

Utah State University

DigitalCommons@USU

Economic Research Institute Study Papers

Economics and Finance

2001

Incentives to Advertise and Economic Efficiency: The Difference Between Beef and Beer

Lynn Hunnicutt
Utah State University

L. Dwight Israelsen
Utah State University

Follow this and additional works at: <https://digitalcommons.usu.edu/eri>

Recommended Citation

Hunnicutt, Lynn and Israelsen, L. Dwight, "Incentives to Advertise and Economic Efficiency: The Difference Between Beef and Beer" (2001). *Economic Research Institute Study Papers*. Paper 229.

<https://digitalcommons.usu.edu/eri/229>

This Article is brought to you for free and open access by the Economics and Finance at DigitalCommons@USU. It has been accepted for inclusion in Economic Research Institute Study Papers by an authorized administrator of DigitalCommons@USU. For more information, please contact digitalcommons@usu.edu.



Economic Research Institute Study Paper

ERI #2001-16

**INCENTIVES TO ADVERTISE AND ECONOMIC EFFICIENCY:
THE DIFFERENCE BETWEEN BEEF AND BEER**

by

LYNN HUNNICUTT

and

L. DWIGHT ISRAELSEN

**Department of Economics
Utah State University
3530 Old Main Hill
Logan, UT 84322-3530**

June 2001

**INCENTIVES TO ADVERTISE AND ECONOMIC EFFICIENCY:
THE DIFFERENCE BETWEEN BEEF AND BEER**

**Lynn Hunnicutt, Assistant Professor
L. Dwight Israelsen, Professor**

**Department of Economics
Utah State University
3530 Old Main Hill
Logan, UT 84322-3530**

The analyses and views reported in this paper are those of the author(s). They are not necessarily endorsed by the Department of Economics or by Utah State University.

Utah State University is committed to the policy that all persons shall have equal access to its programs and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

Information on other titles in this series may be obtained from: Department of Economics, Utah State University, 3530 Old Main Hill, Logan, Utah 84322-3530.

Copyright © 2001 by Lynn Hunnicutt and L. Dwight Israelsen. All rights reserved. Readers may make verbatim copies of this document for noncommercial purposes by any means, provided that this copyright notice appears on all such copies.

**INCENTIVES TO ADVERTISE AND ECONOMIC EFFICIENCY:
THE DIFFERENCE BETWEEN BEEF AND BEER**

Lynn Hunnicutt and L. Dwight Israelsen

ABSTRACT

There is some debate about whether firms advertise too much or too little. We present a simple model to examine the incentives of a firm to advertise, and distinguish between the market-expansion effect and the business-stealing effect of advertising. Firms advertise homogeneous products (beef) too little relative to the amount that would maximize total industry profits. The possibility of stealing customers from competitors causes firms in differentiated products markets (beer) to advertise too much. Finally, we derive conditions that determine when an expansion in one firm's advertising level increases rival advertising.

INCENTIVES TO ADVERTISE AND ECONOMIC EFFICIENCY: THE DIFFERENCE BETWEEN BEEF AND BEER

INTRODUCTION

There is some debate about whether consumers face too much or too little advertising. Bagwell and Ramey (1994) find that there may be too little advertising in equilibrium, if ads serve to coordinate buyers and sellers. Nelson (1974) and Milgrom and Roberts (1986) claim that since advertising itself signals product quality (irrespective of content), there may be too little advertising in equilibrium. Benham (1972) finds that advertising that is informative increases competition and reduces prices paid by consumers. On the other hand, Tremblay and Tremblay (1995) point out that there may be more advertising than is optimal, especially if advertising is costly, uninformative, or used to sell consumers things they do not need. Dixit and Norman (1978), and comments by Fisher and McGowan (1979) and Shapiro (1980), show that if advertising does not enlarge the size of the market, it reduces social welfare.

All of the above papers discuss advertising in differentiated goods industries (i.e., beer). There is a large literature on what is called generic advertising, focusing mainly on agricultural products (i.e., beef),¹ although these papers do not directly address individual producer incentives to fund generic advertising. Instead, they assume the presence of an agency with power to tax production and obtain the optimal amount of funding for generic advertising campaigns. Here, we ask whether individual producers would be willing to fund advertising, in the absence of such a taxing agency. Generally speaking, the answer turns out to be no. As we demonstrate below, since the main role of generic advertising is to expand the size of the market, additional advertising, absent a taxing authority, only the advertising firm bears the cost. This makes incentives to advertise generic products lower than optimal.

¹See, for example, Freebairn and Alston (2001), Piggott, Piggott and Wright (1995), Wohlgenant (1993), Kinnucan, Xiao and Hsia (1996), Chung and Kaiser (2000), Kaiser (1997), Kinnucan and Miao (2000), and Schmidt, Reberte and Kaiser (1997). For book-length treatments of generic advertising, see Kinnucan, Thompson and Chang (1992), and Forker and Ward (1993).

We modify a model first applied to worker decisions in collectives and communes to examine the incentives to advertise. In the model, advertising may increase demand for all products in the industry (the market-size effect), and/or reallocate demand from one firm to another (the business-stealing effect). The market-size effect represents an externality created by the advertising firm for all competitors in the industry. The business stealing effect describes the shift of demand from one competitor to another within the same industry. Because it is not present in homogeneous goods industries, generic advertising may increase the size of the market, but it will not allow one producer to take market share away from other producers of the same product.² We show that when business stealing is not possible, the competitive equilibrium level of advertising is smaller than that which would maximize industry profits. In contrast, business stealing is possible in differentiated goods industries. When firms can reallocate sales toward themselves by increasing their advertising, incentives to advertise are too strong, and the competitive equilibrium number of ads is larger than that which would maximize industry profits.

After examining the effect of a firm's own advertising, we look at the effect of competitors' advertisements. Not surprisingly, as long as generic advertising increases industry sales (the market-expansion effect), it also increases each firm's profit, whether or not they contributed toward the advertising. Thus, we have a free-rider problem, and without some sort of taxing authority, the amount of generic advertising provided will be less than that which would maximize industry profits. In a differentiated-products industry, as long as the average benefit to advertising is falling, rival advertisements reduce own profit. That is, manufacturers in differentiated-goods industries would be better off if their rivals advertised less, while those in homogeneous-goods industries would be better off if their rivals advertised more.

²Kinnucan, Xiao and Hsia (1996) consider the effect of increased beef promotion on the demand for chicken and pork. In our partial-equilibrium analysis, these effects are not identical to business stealing. Indeed, if we consider spending on all goods and assume that advertising does not increase household wealth or income, the only effect possible is the business-stealing effect.

Finally, we look at the effect of firm j 's advertising on firm i 's incentive to advertise, and find that if the business-stealing effect is not present, advertisements are strategic substitutes. Increased advertisements by firm j reduces the marginal profit from an additional ad by firm i , reducing the equilibrium level of advertising firm i wishes to do. In industries where the business-stealing effect is present, the effect is more complicated. In fact, the results may be reversed. Especially for dominant firms in concentrated industries, ads are likely to be strategic complements, so that increased advertising by rivals may increase the dominant firm's incentive to advertise. We discuss the applicability of this result to advertising for beer, and suggest that the rise of smaller brewers may have led the industry's major players (Anheuser-Bush, Coors and Miller) to increase their advertising expenditures.

THE MODEL

This model is related to that presented in Israelsen (1980), which was applied to work incentives in collectives and communes. Each firm's profit is given by $\pi_i = s_i F(A, X) - c(a_i)$, where s_i is the firm's share of industry revenue $F(\cdot)$, which depends on total industry advertising (A) and other industry inputs (X). Profits are reduced by the cost of the firm's advertising, $c(a_i)$. The firm's share of industry revenue (s_i) depends on the structure of the industry, as we will see below.

In the generic advertising case, products are homogeneous, so each firm takes its share of the market as given and its profit depends only on the number of firms in the industry. In particular, when products cannot be differentiated in consumers' minds, advertising done by any one firm does not affect its share of market revenue. These are

the “competitive” industries of economics textbooks. In this case, the firm’s profit function is

$$\pi_i^h = \frac{1}{n} F(A, X) - c(a_i).$$

For simplicity, assume that the n firms in the industry are identical, so that each of them gets an equal share of industry revenue. To ensure a finite level of advertising, we assume $F_1 > 0$, $F_{11} \leq 0$, and $c'(\cdot) > 0$, so that advertising raises revenue but at a decreasing rate. In this market, firm i ’s revenue depends on total industry advertising and the number of competitors in the industry.

A second type of industry is one in which products are differentiated, so that advertising for product i causes consumers to believe that the good is distinct. In this case, the firm’s profit function is given by

$$\pi_i^d = \frac{a_i}{A} F(A, X) - c(a_i)$$

In a differentiated-goods industry, firm i ’s revenue depends both on total industry advertising, and on its share of that total. Many consumer goods companies face revenue functions like this one. Microbrewers benefit if their own share of industry advertisements (a_i) rises, since this will cause those buying larger brewers’ brands to consider switching. Additionally, microbrewers may benefit from their own advertising if they attract new customers to the market. In fact, increased rival advertising may increase a microbrewer’s sales, since ads by competitors draw consumers to the grocery store cooler, or to the neighborhood bar, where they may end up purchasing these smaller brands.

In this industry, advertising has two effects. First, when firm i increases its share of industry advertising, it is able to attract customers that formerly went to competitors. This business stealing exists when $\frac{d}{da_i} \left(\frac{a_i}{A} \right) = \frac{1}{A} \left(1 - \frac{a_i}{A} \frac{dA}{da_i} \right)$ is positive. The second effect of advertising is the market expansion effect. This occurs when firm i 's advertising increases total industry advertising and thus attracts new consumers to the industry. All firms in the industry benefit from a positive market-expansion effect, which occurs when $dA / da_i \geq 0$. Notice that when market expansion fails, $dA / da_i \leq 0$, the business-stealing condition is guaranteed. If ads by firm i are offset by fewer industry ads, then firm i 's revenue rises only because it is stealing some of the industry's existing customers from its rivals (without increasing the number of customers purchasing in the industry). Also note that the larger firm i 's share of industry advertising, a_i / A , the smaller the response of industry ads to increases in i 's advertisements must be in order for i to steal business from its competitors. Firms that already do most of an industry's advertising have a hard time stealing business from their rivals through additional advertisements.

Notice that in homogeneous and differential industries, total profit earned in the industry is given by

$$\Pi = F(A, X) - \sum_i c(a_i).$$

At the industry optimum, $d\Pi / dA = 0$, which implies $\frac{\partial F}{\partial A} = \sum_i \frac{dc}{da_i} \frac{da_i}{dA}$. That is, the increase in industry revenue caused by an additional industry advertisement must equal the total marginal cost of ads. In the private solution, $d\pi / da_i = 0$, which might lead to over- or underinvestment in advertising.

INCENTIVES TO ADVERTISE

To determine the effect of an increase in generic advertising on firm i 's profit, we use the following first-order condition

$$\frac{d\pi_i^h}{da_i} = \frac{1}{n} \frac{\partial F}{\partial A} \frac{dA}{da_i} - \frac{dc}{da_i}.$$

Firm i maximizes its profit by setting $d\pi_i / da_i = 0$, which implies that it advertises until the marginal cost of its own advertising, dc / da_i , is equal to its share of incremental industry profit from advertising, $(1/n)(\partial F / \partial A)(dA / da_i)$.

From the industry's point of view, firm i 's ads should be set to satisfy $d\Pi / da_i = (\partial F / \partial A)(dA / da_i) - dc / da_i = 0$. Evaluating the industry's first-order condition at the privately optimal level of advertising, and assuming that competitors do not completely offset additional ads by firm i with reductions in their own advertising ($dA / da_i \geq 0$)³ we have

$$\frac{d\Pi}{da_i} = \frac{\partial F}{\partial A} - \frac{1}{n} \frac{\partial F}{\partial A} = \frac{\partial F}{\partial A} \left(1 - \frac{1}{n}\right) \geq 0.$$

So we see that industry profits could be increased if there were more generic advertising than is privately optimal. Thus, in the homogeneous-goods industry, without some sort of taxing authority empowered to force each firm to pay for advertisements, firm i advertises too little.

In the differentiated-product industry, the competitive equilibrium solves each firm's first-order condition as follows:

³This assumption guarantees that increased advertising by any firm expands the market. This is certainly true in generic advertising, as this is the only reason for firms to advertise. We believe that it is also true in most (but not all) differentiated products industries. The alternative (that increased advertising reduces the size of the market) doesn't seem reasonable for most products, since firms always have the option of reducing their advertising, and if advertising drives customers away then firms are likely to do so.

$$\frac{d\pi_i^d}{da_i} = \frac{F(A, X)}{A} \left[1 - \frac{a_i}{A} \frac{dA}{da_i} \right] + \frac{a_i dA}{A da_i} \frac{\partial F}{\partial A} - \frac{dc}{da_i}.$$

In the homogeneous- goods equilibrium, the industry benefit of the last advertisement, $\partial F / \partial A$, was n times larger than its cost. Here, the industry benefit to firm i 's last advertisement may not be n times larger than its cost for two reasons. First, $(a_i / A)(dA / da_i)$ may be larger or smaller than $1 / n$.⁴ If it is larger (that is, firm i does more than its share of industry advertising), then the industry benefit to firm i 's marginal ad may be less than n times its cost. The marginal ads of the largest firm in the industry may actually benefit the industry very little.

Second, firm i 's ads may enable it to steal customers from its rivals. If this business-stealing effect, given by $d / da_i (a_i / A) = [1 - a_i dA / A da_i] / A$ is positive, firm i steals business from its rivals when it increases its own advertising. Notice that as firm i increases its share of industry advertising (a_i / A approaches one), stealing customers from rivals becomes increasingly difficult. Industry leaders' advertisements serve mainly to expand the market, not to steal business from rivals.

As with generic advertising, we can compare the industry optimum with private firm incentives by evaluating the industry first-order condition at the competitive equilibrium level of advertisement. Assuming that the industry advertising level changes no more than firm i 's advertisements ($dA / da_i \leq 1$), we see that

$$\frac{d\Pi}{da_i} = \frac{\partial F}{\partial A} \left(1 - \frac{a_i}{A} \right) \frac{dA}{da_i} - \frac{F}{A} \left(1 - \frac{a_i}{A} \frac{dA}{da_i} \right) \leq 0.$$

⁴We will assume that $dA / da_i \geq 0$. That is, an increase in firm i 's ads does not lead to a completely offsetting reduction in ads by firm i 's competitors. This makes $(a_i / A)(dA / da_i)$ non-negative.

In differentiated-products industries, $d\Pi / da_i \leq 0$, since our assumptions about the shape of $F(A, X)$ guarantee that for large enough A , $\partial F / \partial A - F / A < 0$, and since $dA / da_i \leq 1$ implies that $(1 - a_i / A)dA / da_i \leq 1 - a_i dA / A da_i$. Given the concavity of the revenue function $F(A, X)$, firms in differentiated products industries advertise past the socially optimal level. The ability to steal business from competitors gives firms a larger incentive to advertise than is optimal for the industry as a whole. When firms can steal customers from one another, each of them advertises too much.

THE EFFECT OF RIVAL ADVERTISING ON PROFITS

To examine the effect of rival advertising on firm i 's profit, we look at how ads created by firm j affect firm i 's profit. It is straightforward to show in the competitive case that $d\pi_i^h / da_i = (1/n)(\partial F / \partial A)(dA / da_j)$, which is almost certain to be non-negative (since the marginal productivity of advertising, $\partial F / \partial A$, is non-negative, and industry advertising is not likely to fall as firm j increases its own advertising: $(dA / da_j \geq 0)$). Thus, firm i 's profit rises as generic advertising paid for by firm j increases. This tells us that no matter how much it advertises, firm i wishes its rivals to increase their own advertising. Since the only effect of generic advertising is the market expansion effect, all advertising for which it pays nothing benefits firm i . In fact, other things equal, advertising by firm j benefits firm i more than firm i 's own advertising, since the effect on revenue is the same but the cost of the advertising is borne by someone else. That is, firm j 's advertising is more than a perfect complement for firm i 's advertising, from the viewpoint of firm i .

In the differentiated-goods industry, we see both the market-expansion effect and the business-stealing effect. The derivative of interest is given by

$d\pi_i^d / da_j = (a_i dA / A da_j)(\partial F / \partial A - F / A)$, which is likely to be negative. Assuming that the average product of advertising F/A is falling, we know the second term on the right-hand side is negative. As in the homogeneous-goods industry, if advertising by firm j does not reduce total industry advertising, so that if $dA / da_j \geq 0$, then $d\pi_i^d / da_j \leq 0$. In differentiated-goods industries with extensive advertising (such that the average product of advertising is falling), the business-stealing effect outweighs the industry expansion effect. In this case, firm i wishes its rivals to reduce their advertising, as additional ads by firm j reduce i 's profit. Advertisements are substitutes, in that more advertising by firm j reduces the profit that firm i receives.

THE EFFECT OF COMPETITOR'S ADS ON INCENTIVES

Next, we examine the effect of an increase in firm j 's advertising on firm i 's marginal profit, and thus on firm i 's incentive to advertise. In the language of Bulow, Geanakoplos and Klemperer (1985), we are interested in knowing whether advertisements are strategic substitutes or complements. To examine this issue, we calculate $d^2\pi_i / da_i da_j$. If dA / da_i is constant, we see that in the homogeneous-goods industry

$$\frac{d^2\pi_i^h}{da_i da_j} = \frac{1}{n} \left[\frac{\partial^2 F}{\partial A^2} \frac{dA}{da_i} + \frac{\partial F}{\partial A} \frac{d^2 A}{da_i da_j} \right] = \frac{1}{n} \frac{\partial^2 F}{\partial A^2} \frac{dA}{da_i} \leq 0.$$

Thus, an increase in firm j 's advertising reduces the marginal profitability of firm i 's advertisements. The more advertising done by firm j , the lower the marginal benefit to advertising for all other firms. This discourages firm i from advertising, which reinforces our conclusion that there is too little advertising in a homogeneous-goods industry. In homogeneous-goods industries, since the only effect of advertising is to expand the market (benefitting all firms in the industry), an advertisement paid for by

firm j is just as effective as an advertisement firm i pays for itself, but less costly.

Advertisements are guaranteed to be strategic complements. Increased advertising by a rival reduces the marginal benefit of advertising, without changing its cost.

In differentiated-products industries, the effects are more complex, because advertising not only increases the size of the market, it also allows firms to steal business from one another.

$$\frac{d^2 \pi_i^d}{da_i da_j} = \frac{1}{A} \frac{dA}{da_i} \left\{ \frac{\partial F}{\partial A} - \frac{F}{A} \right\} \left(1 + \frac{da_i}{da_j} - \frac{2a_i}{A} \frac{dA}{da_i} \right) + \frac{a_i}{A} \left(\frac{dA}{da_i} \right)^2 \frac{\partial^2 F}{\partial A^2}$$

It is clear that when dA / da_i is zero, advertisements by rival firms are neither strategic substitutes or strategic complements. In this case, additional advertisements by firm j do not affect the marginal profitability of firm i 's ads, and thus do not change firm i 's incentive to advertise.

If $dA / da_i = 1$, we have

$$\frac{d^2 \pi_i^d}{da_i da_j} = \frac{1}{A} \left\{ \frac{\partial F}{\partial A} - \frac{F}{A} \right\} \left(1 - \frac{2a_i}{A} \right) + \frac{a_i}{A} \frac{\partial^2 F}{\partial A^2}.$$

This derivative can be either positive or negative. The first part

$(1/A)(\partial F / \partial A - F / A)$ is negative. The third part $(a_i / A)(\partial^2 F / \partial A^2)$ is also negative.

Thus, if $1 - 2a_i / A \geq 0 \Leftrightarrow a_i \leq A / 2$, we know that this cross-partial derivative is negative and ads are strategic complements. In this case, an advertisement by firm j serves to remind customers that the product exists and to reduce the marginal profitability of firm i 's advertisements. Firm i would improve its profit by advertising less and relying on the business expansion effects of firm j 's advertisements. So, if Anheuser-Busch, for example, increases its advertising, microbreweries will wish to reduce their advertising.

If $a_i > A / 2$, that is if the firm already has does more than half of the industry advertising, the cross-partial derivative may be positive, so that ads are strategic

substitutes. Thus, it is possible that when microbreweries increase their advertising level, Anheuser-Busch may also need to increase the number of ads it runs, in order to maintain its market position. More advertising by rivals increases the marginal profitability of own advertising for an industry's largest advertiser.⁵

In differentiated industries, increased advertising by firm j reduces the incentive for firm i to advertise as long as firm i is a minor contributor to total industry advertisements (a_i is less than one-half of the industry total). Only for a dominant firm would incentives to advertise increase in response to increased rival advertising.

CONCLUSION

This paper has examined the incentives of a firm to advertise in both homogeneous- and differentiated-products industries. Advertising has two effects—it may expand the market, thus increasing the welfare of all firms in the industry, and it may induce customers of one firm to purchase from a competing firm instead. This business-stealing effect is present only when products are differentiated. We show that when business stealing is not possible, individual firm incentives to advertise are too low, and fewer ads than would maximize industry profit are produced. This suggests why many agricultural industries include cooperatives and checkoff programs to purchase generic advertising designed to expand the market. In differentiated-products industries, the possibility of stealing customers from a rival increases the incentive of the firm to advertise, making the privately optimal level of advertising too large.

⁵While direct evidence of the strategic incentive to advertise is difficult to obtain (as it involves strategies that firms do not often make public), it is well known that Anheuser-Busch has close to half of the market for beer in the United States, and is also the industry's largest advertiser. In addition to increasing advertising, large brewers are moving into the specialty beer niche, buying up smaller companies but continuing to sell beer under their name.

Next, we look at the effect of an increase in firm j 's advertising level on firm i 's optimal choice of advertising. In homogeneous-goods industries, we find that an increase in firm j 's advertising level increases the profit of firm i , and reduces the marginal benefit to firm i of advertising, so that firm i advertises less. That is, generic ads are strategic substitutes. In differentiated-goods industries, an increase in firm j 's advertising level likely reduces the profit of firm i , but can either decrease or increase the marginal benefit to firm i of advertising. Hence, in differentiated-goods industries, ads may be strategic substitutes or strategic complements. For smaller firms (those that perform less than half of industry advertising), the market expansion effect dominates, and advertisements are strategic substitutes. Only for the largest advertisers in a differentiated industry is it possible that the business-stealing effect dominates, which makes ads strategic complements.

This paper does not make claims regarding socially optimal levels of advertising, because we have not considered consumer welfare. In both types of industries, the privately optimal level of advertising is not likely to maximize social welfare, as it does not even maximize industry-wide profits. Further results are difficult to obtain without examining the effects of advertisements on consumer utility.

Extensions of this work include looking at the effect of increased industry advertisements on individual firm incentives to advertise. Especially in homogeneous goods industries, where private advertisements need to be supplemented by industry group advertising levels, it would be useful to characterize the effects of a rise in A on the optimal level of a_i . It would also be useful to examine the effect of mergers on incentives to advertise. When two firms merge, their share of industry advertising will (at least

initially) rise. Depending on what one assumes about how final shares adjust, one may see larger or smaller incentives to advertise, which may increase or reduce social welfare.

REFERENCES

- Bagwell, K., and Ramey, G. (1994). Coordination economies, advertising, and search behavior in retail markets. *American Economic Review*, 84, 498-517.
- Benham, L. (1972). The effect of advertising on the price of eyeglasses. *Journal of Law and Economics*, 15, 337-352.
- Bulow, J.I., Geanakoplos J.D. and Klemperer, P.D. (1985) Multimarket Oligopoly: Strategic Substitutes and Complements. *Journal of Political Economy* 93(3), 488-511
- Chang, H. and Green, R. (1989) The Effects of Advertising on Food Demand Elasticities. *Canadian Journal of Agricultural Economics* 37, 481-494
- Chung, C. and Kaiser H.M. (2000). Do Farmers Get an Equal Bang for Their Buck from Generic Advertising Programs? A Theoretical and Empirical Analysis. *Journal of Agricultural and Resource Economics* 25(1), 147-158
- Dixit, A., and Norman, V. (1978). Advertising and welfare. *Bell Journal of Economics*, 1-17.
- Fisher, F. M., and McGowan, J. J. (1979). Advertising and welfare: Comment. *Bell Journal of Economics*, 726-727.
- Forker, O.D. and Ward, R.W. (1993). Commodity Advertising: The Economics and Measurement of Generic Programs. Lexington Books, New York, NY.
- Freebairn, J.W. and Alston, J.M. (2001). Generic advertising without supply control: implications of funding mechanisms for advertising intensities in competitive industries. *Australian Journal of Agricultural and Resource Economics* 45(1), 117-145.
- Israelsen, L. D. (1980). Collectives, communes, and incentives. *Journal of Comparative Economics*, 4, 99-124.
- Kaiser, H.M. (1997). Impact of National Generic Dairy Advertising on Dairy Markets, 1984-95. *Journal of Agricultural and Applied Economics* 29, 303-313.
- Kinnukan, H.W., Thompson, S.R. and Chang, H.S., eds. (1992). Commodity Advertising and Promotion. Iowa State University Press, Ames, IA.

- Kinnucan, H.W., Xiao, H. and Hsia, C.J. (1996). Welfare implications of increased US beef promotion. *Applied Economics* 28, 1235-1243.
- Kinnucan, H.W. and Miao, Y. (2000). Distributional Impacts of Generic Advertising on Related Commodity Markets. *American Journal of Agricultural Economics* 82, 672-678.
- Milgrom, P., and Roberts, J. (1986). Price and advertising signals of product quality. *Journal of Political Economy*, 94, 796-821.
- Nelson, P. (1974). Advertising as information. *Journal of Political Economy*, 82, 729-754.
- Piggott, R., Piggott N.E. and Wright, V.E. (1995). Incremental Advertising Expenditure: Methods and an Application to the Australian Meat Industry. *American Journal of Agricultural Economics* 77, 497-511
- Schmit, T.M., Reberte, J.C. And Kaiser H.M. (1997). An Economic Analysis of Generic Egg Advertising in California (1985-1995). *Agribusiness* 13(4), 365-373
- Shapiro, C. (1980). Advertising and welfare: Comment. *Bell Journal of Economics*, 749-752.
- Tremblay, C. H., and Tremblay, V. J. (1995). Advertising, price, and welfare: Evidence from the U.S. brewing industry. *Southern Economic Journal*, 62, 367-381.
- Ward, R.W. (1975). Revisiting the Dorfman-Steiner Static Advertising Theorem: An Application to the Processed Grapefruit Industry. *American Journal of Agricultural Economics* 57, 500-504.
- Wohlgenant, M.K. (1993). Distribution of Gains from Research and Promotion in Multi-State Production Systems: The Case of the U.S. Beef and Pork Industries. *American Journal of Agricultural Economics* 75, 642-651

Incentives to Advertise and Economic Efficiency: The Difference Between Beef and Beer

Lynn Hunnicutt
Department of Economics
Utah State University
Logan, UT 84322-3530
e-mail: hunnicut@econ.usu.edu
Phone: 435-797-2317

L. Dwight Israelsen
Department of Economics
Utah State University
Logan, UT 84322-3530
e-mail: disraelsen@econ.usu.edu
Phone: 435-797-2298

ABSTRACT

There is some debate about whether firms advertise too much or too little. We present a simple model to examine the incentives of a firm to advertise, and distinguish between the market-expansion effect and the business-stealing effect of advertising. Firms advertise homogeneous products (beef) too little relative to the amount that would maximize total industry profits. The possibility of stealing customers from competitors causes firms in differentiated products markets (beer) to advertise too much. Finally, we derive conditions that determine when an expansion in one firm's advertising level increases rival advertising.

ERI
#10

INTRODUCTION

There is some debate about whether consumers face too much or too little advertising. Bagwell and Ramey (1994) find that there may be too little advertising in equilibrium, if ads serve to coordinate buyers and sellers. Nelson (1974) and Milgrom and Roberts (1986) claim that since advertising itself signals product quality (irrespective of content), there may be too little advertising in equilibrium. Benham (1972) finds that advertising that is informative increases competition and reduces prices paid by consumers. On the other hand, Tremblay and Tremblay (1995) point out that there may be more advertising than is optimal, especially if advertising is costly, uninformative, or used to sell consumers things they do not need. Dixit and Norman (1978), and comments

by Fisher and McGowan (1979) and Shapiro (1980), show that if advertising does not enlarge the size of the market, it reduces social welfare.

All of the above papers discuss advertising in differentiated goods industries (i.e. beer). There is a large literature on what is called generic advertising, focusing mainly on agricultural products (i.e. beef),¹ although these papers do not directly address individual producer incentives to fund generic advertising. Instead, they assume the presence of an agency with power to tax production and obtain the optimal amount of funding for generic advertising campaigns. Here, we ask whether individual producers would be willing to fund advertising, in the absence of such a taxing agency. Generally speaking, the answer turns out to be no. As we demonstrate below, since the main role of generic advertising is to expand the size of the market, additional advertising benefits all producers. Although everyone benefits from such advertising, absent a taxing authority, only the advertising firm bears the cost. This makes incentives to advertise generic products lower than optimal.

We modify a model first applied to worker decisions in collectives and communes to examine the incentives to advertise. In the model, advertising may increase demand for all products in the industry (the market-size effect), and/or reallocate demand from one firm to another (the business-stealing effect). The market-size effect represents an externality created by the advertising firm for all competitors in the industry. The business stealing effect describes the shift of demand from one competitor

¹See, for example, Freebairn and Alston (2001), Piggott, Piggott and Wright (1995), Wohlgenant (1993), Kinnucan, Xiao and Hsia (1996), Chung and Kaiser (2000), Kaiser (1997), Kinnucan and Miao (2000), and Schmidt, Rebete and Kaiser (1997). For book-length treatments of generic advertising, see Kinnucan, Thompson and Chang (1992), and Forker and Ward (1993).

to another within the same industry. Because it is not present in homogeneous goods industries, generic advertising may increase the size of the market, but it will not allow one producer to take market share away from other producers of the same product.² We show that when business stealing is not possible, the competitive equilibrium level of advertising is smaller than that which would maximize industry profits. In contrast, business stealing is possible in differentiated goods industries. When firms can reallocate sales toward themselves by increasing their advertising, incentives to advertise are too strong, and the competitive equilibrium number of ads is larger than that which would maximize industry profits.

After examining the effect of a firm's own advertising, we look at the effect of competitors' advertisements. Not surprisingly, as long as generic advertising increases industry sales (the market-expansion effect), it also increases each firm's profit, whether or not they contributed toward the advertising. Thus, we have a free-rider problem, and without some sort of taxing authority, the amount of generic advertising provided will be less than that which would maximize industry profits. In a differentiated-products industry, as long as the average benefit to advertising is falling, rival advertisements reduce own profit. That is, manufacturers in differentiated-goods industries would be better off if their rivals advertised less, while those in homogeneous-goods industries would be better off if their rivals advertised more.

²Kinnucan, Xiao and Hsia (1996) consider the effect of increased beef promotion on the demand for chicken and pork. In our partial-equilibrium analysis, these effects are not identical to business stealing. Indeed, if we consider spending on all goods and assume that advertising does not increase household wealth or income, the only effect possible is the business-stealing effect.