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The economic impact of the Writers-in-the-Schools program at UNLV: 2003

Jennifer Stikich
University of Nevada, Las Vegas

THE ECONOMIC IMPACT OF THE WRITERS-IN-THE-SCHOOLS PROGRAM AT UNLV: 2003

by

Jennifer Stikich

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Jennifer C. Stikich

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Thomas M. Carroll
Examination Committee Chair

Dean of the Graduate College

R. Keith Schwer
Examination Committee Member

Mary Riddel
Examination Committee Member

Graduate College Faculty Representative

ABSTRACT

The Economic Impact of the Writers-in-the-Schools Program at UNLV: 2003

by

Jennifer C. Stikich

Dr. Thomas Carroll, Examination Committee Chair
Professor of Economics
University of Nevada, Las Vegas

In 2002, the College of Liberal Arts received grants from the National Endowment for the Arts, the International Institute for Modern Letters, and Park Place Entertainment to bring the Writers-in-the-Schools program to the University of Las Vegas. In this paper, I employ surveys to determine the economic impact of the WITS program in the Las Vegas community. Four nationally recognized writers conducted public readings at UNLV, and those that attended these events were the subject of this study. Through employing the logit and probit methods of estimation in a theoretical Random Utility Model, the mean willingness to pay to attend the events were $6.73 and $6.75, respectively. Further, the total money spent in the different categories offered in the survey were inputted in an IMPLAN regional input-output model to estimate the total impact of the events on value-added, employment, and output in the Las Vegas community. These estimates were $25,426, 0.9 (jobs), and $41,897, respectively.

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CHAPTER 1

INTRODUCTION

In 1983, the Writers-in-the-Schools (WITS) program was created primarily to teach "at-risk" children in the Houston area the "power" of writing and reading. Since then, the program has mentored similar WITS programs in schools and universities at the national level. Though its goal of promoting arts literacy to students has not changed, the program has expanded on many levels. Currently, the program has progressed to teaching the importance of arts in museums and other venues as well.

In 2002, the College of Liberal Arts at the University of Nevada Las Vegas (UNLV) received a grant from the National Endowment for the Arts (NEA), the International Institute for Modern Letters (IIML), as well as private patron money (primarily from Park Place Entertainment) to finance the WITS program. The money received was to be spent primarily toward teacher stipends, student scholarships, and Scholastic Aptitude Test (SAT) preparation courses. A five week pilot of the program was conducted in July-August 2002, and the program was implemented in the spring of 2003. The program is to be completed in the fall of 2003, though informal follow-up research may take place in the future.

Twenty high-school teachers were selected from the 22 high schools in the five major school zones in the Clark County School District. Each of these teachers then

chose one "in need"[1] high school junior to participate in the program. The teachers and students were required to attend separate classes for two-and-a-half hours each week for 11 weeks in the spring of 2003. The classes were led by a trained WITS Program Facilitator. Each of these students received an SAT preparation course through Kaplan, and will receive $1000 scholarships upon admission into a college or university. The high school teachers received $1000 stipends as well as UNLV tuition for a graduate level English course.

Four weeks were devoted to classroom discussion with each of the four nationally recognized visiting writers[2]. During these classroom sessions, the students and teachers were able to speak directly with the authors about their literary works and writing methods[3]. Each writer also gave a public reading of their works at the university, as well as one randomly chosen high school.

Essentially, there are two components to this study. The first component focuses on the students and teachers participating in the program, and the second deals with the audience members attending the public readings featuring the four visiting writers. The main purpose of the first portion of this study is to glean from the students and teachers how attending this program affected their decision to go on to college, and their teaching pedagogy, respectively. The students and teachers were handed an open-ended survey at the beginning of the course inquiring about their expectations of the program. They were also handed surveys at the conclusion of the course to see if it had reached their expectations and how they were affected by its content.

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[1] "In need" is very loosely defined in the program as those students who are very intelligent, but perhaps need a bit more encouragement to enroll in college.
[2] The four writers were Tom Perrotta, Sandra Cisneros, Mary Karr, and E. Ethelbert Miller.
[3] All teachers and students involved received a book written by each author. These served as the basis for discussion during these four weeks.

From the responses to these surveys, it is determined that the WITS program did in fact have a profound positive impact on the teachers and students. Several teachers stated that their teaching pedagogy did change positively as a result of the program. Moreover, the teachers stated that they would be more open to incorporating contemporary literature in the classroom after reading the visiting writers' works and interacting with those authors. The students were also positively affected by the program in that many were inspired to go to college (or a more prestigious university than stated in the introduction survey) and show more interest in the art of creative writing. As of this date, the majority of the students have taken their SAT preparation course through Kaplan, but no scores have been received.

The purpose of the second portion of the study is to provide a platform for new research regarding the importance of the literary arts in the Las Vegas area. Using data from the WITS program, it is possible to find some value that the public places on literary arts programs such as the WITS program at UNLV. This data also allows me to find the economic impact of the program in the Las Vegas community. Though the qualitative data from the teachers and students is extremely useful in determining the value of the WITS program, I focus only on the audience members that attended the public reading events at UNLV in this paper.

At the beginning of all four guest speaker events, surveys were handed out to the audience, but for a different purpose than the teachers and students. Several questions were devoted to obtaining the demographics of the respondents. Also, the surveys were designed to glean the audience's WTP to attend the events and find approximately how much an individual spent on given categories during the course of the evening. From the

data collected, it was possible to find the value that the respondents placed on the events as well as the program's estimated economic impact. Rather than providing a traditional cost-benefit analysis of the WITS program at UNLV, I chose to perform statistical analysis on the *value* that the audience placed on the program by finding their mean WTP, as well as the program's economic impact on the Las Vegas community through regional software.

These two approaches for valuing the arts (literary, theatrical, etc.) have been widely used over the years. Through contingent valuation methodology, I find the audience's mean WTP to attend these events. Also, I employ IMPLAN software to estimate the economic impact of the program through its effects on total value added, employment, and output in Las Vegas.

Furthermore, I employ a theoretical Random Utility Model (RUM) which provides a framework for the estimation of an individual's mean WTP to attend the public event. The RUM motivates binary choice models and allows us to find at what mean price will the utility gained from accepting a bid to enter the event exceed the utility of rejecting a bid amount. Both the logit and probit estimation methods are used to estimate the theoretical model for comparison purposes. Further, the economic impact of the WITS program in the Las Vegas community is estimated through the IMPLAN regional input-output software.

The paper is outlined as follows: Chapter II discusses previous studies on the arts and other areas using primarily the CVM, Chapter III provides a description of the theoretical background and models used for estimation, and Chapter IV will show the

empirical results from the logit and probit regressions, as well as the results from the IMPLAN input-output model. Finally, Chapter V will conclude the study.

CHAPTER 2

LITERATURE REVIEW

The Contingent Valuation Method (CVM) has been used in several experiments involving the estimation of the value of a public good, primarily environmental goods. Since its introduction by Ciriacy-Wantrup (1947) to evaluate the benefits of preventing oil erosion, the CVM has been of great importance (Portney, 1994). This method allows researchers to estimate the value that individuals place on a wide variety of goods and services. Studies over the last few decades have used contingent valuation surveys to elicit individuals' willingness to pay for things such as the right to hunt waterfowl, improved visibility in the Southwest, reduced risk of disease, and improved information about prices for non-environmental goods (Portney, 1994).

The literature is divided on the ability of the CVM to produce viable data. Many authors state that its weakness lies in the survey itself. It is argued that individuals give responses that are inconsistent with rational choice (Arrow, et al. 1993). Further, people can be confused by the questions, or they do not take the surveys seriously because the results are not "binding" as seen in the NOAA report by Arrow, et al. As discussed later, people can also manipulate their answers to a question according to how they feel about its purpose. For example, a person might state that they will be willing to pay a large sum of money (that they probably do not have) to support a cause they feel strongly

about. This will put an upward bias in the WTP for a good or service and produce unreliable data.

Alternatively, many authors argue that the CVM is the best method researchers have to estimate the value people place on various goods and services. Any data involving human subjects responding to a survey will not produce entirely perfect and unbiased results, but there are methods one can employ to minimize these imperfections.

In 1993, Kenneth Arrow, et al. and the NOAA explicitly stating "acceptable" CV survey design and its validity in research. They argue that if a CV study follows the guidelines explained in their paper, that it will provide useful information on a person's willingness to pay (WTP). Specifically, the NOAA panel assessed CV surveys as a measure of lost passive use values suffered from the damage of natural resources. However, their guidelines may be followed when using the CVM for other uses such as valuing the arts.

Recently, authors of CVM studies have focused on valuing the arts. CVM studies have been of interest as they assist in determining the source of phenomena such as changes in attendance to arts performances, as well as changes in funding to local arts agencies of all types. Surveys for the purpose of valuing the arts have been designed to elicit individuals' WTP for cultural activities at the federal, state, and local levels (Thompson, et al. 2002). Through ticket purchases and donations, individuals place their value on the arts. Thus, by evaluating those numbers, researchers can estimate the value (perhaps through comparison for other similar activities) that individuals place on a specific good or service.

A number of studies have attempted to place value on a good or service using the CVM. Through extracting an individual's WTP for a good, it is possible to estimate the value they place on that good based on the acceptance or rejection of a certain "bid[4]." Several different methods have been used to find value in WTP studies. Thompson, et al. (2002) used both parametric and non-parametric techniques to find the mean WTP to support the arts in Kentucky. The parametric technique involved solving a simple logit equation with mean values of influential characteristics of the respondents to obtain the mean WTP for each scenario given in their surveys. The nonparametric method employed survivor curves, in which the authors estimated the likelihood of a yes response to a bid and plotted those points along the bid (x) axis. Several problems arise from this method of estimation as some curves were smoothed and many assumptions had to be made to get a full curve intercepting both axes. Regardless, the authors estimated the area under these curves to find the mean WTP for the respondents. After comparing the results of both methods, they found their estimates for the mean WTP to support the arts in Kentucky to be very similar.

The CVM data has also been estimated in different ways among studies. Hansen (1997) used the CVM to estimate the aggregate WTP for the Royal Theatre in Denmark through taxes to see if the Danish would pay at least as much as the theatre receives in subsidies. Through employing Hicks' compensating surplus measure, she found that they would pay as much if not more to keep the arts alive in the Theatre.

Since 1984, studies using CVM data have estimated value of goods using the theory of Random Utility Models (RUMS). RUMS motivate logit and probit choice

[4] A "bid" is defined as the dollar amount given on a survey that the respondent is asked if they are willing to pay for something in return.

models because they are the underlying theory of binary choice through analyzing the utility that is associated with a person's response of "0" or "1". In the case of a dichotomous dependent variable, this model allows us to see at what price the individual would gain more utility from accepting the bid than if they rejected it. For example, in my study, the respondent has the choice of either accepting or rejecting a bid. If they accepted a bid, we infer that their utility from accepting the bid exceeded the utility from rejecting it. To find this difference, the RUM model is used. A step-by-step explanation of this method can be seen in Parsons (2001). In his example, Parsons estimates a multivariate logit equation instead of the travel-cost method to find the value of changes in recreation site characteristics or site closure. It is not difficult to see, however, that a dichotomous dependent variable equation can be estimated with the same methods, as is shown in the next chapter. This model served as the basis for my estimation methods of the mean WTP for individuals to attend the events held at UNLV.

Logit is almost always used to measure WTP for a good in CVM literature. All authors stated logit's mathematical simplicity as the reasoning behind its widespread use among CVM literature. Further, probit is also widely used in contingent valuation studies. With probit, income effects are easier to interpret.

To better understand the difference between the logit and probit methods of estimation, it is necessary to turn to Hanemann and Kanninen (1998) for their discussion on the statistical analysis of contingent valuation data. These authors provide perhaps the most comprehensive study on the statistical methods used in contingent valuation research. They agree with Arrow (1993, et al.) that closed ended questions (as in my survey) should be asked regarding a person's WTP for a good or service. Open ended

questions, tend to confuse and require more work from respondents, resulting in poor response rates. Thus, authors utilize closed-ended contingent valuation surveys to find WTP using several different models and methods of estimation. They emphasize the "key role" of logit and probit in the analysis of CV data. Both the logit and probit methods tend to yield the same estimates concerning the significance of variables and the signs on coefficients and are only slightly different in their coefficient estimates, as will be shown the next section.

Despite successful studies using logit models and CVM survey data, however, others that have researched or used the CVM disagree on some matters. The points most debated are the methods used for estimation, inherent bias in the data, and its measure of true preferences. In their paper, Cameron and James (1987) reparametize the probit model to estimate closed-ended contingent valuation surveys[5]. Specifically, the authors rework the probit model so as to elicit point estimates (marginal contributions) for the standard deviation[6] and parameter estimates between the amounts varied over respondents. Their reason for using this new method evolved from the fact that they saw inherent bias in using logit estimation for closed-ended contingent valuation (CECV) data. Truncation bias can occur with CECV data as there are a given amount of values bound between the lowest and highest bid. Consequently, the demand curves are fixed and there is no room for them to shift in response to exogenous variables. The authors argue that without knowing the marginal contribution of each variable that is provided by the probit model, it is not possible to accurately estimate the aggregate social value of a good.

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[5] In this type of survey, the individual is asked simply whether they accept or reject a certain bid as in this study.

[6] The standard deviation in their model is equal to the dispersion in the conditional distribution of Yi.

Diamond and Hausman (1994) proposed that the CVM did not measure "true preferences" and contains the "embedding effect." The embedding effect occurs when WTP responses are similar across different surveys, even though economic theory suggests that they should not. This brings the authors to the conclusion that the CVM does not yield the true preferences of the respondent. They go on further to say that responses to the surveys are biased in that the individuals answer a certain way due to "warm glow." This concept is discussed in detail in Andreoni (1995) as he states that many people are willing to pay higher amounts (in surveys) because they feel good about their contribution to the cause. It has serious implications in the data as it creates an upward bias in the data and in many cases the respondents do not take into account their budgets. Thus, if bias exists, the WTP values are not feasible or accurate.

The survey employed for the purposes of my research eliminates some of the problems associated with previous studies. I use a concise, closed ended survey to extract an individual's demographics and WTP to enter the public events. With basic demographic questions, confusion is lessened on the part of the respondent. Further, the purpose of the survey was clearly explained by the director of the program so as to reduce confusion. Bias in the WTP response cannot be completely eliminated, however, so it may exist in my estimates. We cannot guarantee or predict if people respond rationally. Also, the question asking a person's WTP reflected purchase decisions make daily in that people choose to purchase (or not purchase) a good given the good's price.

The literature suggests that the CVM, studies, though faced with problems, may still provide useable and theoretically sound estimates. In the words of Paul Portney (1994) "Whatever its shortcomings, the contingent valuation method would appear to be

the only method capable of shedding light on potentially important values." Though my study does not directly employ the CVM, its methods for estimation and data interpretation are still the basis for my research. The models are developed more formally in the next section, where I incorporate several methods from past literature on the subject of survey data evaluation for all three event nights.

CHAPTER 3

METHODOLOGY AND DATA DESCRIPTION

All data used for estimation were obtained from the surveys distributed on three separate event nights. The data were then used to estimate the economic impact of the WITS program at UNLV through IMPLAN software, as well as to determine the mean WTP for attending the event and what factors influenced that mean value. The following sections in this chapter will outline the survey design, respondent characteristics, the logit and probit models used in estimation, and the IMPLAN input-output model.

Survey Design

The data used in this study were obtained for one survey given during all 4 nights of the event spanning over February through April of 2003. The surveys were given in person to a random sample of 791 individuals entering the door to the event, and collected after the reading was completed. After the entrants were seated (save a few latecomers), the director of the program explained to the audience the purpose of the survey, and its importance to UNLV and the Las Vegas community. Table 1 shows the response rates for each night of the event. As it was difficult to count the exact number of people that attended each night (due to people continuously entering and exiting the venue), it was necessary to estimate the number of people by the percentage of the venue that was filled each night. The maximum capacity of the venue was approximately 800

people. Also, the first night of the event was used as a focus group to correct any problems with the survey design, so it is not included in the final count of respondents in this study[7].

The total number of people estimated to have attended on the remainder of the nights is 1,450. Of this number, over half (55%) attended the night that Sandra Cisneros was the guest speaker. This was due in large part to the fact that she was the most widely known author out of the remaining three authors[8]. Further, two out of three nights yielded response rates higher than 50%, and the response rate calculated for all three nights was 61.31%. The rate was unexpectedly high as there were a large number of high school students attending the events for extra credit from their English teachers. This led me to believe that apathy would result from these students, thus providing a low response rate (under 50%), but of course, was not the case with the data.

The number of surveys that were "useable" for data estimation were also included in Table 1. I define surveys as unusable when the respondent provided irrational answers to the majority of the questions on the survey. An example of this would be a high school student stating they had seven or more children and spent thousands of dollars on gambling the night of the event. Responses like this indicated that the person protested the survey or this study[9]. After excluding those surveys however, the majority of the

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[7] Author Tom Perotta was the guest speaker for the first event. After receiving the responses from this night, problems were found with the survey design that were necessary to correct before the second event. Namely, these corrections entailed adding an omitted age category and altering the scale for each category of income.

[8] This high attendance could also be attributed to the event's promotion through other organizations (like Latino organizations, as indicated through some responses from the surveys), as she was on a national book tour at the time.

[9] Hansen (1997) elaborates on the concept of protesting, non-response, and "protest bids" in her study on the WTP for the Royal Theatre in Copenhagen.

surveys received were able to be included in the data set. Thus the final number of data points included in all of my estimations is 449.

The survey was designed as a 14-question, one page questionnaire so as to require little work on the part of the respondents. Moreover, it was hypothesized that making the survey easier to fill out would improve my overall response rate. The majority of the questions were also closed-ended, which contributed to my high response rate as well (Hansen, 1997). The only question that was open-ended was number 14, where I asked respondents to state how much they spent on a number of categories the night of the event. A list of all variable and their definitions are listed in Table 2[10]. The actual survey distributed to the audience may be given upon request.

Inherent in most surveys whose purpose is to extract an individual's WTP for a good are questions regarding demographics. I included typical demographic questions: age, sex, ethnicity, marital status, household income, number of children, and education level. I also asked if the individual was currently a student at UNLV to study the effects of "word of mouth" and advertising on campus. Not surprisingly, 30% of the respondents were UNLV students.

Question 14 elicited the amount of money an individual spent on the event night. It was this data that was used in the IMPLAN estimation for the economic impact of the WITS program. Another question that was included for impact purposes was the number of minutes it took for someone to drive to the event. This served as a proxy for the amount of money someone spent on gas driving to the event. I will discuss later how these values will be used in the input-output model.

[10] Note that the number of questions does not equal the number of variables. This is because, for estimation purposes, the categories from each question had do be separated into their own variables (into values of 1=yes and 0=no in most cases).

Finally, Question 12 asked the respondent their WTP for the event. The survey was based on an actual event, so the question concerning willingness to pay was slightly different than that of the same question on a contingent valuation survey. Essentially, there were six different bid prices that the individual was asked if they would or would not be willing to pay to attend the event. These values were $5, $10, $15, $20, $25, or over $25. One value was on each survey, so as to randomize the data. This bidding approach has two major advantages. Primarily, the questions are akin to the decisions consumers make daily on purchases i.e. they decide to purchase or not purchase a good based on a given price. Secondly, it is possible to determine if their response follows the theory that as the bid price rises, the WTP for the good falls (Thompson, et al. 2002).

Descriptive Statistics

Table 3 contains the descriptive statistics of all variables from the survey. The data from all three events were pooled to as to have the maximum sample size subject to the amount of data. The data can be divided into five major categories: demographics, how the respondent heard about the event, transportation, WTP, and the money they spent the evening of the event.

The mean age for an attendee was 26.53 years. This was calculated by rewriting the AGE variable as the midrange age in each category given[11]. Further, 67% of the respondents were never married, 31% were UNLV students, and 23.11% had only completed some college[12]. These numbers were not surprising as there were a large number of students, both high school and college, at each event. 23.11% also responded

[11] In general practice, calculating the midrange of each category of a question is used when there are several responses to a question.
[12] As seen in Table 3, these categories had yielded the highest percentages out of their respective questions.

to "other" in the education category, explaining that those in high school had not received their degree yet, or that they are in the process of obtaining a degree of some sort.

Moreover, over 72% of the respondents were female, 56% were Caucasian, and the average number of children in a given household was 0.72. As with the AGE variable, the CHILD variable had to be rewritten to reflect the midrange of children in each category. Finally, the mean income of a respondent was $51,446.00. Once again, the POOLINCOME variable had to reflect the midrange of each category of income.

Unexpectedly, the majority of respondents stated that they heard about the event from a source other than those given in question 9. All of the respondents stated word-of-mouth of some form (wife, child, teacher, or friend) as the source rather than formal advertising. Not surprising, however, was the 92% of respondents that traveled by automobile to the event. With respect to money spent on the evening, more money was spent on meals, with a mean of $10.31. 39% of the respondents also claimed they would buy the book from which the author was reading. This would be compared to the actual number of book sales for validation, but those numbers could not be released from the book distributor.

Perhaps most importantly, we see the responses to the bids provided. The bottom of Table 3 shows the percentage of the respondents who answered affirmatively to a bid sorted by each bid category ($5-$25). As the bid price increases, the percentage of people willing to pay the bid does not decrease at every interval. This is common in CV literature, as one cannot control for everything when computing simple means in the data.

In this study, the range of the bid set may not have been large enough. If I had offered the bid range, perhaps in increments of $2.00 from $0 to $30, I might have gotten

different responses from the audience. Specifically, I might have gotten a larger portion of the audience to answer with an affirmative response to a bid, providing more information on what determines a person's WTP. However, a negative sign is shown on the bid amount variable in the next chapter, so this phenomenon is acceptable in the data.

Delving deeper in the data, though, this phenomenon could also be due to the majority of the responses coming from the evening in which Sandra Cisneros was the guest speaker. As previously stated, the majority of responses, 52%, were obtained at this event. Furthermore, the responses from the Cisneros event comprised of between 55% and 67% of the responses in each bid category. People attending this event could be willing to pay more because they are more familiar with her work, are impressed with her notoriety, or any number of reasons.

The total percentage of the audience that responded "yes" to a bid totaled 31.57% of the given sample. With this large amount of rejection of bids (about 70%), the mean WTP found in the next section could be undervalued, thus the results from the model must be evaluated closely. This low percentage is very common in survey responses, however, and thus will not be a source of great worry in the model results. Ultimately, the data follow the theory that as bid price rises, the odds of an individual accepting the bid falls.

Random Utility Models

A Random Utility Model (RUM) is the theoretical model upon which I base my study. In a RUM, we estimate at what value will the utility of accepting a bid exceeds that of rejecting it. For the purpose of this study, this value is calculated as the mean

WTP of an individual. To find this value, I employ both the logit and probit methods of estimation in the theoretical model. Because so much of the CVM literature is divided between the two methods, I chose to show both results for comparison purposes. RUMS motivate binary choice models because they provide the underlying theory for the reasons of choosing one option over another. The RUM allows us to examine the utility gained or lost by a person as a result of their decisions.

Random Utility Models and Logit

A RUM is not a conceptual model in itself, so both the logit and probit models are utilized to estimate the mean WTP to attend the public events. Combining the two will provide a strong base under the regressions used in this study. This section will incorporate the RUM theoretical structure with logit theory to ultimately present the equation calculating the mean WTP. More specifically, I follow the RUM explained in Parsons (2001) along with fundamental logit theory in Kennedy (1998) to estimate the mean WTP.

In his paper, Parsons (2001) describes the use of the travel cost RUM to evaluate environmental resources. He argues that the strength of this model over others is that it can account for substitutes in valuation of a good. Also, it is possible to determine what factors influence the individual to choose one option out of a set of two, as in contingent valuation studies. This version of the RUM (though not an exact replica) serves as the basis for my model.

The structure of a RUM in the context of this paper stems from the theory that the utility gained from accepting a bid is greater than the utility gained from rejecting it.

Thus, for each individual, the chosen response to a bid is assumed to have the higher utility. We see that the utility from paying a bid to enter the event is:

$$(1)\ U_1 = \beta_1 x_{1i} + \mu(Y_i - A_i) + \varepsilon_{1i}$$

where x_i is a vector of demographics and dummy variables for the event night, and β is an unknown parameter vector. Also, Y_i is income, A_i is the bid amount, and ε_i is the random error.

Alternatively, we see that the utility from not paying a bid is:

$$(2)\ U_0 = \beta_0 x_{0i} + \mu Y_i + \varepsilon_{0i}$$

where all variables represent the same demographics as in equation (1). From both (1) and (2), it is hypothesized that those with higher education and age will gain more utility by paying a bid amount from this event. Further, due to the high percentage of the data coming from the Cisneros event, it is assumed that less utility will be gained (resulting in the rejection of bids) from the Miller and Karr events when compared to the Cisneros events. If a person pays a given bid to enter the event, a person is expected to have a utility of:

$$(3)\ U_1 > U_0,$$

which simply states that the utility of accepting a bid is greater than the utility from rejecting it. Because the utilities in (1) and (2) have errors associated with them, we consider the probability of observing a respondent's choice. Thus the probability of observing an individual choosing to accept a bid is:

$$(4)\ P(accept) = P(U_1 > U_0) = P(\ \beta_1 x_{1i} + \mu(Y_i - A_i) + \varepsilon_{1i} > \beta_0 x_{0i} + \mu Y_i + \varepsilon_{0i} =$$

$$P(\beta x_i - A_i > \varepsilon_i),$$

where $\beta x_i = \beta_1 x_{1i} - \beta x_{0i}$ and $\varepsilon_i = \varepsilon_{1i} - \varepsilon_{0i}$. Note that income has cancelled from the equation, which is consistent with the assumption that the model is linear in income.

Because this model assumes a logistically distributed random error, we can write the logistic distribution function for a logit model as:

$$(5)\quad P(accept) = \frac{\exp(\beta x_i - \mu A_i)}{1 + \exp(\beta x_i - \mu A_i)}.$$

Other distributions (like the cumulative normal distribution in the next section) are possible by substituting $\Phi(z)$ for P(accept) in (4). Again, logit's simplicity is the most prominent reason that authors have relied so heavily on logit estimation in their research (Kennedy, 1998). From this, we can derive the likelihood function:

$$(6)\quad L(\beta) = \prod_1 \frac{\exp(\beta x_i)}{1 + \exp(\beta x_i)} \prod_0 \frac{1}{1 + \exp(\beta x_i)}.$$

In (6), "1" refers to those accepting a bid and "0" refers to those who did not. Maximizing this likelihood function with respect to the vector of βs produces the maximum likelihood estimate (MLE) of β. In other words, the vector of βs is most likely to show the pattern of bids accepted actually observed in the data. We can also find the log-odds ratio from the distribution in (5), which is expressed as:

$$(7)\quad \text{Log-odds ratio} = \beta x_i - \mu A_i.$$

Finally, to find the mean WTP to attend the events, the expected maximum utility is computed with and without this change to income. The utility difference (estimation with the change minus the estimation without the change as seen in (4)) is then divided by the parameter estimate on the bid amount (μ). It is found that from (4), several variables (xβs) cancel each other out from both utility equations to yield the final model to estimate the mean WTP calculated as:

$$(8)\ \text{Mean WTP} = -\frac{(\sum \beta \bar{x}_i)}{\mu},$$

where the bar over the x_i indicates the mean values were used. The estimation results are shown in the next chapter.

Random Utility Models and Probit

Probit estimation is different than logit, but only slightly. Gujarati (2003) compares and contrasts the two models in his book. Qualitatively, the estimation results are similar regarding significance and signs of the coefficients. However, the magnitude and interpretation of the coefficients differs. In contrast to the logit model in which the coefficients are interpreted as the change in log odds of the variable with respect to a unit change in the dependent variable, the probit coefficients represent the rate of change in the probability of [Y=1] occurring. There is no definitive reason for choosing logit over probit, but one main reason for choosing probit is that its distribution has fatter tails. This means that the probability of someone accepting a bid will approach zero or one at a slower rate than with logit[13].

To compare the logit and probit methods of estimation, I also compute the same RUM in the previous section now using probit. Though they produce similar estimates, the models are slightly different. The differences between the logit and probit models lie in their distributions and likelihood functions. Instead of the logistic distribution, probit employs the normal cumulative distribution function:

$$(9)\ \Phi(z) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\beta x_i} e^{-z^2/2} dz$$

[13] In the context of this study.

where Φ is the standard normal cumulative density function (CDF). Since P(accept) represents the probability of a "yes" response, it is measured by the area of the standard normal curve from $-\infty$ to U_1 from (1). From this distribution, we can now employ a new likelihood function:

$$(10)\ L(\beta) = \prod_1 \Phi\left(\frac{\exp(\beta x_i)}{1+\exp(\beta x_i)}\right)\prod_0 \Phi\left(\frac{1}{1+\exp(\beta x_i)}\right)$$

again, where "1" is the probability of accepting a bid and "0" is the rejection of a bid. The remainder of the probit model is the same as the logit model described in the previous section. The results from this estimation are shown in the next chapter.

IMPLAN

Input-output models are used to describe flows of commodities from producers to intermediate and final consumers. For estimation of the economic impact of a commodity produced, we analyze the total industry production of commodities, services, employment compensation, value added, and imports. The IMPLAN database and software allows us to accomplish this.

The IMPLAN (Impact Analysis for Planning) system was developed so as to allow for easier estimation of input-output models. There are two components to the system – the database and the software. The database consists of national technology matrices and estimates of sector activity for final demand and payments, along with industry output and employment for every county in the U.S. used with state and national totals. This database provides all information to create a regional IMPLAN model and the software performs the calculations and provides an outlet for a person to make final demand changes. 528 industrial sectors are included in the database.

Final demand changes were made for the purposes of this study. The total dollar amounts were obtained from each category in question 14 (and question 11) then inputted directly into the software. This is how we can directly assess the impact that these events impacted the local economy. Some categories had to be combined before entering into the software, however. "Meals" and "drinks" (alcoholic and non-alcoholic) had to be combined into the same category. All other categories (including gas) were inputted into their own fields. The results from recording these changes yield information on the corresponding changes in final demand, output, income, and employment. In the case of this study, however, I focus directly on the total output, value added, and employment effects of the public events held at UNLV.

As was previously stated, the majority of the data used inputted in this software was derived from the final question of the survey (number 14). In this question, I asked the audience if they could estimate how much they spent in certain areas on the event night. These categories (as shown on the survey) were grouped by meals, drinks (alcoholic and non-alcoholic), parking, gaming, babysitter, and other.

Further, I also included a question (#11) inquiring about the length of the drive to the event. This was used to extract the amount of money the average person spent on gas that evening. The assumptions I made were that a person could drive approximately 15 miles in the average of 24.32 minutes, and 15 miles required the use of approximately 1 gallon of gas. Thus, the total amount of money that the audience spent on gas was calculated by multiplying $1.70[14] by the total number of people in the audience (approximately 1,450 people). To be realistic, however, I multiplied the gas price by

[14] This was the average gas price per gallon in the first quarter of 2003, during the time of the events. The number was obtained from The Federal Reserve Bank of Dallas' website.

50% of the estimated attendees as most people are assumed to have driven with someone else. In other words, it was unrealistic to assume that every person in the audience drove in a separate vehicle. This value, along with those from question 14, were then inputted it into the IMPLAN software. The results from this estimation are discussed in detail in the next section.

CHAPTER 4

DATA ANALYSIS

Employing those methods discussed in Chapter 3 yielded coherent results that are consistent with economic theory. In this section, I will compare the results from the estimation of both RUMS using logit and probit. I will also discuss the results from the IMPLAN input-output model and its implications.

Results from the Logit Regression

Table 4 contains the results of the logit regression used in the RUM from the previous chapter. From equation (9), the mean WTP for all three events may be calculated. Before discussing the final value of the mean WTP, I analyze the logit results.

The first column states the variable entered into the equation and the second shows the logit coefficient of the variable (i.e. the effects of those variables on WTP). All coefficients in a logit model represent the change in log-odds of a variable given a one unit change in WTP. Recall the log-odds ratio given in equation (7) for each coefficient. The coefficients can be interpreted, depending on their sign, as an increase (+) or decrease (-) in the odds that the individual will be willing to pay the bid amount offered in the survey. Furthermore, those numbers under the coefficients are the z-statistics with asterisks representing the significance of the variable in the equation.

Demographics are critically important in determining a person's WTP to enter these public literary events. In order to analyze a person's decision to accept or reject a bid, it is necessary to find out more about a person's background. For example, if a person rejected a bid, some factors explaining this could be that he or she is a high school student with virtually no income. Also, demographics are important for the validity of the results, meaning that if they follow theory, the model is coherent and valid. In this paper, I include age and education in the regressions to find if WTP does increase with age and education, as theory suggests.

All ethnicity variables but "WHITE" were originally entered into the equation, as that was the largest ethnic population in the data and was used as the base for comparison[15]. After estimating the regression, however, "BLACK" proved to be insignificant in determining WTP and was thus taken out of the model. The remaining ethnicity variables proved significant to the model. "ASIAN" was negative and significant at the 10% level, indicating that the group was less likely to accept a bid than Caucasians to attend the events. "HISPANIC" and "NATIVE" were positive and significant at the 1% and 10% levels, respectively, indicating that they were more likely to accept a bid than Caucasians. Finally, "ETHOTHER" was not significant in the model. However, excluding this variable proved to be detrimental to the entire equation by causing some variables to be insignificant that were previously significant. Thus, rather than creating omitted variable bias, the variable was left in the model.

In theory, higher educational attainment is hypothesized to increase an individual's willingness to pay for arts events. Again, all levels of education from the survey were entered into the equation. High school graduates were used as the

[15] None were expected to have a specific sign on the coefficients.

comparison group and those with "SOMECOL" proved highly insignificant in the model and thus were left out. "MASTER" and "EDUOTHER"[16] were positive and significant at the 1% and 5% levels, as follows with theory. The coefficients indicate that those with a master's degree or some education other than the options listed were more likely to pay to attend the event than those respondents who have obtained a high school diploma. Moreover, "ADVDEG" and "COLGRAD" have the expected positive signs, but are insignificant. Again, these were not omitted as they still contributed to the model. Though the coefficients on the education variables produced the expected positive signs, the magnitudes of the coefficients do not. The significant education variables follow theory, as the magnitude of "EDUOTHER" is less than "MASTER." The "EDUOTHER" variable could account for the respondents that stated they were in the process of getting a degree higher than a college degree. The other education variables do not follow theory, which may be due to the small percentage of the sample stating they were willing to pay a bid to enter the event or the bid range, which will be discussed later in the chapter.

Of the marital status variables, "MARRIED" was the only group that was left in the model, as it was the only variable that was significant (15%). The sign on the coefficient showed that this group was less likely to pay a given bid amount to attend the event. The other marital status variables were not significant and improved the model with their exclusion. "AGE" had the expected positive sign, and was significant at the 5% level. Theory suggests that as age increases, so does income and occupation level,

[16] Many individuals answered this question indicating that they had some sort of vocational degree or other type of schooling higher than a high school diploma. Some also answered that they were still in high school and others indicated that they were in the process of obtaining a degree higher than college.

thus older people will be willing to pay more for an arts event (or some other good or service).

Finally, as the data from all three events were pooled, it was necessary to enter variables that represented each night of the event. This allows for us to examine the different values the audience members place on each different speaker. The variable representing the night in which Sandra Cisneros was the speaker represented the largest portion of the data, so it was used as a base for comparison. Those variables for Miller and Karr produced the expected negative signs in comparison to the Cisneros event, indicating that the respondents that attended those events were less likely to pay to attend the events than those in the Cisneros audience. Both coefficients were significant at the 10% and 5% levels, respectively for Miller and Karr.

The fact that Cisneros was the most widely known speaker and the audience members were more likely to pay a bid amount to attend her public reading has certain implications for the WITS program. This suggests that those authors with more notoriety will attract more people, and perhaps more money. People will be willing to pay to see these authors, and perhaps spend more on other categories during the event evening. Hence, bringing more famous authors to the university will have a positive impact on the outcome of the WITS program in the future. I also attempted to use interaction variables between the event night and the bid price. The purpose of the interactions was to find if individuals would pay more or less to see Karr and Miller than Cisneros, but those variables were highly insignificant in the model.

Usually, multicollinearity is suspected in a model if hypothesized signs are not found in the regression results, when variables known to be important have insignificant z

(or t) values, or finally when regression results change substantially resulting from a deleted variable (Kennedy 1998)[17]. As the former two are inherent in my results, it would follow that multicollinearity exists in my model. However, after creating a correlation matrix including all of the variables in the original model, no collinearity among variables was found[18]. This requires analyzing the original data again to find the source of the problem. Recall that 31.57% of the entire sample indicted that they were willing to pay the bid amount offered. The large number of [Y=0] answers that resulted are hypothesized to have contributed to the high sensitivity of the variables in the model. Because such a small portion of the sample represented the WTP [Y=1], entering or omitting certain variables could have had a great impact on the results. This could be corrected with a change in the bid range, mentioned earlier in the paper.

Furthermore, the small sample could have caused insignificance in variables. If the sample size were greater, the sensitivity in the model would be reduced and more variables would follow theory. Again, these results are common in survey data (especially with small sample sizes), as we can't control for everything that contributes to a person's decision to accept or reject a bid.

Results from the Probit Regressions

Recall from the last chapter that the probit coefficient estimates are interpreted as the rate of change in the probability that [Y=1]. Keeping this in mind when looking at Table 5, it is possible to interpret the probit estimates. All variables are the same as those included in the logit model, and for the same reasons. It follows that, because of their

[17] Multicollinearity occurs in a model when there is an approximate linear relationship among regressors.
[18] Creating a correlation matrix of all independent variables in a model is the easiest way to detect collinearity between two variables.

qualitative similarities, the signs on all coefficients are identical. Also, it is found that both results yield the same significance of the variables as well, though some at slightly different levels.

Gujarati (2003) explains further that the coefficient estimates from the probit and logit models are different, but minutely. Because of their respective distributions, the coefficients are slightly different. The logit model has a logistic distribution with a mean of zero and a variance of $\pi^2/3 \approx 22/7 \approx 1.81$. The probit model employs a standard normal distribution with a mean of zero and a variance of one. Thus, by multiplying the probit coefficients by 1.81, we can approximately get the logit coefficient. This proves true for my models[19].

Marginal Effects of Key Variables

Because the exact effects of the logit and probit coefficients are not represented in the estimation of the logit and probit regressions, it is necessary to calculate each regressor's marginal probabilities. Marginal probabilities yield the change in the probability of the dependent variable given a one unit change in the independent variable. Thus, they represent the estimates of the relationships between the independent and dependent variables, and are subject to statistical error. As previously stated, the logit and probit estimates are similar, thus I present only the marginal probabilities of the probit coefficients[20].

All education variables yield positive marginal probabilities, as expected. Given a one unit change in the "COLGRAD" and "EDUOTHER" variables, the probability of

[19] Hanemann and Kanninen (1998) also agree with the similarities in logit and probit coefficients.
[20] Both the logit and probit marginal probabilities were calculated, and the estimates were not equal by approximately 1/1000 of a percent.

an individual stating that they were willing to pay a bid offered is 7.60% and 11.05%, respectively. Further, a one unit change in the "MASTER" and "ADVDEG" variables yielded 16.77% and 13.57% changes in the probability of a person willing to pay a bid to enter the events. Note that all marginal probabilities of the education variables follow the theory that as education level increases, so does their WTP probability. The magnitude of the marginal probabilities also increased at each education level, except for the "ADVDEG" variable. As previously discussed, this phenomenon is acceptable in this study.

The age and ethnicity marginal probabilities were also calculated. As age increases by one year, WTP increases by .41%. Also, the variable representing "NATIVE" proved to increase the probability of a person WTP by 32.04%. This is inflated as we see from the descriptive statistics that this group represented only 1.35% of the entire sample, however. "HISPANIC" and "ETHOTHER" also increased the probability of a person WTP by 13.90% and 5.98%, respectively. The only ethnicity variable that decreased WTP was "ASIAN," by -19.68%.

Goodness-of-Fit

It is the consensus among researchers that there is no universal measure of goodness-of-fit for dichotomous dependent variable models. There are however different indicators of goodness-of-fit that many authors agree upon. Thus, I rely on the McFadden R-squared coefficient and log likelihood ratios to determine if the variables in my models are adequate in determining the willingness to pay to attend the WITS events.

The McFadden R-squared is loosely defined as the likelihood ratio index and is an "analog" to the R-squared in linear regression models (Gujarati 2003). This value also lies between zero and one. In both models, this value was approximately 0.19.

From this number, it does not seem like the model is a "good fit" for the data, but low McFadden R-squared numbers are common in research. For additional internal validity, log-likelihood ratios are employed to show the overall significance of the model. Table 5 presents the log-likelihood ratios for each of the variable groups used in both models. The ratio is used to show the significance (or contribution) of each group of variables to explaining the WTP for the events. The ratios (and their probabilities) are computed by performing a redundant variable test for each group of variables from the unrestricted models to test the null hypothesis that all the slope coefficients are simultaneously equal to zero[21].

Most variable groups proved to contribute significantly to the model at the 1% or 5% levels as expected. The significance was the same for both the logit and probit estimations. Three groups of variables did not contribute significantly to the model. Women and marital status did not determine significantly the odds of WTP for the events. Curiously, those variables representing each speaker night did not prove to be significant to the entire model, but they were significant with the expected signs when the logit and probit models were estimated. This may be due to the fact that those variables were only entered into the model to distinguish between all three nights, as the data were

[21] The unrestricted regressions contain all variables but the base variables in each variable group. Also, the LLR is comparable to the F-statistic in linear regression.

pooled. The unrestricted models produced significant log-likelihood ratios. This indicates that both models were significant[22].

Mean WTP Values

Subsequent to assessing the components of the RUM, we can now solve for the mean WTP for all three events. Following equation (9), the estimation yields a mean WTP of $6.72. This is a reasonable estimate considering the data used for estimation. If I were to assess only the WTP for the Cisneros event, this mean value would be upwards of $20.00 as most of the respondents indicated that they would be willing to pay this amount[23]. After combining data from all three events, we see that the Karr and Miller events brought the mean WTP well below $20.00. Again, this estimate seems reasonable when considering that approximately 70% of the entire sample were not willing to accept a given bid amount to attend the guest speaker events. Also, this is comparable to the price of a movie ticket in Las Vegas, which adds to the legitimacy of the mean value.

After the similarities were found between the models as suggested in the literature on the subject, it was possible to estimate the mean WTP with the probit coefficients. Using the same equation (9), the mean WTP to pay to attend the events was $6.75, only $0.02 higher than the logit estimate. The same reasoning for this estimate follows that from the logit results section.

[22] As shown in the results for the logit and probit models, I did not use the unrestricted model for the final estimation of mean WTP. The models were still significant and the McFadden R-squared decreased only slightly with the subtraction of some of the variables.
[23] Recall that over 50% of those who were willing to pay a bid amount stems from the Cisneros event.

Comparison of WTP Estimates with Other Studies

No price was or is planned to be charged for these events, but it is still necessary to find some measure of value the public places on the events. As indicated in the review of the literature, several researchers have estimated the mean WTP to find the value that individuals place on the arts or related areas. Other values of WTP for the arts have been within the range of the values found in the logit and probit models above. Table 6 shows what other researchers have calculated as the WTP for some form of arts events and related areas of research. Hansen's estimate of individual's WTP to maintain the Royal Theatre in Denmark is 154 DKK, or US $24.04. This is relatively high, but the Danish may value this specific theatre more than they value the arts events it hosts. This was suggested in her study as she believes that the Danish are willing to pay the "option price" for the possibility of being able to attend the theatre. Also, in comparison to the mean WTP values estimated by Thompson, et al. (2002) for all households, my estimates seem to be reasonable. I do not compare my estimates to their values for arts patrons households, because my sample consisted of random individuals in the Las Vegas area that attended the WITS event. It cannot be assumed that, because the individuals attended these events that they are considered regular "arts patrons."

Finally, I compare my mean WTP estimates to the WTP estimates found by Riddel and Schwer, (2003) for entrance into the Atomic Testing Museum in Las Vegas. I compare my estimates to the values the authors estimated for residents, however, since my sample was taken from the Las Vegas population. My estimates are very similar to those found in their study with respect to the adult prices, which adds to the validity of my results. Estimates in both studies are comparable to the price of a movie ticket. It is

also worth noting that the estimates are very reasonable despite the competitive nature of the entertainment industry in Las Vegas.

Further, as in Riddel and Schwer (2003), it can be noted that price discrimination may apply to this study as well. This is implied as an increase in age yields a higher WTP to enter the event. Thus, if a price were to be charged to enter the public readings, the program may offer discounts for UNLV students, high school students, and perhaps seniors so as to increase revenues from the program.

IMPLAN Input-Output Model

Through the IMPLAN database and software, it was possible to find the value added, employment, and the total output impact of the WITS program. Table 7 shows the results from the input-output model. The results are categorized into four columns. The first column shows the direct effects on a given category given the changes made to final demand. The second shows the indirect effects given the changes in final demand, and the third column reveals the induced effects (or household expenditure effect) given the changes made to final demand in the IMPLAN software. Finally, the last column shows the total effects of each category which is calculated by summing the previous three columns.

Value added impacts include four sub-components: employee compensation, proprietary income, other property type income, and indirect business taxes. Employment compensation is wage and salary payments (as well as fringe benefits) and provides a measure of income to workers who are paid by employers. Proprietary income includes any payments received by self-employed individuals as income. Other

property type income covers payments from rents from property, royalties from contracts, and dividends from corporations (also profit earned by corporations). Finally, indirect business taxes consist of excise and sales taxes paid by individuals to businesses, but not on profit or income. The total value added resulting from the changes made to final demand is $25,426.00.

Employment effects are also shown in Table 7. Employment, in the database, is the total wage and salary and self employed jobs in a region. The total number of jobs given the change in final demand from the WITS events is 0.9. This small number is not surprising given the small amount of data used in the IMPLAN software.

Total output is also measured through the changes in final demand made to the database. This is the total output from all industries given the change in final demand. From the WITS program, the total output is $41,897.00.

CHAPTER 5

CONCLUSION

The purpose of this study was to find the value, through the mean WTP, that the public placed on the attending the guest speaker events as well as the WITS program's economic impact. Estimating logit and probit regressions yielded mean WTP estimates of $6.73 and $6.75, respectively. From these dollar estimates, it is possible to see that the audience values the public events at least as much as a movie ticket in Las Vegas. Further, the WTP estimates are comparable to other findings from previous studies, especially that of Riddel and Schwer (2003). Considering the competition for entertainment in Las Vegas, these values are very reasonable.

These WTP values are important as they show that audience members do place some value on attending these literary arts public events. It seems that if the writer is more nationally known, individuals are willing to pay more to attend the reading. Also, marketing will prove to be important to the success of the public events if the program is to be hosted at UNLV in the future.

Both logit and probit estimations were used so as to show their similarities. The likelihood estimation of the coefficients are the same but for their distribution functions. The logit employs a logistic distribution of the error terms, and probit employs the cumulative normal distribution. Also, if the probit estimates are simply multiplied by 1.81 (the variance of the logit distribution), the coefficients are almost identical. Both

methods produced comparable estimates, as shown in Table 4, regarding the significance and signs of the variables but for the significance of the "NATIVE" variable. Though significant in the logit model, this variable was insignificant in the probit model. Variables in both models that were expected to be significant were not, and this is hypothesized to be due to the small percentage of the sample (31%) stating they would be willing to pay to attend the events as well as the small sample size.

These demographic and WTP results prove to be significant in their implications to the Las Vegas community. They show primarily that literary arts events are valued to the community, in spite of the great competition for entertainment that exists in the city. The demographics provide useful information about who attended the events and what factors contributed to a person's likelihood of paying to attend the public readings.

The economic impact of the program was estimated from the monetary amounts that the audience stated they spent in different categories on the event evening. These values were inputted into the IMPLAN software as changes in final demand. The sum of the direct, indirect, and induced effects yielded the total impact on three major areas. The value-added impact was estimated as $24,526. Also, the total employment impact indicated that 0.9 jobs resulted from the money spent on the event nights. Finally, the total output impact was an estimated $41,897.

From the responses to the surveys, we can see that the WITS program held at the UNLV campus did have an impact on the Las Vegas community. The numbers from the IMPLAN input-output software yield significant monetary contributions to the community despite the fact that the program was relatively small. Implications of this program could warrant more literary arts programs at UNLV and perhaps Las Vegas.

Further, these results are useful to show that a program such as the WITS program can be successful in a city where there is so much competition for entertainment.

Further research needs to be done to enhance the validity of the models described in this study. Perhaps most importantly, if the WITS program is to be held at UNLV in the future, a comparison study will be useful in providing both external and internal validity to this paper. The survey method should still be employed, but its design should be enhanced so as to extract more information from the respondents. Specifically, a scale should be included as in Thompson, et al. (2002) so that the respondents can indicate the certainty of their bid. This will provide more information on the audience's "true" preferences. Also, the survey should ask questions regarding a person's past use of the arts, theatre, or literary event. This will give more information on the audience attending the WITS events and perhaps provide a better understanding of what attracted the individuals to the public events. Outside the scope of this paper, much research needs to be done regarding the valuation of the (literary) arts in Las Vegas. As the city is gradually shifting its focus to more cultural entertainment, this research is becoming more important and must be studied further.

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Table 1
Response Rates for Each Night of the Event

Attendance	Mary Karr	Sandra Cisneros	E. Ethelbert Miller	Total
Estimated Attendance	400	800	250	1450
Number of Surveys Handed Out	274	408	109	791
Number of Surveys Received	114	282	89	485
Number of Surveys that were Usable	104	261	84	449
Response Rate	41.61%	69.12%	81.65%	61.31%

Table 2
Definitions of All Variables

Variable	Definition
AGE	age of respondent
FEMALE	1 if female, 0 if male
ASIAN	1 if asian, 0 if not
BLACK	1 if black, 0 if not
ETHOTHER	1 if other than asian, black, hispanic, white, or native american
HISPANIC	1 if hispanic, 0 if not
WHITE	1 if white, 0 if not
NATIVE	1 if native american, 0 if not
MARRIED	1 if married, 0 if not
NEVERMAR	1 if never married, 0 if not
DIVORCED	1 if divorced, 0 if not
CHILD	Midrange of the number of children in each category (see survey)
POOLINCOME	Midrange of household income in each category (see survey)
ADVDEG	1 if obtained an advanced degree (PhD, MD, etc.), 0 if not
COLGRAD	1 if graduated from college, 0 if not
HSGRAD	1 if graduated from high school, 0 if not
MASTER	1 if obtained a masters degree, 0 if not
EDUOTHER	1 if obtained some other degree than those listed, or no degree, 0 if obtained another degree
SOMECOL	1 if completed some college, 0 if not
STUDENT	1 if student at UNLV, 0 if not
NEWSPAPER	1 if heard about event through newspaper, 0 if not
MERCURY	1 if heard about event through Mercury Newsweekly, 0 if not
CITYLIFE	1 if heard about event through CityLife Newsweekly, 0 if not
POSTERS	1 if heard about event through UNLV posters, 0 if not
HEAROTHER	1 if heard about event through another source (friends, teachers, etc.), 0 if not
TV	1 if heard about event through television, 0 if not
EMAIL	1 if heard about event through email, 0 if not
RADIO	1 if heard about event through radio (KNPR), 0 if not
WALK	1 if walked to event, 0 if not
TAXI	1 if traveled by taxi to event, 0 if not
BIKE	1 if biked to event, 0 if not
BUS	1 if traveled by bus to event, 0 if not
CAR	1 if traveled by automobile to event, 0 if not
OTHERCAR	1 if traveled to event by another method than listed, 0 if not
DRIVETIME	# minutes to get to event
POOL5	1 if willing to pay $5, 0 if not
POOL10	1 if willing to pay $10, 0 if not
POOL15	1 if willing to pay $15, 0 if not
POOL20	1 if willing to pay $20, 0 if not
POOL25	1 if willing to pay $25, 0 if not
POOLOVER25	1 if willing to pay over $25, 0 if not

Table 2, continued
Definitions of All Variables

Variable	Definition
BOOK	1 if planning to by the book, 0 if not
POOLMEALS	amount of money spent on meals
POOLALC	amount of money spent on alcohol
POOLNONALC	amount of money spent on non-alcoholic drinks
POOLGAMING	amount of money spent on gaming activity
POOLOTHER	amount of money spent on anything else other than the categories listed
POOLPARK	amount of money spent on parking
POOLSITTER	amount of money spent for a babysitter

Table 3
Descriptive Statistics for All Variables from the Surveys

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
AGE	26.5313	13	71	13	17.2006	448
FEMALE	71.60%	1	1	0	45.15%	419
ASIAN	9.19%	0	1	0	28.92%	446
BLACK	6.73%	0	1	0	25.08%	446
ETHOTHER	8.02%	0	1	0	27.19%	449
HISPANIC	19.06%	0	1	0	39.32%	446
WHITE	56.05%	1	1	0	49.69%	446
NATIVE	1.35%	0	1	0	11.53%	446
MARRIED	23.76%	0	1	0	42.61%	442
NEVERMAR	67.19%	1	1	0	47.00%	442
DIVORCED	9.05%	0	1	0	28.72%	442
CHILD	0.7179	0	8	0	1.3513	436
POOLINCOME	$51,445.78	$45,000.00	$125,000.00	$7,500.00	$44,327.91	415
ADVDEG	5.95%	0	1	0	23.68%	437
COLGRAD	16.93%	0	1	0	37.55%	437
HSGRAD	16.25%	0	1	0	36.93%	437
MASTER	14.65%	0	1	0	35.40%	437
EDUOTHER	23.11%	0	1	0	42.20%	437
SOMECOL	23.11%	0	1	0	42.20%	437
STUDENT	30.95%	0	1	0	46.28%	433
NEWSPAPER	6.74%	0	1	0	25.10%	445
MERCURY	0.90%	0	1	0	9.45%	445
CITYLIFE	2.70%	0	1	0	16.22%	445
POSTERS	4.04%	0	1	0	19.72%	445
HEAROTHER	72.58%	1	1	0	44.66%	445
TV	0.67%	0	1	0	8.19%	445
EMAIL	8.54%	0	1	0	27.98%	445
RADIO	3.82%	0	1	0	19.19%	445
WALK	5.38%	0	1	0	22.59%	446
TAXI	0.22%	0	1	0	4.74%	446
BIKE	0.22%	0	1	0	4.74%	446
BUS	1.35%	0	1	0	11.53%	446
CAR	91.26%	1	1	0	28.28%	446
OTHERCAR	1.57%	0	1	0	12.44%	446
DRIVETIME	24.3175	20.00	225.00	0	15.7792	422
POOL5	17.37%	0	1	0	37.93%	449
POOL10	14.70%	0	1	0	35.45%	449
POOL15	15.37%	0	1	0	36.10%	449
POOL20	19.15%	0	1	0	39.39%	449
POOL25	16.04%	0	1	0	36.73%	449
POOLOVER25	17.37%	0	1	0	37.93%	449

Table 3, continued
Descriptive Statistics for All Variables from the Surveys

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
BOOK	38.75%	0	1	0	48.78%	400
POOLMEALS	$10.31	$5.00	$100.00	$0.00	$15.43	448
POOLALC	$2.55	$0.00	$50.00	$0.00	$6.84	448
POOLNONALC	$1.71	$0.00	$200.00	$0.00	$9.75	448
POOLGAMING	$2.12	$0.00	$150.00	$0.00	$13.97	448
POOLOTHER	$2.45	$0.00	$50.00	$0.00	$7.08	448
POOLPARK	$0.23	$0.00	$15.00	$0.00	$1.26	448
POOLSITTER	$0.59	$0.00	$100.00	$0.00	$5.74	448
KARR	23.16%	0	1	0	42.23%	449
CISNEROS	59.69%	1	1	0	49.11%	449
MILLER	17.15%	0	1	0	37.74%	449
NEWPRICE	-0.0010	-0.0004	0.0000	-0.0040	0.0012	415
AMT$	$16.83	$20.00	$25.00	$5.00	$7.49	449
WTP	31.57%	0	1	0	46.53%	434

Table 4
Results from the Logit and Probit RUMS

	LOGIT	PROBIT
Varibable	Coefficient	Coefficient
C	-0.1074	-0.0586
	-0.26	-0.24
HISPANIC	0.8237	0.4809
	2.73****	2.70****
ASIAN	-1.2570	-0.6810
	-1.94**	-2.01***
NATIVE	1.8634	1.1088
	1.71**	1.63*
ETHOTHER	0.3527	0.2070
	0.85	0.81
COLGRAD	0.4850	0.2631
	1.28	1.18
MASTER	1.0046	0.5805
	2.54***	2.50***
ADVDEG	0.8488	0.4694
	1.54	1.43
EDUOTHER	0.6983	0.3824
	2.16***	2.04***
MARRIED	-0.5695	-0.3572
	-1.56	-1.64
AGE	0.0233	0.0141
	2.24***	2.31***
AMT$	-0.0957	-0.0564
	-5.91****	-6.02****
MILLER	-0.6441	-0.3495
	-1.87**	-1.77**
KARR	-0.6769	-0.4111
	-2.09***	-2.17***
Mean WTP	$ 6.73	$ 6.75

* = 15%, ** = 10%, *** = 5%, **** = 1% levels of significance

Table 5
Log Likelihood Ratios for All Groups of Variables
using the Logit and Probit Methods of Estimation

Variable Group	Logit	Probit
Log Likelihood (unrestricted)	92.2048***	91.7893***
Education	11.7558**	11.5492**
Ethnicity	16.5334***	16.1404***
Female	0.2881	0.5270
Marital Status	2.8863	3.098
Event Night	3.448	3.4138
Bid Amount	40.48212***	40.2133***
Age	6.1750**	6.4190**

* = 10%, ** = 5%, *** = 1% levels of significance

Table 6
Comparison of Mean WTP Estimates from Related Research and the WITS Program Estimates

AUTHOR	PURPOSE	METHOD OF ESTIMATION
Hansen, 1997	to estimate the WTP for the Royal Theatre in Copenhagen and compare that value to the amount of subsidy that the Theatre receives	Hicks' compensating surplus measure
Thompson, Berger, Blomquist, and Allen, 2002	to value the arts among Kentucky (all households and arts patrons households)	Logit regression using data from two surveys mailed to both household groups in question.
Riddel and Schwer, 2003	to find Las Vegas residents' and tourists' WTP to enter the Atomic Testing Museum in NV	Probit regression using data from intercept surveys and a case study comparison of a similar museum
Stikich, 2003	to estimate WTP to attend the WITS guest speaker events so as to find the value that the audience placed on the events	RUM model estimated with logit and probit using data from in-person surveys gathered from three events at UNLV.

Table 6

Comparison of Mean WTP Estimates from Related Research and the WITS Program Estimates

Related Research and the WITS Program Estimates, continued

AUTHOR	MEAN WTP VALUE
Hansen, 1997	154 DKK = $24.04 US
Thompson, Berger, Blomquist, and Allen, 2002	All households: a. Increase arts performances by 25% = $6.21 b. Prevent decrease in arts performances by 25% = $11.44 c. Prevent decrecrease in arts performances by 50% = $26.76 Arts patron households: a. Increase arts performances by 25% = $67.22 b. Prevent decrease in arts performances by 25% = $61.25 c. Prevent decrecrease in arts performances by 50% = $69.95
Riddel and Schwer, 2003	Residents: Adult: $7.63 Child: $4.39 Senior: $7.32 Tourists: Adult: $10.98 Child: $6.85 Senior: $8.51
Stikich, 2003	Logit: $6.73 Probit: $6.75

Table 7
IMPLAN Impact Results from the Total Money Spent on the Event Night

Direct	Indirect	Induced	Total
Value Added:			
$17,195.00	$3,890.00	$ 4,342.00	$25,426.00
Employment:			
0.8	0.1	0.1	0.9
Output:			
$28,936.00	$6,391.00	$6,570.00	$41,897.00

VITA

Graduate College
University of Nevada, Las Vegas

Jennifer C. Stikich

Home Address:
6221 Prairie Brush Court
Las Vegas, Nevada 89141

Degrees:
Bachelor of Science in Business Administration in Economics, 2001
University of Nevada, Las Vegas

Special Honors and Awards:
Hall Fellowship

Thesis Title: Estimating the Economic Impact of the Writers-in-the-Schools Program at UNLV: 2003

Thesis Examination Committee:
Chairperson, Dr. Thomas Carroll, Ph.D.
Committee Member, Dr. Mary Riddel, Ph.D.
Committee Member, Dr. Keith Schwer, Ph.D.
Graduate Faculty Representative, Dr. Douglas Unger, Ph.D.