Retail-to-Farm Transmission of Generic Advertising Effects

Michael K. Wohlgenant

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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-commodity 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 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.

For More Information

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Michael K. Wohlgenant (Michael_Wohlgenant@ncsu.edu) is William Neal Reynolds Distinguished Professor of Agricultural & Resource Economics, North Carolina State University, Raleigh, NC.