placed on lower quality pastures.

The slaughter in 2006 is projected to be somewhat lower than the previous year due to poorer herd efficiency. However, the average carcass weight is expected to increase as a result of a recent measure implemented by the Argentine Government prohibiting the slaughter of cattle weighing less than 300 kilos.

Beef consumption in Argentina is the highest in the world, though there has been a steady decrease from the record levels of the early 1990s (80 kg/cap) to current levels of 60 kg/cap. Much of the decrease has simply been due to the lack of buying power following the 2001 financial crisis.

Argentine beef exports in 2006 were forecast to reach 720,000 tons, one of the highest levels in history. An improved sanitary status, the opening of new markets, and strong foreign demand for beef are creating more opportunities for the local

industry, which is very optimistic about the future.

Argentina will also take advantage of the decreases in production in the European Union (EU), which became a net importer of beef in 2003. EU beef consumption has rebounded from the BSE-induced decline. Total beef production in the EU though will continue to trend downward in 2006 to 7.8 mmt. Increases in the beef herd of New Member States (NMS) have not offset EU total decreases.

The decoupling of payments under the reform to the CAP (Common Agricultural Policy) reduced cow numbers (and, hence, beef production) and caused an increase in prices. Though the NMS are net beef exporters, dairy quotas under the accession agreement have forced the culling of dairy cattle and, as a result, raised the supply beef. However, any increase in beef production in the NMS will be short-lived as EU policies are likely to increase grain prices and, hence, production costs in the NMS.

The European Union is the largest market in terms of value for Argentine beef exports. Europeans are importing large volumes of out-of-quota beef and paying the very high duties on the high-value chilled cuts. The Russian Federation is the largest market in terms of volume. Their declining domestic supply, plus the European Union's lack of export surpluses has forced the Russians to look to South America for its beef. High world oil prices will generate income for the Russian Federation which will allow it to continue importing large volumes of beef.

All the factors together (competitive exchange rate, improved sanitary status, new markets open, growing world demand, and FMD outbreak in Brazil) mean a positive shift in

export demand for Argentina. The question is how judiciously are farmers able to expand supply to take advantage of the current environment? Although Argentine exporters are close to full capacity, there is still room for further export expansion in the future. Investment in the sector, especially adding capacity, has not been significant over the last decade, even though there was an important flow of foreign investment in the Argentine food sector. However, exporters can still tap some unused capacity and shift some production from the local market to exports. Some companies have been buying idle processing plants and refitting them to serve export customers.

An important change in Argentina's cattle sector in the past couple of years has been the utilization of corn as feed. Before, alfalfa pastures were the most common source of feed. Many owners are now able to increase their herd sizes as cattle are placed on more marginal land and in smaller lots are being fed inexpensive and highly productive corn. Domestic corn prices were also below world prices because of export taxes that translated into lower prices at the farm level. As a result, the feed lot industry expanded significantly. Cattle feeders copied the vibrant domestic dairy industry and incorporated the use of corn silage and corn grain into cattle rations. This production technique was especially profitable to farmers and ranchers located far from the ports where freight costs per kilo were reduced and added value could be added to corn.

A second recent event in Argentina has been the use by the government of consumers' inelastic demand for beef as a means to control domestic inflation and maintain political stability. The Argentine government has stated that its goal is to provide

beef at reasonable prices. In 2005, the government implemented measures to discourage beef exports in order to increase domestic supply. In November 2005, the government suspended export tax rebates on 200 mostly food products.¹ Export rebates were designed to return to exporters 2.7% for beef cuts and 5% for thermo-processed products. The government raised export taxes on beef cuts from 5% to 15% (a 200% increase). This has dimmed the once favorable outlook for beef exports.

The Future

United States beef exports are going to recover from the BSE incidents and will add another important player to the global beef scene. Even though the US exports are oriented to Japan and Korea, and not direct competitors with Mercosur, the added supply will negatively impact prices. This is less of a concern to Argentina and Brazil beef producers because they have some of the lowest costs of production in the world. The real challenge will not come from greater price competition, but market access. Brazil and Argentina need to improve their quality control and traceability to comply with Europe's increasingly rigid standards. This will require relatively greater investment in the processing sector than for the farming sector. Delivering a fully traceable product though will be a challenge for all.

Up until now, Brazil has shown dramatic increases in production that have allowed the country to keep per capita consumption constant, while still increasing exports. Now the

1. *The measure was relaxed in May 2006 releasing large quantities of meat into the marketplace from cold storage.*

question is whether in the future it will be possible for Brazil to keep the same growth rates. While there is still plenty of room to increase the industry's productivity and quality, the industry is extremely heterogeneous, uncoordinated, and strategically not well defined (Zylbersztajn & Pinehro Machado). The future portends greater segmentation of meat demand towards more sophisticated quality attributes. Therefore, all players in the Brazilian beef chain will have to adapt and improve coordination in order to meet the changing needs of final demand.

There is a good opportunity at present, while prices are high, for organizational change in Brazil's beef and meat system. There is an opportunity to add value to the beef the country produces by moving from a low cost/low value-only industry to a more modern industry that competes at multiple levels. The industry needs to be able to exploit niche and high-value opportunities, while still being a reliable low cost commodity supplier.

An immediate challenge is the overvaluation of the Brazilian Real. Unfavorable exchange rates have directly reduced the competitiveness of Brazil's low value commodity exporters. Another important issue is the need to improve the coordination of private firms and government agencies regarding sanitary problems such as FMD. Foot and Mouth disease not only cuts off key markets, but causes deleterious fluctuations for those in the chain with fixed asset investments. Also, national and proprietary export promotion programs are challenged to counter the effects of FMD, while marketing the healthful aspects of Brazilian grass-fed beef. The implications with respect to FMD are the same for both Brazil and Argentina.

Longer term, the Brazilian beef industry faces serious challenges as well as it attempts to develop in the Center-West region. The agrarian reform movement calls for very different land use priorities in the Cerrado and drier regions of the Amazon compared to those of commercial agriculture. Top priorities include environmental preservation, land for the landless, and preservation of lands held by indigenous peoples. The impacts are greater competition for land, higher land prices, and increases in costs of production. The prevalence of large landowners in the Center-West and the high cost of land in the traditional eastern agricultural regions could generate conditions potentially conducive to social unrest (Matthey, Fabiosa, & Fuller). International organizations continue to apply pressure on the Brazilian government and corporations to limit deforestation in Brazil.

So, in Brazil there is a potential conflict that would prevent the continued expansion of larger, more commercial, operations. Brazil's subsidization of small farms may increase rather than decrease in the coming years. Such policies give priority to social objectives rather than efficiency objectives, and as a result could limit the rate of growth of the beef industry.

In Argentina, the future of the beef and meat sector will heavily depend on government policies. Policymakers are torn between serving domestic consumers that have the highest per capita meat consumption in the world and helping the industry to service growing world-wide demand.

In 2006, for example, the government banned beef exports, reducing forecasts for the year by 200,000 metric tons. This measure caused a decline of about 20% in the price of

live cattle. Surprisingly, the drop in producer prices was not fully transferred to retail prices, thus limiting the government's efforts to fight inflation. The impact on the industry was immediate and very negative. More than 8,000 workers in the export processing plants were fired. Argentina's credibility as a reliable supplier was damaged as export contracts had to be broken. These events were taking place at the same time the Institute for Argentine Beef Promotion was attending fairs around the world promoting the Argentine brand.

The future direction of Argentina's role as a major beef exporter is uncertain because of Argentina's history of government intervention in the industry to serve policy objectives. In the short run, Argentina will not increase its global share of exports because the government's priority is to control inflation. Even though the government has allowed the industry to partially resume exports after the decline in live cattle prices, the Argentine image as a reliable supplier has been hurt.

The expansion of Mercosur beef exports would benefit from trade liberalization and elimination of farm domestic support policies around the globe. Support programs are creating artificially high beef production in regions like the EU. This causes the accumulation of meat stocks at target

prices that are well above world prices and subsequent dumping, which drives prices down. This has been historically problematic in low purchasing power countries like Russia, which is both a customer for the EU's excess production as well as Mercosur beef.

The Common Agricultural policy in Europe and agricultural policies in Japan are designed in part to slow or prevent the continued decline in the number of farms in these countries. By retaining small family-owned farms, rural economies are strengthened and certain environmental goals are achieved in Europe. However, these policies have the indirect effect of hindering the expansion of the large-scale, low-cost farms typically found in Mercosur countries.

The next meeting of the Doha Round of the World Trade Organization is going to discuss those issues regarding the decrease of tariffs and other protectionist measures. But experience has shown that little progress has been achieved so far. So there is not much optimism in Mercosur countries regarding trade liberalization in world beef markets.

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The Dairy Case Management Program: Does It *Mooove* More Milk?

Todd M. Schmit, Chanjin Chung, and Harry M. Kaiser

JEL Classification: M31, Q13

Dairy farmer check-off contributions are used to fund a variety of generic commodity promotion programs. Historically, generic advertising of fluid milk and cheese have constituted the majority share of check-off budgets for dairy products. In recent years, however, slow growth in dairy farmer check-off revenues, combined with sharp increases in media advertising costs, has prompted a shift away from generic advertising to other nonadvertising commodity promotion activities.

Recently, new store-level marketing efforts by the American Dairy Association and Dairy Council (ADADC) have focused on implementing retail category management (CM) programs for fluid milk products in the dairy case – the Dairy Case Management Program (DCMP). This program aims to improve the management, appearance, and operation of the dairy case in retail stores, with the ultimate goal of increasing per capita milk consumption. Retailers have long recognized category management as a promotional tool for marketing their products, and grocery retailers have applied various methods of using space in dairy cases to encourage consumers to buy dairy products. The CM process involves managing product categories as *strategic business units* and customizing them on a store-by-store basis to satisfy customer needs.

The expectation of increased sales provides an incentive for retailers to adopt CM programs. However, to milk producers who fund DCMP efforts through their check-off investments, the underlying expectation is that these activities will increase consumption. A CM program aimed at understanding consumer preferences and strategically redefining a category accordingly should increase sales growth. It is reasonable then to hypothesize that a successful multi-store/market application could increase

overall market sales volume and per capita consumption levels. To test this hypothesis we investigate a case-study application of the DCMP in the Hudson Valley region of New York State.

The Hudson Valley DCMP

ADADC DCMP staff worked with ProCorp USA, Inc., a marketing agency specializing in category management, to conduct retail store programs and work with retail/category managers. Program personnel provided multiple store visits per week during the duration of the eight-week program cycle and worked closely with retail store staff to improve stock control procedures by evaluating ordering, variety, hygiene, and rotation procedures. In addition, alternative dairy case designs (i.e., planograms) were developed to consider shelf management and presentation of the product.

Various evaluative tools were used to measure the progress in achieving program objectives. Our focus is directed towards two such tools – weekly store Benchmark Scores and store fluid milk sales volumes. Weekly Benchmark Reports (BMR) were prepared to provide overall store scores encompassing five benchmark categories – planogram, hygiene, rotation, stockweight, and ordering. The *planogram* benchmark relates to acceptability of the display case through proper placement of pricing tickets and adherence to the recommended case design. *Hygiene* relates to the overall cleanliness and appearance of the display case. *Rotation* relates to maintaining a regular rotation schedule for proper movement of product. *Stockweight* relates to having appropriate levels of stock in both the display case and coolroom. *Ordering* deals with balancing ordering levels with product movement to prevent low stockweights and out of stocks. The scoring system is an

indication of each store's weekly progress and the scores reflect the number of benchmarks achieved during the course of that week.

Another important tool to evaluate store progress from the DCMP is a comparison of monthly sales of fluid milk products over time. Sales data were collected on a monthly, volume basis with individual products specified by Universal Product Code (UPC). Milk products were classified into three types: (i) Standard Milk – standard, unflavored fluid milk products in packages greater than 16 ounces, (ii) Beverage Milk – flavored fluid milk products and unflavored fluid milk products in packages of 16 ounces or less, and (iii) Lactaid Milk – all lactaid fluid milk products. The monthly sales figures compare sales (in volume sold) for six months – two months prior to program operation, two months during program operation, and two months after program operation. In addition, monthly sales figures are compared to the previous year's sales.

The Hudson Valley Region DCMP program was conducted in the summer of 2002, with over 200 stores participating, and run in four separate cycles by geographic area (Figure 1). Store participation in the region included 65% of all supermarket, mass merchant, convenience, and drug stores, and accounted for over 91% of average weekly volume (in total store dollars). The North-western Hudson Valley Market area (cycle 3) is located primarily in the northwest geographical area of the Hudson Valley territory and is the focus of this case study. A total of 61 retail stores completed the duration of the in-store DCMP in the North-western Hudson Valley Market area. The eight-week program cycle ran from July 2002 through August 2002. A wide array of store types par-

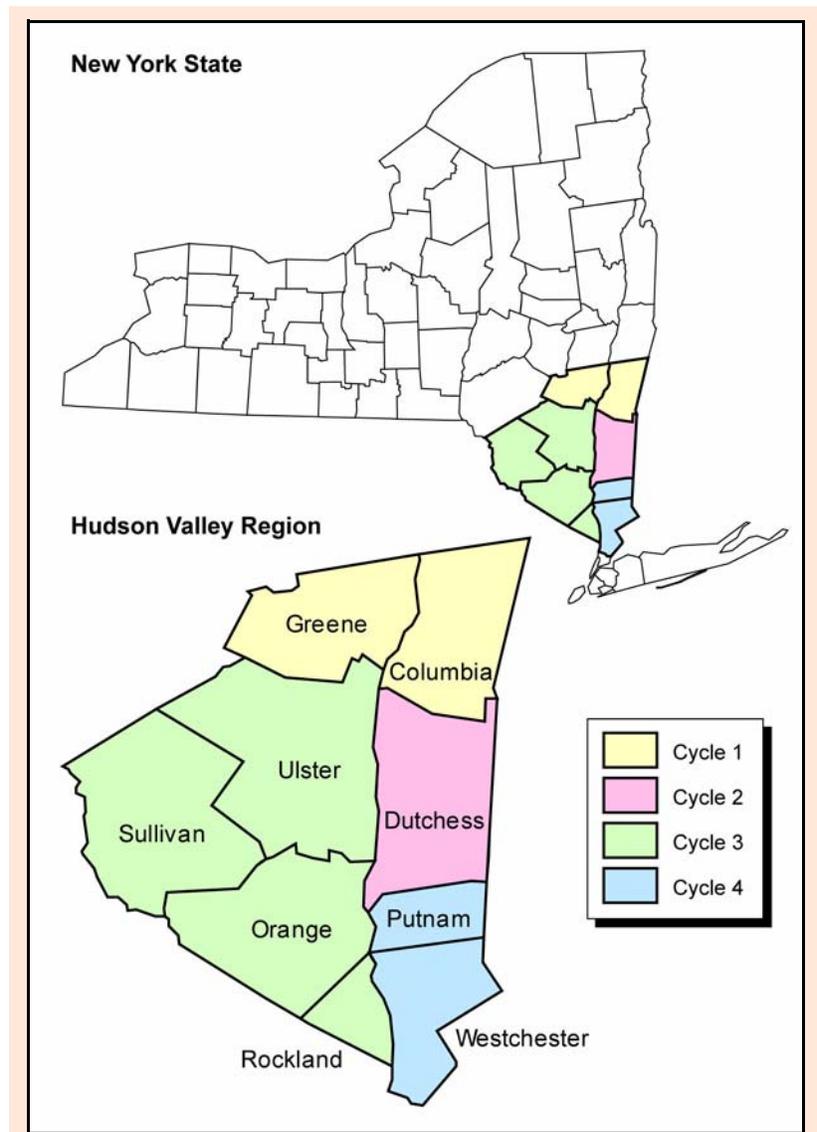


Figure 1. Map of Hudson Valley market area and DCMP cycles.

ticipated, including 25 convenience stores, 16 drug stores, 16 supermarkets, and 4 mass merchants.

DCMP Benchmark Achievement

To get a sense of store progress during the eight-week DCMP, we computed volume-weighted average weekly benchmark scores by store type, and subsequently, we normalized them on a basis of 100 (Figure 2). One would expect improvement in benchmark scores during the DCMP period, and this result

appears to have occurred across all store types following some transition in the first few weeks. The declines in average scores in the last week of the program, particularly for supermarkets and mass merchants, offset statistical gains from the scores evident in weeks six and seven, and highlight the need for continual evaluation in adherence to DCMP objectives.

Looking more closely at the types of benchmark deficiency, we can identify specific problems in stores not achieving full compliance. Figure 3 displays the (weighted) percentage

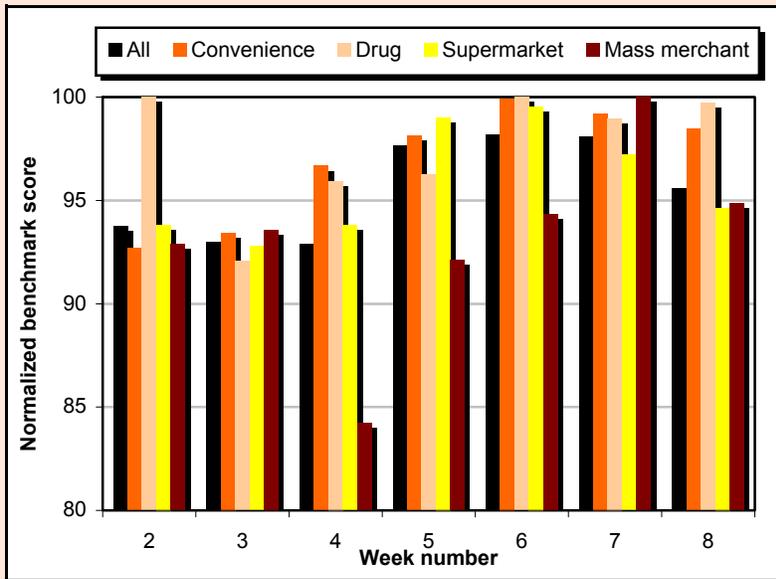


Figure 2. Average normalized benchmark scores, by store type.

Benchmark scores were normalized to a basis of 100 for achieving all benchmarks. Four benchmarks were scored in weeks 2 and 3 (P, H, R, and S), while five benchmarks were scored for weeks 4 through 8 (P, H, R, S, and O), where P, H, R, S, and O are, respectively, Planogram, Hygiene, Rotation, Stock-weight, and Ordering.

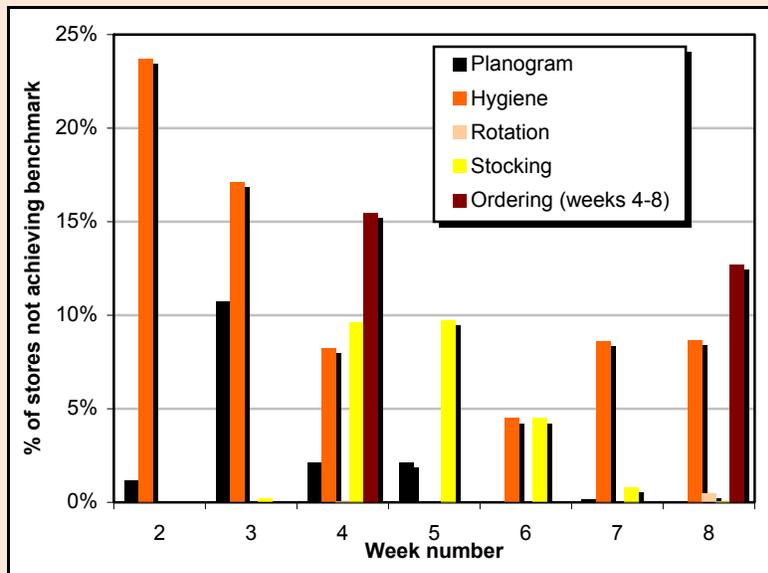


Figure 3. Percent of all stores not achieving benchmarks, by week number.

of all stores not achieving particular benchmarks by program week. Early in the program, attention was directed mostly to hygiene and planogram deficiencies; however, both benchmark categories showed substantial improvement over the program period. Stocking issues were evident by week four, presumably as product variety and planogram

changes occurred, but decreased to near zero by the end of the program cycle.

When the ordering benchmark was first introduced in week four, problems were evident in about 15% of stores; these were likely due, in part, to changes in product mix with a revised planogram design and the need to reconfigure ordering sched-

ules with suppliers. Rotation issues seemed the least problematic throughout the program period. However, after early rotation problems appeared to have been resolved, new problems appeared to return during the final week of the program period and may be indicative of subsequent changes in planogram design without updating and balancing supply schedules.

Benchmark deficiencies differentiated by store type provide program staff information on areas of focus. While not differentiated in Figure 3, hygiene issues needed relatively more attention in convenience stores and supermarkets, while problems in planograms were most evident in convenience and drug stores. Ordering concerns were not of issue in smaller stores, but they did need attention in the higher-volume supermarkets and mass merchants. Stocking concerns were most evident in mass merchant stores, whose general display is dominated by larger, quickly moving volume, but with limited numbers of individual products.

Store Sales Volume Comparison

Store size and sales volume of fluid milk products varied widely across participating stores. Average daily volume (ADV) sales for all participating stores exceeded 11,000 total gallons during the study period, or 192 gallons per day per store on average. As expected, this movement was dominated by supermarket sales, covering 63% of total milk sales in the area. Mass merchants (18%) and convenience stores (15%) also were significant contributors to total milk movement, with drug stores lagging further behind (5%).

As expected, the predominant source of milk movement on a vol-

ume basis was standard, unflavored fluid milk products (96%). Gains in beverage milk products were evident in all store types since 2001, but relative volume movement was small at 6% of fluid milk sales, with the largest proportion sold in convenience stores. Lactaid products represented the smallest proportion of volume and were sold almost exclusively in supermarkets.

Year-to-year changes in sales volume (ADV) for the May through October sales period for standard, beverage, and lactaid milk were +5.6%, +16.6%, and -3.0%, respectively (Figure 4). While sales changes in standard milk varied across store types, gains in beverage milk sales consistently were positive. This result was expected, given the program emphasis on increasing products and facings of popular beverage products. The overall 3% sales volume loss in lactaid products was largely the result of lower volume sales in one month of 2002 (July), just as the DCMP entered the retail stores.

DCMP Sales Impacts

Using the monthly sales data described above, regression analysis was used to estimate volume changes due to the DCMP in the Northwestern Hudson Valley Market stores. Regression analysis is a useful tool for isolating independent sources of variation in explanatory variables to variation in the dependent variable of interest. Both overall market volume impacts of the DCMP and sales volume impacts by store and product type were estimated (for details see Schmit, Kaiser, & Chung, 2004). Supermarkets and mass merchants were classified into a “large store” category, while convenience and drug stores were classified into a “small store” category.

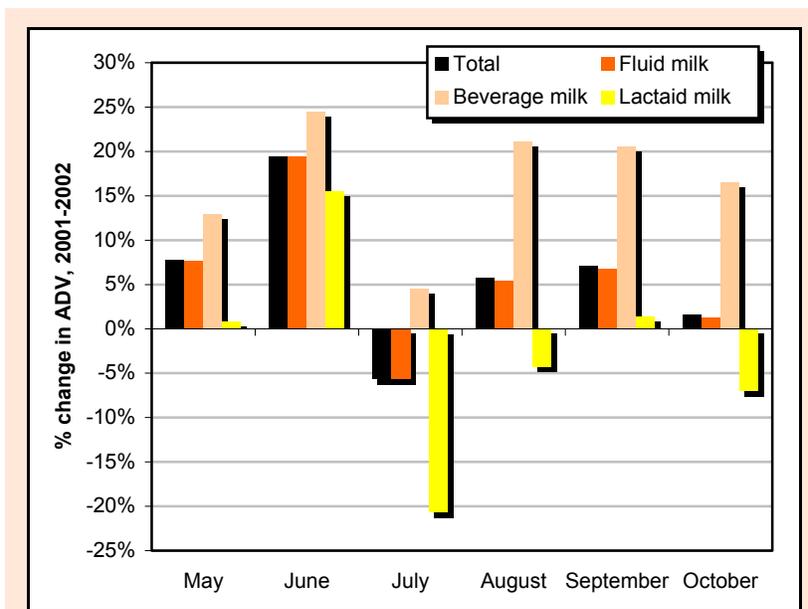


Figure 4. Average year-to-year gross volume changes, by product type.

Recall that the DCMP in-store period occurred during the eight weeks of July and August 2002. While many of the DCMP recommendations may have been instituted during this time, continual changes occurred throughout the in-store program. In addition, it was felt that longer-run DCMP sales impacts should be estimated after the time period when program staff visited the stores so that impacts would be based on actual store management following the program cycle. Therefore, the period September through October 2002 was selected for measuring volume changes attributable to the DCMP, after accounting for other independent sources of variation.

Estimated DCMP impacts indicated that the program was effective at increasing ADV across all stores, on average, 4.40%. Using the average store ADV of 192 gallons per day, this result implies store ADV gains of 8.44 gallons per day. The DCMP was relatively more effective in supermarkets and mass merchants (ADV gain of 5.25%) than in convenience

and drug stores (ADV gain of 4.05), and resulted in ADV gains across all products of 24.17 and 2.20 gallons per day, respectively. The larger relative percentage gains for supermarkets and mass merchants were to be expected, due in part to more flexibility in space use in these store types.

Given that the dominant share of total milk volume movement is due to sales of standard fluid milk products, it was not surprising that gains in this volume largely mirror the overall product results. ADV gains for standard, unflavored milk from the DCMP were positive and significant for both store classes, with gains of 5.22 and 4.08% for supermarkets/mass merchants and convenience/drug stores, respectively. Strong volume gains in the largest dairy case category are encouraging evidence of the program’s effectiveness in moving more milk in both smaller and larger stores.

While DCMP efforts emphasized increases in space allocations for beverage products (i.e., around 4% based on planogram recommendations), average store volume impacts

were not statistically different from zero. This combined-store result was realized by decreased volume in convenience/drug stores, offset by statistically significant gains in supermarkets and mass merchants. A closer examination shows that general volume changes were higher during the eight-week in-store program and then they dropped off during the two-month evaluation period. This result may indicate that increases in volume of beverage products were better attained under the close monitoring of program implementation during the market cycle, and that a loss of program integrity and operational design occurred after in-store visits. This situation is likely due to the large number of individual beverage products cycled through store displays and increased influences by wholesale distributors and merchandisers.

Lactaid milk volume across all stores showed a relatively large percentage increase due to DCMP efforts of over 9%. DCMP volume gains in the lactaid product category were evident from both store type classes, but stronger influences were attributed to the larger stores where lactaid milk products are primarily available. While volume movement of lactaid products is relatively small,

given the more recent introduction of lactose-reduced products in the dairy case, positive volume gains from this program was a promising result.

Evaluating Effectiveness

The sales model estimates indicated that the DCMP was effective at increasing sales volume in participating program stores. To put these estimates in proper perspective, it is necessary to value the incremental volume relative to the costs of the program. Considering the estimated ADV gain for all products across all stores and assuming the volume gain is maintained over a full year implies additional annual market value to producers of approximately \$48,000. Given the total cost of the program of approximately \$122,000 (roughly \$2,000 per store), this finding implies that, assuming maintained sales enhancement, the program would pay for itself in 2.5 years. Viewed from a longer-term structural change in management perspective, this payoff timeline may be acceptable. However, the absence of immediate or short-run net gains underscores the importance of implementing a long-run management strategy, with continual

evaluation for the program to be successful.

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Wall Street vs. Main Street: What are the Benefits and Costs of Wal-Mart to Local Communities?

Elena G. Irwin and Jill Clark

JEL Classification: L81, R52, R58

“In business, there is big and there is Wal-Mart.”
--- *BusinessWeek*, October 6, 2003

So begins a recent report about the wide-ranging influence of Wal-Mart. To get a sense of just how big Wal-Mart is, consider the following:

- Wal-Mart Stores, Inc. is the world's largest retailer, with \$285.2 billion in sales in the fiscal year ending Jan. 31, 2005 (Wal-Mart, 2006).
- The company employs 1.2 million employees in the United States and 1.6 million worldwide. Wal-Mart is the largest private employer in the United States (Wal-Mart, 2006).
- Wal-Mart's estimated \$18 billion purchases from China in 2004 represent 10% of all U.S. imports from China (Lahart, 2005).
- Wal-Mart controls a large share of retail business done by almost every major U.S. consumer-products company; it accounts for 28% of Dial total sales, 24% of Del Monte Foods, 23% of Clorox, and 23% of Revlon (Bianco & Zellner, 2003).
- Wal-Mart began selling food in 1988 and in 2002 became the largest grocery chain in the United States. In 2004, U.S. grocery sales from Wal-Mart Supercenters and neighborhood markets totaled \$80 billion (Agnese, 2005).

Despite these successes or perhaps because of them, America has a love-hate relationship with Wal-Mart. The company is revered on Wall Street for its growth and business success, but often reviled on Main Street for driving out mom and pop retailers. Just what are the local benefits and costs of a Wal-Mart store opening up in a community?

A review of the recent academic research that addresses the question of the local impacts of Wal-Mart and other supercenters shows that there are clear benefits and costs associated with supercenter retail stores, and that they are unevenly distributed across employees, shoppers, other businesses and local communities. Here, we provide a summary of these recent research findings and suggest some local strategies for managing large retail development.

Local and regional shoppers. Consumers enjoy tremendous benefits from the lower prices offered by Wal-Mart and other large discount retailers. For example, prices for various food items in Wal-Mart and other “nontraditional” large discount food retailers are typically 5-48% less than prices for the same product in conventional supermarkets (Hausman & Leibtag, 2006). This generates tremendous savings to consumers in the form of both a *direct* effect from having lower priced goods available in the community, as well as an *indirect* effect generated through competition with other retailers. While only those who shop at the large discount retailers benefit directly from lower prices, all shoppers benefit from the competition effect. Basker (2005a) estimates price declines of 7-13% in the long run as the result of a Wal-Mart store opening, with the largest price declines occurring with drugstore items such as toothpaste and shampoo.

Hausman and Leibtag (2006) estimate the savings in food expenditures resulting from entry and expansion of Wal-Mart and other large discount retailers in a community. They find that the direct effect of having access to lower priced goods generates a savings of 20.2% in food

expenditures for the average household. The competition effect generates additional savings of 4.8%. Thus, the total consumer savings from these combined effects for a household with average income and food expenditures is equal to 25% of the household's total food expenditures. Not surprisingly, lower income households benefit even more from lower food prices; the estimated savings in expenditures is close to 30% for households with an annual income below \$10,000.

Shoppers face potential costs associated with supercenters as well. Service clerks are often less knowledgeable and product variety is more limited in comparison to retail specialty stores. On net, however, the substantial gains to consumers from lower prices are widespread and more than offset these costs.

Local retail workers. While it is certainly true that Wal-Mart provides individuals with employment opportunities, there is some evidence that points to the negative impact that Wal-Mart has on local labor markets. According to Wal-Mart, the average full-time employee (which includes all levels of employees) makes an hourly wage of \$10.11—an average annual salary that is roughly equal to the federal poverty line for a family of four.

The impact of lower paying Wal-Mart jobs on local retail employment depends on whether and where workers would be employed in the absence of a Wal-Mart. It is possible that Wal-Mart workers have been displaced from formerly better paying retail jobs, but also possible that they were unemployed or underemployed previously. Two recent national studies examine the effect of a Wal-Mart store entry on total retail employment at a county level. Basker

(2005b) finds that the immediate effect of Wal-Mart's entry is an increase of 100 retail jobs; after 5 years, this number is reduced to an average of 50 jobs. On the other hand, Neumark, Zhang, and Ciccarella (2006) find that Wal-Mart entry reduces retail employment at the county level by about 180 workers, which translates into each Wal-Mart worker displacing 1.5 other retail workers. The discrepancy between these results is due to different methods used to identify the causal relationship between Wal-Mart entry and county employment. Neumark, Zhang, and Ciccarella (2006) also investigate the influence of a Wal-Mart store opening on retail earnings at a county level. The results indicate that a Wal-Mart store opening leads to a decline in county-level retail earnings of about 2.8%, driven largely by the reduction in retail employment.

Increasing concern has mounted over whether Wal-Mart workers with limited benefits disproportionately rely on public assistance programs (including subsidized healthcare, housing, and food stamps). Goetz and Swaminathan (2006) consider the relationship between Wal-Mart and county poverty rates. Controlling for other factors that may influence poverty rates and for the possibility that poverty rates may influence the location of a new Wal-Mart store, they find that counties with more Wal-Mart stores in 1987 had higher rates of poverty in 1999 than counties with fewer or no Wal-Mart stores. They also find that counties in which new Wal-Mart stores were built between 1987 and 1998 experienced higher poverty rates in 1999. Specifically, the opening of a new Wal-Mart store is found to increase the average poverty rate in a county by 0.2%. In aggregate, the

authors estimate that an additional 20,000 families are in poverty as a result of Wal-Mart's presence in local communities.

Other businesses. Many objections to a new Wal-Mart store have to do with the anticipated negative effects of Wal-Mart on existing retailers. While there is some disagreement over how total retail employment in a county is affected, the impact on small retailers (with fewer than 20 employees) is clear. Basker (2005b) considers small retailers specifically and finds that five years after Wal-Mart's entry, an average of four small retailers are displaced. In contrast, the number of medium-sized retailers (with 20-99 employees) is estimated to decline only by 0.7 retailers five years afterwards. Jia (2005) estimates a statistical model of large and small retail firms' entry and exit decisions also using a national sample of U.S. counties. Wal-Mart's expansion from the late 1980s to late 1990s is found to account for 50-70% of the decline in small retailers.

Because large retailers require relatively large parcels of land, they tend to locate at the edges of a town. This can have clear negative effects on the traditional Main Street shopping district, while bringing potential benefits to complementary stores located on the fringes. However, perhaps because of their "one-stop shopping" appeal, Wal-Mart stores do not appear to have strong attraction effects. Basker (2005b) investigates the influence of a Wal-Mart store on the number of restaurant and automobile dealership jobs within a county, but finds no causal relationship.

Local jurisdiction. The opening of a Wal-Mart store can be a mixed blessing for a town. A new Wal-Mart can

stimulate total retail sales within a community by attracting customers from further away, and thus the local jurisdiction benefits through higher sales tax revenues. However, this depends on the regional distribution of Wal-Mart and other large retail stores and how much of an increase in the local market area a new Wal-Mart store is able to achieve. If large discount retailers are already present, then the local market area may not expand substantially and overall retail sales may not increase.

A study of Iowa rural towns by Stone (1997) found that total sales for the towns in which a Wal-Mart opened increased by six percent two years after the Wal-Mart opened, but after ten years, sales were four percent below the pre-Wal-Mart level. Stone concludes that this downturn probably reflects the opening of several large retail stores in proximate urban areas that, in turn, recaptured trade from the Wal-Mart towns. This dynamic reflects a broader trend of rapid growth in the number of retailers in recent years across the United States; for example, the number of general merchandise retail establishments in the United States increased by 4,000 between 1997 and 2002. Stone, Artz, and Myles (2002) conclude that in many rural areas, a "zero-sum game" frequently prevails: a new entrant (such as a new Wal-Mart store) captures its sales from existing businesses rather than from a growing market and thus there are often no net gains in sales revenues.

In addition to impacts on local tax revenues, large retail development may generate greater fiscal costs to a community than it generates in revenue, thereby being a drain on fiscal resources. For instance, in a 2002 study of the Town of Barnstable, Massachusetts, it was found that after taking into account new revenues,

the net cost to the community of a new large discount retailer was \$468/10,000 square feet (Tischler & Associates, Inc., 2002). Vehicle trip generation drives much of these costs. Depending on location and demographics, supercenters in regional shopping centers can generate up to 20,000 average daily car trips (Boarnet & Crane, 1999). Because supercenters typically locate in outer suburban and exurban areas, this can exacerbate the fiscal costs associated with traffic congestion and infrastructure strain.

Macro-level effects. Many claims have been made about Wal-Mart's positive and negative impacts on the national and even global economy. While a thorough review of research on this topic is beyond the scope of this paper, we mention two potential impacts because of their relevance to local communities. First, many have asserted that Wal-Mart's adherence to low prices and their strong bargaining position with suppliers has helped to keep down consumer price inflation. In a study of the national economy, the consulting firm Global Insight Inc. (2005) estimates that the expansion of Wal-Mart from 1985 to 2004 is associated with a 3.1% decline in overall consumer prices as measured by the Consumer Price Index.

Second, many have claimed that Wal-Mart has hastened the flight of U.S. manufacturing jobs overseas through aggressive global sourcing of inputs. Basker and Van (2005) provide evidence that the import share of apparel sales at Wal-Mart stores is substantially higher than the average apparel retailer. However, while such practices may *accelerate* manufacturing job loss at the national level, the loss of manufacturing jobs from the U.S. is a long term trend that is the

result of many global economic and political forces. Global sourcing of manufacturing began in the early 1980s and has happened irrespective of Wal-Mart's existence and growth.

Net impacts. In summary, consumers have benefited from Wal-Mart's tremendous cost efficiencies in the form of greatly reduced retail prices, which generate substantial savings to U.S. consumers annually. However, evidence also shows that Wal-Mart does not bear the full economic and social costs of its business practices. As a result, the benefits and costs are unevenly distributed across individuals. Those who are employed in non-retail sectors of the economy reap substantial benefits from lower prices and absorb some of the potential costs if tax revenues are needed to cover increased social costs. Those employed in the retail sector absorb the additional cost of lower wages, fewer benefits and a potentially shrinking employment base.

Strategies for Local Communities

Communities can attempt to fight the opening of a new Wal-Mart store, but few have been successful in keeping Wal-Mart out permanently. In cases in which a new Wal-Mart store was defeated initially, Wal-Mart has often been successful on the second try. Alternatively, they have simply chosen to locate their store in a neighboring community, a move that may have more adverse impacts on the community that fought the Wal-Mart store.

In communities without large retailers, the opportunity costs of keeping out Wal-Mart or other large discount retailers is high. Without the option of lower priced goods and the competitive pressure that these stores bring, consumers are forced to pay higher prices. On the other hand,

communities that already have several large discount retailers are unlikely to experience further reductions in consumer prices with the addition of another large discount store, but will still experience increasing infrastructure costs and may absorb additional social costs as well. In these cases, the community risks an oversupply of large retailers, which can lead to vacancies in older strip and large retail developments as newer retail outlets out-compete older ones. Thus, the net benefits of additional large discount retailers to a community that already has easy access to such stores are far less and in these cases, the costs of an additional store may easily outweigh the benefits. In light of these considerations, what can a community do? Below we discuss several local options that can improve the net benefits associated with large retail development.

Expand control over retail development.

Comprehensive plans should explicitly address large retail development by identifying locations that maximize existing infrastructure and potential attraction effects and that minimize land impacts and traffic congestion. For example, the City of Hailey, Idaho's 2000 comprehensive plan clearly specifies community goals and implementation procedures that anticipate new retail development. These goals promote the health of the existing downtown (a defined, walk-able business core) and fiscally responsible use of existing infrastructure (City of Hailey, Idaho, 2000). St. Petersburg, Florida dictates concurrencies for public services (St. Petersburg, Florida, 2005), where concurrency is defined as having the "necessary public facilities and services to maintain the adopted level of service standards that are available

when the impacts of development occur (page GID-20)."

Plans, and the tools used to implement plans such as zoning and site design, can dictate the placement of public services (water, sewer, roads) and standards can be instituted that achieve local goals for aesthetics and other development priorities. The zoning ordinance can require adherence to the comprehensive plan, cap the size of retail structures (Easton, Maryland, 2006) or require that any new development over a certain size meet minimum standards as to not adversely impact the community (Greenfield, Massachusetts, 2006). Design and site standards can be enforced that address specifics in regards to the site itself and the form of development (San Jose, California, 2006).

Educate existing retailers. Existing retailers can adopt strategies to co-exist with a large discount retail store such as Wal-Mart (Center for Applied Economic Research, Montana State University, 2002). Smaller retailers should develop strategies for staying competitive with big box competition. Pricing should be at least within 10 to 15% of larger retail stores and the emphasis should be on diversity in merchandise. Small retailers can focus on filling the "voids" in products or services that do not exist in large retail stores and provide high levels of customer service. Promotional campaigns and adequate signage could attract regional Wal-Mart customers into the other retail centers of the community.

Promote long-term local economic development strategies. In the long run, local communities are best served by using their scarce resources to promote long-term economic develop-

ment rather than to keep out large retail development. This implies understanding global economic forces and identifying strategies that take advantage of these forces to foster economic growth and the creation of higher wage jobs. A good example is Aurora, Nebraska (Federal Reserve Bank of Kansas, 2001). Community leaders in Aurora, a town of just over 4,000 people, decided to leverage their assets—local proactive leadership, dedicated community volunteers and an existing high-tech telecommunications company — to create their competitive advantage. In addition, they anticipated the potential labor needs and prior to recruitment instituted a training program for residents to work in this industry. Capitalizing on their technological infrastructure, available labor force and quality of life, Aurora officials were able to woo a couple of high-tech communications firms.

State policy options. There is a clear role for states to play in supporting local planning. The state can provide minimum, sound planning, zoning and design standards dealing with large retail developments that not only provide a good base, but also strengthen local priorities. State laws can support communities by designating large developments as conditional uses and requiring a comprehensive economic and community impact review of any new retail construction that is over a certain footprint.

In recent months some states have passed legislation that mandates a minimum level of benefits provided by large employers such as Wal-Mart.¹ The rationale for such regulation is both philosophical—that firms should pay employees a "living wage"—and practical, since employees with limited benefits may

place greater demands on states' public health care and other assistance programs. However, this conclusion depends critically on whether large retailers such as Wal-Mart are imposing an additional social burden by displacing retail jobs with better benefits vs. lessening the social burden by providing health care benefits to otherwise unemployed workers. In addition, because such legislation would increase the operating costs of large employers, it could lead to a reduction in the number of employees or an increase in consumer prices. In considering such legislation, the benefits of increased healthcare benefits to workers should be weighed against these potential costs.

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1. *The first state to legislate this is Maryland, which passed a bill in January 2006 that requires private companies with more than 10,000 employees in Maryland to spend at least 8% of their payroll on employee health benefits or make a contribution to the state's insurance program for the poor. Wal-Mart, which employs about 17,000 Maryland residents, is the only known company of such size that does not meet that spending requirement (Wagner, 2006).*

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- Elena G. Irwin (irwin.78@osu.edu) is Associate Professor and Jill Clark (clark.1099@osu.edu) is Program Manager, Department of Agricultural, Environmental, and Development Economics, The Ohio State University, Columbus, OH. A more detailed report is available online at: http://aede.osu.edu/programs/Com-RegEcon/retail.htm.*



Coming Attractions

Resources and the Environment

Invasive Species

Rachael E. Goodhue, Guest Editor, and Gregory McKee, Guest Editor

U.S. agriculture faces the invasion of foreign pest species like the med fly or, in prior times, the fire ant. Invasive species policy problems are characterized by substantial uncertainty regarding biological interactions/processes and economic relationships. Critical mistakes regarding policy choices can be made if such relationships are not properly considered. Each article in this set identifies a key lesson for invasive species-related actions and policy.

Agriculture and Trade

Livestock Future

Walter J. Armbruster, Steve Halbrook, and Mary M. Thompson, Guest Editors

Animal Agriculture in North America faces a future with opportunities and challenges. This set of papers tries to overview the current state of the industry, give a glimpse into the future, provide ideas for change and their potential consequences, inventory issues that need further research, industry actions, or government policy, propose future policy alternatives and business strategies, and analyze impacts on stakeholders identifying knowledge gaps and set forth a research and policy agenda. The papers are drawn from a broader report that provides additional detail.

We are working on future theme coverage on the Farm Program, Animal ID, Illegal Immigration, Water Quality, Returns to Research and Extension, and Produce Marketing. See our thematic coverage page for a complete list and planned schedule.

