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Estimating the Non-Market Value of a College Sports Tradition

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Abstract

We conduct the first study to estimate the dollar value of a sports tradition. Using a contingent valuation survey, we estimate the net benefits of ringing cowbells at Mississippi State University football games to be about $1 million per home game. The per-person benefits of the tradition are $25 for non-students and $9 for students who favor the tradition, and the costs are $8 for non-students and $6 for students who oppose the tradition. Alumni and fans who bring cowbells to games have significantly higher values for the tradition. The tradition is continually under threat of being prohibited by the Southeastern Conference (SEC) and the University incurs fines when fans violate the cowbell-ringing rules. Our estimates can be used by the University to compare costs and benefits of preserving the tradition or in current marketing efforts to encourage fans to ring responsibly.

Keywords: sports tradition, non-market value, contingent valuation, SEC football

Introduction

College football is known for having enthusiastic fans united by long-held traditions, many of which involve a specialized form of cheering for the team. For example, fans of the Florida State Seminoles make a chopping motion during the War Chant, fans of The Ohio State University Buckeyes spell out O-H-I-O with their arms, and fans of the University of Arkansas Razorbacks perform the Hog Call, which involves arm movements and chanting. Generally, these traditions are seen as relatively harmless ways to cheer one's team and there is no reason to believe that they will wane in popularity or otherwise cease anytime soon. However, one college football cheering tradition is sometimes viewed as unfair or unsafe, and whether it should continue to be permitted is often questioned: the ringing of cowbells by fans at Mississippi State University (hereafter, "the University") home football games.

According to University legend ("Mississippi State Traditions," 2015), a cow wandered onto the football field during a 1930s game against the school's biggest rival. Mississippi State proceeded to win the game, and a tradition emerged thereafter of bringing and ringing cowbells at games. However, in 1974, the Southeastern Conference (SEC) ruled cowbells to be disruptive artificial noisemakers and they were subsequently banned. The SEC reconsidered the rule in 2010, and cowbells have since then been allowed to be rung during games except when the center of the opposing team is positioned over the ball and until the play is whistled dead.

Mississippi State University is the only Division I school for which fans are allowed to have artificial noisemakers. However, when the rules for ringing cowbells are not followed, the university faces fines from the SEC that increase for each violation. In 2010, the school was fined $5,000; in 2013, $25,000; and the third offense would be accompanied by a $50,000 fine. Furthermore, at any time the SEC could reconsider the special allowance and possibly prohibit the ringing of cowbells during games once again. The tradition of ringing cowbells at Mississippi State University home games is therefore unique among college football cheering traditions in that it is continually under threat of being prohibited.

We use a contingent valuation study to estimate the value, measured in dollars, to Mississippi State University football fans of being able to ring cowbells in the stadium during home games. The tradition being under threat creates a unique opportunity where its value can be reasonably interpreted and estimated; the value of most sports traditions, such as those previously mentioned, is only a nebulous concept because there is no meaningful baseline utility level in which the tradition would not exist. It is therefore difficult to conceptualize, much less estimate, a monetary tradeoff with the tradition. Indeed, we know of no other study attempting to estimate the value of a sports tradition.

Despite the generalization that most sports traditions are not under threat, there are several exceptions for which a study like ours would be informative of sports venue policy. For example, during the 2010 FIFA World Cup in South Africa, many fans blew vuvuzelas, a type of plastic horn that creates a loud, monotone note, and which is a common fan support item at soccer matches in South Africa. Many fans, including foreign visitors to the competition and television viewers, were annoyed by their sound, however, and they were consequently banned from many prominent soccer competitions, including the 2012 UEFA Champions League and the 2014 FIFA World Cup in Brazil. For the former event, UEFA explicitly stated that vuvuzelas can overwhelm other traditions such as singing (common at European soccer matches), implicitly acknowledging their value (Associated Press, 2010). Similarly, smoke bombs have been promoted by some organizations like the MLS soccer team Orlando City, but are banned in many stadiums (Harris, 2014). And at many sporting events, items like signs, banners, flags, and thundersticks are permitted but it is conceivable that event organizers might consider banning these items, for example, if a trend of abuse arises. The Ohio State University is one of several universities that has banned noisemakers because they could cause guests discomfort or be hazardous ("Football gameday," 2016). Our study considers a similarly loud and potentially dangerous tradition; other sports leagues and venues may discover the benefits exceed the costs of banning such

traditions and reconsider their current policies, as well as how they address future decisions regarding traditions.

The relevant policy question for our study is whether the value of the tradition of ringing cowbells at games outweighs the costs of permitting the tradition. From the University's perspective, the most immediately relevant costs of the tradition would be the successively increasing fines that accrue when fans violate the ringing rules. However, as we found in our study, some fans dislike the tradition as it can harm the ears or cause headaches, it entails a risk of being accidentally hit by a bell or by a clapper that comes loose, it is seen by some as unfair to opponents, and is thought by some to project a negative image of the University. A wider perspective would include costs of the tradition imposed on opposing teams and their fans. In addition to being useful for benefit-cost comparisons, our estimates could be of use to the University in encouraging fans to ring cowbells only during permitted times (which it currently in fact tries to do); if fans see a dollar estimate of the net benefits that might be lost from losing the right to this tradition, they may be more inclined to respect the ringing rules.

Related Literature

Although it has a much longer history in other contexts, contingent valuation is only recently becoming common in sports applications (e.g., Atkinson et al., 2008; Castellanos, García, & Sánchez, 2011; Johnson & Whitehead, 2000; Owen, 2006; Vekeman et al., 2015). A strength of the approach is that in can be used in situations in which a baseline scenario has not yet occurred (Haab & McConnell, 2002) such as before the construction of a new stadium, or, in our case, under a possible future state in which ringing cowbells is banned. A potential weakness of the approach is that, because the situation proposed is hypothetical, respondents may have difficulty answering the survey as if the policy were actually to be implemented. We discuss this latter problem later, but refer the reader to Champ, Boyle, and Brown (2003) for more information on the strengths and weaknesses of contingent valuation and other non-market valuation approaches and to Walker and Mondello (2007) for a discussion of contingent valuation specifically in sport economics.

Existing studies most closely related to ours have estimated the value of other sport-related goods including the value to the public of a major sports team in a community (Johnson, Mondello, & Whitehead, 2007) or of the improvement in a team's stadium or sports facilities (Johnson & Whitehead, 2000; Pedersen, Kiil, & Kjær, 2011), the value of sports stadiums (Harter, 2015; Johnson et al., 2012), of hosting a major international sporting event (Vekeman et al., 2015; Walton, Longo, & Dawson, 2008), of one's nation's performance in a major international sporting event (Humphreys et al., 2016; Wicker et al., 2012; Wicker, Prinz, & Hanau, 2012), and from attending games of a major sports team (Whitehead et al., 2013). A common motivation expressed in this vein of literature is that funding to support major sports franchises or major sporting events often comes largely from the public. To justify these public expenses, leaders, the media, and others often tout the large "intangible" benefits resulting from sports, including civic pride, community spirit, and improved race relations. These studies attempt to estimate these intangible benefits and the general finding is that the public investment is rarely a sound economic investment, even when these intangible benefits

are included (Johnson, Mondello, & Whitehead, 2007). We conduct the first estimation of the intangible benefits of a sports tradition.

Study Design

The general format of our contingent valuation survey was as follows: first, respondents were asked whether they were fans of the team and, if so, were asked about their game attendance behavior, including attendance frequency and whether they typically ring cowbells at games when attending. They were then asked, under no additional conditions, whether they would prefer that cowbells not be allowed in the stadium and those who responded "no" self-selected into what we call the "*favor*" treatment whereas those who responded "yes" self-selected into the "*oppose*" treatment.[1] Respondents were then asked about the type of admissions tickets they buy (a season ticket package or single-game tickets) and who pays for them. Then background information was provided to the respondents on the issue of cowbells in the stadium. Specifically, it was explained that the University had thus far incurred $30,000 in fines from the SEC due to cowbell rules violations and that each successive fine would increase. Respondents were then asked to suppose that the University were considering banning bells and enforcing the ban with increased security and monitoring and with metal detection wands used by staff at the entrance gates.[2] Respondents were then shown one of the following paragraphs depending upon their treatment:

> *(favor treatment:)* But also suppose that, because there would no longer be a risk of fines from the SEC, football tickets would now be cheaper. Of course, ticket prices might change from season to season for other reasons, but they would generally be cheaper than if cowbells were allowed in the stadium.

> *(oppose treatment:)* But also suppose that, in order to cover the increased cost of security equipment and monitoring, football tickets would now be more expensive. Of course, ticket prices might change from season to season for other reasons, but they would generally be more expensive than if cowbells were still allowed in the stadium.

Our contingent valuation study used the dichotomous choice question format (see Haab & McConnell, 2002) and the main task was then for respondents to choose whether they were in *favor* of or against the proposed policy shown to them.[3] Respondents in the *favor* treatment (who *favor* cowbells in the stadium) were asked whether they would be willing to accept a lower admission ticket price to forgo their right to ring cowbells at games, whereas those in the *oppose* treatment (who *oppose* cowbells in the stadium) were asked if they would be willing to pay a higher ticket price to enforce a ban on cowbells in the stadium. The price discount (for the *favor* treatment) and price premium (for the *oppose* treatment) proposed to respondents varied across their respective treatments using the values given in Table 1. To potentially mitigate hypothetical bias, respondents were presented with the following script before answering the choice question:

> There are no right or wrong answers. Some people would support a proposal like this and others wouldn't. Both have good reasons for why they would vote one way or the other. This is only a hypothetical question, but please try your best to honestly

Table 1. Choice Question Bid Values

Favor Cowbells			Oppose Cowbells		
price discount bundles (student tickets, non-student tickets)	% in favor of proposal		price premium bundles (student tickets, non-student tickets)	% in favor of proposal	
	students	non-students		students	non-students
($0.75, $3.75)	1.6%	4.9%	($0.40, $2.00)	86.4%	96.2%
($1.50, $7.50)	2.8%	7.8%	($0.80, $4.00)	75.0%	62.1%
($2.25, $11.25)	3.2%	4.7%	($1.20, $6.00)	60.0%	71.4%
($3.00, $15.00)	2.4%	13.1%	($1.60, $8.00)	65.6%	70.6%

Note: One (student, non-student) pair was randomly presented to the respondent depending upon whether the respondent was in the favor or oppose treatment.

answer as if it were a real vote and that the majority of votes would determine the outcome.

Additionally, respondents were asked a follow-up question about the amount of influence (none, a small amount, a large amount) survey responses were likely to have on future football ticket prices. Such questions have been used in recent literature to assess respondent perceptions of the consequentiality of their responses (e.g., Herriges et al., 2010; Vossler & Watson, 2013); consequentiality is considered essential in recent literature for response validity and for minimizing hypothetical bias (Carson & Groves, 2007, 2010). The survey concluded with follow-up questions about the respondents' choice and additional demographic questions.

The Choice of Value Measure

An important design consideration was how to pose the valuation question. For example, we could have asked those in the *favor* treatment whether they would be willing to pay a higher ticket price to keep their right to ring cowbells at games. However, phrasing the question thus would have created both theoretical and practical difficulties. Knetsch (2010) argues that the correct theoretical measure of value (willingness to pay or willingness to accept) is the one for which there is "wide agreement of whether particular changes are in the domain of gains or of losses" (p. 186). In our case, because fans currently have the right to ring cowbells at games and they feel entitled to this right, a proposed ban on cowbells is clearly in the domain of losses.[4] Willingness to accept is therefore the theoretically correct measure of value in this case. Practically as well, it would have been counterintuitive to ask respondents in the *favor* treatment whether they would be willing to pay to keep their right to cowbells. The justification could have been argued that increased ticket prices would be used to cover any future fines, but respondents likely would reason that potential fines are already accounted for in ticket prices and that, furthermore, such a policy would be impractical or only very short-term because the SEC would likely ban the tradition under repeated rules violations. Similarly, it would have been strange to ask those in the *oppose* treatment whether they would be willing to accept a lower ticket price to allow the tradition to

continue. The vast majority of valuation studies attempt to measure willingness to pay, even when willingness to accept is the correct measure (Knetsch, 2010); our study is therefore a rare example of when estimating willingness to accept (for the *favor* group) is both practical and theoretically correct.

Bid Levels

The University offers several different season and single-game ticket purchasing options. Students can purchase tickets to every home game of the season for $50 total (2014 prices). The general public has a choice between regular season tickets ($310) or season tickets in a less desirable seating area ($210). Faculty and staff of the University can purchase season tickets for $248. There is also the possibility of buying tickets for a single game through the University or through another person, or somehow obtaining tickets for free (e.g., from a friend or family member). To simplify the survey design, we broadly grouped these various ticket purchasing options into student (the $50 season ticket package or student-priced single-game tickets) and non-student tickets (all other ticket options) and asked respondents to consider how much they typically spend on average for a single-game ticket. For season ticket holders, this average amount was calculated for them and displayed, and for single-game ticket purchasers, this value was elicited. We then asked them to suppose that the average price of a single home game ticket would be $X more or less, with separate X values for student and non-student tickets.

An unusual design characteristic that we implemented because of the uniqueness of our study pertains to how the bid values were presented to respondents. Flores (2002) and Bergstrom (2006) show that, under non-paternalistic altruism[5] the distribution of costs actually affects the benefits of a policy. For this reason, we displayed the average ticket price change for both students and non-students in the choice question displayed to respondents, with the idea being that non-students might care about how the proposed policy would affect students and vice versa. The choice question for respondents in the *favor* treatment reads: "Based on your previous responses, your average ticket cost, for a single game, is about $Y. Suppose the average price of a single home football game ticket were X_s$ less for students and X_{ns}$ less for non-students than it is currently, but that cowbells would no longer be allowed in the stadium and that the ban would be strictly enforced. Would you be in *favor* of this change?" Parallel language was used for the *oppose* treatment and the values X were randomly drawn (in student-non-student matched pairs) from Table 1. The ticket price changes ultimately chosen result from convenience sample responses (n=8) to an open-ended question about the smallest discount (largest premium) they would be willing to accept (pay) in exchange for the ban on cowbells.

Data Collection and Cleaning

We programmed the survey using Qualtrics software. Qualtrics is a well-known online survey company. The target population for our survey was self-proclaimed fans of the University football team who either attend games or might potentially attend games if cowbells were not allowed in the stadium, and the survey was administered in two different ways. First, before each of five Mississippi State home games during October

and November, 2014, fans tailgating at the University were asked to complete the survey on an iPad using the Qualtrics iPad application. Most tailgating occurs on open land that is immediately to the south of the football stadium or to the east or southwest of the stadium. This area was divided into five sections, each of which was sampled at one of the five home games during the sampling time frame. Each tailgating party in each section was asked whether they would participate in the survey before that day's game had started.[6] Respondents who completed the survey at a tailgate received a token appreciation item (e.g., a pen). The survey was also distributed through a link in an email sent to all faculty, staff, and students with an official university e-mail address. Requesting survey participation through email serves to reach members of our target population that do not tailgate, who tailgate less frequently, or who might attend but currently do not because cowbells are permitted. The survey was available from October 3 to December 5, 2014.[7]

Our target population of self-proclaimed University football fans who are current or potential attendees is difficult to identify precisely. In particular, our sampling approach misses fans who neither tailgate nor are members of the University, or fans who tailgate farther from our sampling area.[8] These concerns may have implications for the generalizability of our results to the population of interest, but we believe our approach of using both tailgating and University member fans should capture most types of population members.

We treated the first game day of data collection on October 4, 2014, as a pre-test for the survey. We made minor adjustments according to the feedback from respondents, including removing unnecessary visual aids and shortening some of the reading involved. In the analysis that follows, the pre-test data is combined with the rest of the data as no significant difference was detected in these responses. A total of 23,875 people (University students, faculty, and staff) received the email announcement about the survey. Of these, 3,866 people took the survey for a response rate of 16.2% for the email invitation to complete the survey. One hundred forty-three respondents completed the survey on an iPad at a tailgate. Unfortunately, because of relatively uncontrollable elements of tailgating (e.g., tailgaters interrupting survey administrators) we lost track of how many in-person invitees declined to take the iPad version of the survey at football game tailgates, but we believe an estimate of 50% would be reasonable.

Observations Excluded from the Analysis

In contingent valuation surveys, the researcher wants respondents to take the proposed tradeoff seriously and to respond accordingly. Otherwise, responses are less trustworthy as are any inferences derived therefrom (Atkinson et al., 2012; Carson & Groves, 2007; Jorgensen et al., 1999). Respondents who answered "no" (would oppose the proposed policy) to the choice question were asked why they made that choice, and could provide an open-ended explanation. Also, at the end of the survey, respondents were asked to share any other open-ended comments. Respondents who made comments in either of these questions that fell into one of the following categories were identified as being likely to not have taken the proposed tradeoff seriously: the respondent did not believe ticket prices would be related to a cowbell ban or would not be related in the manner specified; the respondent believed the proposed policy was

unfair to ticket purchasers since there are other potential solutions; and the respondent did not believe that cowbells would ever be banned from the stadium. Using these criteria, we identified 94 respondents in the *favor* group and six in the *oppose* group who did not take the proposed tradeoff seriously, and these observations were omitted from the analysis. Omitting these respondents causes only very minor differences in the inferences that are denoted in a footnote to Table 3.

We also dropped respondents who did not believe the survey would have any influence whatsoever on future football ticket pricing; this decision was based purely on theoretical grounds as there were so few (only five in the *favor* treatment and one in the *oppose* treatment) that dropping them had no meaningful empirical implications. Lastly, 13 non-students in the *favor* group (there were none in the *oppose* group) who stated that they purchase student season tickets were removed from the analysis; when

Table 3. Regression Results

	Favor cowbells (*N* = 2933)			**Oppose cowbells (*N* = 188)**		
Variable	Parameter		s.e.	Parameter		s.e.
price (students who get student season tickets)	0.27	*	0.16	-1.20	**	0.61
price (students who get any other season tickets)	-0.10		0.14	-0.30		0.26
price (students who get single-game tickets)	0.01		0.05	-0.26	*	0.14
price (non-students who get faculty/staff season tickets)	0.10	**	0.05			
price (non-students who get season tickets in less-desirable seating)	0.12		0.08			
price (non-students who get faculty/staff or less-desirable seating season tickets)		–		-0.15	0.16	
price (non-students who get general public season tickets)	0.13	**	0.06	-0.33	*	0.20
price (non-students who get single-game tickets)	0.09	**	0.04	-0.23		0.15
income*non-student (1000s of $)	-0.00		0.00	-0.00		0.01
income*student (1000s of $)	-0.01	**	0.00	0.01		0.01
age (years)	0.20	***	0.06	0.04		0.05
age squared	-0.00	***	0.00	-0.00		0.00
Male	-0.74	***	0.23	0.69	*	0.41
Attended more than 10 games in last 5 years	-0.69	***	0.23	-1.13	**	0.56
Brings cowbell to games	-1.51	***	0.24	0.35		0.90
Student	0.05		0.84	0.71		1.70
Faculty or staff member	0.01		0.54	-0.64		1.15
Alumni	-0.80	**	0.34	0.10		0.59
Buys own tickets	-0.15		0.24	-0.82		0.56
Survey gave enough info to make a good choice	-0.55	***	0.17	0.68	**	0.34
Survey was unbiased	0.40	**	0.17	-0.30		0.28
Survey was easy to understand	0.19		0.21	-0.40		0.34

Table 3. (Cont.) Regression Results

Variable	Favor cowbells (N = 2933) Parameter		s.e.	Oppose cowbells (N = 188) Parameter		s.e.
Took survey in weeks 6-10 (during win streak)	-2.11	***	0.69	--		
Took survey in week 11 or 12 (after 1st loss)	-0.87		0.93	--		
Believes cowbells are annoying or could cause hearing damage	--			1.84	***	0.54
Believes cowbells are or could be physically dangerous	--			2.67	**	1.24
Believes cowbells project a negative image of the university	--			2.84	*	1.49
Constant	-3.25	**	1.54	0.19		2.18
-2 LogL (Firth-penalized)	625.097			76.13		
LR test (23): all parameters but constant equal 0	163.28***			49.66***		
Percent of predictions correct	81.9			83.7		

*,**, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Our ex ante hypotheses about the signs of the price parameters would be positive for the favor treatment because we'd expect an increase in the ticket discount to raise the probability of respondents accepting the proposed ban, and negative for the oppose treatment because we'd expect an increase in the ticket premium to decrease the probability of respondents favoring the proposed ban. If respondents identified as not taking the proposed tradeoff seriously are included in the model, the signs and significance in the favor model do not change. In the oppose model, price (non-students who get general public season tickets) and male are no longer significant.

included, their ticket price parameter is not significant (*pval* = 0.31) and removing them does not affect any of our results. After omitting these observations and observations containing missing values for variables in the model, the final analysis was conducted on a sample of 2,933 respondents for the *favor* group and 188 responses for the *oppose* group.

Model Specification

Theoretical and Empirical Models

Each survey respondent makes a binary (yes-no) choice about whether he is in favor of or opposed to the proposed policy of banning cowbells. The theoretical model assumes that respondents will have different utility levels between if the proposed policy is in place and if it is not in place, and that a respondent chooses in favor of the proposed policy if his utility under the policy is greater than under the status quo. The utility, *U*, of individual i under policy regime *c* (*c* = 1 if under the proposed policy or = 0 under the status quo) is expressed as:

$$U_{ic}=\alpha_c+\gamma_k t_{ic}+\beta_c' x_i+\varepsilon_{ic} \qquad [1]$$

where α is a constant term, γ_k is a parameter on the average single-game ticket price, t_{ic}, that we allow to vary by how (k) population members obtain tickets (i.e., the different ticket packages they may purchase), x_i is a vector of respondent-specific variables with

corresponding parameter vector β_c, and ε_{ic} is a disturbance term. Equation (1) is used to create equations that implicitly define willingness to accept (WTA) a lower ticket price to forgo the right to ring cowbells for the *favor* group and average willingness to pay (WTP) to enforce a ban on cowbells for the *oppose* group. Adding additional subscripts *f* and *o* to allow the parameters to differ between the *favor* and *oppose* groups yields:

$$\alpha_{1f}+\gamma_{kf}\,(t_i-\text{WTA})+\beta'_{1f}x_i+\varepsilon_{i1f}=\alpha_{0f}+\gamma_{kf}t_i+\beta'_{0f}x_i+\varepsilon_{i0f} \qquad [2]$$

$$\alpha_{1o}+\gamma_{ko}\,(t_i+\text{WTP})+\beta'_{1o}x_i+\varepsilon_{i1o}=\alpha_{0o}+\gamma_{ko}t_i+\beta'_{0o}x_i+\varepsilon_{i0o\ f} \qquad [3]$$

Solving equations (2) and (3) for WTA and WTP, respectively, taking the expectation over the disturbance terms, and using the average values ($\bar{x}$) of the respondent-specific variables (Haab & McConnell, 2002) yields:

$$\text{WTA} = \frac{\hat{\alpha}_f+\hat{\beta}'_f\bar{x}_f}{\gamma_{kf}} \qquad [4]$$

$$\text{WTA} = \frac{\hat{\alpha}_o+\hat{\beta}'_o\bar{x}_o}{\gamma_{ko}} \qquad [5]$$

where the carat symbol signifies the difference in corresponding parameters across policy regimes (e.g., $\hat{\alpha}_f=\hat{\alpha}_{1f}-\hat{\alpha}_{0f}$). A logistic regression[9] is used to estimate the difference in parameters across policy regimes (Haab & McConnell, 2002).

Additional Model Variables

Variable definitions and their summary statistics for each group are shown in Table 2. We allowed the parameter on the ticket price to differ between students and non-students, and by how respondents obtain tickets. Allowing the price parameter to differ between students and non-students captures any differences in their marginal utility of ticket prices (e.g., if a $1 change in ticket prices affects students more than non-students). Allowing the price parameter to differ by how respondents obtain tickets captures any potential differences in marginal effect resulting from the fact that, for example, some respondents might buy just one ticket per season, whereas others might buy season tickets every year. The most flexible specification would have contained a unique student and non-student parameter for each of the following: the student season ticket package, the regular season ticket package, the season ticket package in the less desirable seating area, faculty and staff season ticket packages, and non-season tickets (i.e., single-game tickets). However, we tested several relevant parameter equality restrictions. First, 70 students stated that they purchase non-student season tickets in the *favor* group and six stated so in the *oppose* group. The hypothesis that the price parameters for students who buy faculty, less-preferred seating, or general public

Table 2. Variable Definitions and Descriptive Statistics

	Favor Cowbells (pro)				Oppose Cowbells (anti)			
	Students (N = 2348)		Non-students (N = 585)		Students (N = 95)		Non-students (N = 93)	
Independent Variable	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
income[a]*non-student[b] (1000s of $)	_		96.15	44.68	_		101.67	42.21
income[a]*student[b] (1000s of $)	91.83	50.16	–		82.84	51.18	–	
age (years)	21.16	4.06	41.86	12.59	25.15	7.86	46.75	14.50
male[b]	0.47	0.50	0.39	0.49	0.53	0.50	0.46	0.50
attended more than 10 games in last 5 years[b]	0.52	0.50	0.55	0.50	0.18	0.39	0.29	0.46
brings cowbell to games[b]	0.93	0.26	0.64	0.48	0.11	0.31	0.03	0.18
student[b]	1	0	0	0	1	0	0	
faculty or staff member[b, d]	0	0	0.79	0.41	0	0	0.94	0.25
alumni[b]	0	0	0.62	0.49	0	0	0.44	0.50
buys own tickets[b]	0.62	0.49	0.78	0.41	0.47	0.50	0.59	0.49
survey gave enough info to make a good choice[c]	4.15	0.95	4.17	0.91	3.97	0.98	3.87	0.97
survey was unbiased[c]	3.96	1.09	4.15	0.99	3.82	1.18	3.91	1.03
survey was easy to understand[c]	4.29	0.94	4.35	0.83	4.21	0.89	4.24	0.76
Number of Respondents in Each Week								
took survey in week 5[b]	9		17		0			
took survey in weeks 6-10[b]	2329		548		188			
took survey in week 11 or 12[b]	10		20		0			

[a] Family annual income elicited in 11 categories (1 = less than $10,000, 11 = $175,000 or more). Recoded using category median values ($175,000 for category 11).

[b] Binary variables equal 1 if statement applies to respondent, 0 otherwise.

[c] Measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

[d] Two response categories were combined here as no statistical difference was detected.

season tickets are equal to each other could not be rejected at the 5% level ($\chi^2_2 = 1.67$) based on likelihood ratio tests for the *oppose* group. We therefore grouped these three types of ticket observations together for purposes of estimating the ticket price parameter. For the *favor* group, the same hypothesis was barely rejected at the 5% level ($\chi^2_2 = 6.16$), but to keep the models consistent across groups, we combined these parameters in the *favor* group as well, which does not affect any of the conclusions herein.[10] So for students we ended up with three unique price parameters for those who buy student

season-ticket packages, those who buy some other season ticket package, and those who buy single-game tickets.

The following respondent-specific variables were included in the analyses of both the *favor* and the *oppose* groups: income (allowed to differ between students and non-students),[11] age, age squared, sex, whether they have attended more than 10 games in the past five season including the current season, whether they bring cowbells to the stadium when they attend games, their role in the University (undergraduate student, graduate student, staff or faculty, alumni, none), and whether they purchase their own tickets.

In order to capture the effect of the team's performance on responses, dummies for the week in which the respondents took the survey were also included for the *favor* group.[12] A given "week" number (e.g., week 5) is defined as the time period between the end of the previous game of the season (game 4) and before the start of the given game, which may in fact be more or less than one calendar week in duration, and the survey was conducted over eight different weeks. No respondent took the survey during a game. Data were collected beginning in week 5 and ending with week 12. No statistical difference was found in the parameters for weeks 6 through 10 ($\chi^2_4 = 4.07$) or between weeks 11 and 12 ($\chi^2_1 = 0.16$), however, so these respective parameters are modeled as being equal.

A few variables regarding the respondent's perceptions about the survey itself were also included. In order to assess the quality of the survey and to see how respondent perceptions thereof affect responses, each respondent was asked to rate his or her level of agreement on a five-point scale with each of the following statements: "The survey provided enough information for me to make a good choice," "Information in the survey was easy to understand," and "Information in the survey was presented in an unbiased way."

Lastly, respondents in the *oppose* group who indicated they would not be willing to pay higher ticket prices to impose a ban were asked why they made that choice. Dummy variables for these open-ended responses were created for respondents who fell into one of the following categories: respondent had previously had a strong negative cowbell experience such as being hit or threatened; they believe cowbells are or could be physically dangerous (other than harming hearing); they find the sound of the cowbells annoying; they believe there is a risk of hearing damage; they believe cowbells project a negative image for the university; and they believe cowbells give the team an unfair advantage.[13]

Results

Regression Results

The analyses for each group (*favor* and *oppose*) were conducted separately and the estimation results are displayed in Table 3. The signs for the parameters in the "favor cowbells" column indicate whether the likelihood of accepting the lower ticket price and giving up the right to cowbells increases or decreases with each variable, and the signs for the parameters in the "opposed cowbells" column indicate whether the like-

lihood of paying a higher ticket price to ban cowbells increases or decreases with each variable. Based on likelihood ratio tests, we could not reject the null hypothesis that the parameter on a dummy for survey mode, iPad versus online, was not significant for either treatment ($\chi^2_1 = 2.80 < 3.84$ for the *favor* treatment, $\chi^2_1 = 0.43 < 3.84$ for the *oppose* treatment) so respondents from both survey modes are modeled together.[14]

Those who favor cowbells in the stadium

Because those in the *favor* group were asked if they would accept a lower ticket price to forgo their right to bring in cowbells, a positive price parameter means that as the proposed ticket discount increases, the respondent is more likely to accept the ban on cowbells. Therefore we observe that a lower proposed ticket price increased the likelihood of accepting the proposal for students who had student season tickets, non-students with faculty/staff season tickets, non-students who get general public season tickets, and non-students who get single-game tickets. Overall, students seem less responsive to the price offered in the choice question than non-students. This may be because student ticket prices are quite low to begin with but also, casual observation suggests that students are more likely to ring cowbells in the stadium than non-students and therefore be more passionate about the tradition.

Students with greater income are less likely to accept the proposal. Older respondents are more likely to accept the proposal but the marginal effect decreases as age increases, indicated by the significant and negative parameter on age squared. Males, alumni, those who themselves bring cowbells to the stadium, and those who had attended more than 10 games in the last five years are all less likely to be willing to forgo their right to bring cowbells into the stadium.

Interestingly, those who took the survey in weeks 6 through 10, which was before the team's first loss of the season and which was during their unprecedented win streak, were significantly less likely to be willing to forgo their right to bring cowbells into the stadium. However, after the team's first loss of the season, this effect disappears, indicating that fan support for cowbells in the stadium is related to team performance.

Those who oppose cowbells in the stadium

Here, a negative price parameter indicates the respondent is less willing to impose the ban on cowbells the greater the price premium is. We therefore observe that students who get student season tickets, students who get single-game tickets, and non-students who get general public season tickets were less likely to be in *favor* of the ban as the price premium increases. Males were more likely to accept the proposal than females, all else equal, and, as in the *favor* group, those who had attended more than 10 games in the last five years were less likely to support a proposed ban on cowbells.

The model for the *oppose* group also includes control variables for reasons the respondents gave for opposing cowbells in the stadium. Those respondents who believed cowbells are annoying or could cause hearing damage, that cowbells are or could be physically dangerous, or that cowbells project a negative image of the university were all more likely to support a ban on cowbells relative to respondents who did not feel this way.

Individual Values

Table 4 displays the mean value estimates and their 95% confidence intervals for significant price parameters only. Value estimates are calculated separately for students and non-students for both those who favor cowbells in the stadium and those who oppose them, and the corresponding variable means for students and non-students, respectively, were used in the value calculations as depicted in equations 4 and 5. Several properties of the estimates are noteworthy.

First, among those who *favor* cowbells in the stadium, students who purchase student season tickets and non-students who purchase faculty/staff season tickets have estimated mean willingness to accept values of $17 per ticket and $48 per ticket, respec-

Table 4. Value Estimates (95% confidence intervals)[a]

	Favor cowbells (WTA to forgo cowbells)		Oppose Cowbells (WTP to ban cowbells)	
Ticket type	**Students**	**Non-students**	**Students**	**Non-students**
faculty/staff season tickets	–	$48 (26, 227)[b]	–	–
no streak	–	$26 (9, 114)[c]	–	–
no streak & doesn't bring cowbells	–	$10 (-13, 42)[d]	–	–
general public season tickets	–	$36 (19, 170)[b]	–	$8 (-21, 52)
no streak	–	$19 (6, 82)[c]	–	–
no streak & doesn't bring cowbells	–	$8 (-9, 32)[d]	–	–
student season tickets	$17 (-72, 109)	–	$2 (1, 7)	–
no streak	$9 (-34, 55)	–	–	–
no streak & doesn't bring cowbells	$3 (-12, 21)	–	–	–
single-game tickets	–	$54 (27, 253)[b]	$9 (-5, 39)	–
no streak	–	$29 (7, 126)[c]	–	–
no streak & doesn't bring cowbells	–	$12 (-16, 49)[d]	–	–

[a] Confidence intervals calculated using Krinsky and Robb simulation (see Haab and McConnell, 2002).

[b, c, d] No distributions with matching letters statistically differ from each other in pairwise tests.

[b, d] Within a ticket type, the two distributions labeled b and d statistically differ at the 10% level.

tively. Each of these is greater than the average cost of a ticket in their respective season ticket packages (roughly $7 per ticket for student season tickets and $35 per ticket for faculty/staff season tickets). This would imply that these respondents would have to be given free tickets and be paid extra in order to be willing to forgo their right to ring cowbells during games. As passionate as University football fans are, however, we believe that an important feature of the 2014 football season causes this extreme result.

The 2014 University football season was unique in school history for its success. Mississippi State University won the first nine games of the season, including wins over historically tough and highly ranked opponents such as Louisiana State University, Texas A&M, Auburn, and Arkansas. After these wins, the University was ranked number one in the nation for the first time in school history. The 2014 season can therefore be considered atypical in school history. The team lost its 10th game to Alabama (and later its 12th game as well). One feature of our study is that we have respondent observations from both before and after the team's first loss of the season. This allows us to control for the "hot streak" leading up to the team's first loss, which occurred in game 10 of the season (before week 11 of the study).

We therefore calculated willingness to accept values that exclude the effect of the hot streak, under the possibility that these might represent values for a more typical season. As seen in Table 3, the parameter estimate on the dummy for whether a respondent completed the survey in weeks 6 through 10 is negative and highly significant, indicating that in those weeks, respondents were significantly less inclined to be willing to forgo their right to cowbells in the stadium. Table 4 shows the distributions of willingness to accept for each ticket type when the effect of the hot streak is removed from the calculation (by setting the corresponding dummy variable equal to 0). Then, mean willingness to accept for students who purchase student tickets and non-students who purchase faculty/staff tickets falls to $9 and $26, respectively.

We also estimated willingness to accept values for respondents who do not typically bring cowbells with them to the stadium when they attend games. For these respondents (and eliminating the effect of the hot streak as well), willingness to accept is $3 for students and $10 for non-students who purchase faculty/staff tickets. In other words, students who ring cowbells at games value that right $6 more per game than students who do not, and non-students who ring cowbells value that right $16 more per game than non-students who do not ring cowbells.

The corresponding willingness to accept estimates for non-students who purchase general public season tickets or who purchase single-game tickets were also estimated. As noted in the table footnote, none of the corresponding willingness to accept distributions for non-students who purchase different ticket types statistically differ from each other according to complete combinatorial tests of simulated distribution equality (see Poe, Giraud, & Loomis, 2005). For the *oppose* group, estimates of willingness to pay for imposing a ban on cowbells were calculated, with students who purchase student tickets, students who purchase single-game tickets, and non-students who purchase general public season tickets willing to pay $2, $9, and $8 on average, respectively.

Aggregate Values

The seating capacity of the University stadium is 61,337 and for what follows we assume that 60,500 of those are occupied by home fans on average, a rounding based on the number of seats typically reserved for fans of the visiting team. The individual value estimates can be weighted to estimate the net benefits fans enjoy from being able to ring cowbells at each game. We use individual values based on Table 4 that eliminate the effect of the win streak, and, to keep the analysis simple, assume a single value for non-students who favor cowbells ($25), students who favor cowbells ($9),

non-students who oppose cowbells ($8), and students who oppose cowbells ($6). In what follows, we assume that our sample proportions of those, among students, who favor cowbells in the stadium and those, among non-students, who favor cowbells in the stadium match the proportions in the population of interest, but we vary the proportions of students and non-students in the population as the number of students who purchase non-student tickets is unknown.

The first, and most ideal, approach would be to assume that our sample is representative of the population. Our responses would indicate (see Table 2) that 19% are non-students who *favor* cowbells, 75% of attendees are students who *favor* cowbells, 3% are non-students who *oppose* cowbells, and 3% are students who *oppose* cowbells. These weightings would imply a mean benefit of about $696,000 per game for those who *favor* cowbells, and a mean cost of about $25,000 per game for those who *oppose* cowbells, for a net benefit of $671,000 per game, or $11 per attendee.

Our sample, however, almost certainly contains proportionally too many students. An alternative way to weight the individual value estimates would be to assume that the number of student attendees is equal to the number of seats reserved for students, which is 11,000. This weighting would imply a mean benefit of about $1,163,000 and a mean cost of about $57,000, for a net benefit of $1,106,000 per game, or $18 per person.

A final way to weight the individual values might be according to the proportions from the sub-sample who took the survey in-person at tailgates. Of respondents who took the survey at a tailgate, 39 were students who favored cowbells, one was a student opposed to cowbells, 100 were non-students who favored cowbells, and three were non-students opposed to cowbells. These weights would imply a mean value of $1,206,000 and a mean cost of $13,000, for a net benefit of $1,193,000 per game, or $20 per person.

Conclusions

Most sports traditions are relatively harmless and there is no realistic chance that they might someday be prohibited. That the ringing of cowbells at Mississippi State University football games is continually under threat, therefore, creates a unique opportunity to estimate the value of the tradition because at any time the SEC could vote to overturn this only allowance of artificial noisemakers permitted in Division I sports. While the tradition is supported by a clear majority of University football supporters, some supporters are opposed to the tradition. Here, we estimate the value of the tradition to those who favor it, and the cost of the tradition to those who oppose it, noting that the focus is on these values for fans of the University team; we do not estimate, for example, the costs of the tradition to fans of visiting teams or to the visiting team itself.

We calculated the net benefits of the tradition under various assumptions about the unknown proportion of fans at games who are students. Our estimates of the total net benefits of the tradition per game range from $671,000 to $1,193,000. These values are representative of what we believe to be a more "typical" University football season in which the effect of an unprecedented winning streak is removed. We note, however, that while our use of WTA as a value measure is theoretically correct, it is well known in the valuation literature that WTA can be substantially higher than WTP (Horowitz

& McConnell, 2002). Furthermore, while some checks were made to mitigate and control for potential hypothetical bias in responses, future research using either stated or revealed preferences would shed light on the external validity of our results. Another challenge of our application was that the population of interest is difficult to isolate for sampling purposes. We therefore used a combination of on-site sampling and online sampling to capture most of our intended population, but our sampling procedure would not capture, for example, people who might attend football games if cowbells were banned but who are not members of the University community.

Our estimation of the value of the tradition can be used in a number of ways. First, from the broadest economic viewpoint, the information can be used to determine whether the benefits of maintaining the tradition outweigh its costs. Second, the information can be used by University officials as a measurement of the value of the tradition as they continue to lobby the SEC for its preservation. Third, the information can be used in University campaigns to encourage fans to respect the SEC bell-ringing guidelines. A dollar amount attached to the tradition may make the risk of its potential prohibition more salient to fans. Finally, our approach may be relevant to sports venue policy in other contexts, such as allowing vuvuzelas, smoke bombs, flags, banners, thundersticks, and other fan support items into the venue.

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Endnotes

[1] Respondents in the *oppose* treatment who had not attended at least one game in the past five seasons were asked if they would attend games if cowbells were banned from the stadium. Those who responded yes to this question completed a version of the survey phrased, where appropriate, in the subjunctive (e.g., "How *would* you probably obtain tickets?", etc).

[2] Currently, the university implements no metal detectors at the gate and has limited monitoring of fan behavior within the stadium; the only security measure at the gate is security personnel who physically search (generally female) attendees' purses for banned objects.

[3] Do not confuse the treatments (*favor* cowbells in the stadium and *oppose* cowbells in the stadium) with whether or not the respondent favored or opposed the proposed policy.

[4] If, on the other hand, people had the right, but did not feel entitled to it, avoiding a ban (posed as a willingness to pay question) would be in the domain of gains (see Knetsch, 2010).

[5] A person is non-paternalistically altruistic towards another person if he cares how well off that other person is (i.e., he cares about her overall utility level). A person is paternalistically altruistic towards another person if he cares about another person's consumption of a particular good (e.g., he cares about her safety; see Flores, 2002).

[6] Most fans tailgate in the exact same location during each home game.

[7] The survey cannot be taken more than once from the same IP address. However, there is still a chance that some respondents could have answered the survey more than once on different devices.

[8] We sampled from the densest area of tailgating, but some fans tailgate farther away. Furthermore, if there were a correlation between distance of tailgating to the stadium and support for cowbells in the stadium our data would not capture this effect.

[9] Our estimator maximized the Firth-penalized log-likelihood (Heinze & Schemper 2002), an adjustment to regular maximum likelihood estimation used when there is quasi-complete separation of the data points. This is when one of the binary independent variables takes on only one value (e.g., 1) for one of the values of the binary dependent variable. In the favor regression, this variable was the interaction of ticket price and students who buy non-student season tickets. In the *oppose* regression, this variable was the belief that cowbells negatively affect the image of the university. Quasi-complete separation is most typically associated with small sample sizes (as in our *oppose* model), but, as we have here, can also occur with a very passionate sample (as in our *favor* model, where students are very reluctant to forgo cowbells).

[10] Furthermore, none of these individual parameter estimates were close to being significant.

[11] As one reviewer pointed out, it is reasonable that some students might not be able to reliably report family income.

[12] It just so happens that all the respondents in the oppose group, which is much smaller in size than the *favor* group, took the survey in the same week—the week in which the survey was announced via email.

[13] Whether respondents believe cowbells give the team an unfair advantage was not found to be significant, so it is not included in the final models shown.

[14] In both treatments, the magnitudes of the parameters are nearly identical when the control for survey mode is included in the model. In the *favor* treatment, the parameter on price for students who buy student season tickets becomes marginally non-significant (pval = 0.103) and the constant parameter becomes non-significant. In the *oppose* treatment, the price parameter for student-bought single-game tickets becomes significant at the 5% level (pval = 0.040), the price parameter for non-students who buy general admission season-tickets becomes marginally non-significant (pval = 0.112), and the parameter on those who attended more than 10 games becomes significant only at the 10% level.

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