11-2010

Shipping the Runners to the Race: A Sport Tourism Interpretation of the Alchian-Allen Theorem

Steven Cobb
Xavier University - Cincinnati

Douglas J. Olberding
Xavier University - Cincinnati

International Journal of Sport Finance, 2010, **5**, 268-279, © 2010 West Virginia University

Shipping the Runners to the Race: A Sport Tourism Interpretation of the Alchian-Allen Theorem

Steven Cobb and Douglas J. Olberding

Xavier University

Steven Cobb is an associate professor in the Department of Economics. His research interests include economic impact analysis and the valuation of local public goods.

Douglas J. Olberding is an associate professor and chair of the Department of Sport Studies. His research interests include examining strategic management in sport organizations.

Abstract

This paper provides empirical support for the Alchian and Allen "shipping the good apples out" hypothesis. The hypothesis version tested here involves estimating the effect of travel cost on the quality of a weekend trip to Cincinnati, where travel cost is measured by time spent in travel and visit quality is measured by the amount of discretionary spending associated with the trip. Using linear regression analysis on data from race participants in the 2008 Flying Pig marathon and half marathon races, strong and robust evidence is found to support the validity of this hypothesis. Specifically, travel distance does indeed have a statistically significant positive but diminishing (with distance traveled) impact on discretionary spending for both marathon and half-marathon participants. The results provide support for this proposition, a variant of the "shipping the good apples out" hypothesis, and add empirical support to the diverse but relatively limited literature on this subject.

Keywords: Alchian-Allen, sport tourism, marathons, economic impact

Introduction

As any student who has taken a microeconomics principles course well knows, the "law" of demand states that there is an inverse relationship between the price of a good and the quantity demanded. This empirical fact derives from the income and substitution effects that are created when a product price changes *ceteris paribus*. A special case of this phenomenon occurs when a product available in varying qualities experiences a change in the *relative* prices of these quality levels because of a change in the cost of one of the quality components. One way that such changes in relative prices for quality alternatives can occur is when the cost of a component common to all qualities changes, and that component's cost share across quality alternatives varies. Such a situation might be expected to occur, for example, when the cost of shipping products increases for all product quality variants and those costs are them-

selves independent of product quality. In this instance, a substitution response is likely to occur among the quality options.

This paper examines this phenomenon in the context of travel cost effects on the quality of a marathon experience purchased when the primary travel cost component is the time spent to reach the race destination. More specifically, it tests the proposition that people who travel further to reach their marathon destination are likely to purchase a higher quality marathon experience at that destination because the higher travel costs have reduced the cost of such a purchase relative to that of a lower quality experience. If the quality of the marathon experience depends upon the level of discretionary spending at the destination site, it follows that the level of discretionary spending varies directly with distance traveled. In essence, the substitution effect is at work here; the further one travels to reach the marathon destination, the more attractive a high quality experience becomes relative to lower quality alternatives.

The experience analyzed in this research is that associated with participation in the Cincinnati Flying Pig Marathon event. More specifically this paper examines the impact of travel distance, controlling for travel cost related income effects and other variables likely to impact discretionary spending levels, on the amount of such spending done by marathon race participants while visiting Cincinnati, Ohio. The paper begins with a review of the literature on the "shipping the good apples out" hypothesis, including the empirical studies which test the strength of this effect for a variety of goods. The literature review is followed by sections containing a detailed description of the data and methodology used for the empirical tests, and a summary of the results of those tests.

Literature Review

In their classic textbook, *University Economics* (1964), Armen Alchian and William Allen describe a phenomenon that has come to be known as the "shipping the good apples out" hypothesis. As originally stated, apple growers are predicted to ship their higher quality apples to nonlocal markets. The idea underlying this hypothesis, as it pertains to apples, is quite simple; good apples command a higher price than "bad" apples, yet their shipping costs are the same. As a result, the difference in relative prices of good versus bad shipped apples is smaller than for good versus bad non-shipped apples sold in local markets. Economic theory predicts that the market share of good apples to bad apples should be higher in markets where they are shipped than in markets where they are grown, a direct consequence of the substitution effect induced by the normal curvature of consumer indifference curves. Of course if the shipping costs are very high, income effects may complicate the size of the consumer demand response to the change in relative apple quality prices in shipped markets. But absent significant income effects, this phenomenon predicts stronger relative demand for higher quality apples in markets where shipping costs are added into the market prices.

The empirical implications of this "third law of demand," as it was labeled by Bertonazzi, Maloney, and McCormick (1993), have been examined in both theoretical and empirical papers beginning with a paper by Gould and Segall (1968). In their paper, the authors question whether the Alchian-Allen hypothesis must be true in a world where alternatives to both apple quality alternatives exist, i.e. when one gener-

alizes the analysis to an *n*-good world. Their concern is based on the possibility that any substitution behavior across apple qualities might be dominated by a substitution response toward a non-apple substitute. Borcherding and Silberberg (1978) counter that as long as the different quality alternatives are "close" substitutes, the Alchian-Allen prediction will still hold because the direct substitution effect between the two close substitutes dominates any substitution response with an outside alternative. However, Bauman (2004) argues that the Alchian-Allen prediction holds in an *n*-good world even when the quality alternatives are not close substitutes because the addition of a fixed shipping charge to the prices of shipped apples changes the price of the lower quality apples by a greater percentage than it does for the higher quality apples, and therefore causes a greater substitution away from lower quality apples.

Borcherding and Silberberg (1978) also propose that the Alchian-Allen hypothesis might be true when consumers are "shipped to the apples" rather than the other way around. This application would apply, for example, when tourists who pay the same travel cost to a destination regardless of the quality of their experience once they reach there, opt to spend more on the higher quality stay because the overall cost of such a trip relative to that of a lower quality stay is reduced when such travel costs are included. Bertonazzi et al. (1993) raise the possibility that travel cost may be considered "sunk cost" and therefore not factored into the overall relative cost calculation of alternative quality trip options. If this were the case, such travel cost effects that would not change the relative trip costs as viewed by travelers in the decision on what quality trip to take. However, Cowen, and Tabarrok (1995) argue that this concern is a "red herring" because travelers are more likely to take all costs including travel costs into account when deciding the quality of trip to undertake. Bauman (2004) agrees, arguing that his analysis in support of the Alchian-Allen hypothesis, even in an *n*-good world, applies regardless of whether the apples are shipped to the consumer or the traveler is shipped to the destination location.

Given the fact that the strength of the Alchian-Allen hypothesis on actual substitution behavior would appear to depend upon the relative strengths of both income and substitution effects regardless of the number of alternatives to the varying quality options or whether apples are shipped to consumers or the other way around, a number of papers have examined this issue empirically. Since Gould and Segall (1968) first questioned the validity of the Alchian-Allen hypothesis in a generalized *n*-good setting, published research has examined such disparate subjects as the effect of tobacco taxes on cigarette quality purchases (Sobel & Garrett, 1997), the effect of gasoline taxes on gasoline grade purchases (Lawson & Raymer, 2006), the effect of two part tuition pricing (in-state versus out-of-state) on student credit hour per semester choices (Staten & Umbeck, 1978), the effect of per unit freight charges on import quality combinations (Hummels & Skiba, 2004), the effect of travel distance on the quality of college football season ticket package purchases (Bertonazzi et al., 1993), and most recently the effect of distance traveled by golfers to reach golf courses in Ohio on total trip spending as well as the amounts spent on greens fees and other golf-related activities (Brown, Rascher, McEvoy, & Nagel, 2006). These empirical efforts generally support the Alchian-Allen hypothesis with varying degrees of success. But as Bertonazzi et al. (1993) state, the ultimate test of the validity of this hypothesis as it pertains to tourist purchases lies in empirical analysis because the "empirical validity of the

Alchian and Allen theorem rests primarily on a large volume of anecdotes and *ad hoc* evidence" (p. 386).

The research presented here provides additional empirical evidence on the strength of this effect when the buyers are shipped to the goods, and does so by focusing on the effect that travel costs have on the destination quality in the "classical" tourist expenditure framework. In this paper, the tourists are all participants in either the marathon or half-marathon races associated with the 2008 Cincinnati Flying Pig Marathon event. Therefore the "good" being purchased is a stay in the Cincinnati area while participating in these races, and the quality level of that good varies directly with the amount of their discretionary spending associated with that stay. Of the empirical papers cited above, this work aligns most closely with the paper by Brown et al. (2006) in using micro data and focusing specifically on the impact of distance traveled on tourist spending.

Data and Methodology

The Cincinnati Flying Pig Marathon event is held each spring in downtown Cincinnati and is now in its 11th year. It has grown steadily since its inception, reaching a total of nearly 24,000 race participants in 2009. In 2008, the year of the races used to analyze the Alchian-Allen hypothesis for this paper, the number of marathon and half-marathon race participants were 5,611 and 8,230 respectively. A random sample of runners from each race was surveyed using an on-line survey instrument originally designed to estimate the economic impact of the Flying Pig races on the greater Cincinnati area economy.[1] The data collected using this survey instrument can also be used to test the Alchian-Allen hypothesis once certain restrictions, described below, are imposed on the participant sample. Therefore this instrument, with minor modifications, was also used for the research here, with sample sizes of 261 marathon and 160 half-marathon participants before any of these restrictions were imposed.

The survey was designed to collect information from race participants on their spending amounts for various categories of goods and services in the Cincinnati area. It also asked them, among other things, for their income range category, home zip code, gender, prior race experience in the Pig, and whether any family members accompanied them on their visit to Cincinnati. While the spending categories were constructed to fit an input-output model that allows for economic impact analysis, the levels of spending in most of these categories are discretionary and therefore reflect the quality of stay in Cincinnati. Under the Alchian-Allen hypothesis, this quality of stay variable should be directly related to travel costs, which in turn are directly related to distance traveled to Cincinnati. In this analysis, the level of "discretionary spending" while staying in Cincinnati consists of total spending on hotels, restaurants, bars, entertainment, and at the race Expo "store." Nearly all out-of-town participants spent at least one night in the area because the races began early enough Sunday morning that it was difficult to participate without a Saturday night stay. Although this means that such spending may not be purely discretionary, the level of participant spending will vary with the quality of the hotels and restaurants where such spending occurred, as well as the number of nights spent in Cincinnati. Many race participants spent more than one night in the area, and prior race information suggested that race participants staying more than one night tended to do so before rather than after the race. This

phenomenon supports the presumption that variation in spending on these activities reflects choice rather than necessity.

Of the 421 race participants in the sample, 95 respondents reported that they did not pay for accommodations in the Cincinnati area. Some may have been close enough to arrive by the start time, while others may have stayed with family or friends. To ensure sample homogeneity, those participants were dropped from the analysis. In addition, participants who flew to the area were dropped from the analysis because the Alchian-Allen hypothesis technically applies to situations where the income effects created by shipping costs are not strong enough to overcome the substitution effects created by the change in relative quality costs. Dropping those who traveled by air minimizes the possibility that such effects might be dominant.[2] This adjustment reduced the sample by an additional 32 participants but increases confidence that those remaining in the sample both drove to Cincinnati and paid to stay in the area. Travel costs under these restrictions consist of gasoline expenditures and more importantly, the time spent traveling. However, these costs are unlikely to create income effects strong enough to confound the estimates of the substitution effect generated by travel cost variation. And given that these costs are independent of the "quality" of stay, race participants face a lower "price" for a high quality stay relative to a lower quality stay when they travel further to get to the Cincinnati area.

In addition to the effect that relative "prices" have on the amount of discretionary spending by race participants while in Cincinnati, it is also likely that the amount of such spending depends on the size of the family group accompanying the race participant, the income level of the participant's household, whether the race participant had prior race experience in Cincinnati, the race type involved, and the participant's gender. As noted earlier, the survey did not collect actual household income information; instead, race participants were asked to choose from preselected ranges of total household income. Roughly 50% of the sample, 212 respondents, either skipped this question or chose not to answer it, and so they were excluded from the analysis. While dropping sample participants for a non-response to the income question might create a non-response bias if the non-respondents varied systematically from those remaining in our sample, our examination of the spending and distance traveled distributions for that group suggested that they were not different than those that did respond.[3] The survey also asked respondents about the number of adults and/or children under 18 years of age that traveled with them to the Cincinnati area. Any sample participants

Table 1: Sample Size Modifications

Sample Data	Marathon	Half-Marathon
Initial sample size	261	185
Number that either rented a car or spent at least $50 on public transportation	25	7
Number that spent nothing on accommodations	46	49
Number that failed to report income category	121	91
Final sample size (*n*)	92	53

Table 2. Sample Variable Chacteristics

Variables	Marathon	Half-Marathon
Mean discretionary spending (EXPEND)	$495	$387
Mean distance traveled (DISTANCE)	339 miles	241 miles
Percent income between $60,000 and $100,000 (INCOME1)	35%	34%
Percent income above $100,000 (INCOME2)	48%	49%
Percent accompanied by family members (FAMILY)	47%	34%
Percent male (GENDER)	49%	32%
Percent with prior Pig experience (PRIOR)	27%	28%

accompanied by either one adult or at least one child under 18 years of age was assumed to be traveling with family. The rest of the sample was assumed to be traveling alone.

After all of these adjustments, the final sample size totaled 145 race participants. This total consisted of 92 marathon and 53 half-marathon participants. The impacts of these restrictions on the sample are shown in Table 1; to the extent that the numbers do not "add up," it was because some were removed from the sample for more than one reason.

With these restrictions imposed, there is strong evidence to suggest that all participants used in testing the Alchian-Allen hypothesis drove to Cincinnati, paid for their accommodations while in the area, and were therefore representative of the race participants generally who spent money on at least one night's accommodations while in the Cincinnati area for the race. And given the fact that participants who spent more than one night almost certainly did so by spending the extra nights before rather than after the race, we believe that the pattern of spending may be reasonably assumed to be discretionary once income and family effects are accounted for. Consequently if the Alchian-Allen hypothesis is correct, such spending should increase as distance traveled increases, but at a decreasing rate given the convexity of the standard consumer indifference map.

To test the Achian-Allen hypothesis, the quality variable (discretionary spending) was regressed on distance traveled (scaled in units of 100 miles), the square of distance traveled, dummy variables for the income category of each race participant, whether the participant traveled alone or with family, gender, and prior Pig race experience. Because the sample sizes are relatively small, the income categories were consolidated into the following groups: income below $60,000, income between $60,000 and $100,000, and income above $100,000. The sample participant information for each of the two races is shown in Table 2. This table suggests that although the sample income distribution and prior race experience looks similar in both races, marathon participants tended to travel further, spend more, be male, and have traveled to Cincinnati with family members than half-marathon participants.

When the relationship between spending and the explanatory variables is specified in linear form, the impact of a change in the level of each explanatory variable is independent of the level of spending. However, it is more likely that such effects vary directly with the level of spending, and therefore an alternative specification of the relationship is needed to allow this to happen. Accordingly, a semi-log specification is more appropriate for this regression analysis because under this specification, the coefficient for each explanatory variable tells the impact from a change in that variable on discretionary spending, but in percentage terms. Regressions using both the linear and semi-log specifications yielded comparable test results but given that the semi-log specification seems preferable on theoretical grounds, only the results from that specification are presented here. Each semi-log regression equation takes the following form:

$$\ln(\text{EXPEND}) = B_0 + B_1(\text{DISTANCE}) + B_2(\text{DISTANCESQ}) + B_3(\text{INCOME1}) + B_4(\text{INCOME2}) + B_5(\text{FAMILY}) + B_6(\text{GENDER}) + B_7(\text{PRIOR}) + e$$

Variable List

Name	Description
EXPEND	Total race participant expenditure for hotels, food and drink, entertainment, and at the race exposition.
DISTANCE	Distance from home zip code to Cincinnati in 100-mile increments.
DISTANCESQ	Distance squared.
INCOME1	Dummy variable equaling 1 if income is between $60,000 and $100,000; 0 otherwise.
INCOME2	Dummy variable equaling 1 if income exceeds $100,000; 0 otherwise
FAMILY	Dummy variable equaling 1 if participant is accompanied by family members; 0 otherwise.
GENDER	Dummy variable equaling 1 if gender is male; 0 otherwise.
PRIOR	Dummy variable equaling 1 if prior Pig race experience; 0 otherwise.

Empirical Analysis

Intuition and economic theory suggest positive coefficients for both income dummy variables (assuming that race experience quality is a normal good), and the family dummy variable to the extent that spending might be expected to increase with the size of the family group in attendance. However, the coefficient on the prior race experience dummy variable should be negative if participants coming back to Cincinnati feel less need to make the visit a "high quality" experience. Most importantly, if the Alchian-Allen hypothesis is supported by the data, the coefficient on the distance traveled variable should be positive. And a small but negative coefficient for the variable measuring the square of distance traveled would mean that this positive "distance

Table 3. Marathon and Half-Marathon Regression Results

Variable	Marathon		Half-Marathon	
	B	t	B	t
Constant	5.572***	26.90	4.741***	23.68
DISTANCE	0.096**	2.34	0.173**	2.56
DISTANCESQ	-0.003	1.64	-0.006	1.61
INCOME1	-0.098	0.48	0.420*	1.91
INCOME2	0.155	0.79	0.620***	3.09
FAMILY	0.173	1.22	0.216	1.40
GENDER	-0.126	0.89	0.214	1.36
PRIOR	-0.155	0.96	0.277	1.61
R-square	0.162		0.496	
F-value	2.325**		6.336***	

*** = significance at the 1% level, ** = 5%, * = 10%

effect" diminishes with distance. This too seems consistent with economic theory. Table 3 shows the regression results when separate regressions are run for each race. Notice that while many of the variable coefficient estimates are not statistically significant, they are collectively significant and all have the expected signs.

In the marathon regression, the only statistically significant variable coefficient estimates are on the two distance variables. These coefficients suggest, as theory predicts, that distance has a positive but diminishing impact on spending. At the mean distance level of 339 miles traveled for marathon participants, a 100-mile increase in distance traveled increases discretionary spending by 8.6%. With a mean spending level of $495, this translates into a change in discretionary spending of about $43. This positive impact on spending diminishes with distance traveled, however, with each 100-mile increment reducing the percentage effect by 0.6%.[4] The regression coefficients suggest that spending for marathon runners is not significantly affected by income, gender, prior race experience, or by the size of the family group traveling with the race participant.

In the half-marathon, the coefficients on both the distance and income variables are statistically significant. And the distance effects on spending for the half-marathon race participants are nearly twice as large. For runners traveling the mean distance of 241 miles, an increase in distance traveled of 100 miles results in a 15.9% increase in spending. Like the marathon race, this effect on spending falls with distance with each 100-mile increase in distance traveled, reducing the distance effect on spending by 1.2%. The explanatory power of the half-marathon regression, as measured by the R-square statistic, is much higher than for the marathon due perhaps to the smaller number of degrees of freedom in that regression.

Table 4. Pooled Regression Results

Variable	Marathon & Half-Marathon w/RACEDUMMY		Marathon & Half-Marathon w/o RACEDUMMY	
NAME	B	t	B	t
Constant	5.116***	33.01	5.198***	35.55
DISTANCE	0.131***	4.12	0.137***	4.30
DISTANCE SQ	-0.004***	2.85	-0.004***	3.09
INCOME1	0.113	0.75	0.104	0.70
INCOME2	0.331**	2.31	0.319**	2.22
FAMILY	0.180*	1.72	0.199*	1.90
RACEDUMMY (mara.=1)	0.165	1.55		
GENDER	0.005	0.05	0.031	0.29
PRIOR	-0.218*	1.86	-0.223*	1.89
R-square	0.264		0.251	
F-value	6.10***		6.56***	

*** = significance at the 1% level, ** = 5%, * = 10%

To determine if it is appropriate to pool the two groups of race participants, regressions were run for both the separate and pooled samples. A residual sum of squares test showed that the hypothesis that the coefficients in the two separate regressions are statistically identical could not be rejected.[5] Therefore, only the pooled regression results, both with and without a dummy variable for race type run, are presented here. These are shown in Table 4.

While the explanatory power of the regression is slightly higher when the race dummy is included, the coefficient on that variable is not statistically significant. Therefore, the difference in spending levels observed across the two race samples is largely attributable to differences in distance traveled and family group size, given that the income distributions across the two groups are comparable and that there are no statistically significant race effects either in the race dummy or the individual coefficient estimates. In both pooled regressions, the estimated coefficients on income, distance, family group size, and prior race experience are all statistically significant, with the distance and income variables being significant at higher threshold values. However, the results also suggest that race participants with income levels below $60,000 and those with income levels between $60,000 and $100,000 are not statistically different from each other so that income effects on spending appear to occur only at higher income levels. At 300 miles, the approximate average distance traveled by the pooled race participants, the impact on spending of an increase in distance traveled of 100 miles is roughly 11%. This impact on spending falls by 0.8% with each 100-mile

increase in distance traveled. The R-square statistic suggests that the regressions explain about 25% of the variation in discretionary spending, and the equation F-values strongly reject the hypothesis that all regression coefficients are zero.

The regression results in this research appear to demonstrate the importance of distance traveled on the quality of stay in Cincinnati as measured by the level of discretionary spending, and these results are robust across both kinds of races and regardless of the functional form used. However, because the income variables are generally not statistically significant in many of the regressions, it is possible that a multicollinearity problem exists between income and distance traveled. If this were the case, the coefficients on both income and distance traveled are not reliable. To test for this, distance traveled was regressed on the income dummy variables. This test showed no statistically significant relationship between income and distance traveled,[6] and therefore we conclude that the distance coefficients are reliable.

Conclusions

This paper provides more empirical support for the so-called "shipping the good apples out" hypothesis first advanced by Alchian and Allen (1964) in their classic economics textbook. This analysis examines the hypothesis in the context of "shipping consumers to the apples," rather than the other way around, by analyzing the extent that travel distance to Cincinnati affects the quality of the trip by both Flying Pig marathon and half-marathon participants. To minimize potential income effects created by the cost of travel, the sample of race participants used in this study included only those who drove to Cincinnati. With this restriction in place, the major cost component associated with travel distance is time spent in travel. Because this cost is non-monetary, the problem that income effects create for estimating the strength of pure substitution effects is therefore avoided. The distance impact on spending was allowed to vary with both distance and spending levels by including the square of distance in our regressions, and by using a semi-log specification. While the regressions for both the marathon and half-marathon races show strong and consistent distance effects in both regressions, these effects do not vary between races. More importantly, the results suggest that distance trumps all other variables in explaining discretionary spending variation, and that these distance effects are indeed positive but diminishing in impact. Hence, we are comfortable in concluding that the results support the findings in prior empirical studies of this hypothesis. We therefore conclude that our application of the Alchian-Allen hypothesis in a "pure" tourist destination quality choice decision provides both strong and robust evidence that this conjecture holds even when the consumers are shipped to the apples rather than the other way around. If the validity of this hypothesis "rests primarily on a large volume of anecdotes and *ad hoc* evidence," as stated in the paper by Bertonazzi et al., (1993, p. 386) this research provides such evidence.

References

Alchian, A., & Allen, W. (1964). *University economics.* Belmont, CA: Wadsworth Publishing Company.

Bauman, Y. (2004). Shipping the good apples out: A new perspective. *Economic Inquiry, 42*(4), 534-536.

Bertonazzi, E., Maloney, M., & McCormick, R. (1993). Some evidence on the Alchian and Allen theorem: The third law of demand. *Economic Inquiry*, *31*(3), 383-393.

Borcherding, T., & Silberberg, E. (1978). Shipping the good apples out: The Alchian and Allen theorem reconsidered. *Journal of Political Economy*, *86*(1), 131-138.

Brown, M., Rascher, D., McEvoy, C., & Nagel, M. (2006). Treatment of travel expenses by golf course patrons: Sunk or bundled costs and the first and third laws of demand. *International Journal of Sport Finance*, *2*(1), 239-252.

Cobb, S., & Olberding, D. (2007). The importance of import substitution in marathon economic impact analysis. *International Journal of Sport Finance, 2*(2), 108-118.

Cowen, T., & Tabbarok, A. (1995). Good grapes and bad lobsters: Applying the Alchian and Allen theorem. *Economic Inquiry, 33*(2), 253-256.

Gould, J., & Segall, J. (1968). The substitution effects of transportation costs. *Journal of Political Economy, 76*(1), 130-137.

Hummels, D., & Skiba, A. (2004). Shipping the good apples out? An empirical confirmation of the Alchian-Allen conjecture. *Journal of Political Economy 112*(6), 1384-1402.

Lawson, R., & Raymer, L. (2006). Testing the Alchian-Allen theorem: A study of consumer behavior in the gasoline market. *Economics Bulletin*, *4*(35), 1-6.

Olberding, D., & Cobb, S. (2007). On-line and telephone surveys: The impact of survey mode on spending estimates by participants in a major urban marathon. *ICHPERD-SD Journal of Research, 2*(1), 27-32.

Sobel, R., & Garrett, T., (1997) Taxation and product quality: New evidence from generic cigarettes. *Journal of Political Economy, 105*(4), 880-887.

Staten, M., & Umbeck, J. (1989). Shipping the good students out: The effect of a fixed charge on student enrollments. *The Journal of Economic Education*, *20*(2), 165-171.

Endnotes

[1] See Cobb and Olberding (2007) for the economic impact estimates for the 2006 Flying Pig Marathon. See Olberding and Cobb (2007) for tests on the reliability of using on-line survey methodology in economic impact analysis.

[2] Since actual travel mode information was not collected in the survey, anyone renting a car or spending more than $50 on public transportation was assumed to have flown to Cincinnati.

[3] Tests on the mean and variance for both the spending and distance traveled variables showed no significant differences between those answering the income question and those who did not.

[4] To see how the spending effect diminishes with distance, notice that d(lnEXP) / d(DIST) = B_n + $2B_2$(DIST). Therefore the percentage impact changes by $2B_2$(DIST) for each 1 unit (100 mile) change in DIST.

[5] The F-statistic value for this test is 1.34, well below the 5% threshold value of 2.02 for samples of the sizes in this study.

[6] Regressing distance traveled on income yielded t-values for both income dummy variables well below 1.0, and an equation F-statistic of 0.51.

Authors' Note

The authors would like to thank Dan Rascher for the suggestion to explore this research topic. In addition, comments by members of the Xavier University Department of Economics, discussants at the 2009 Midwest Economics Association and 2010 North American Society for Sport Management meetings, and the referees of this journal were extremely helpful.