

Results of an Online West Texas Dark-Sky Economic Survey

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Introduction

A simple economic survey was made available online at www.surveymonkey.com from May 1 – June 1, 2010. The survey consisted of 10 questions asked in response to a short paragraph describing the increased presence of light pollution in three West Texas towns that are all within 30 miles of each other; Fort Davis, Marfa, and Alpine. In addition, the multi-million dollar McDonald Observatory operated by the University of Texas system, located just outside of Fort Davis, was mentioned as a potentially negatively impacted location due to its heightened sensitivity to outdoor lighting conditions immediately surrounding it. In short, as sky brightness levels increase around the observatory the ability to observe faint astronomical objects decreases, which can potentially impact the economic livelihood of the surrounding communities were the observatory to shut down operations. The sample survey was constructed and created by the author.

A link to the online administered survey was made available to those directly concerned with the issues of light pollution and dark-skies. Friends, associates, and colleagues of those affiliated with the Texas Section of the International Dark-Sky Association were emailed a link to the survey. Each respondent was only allowed to complete the survey one time. Respondents had the option of not answering each and every question. By only making the survey available to those involved in dark-sky protection efforts, there will be a distinct bias in any results gathered from it. In particular, we expect overall support for dark-sky protection programs to be higher than those found among a randomized sample of the general population at large. We should also note that respondents did not have to reside in Texas in order to complete the survey, however, a vast majority of them did. Since we were chiefly concerned about the dark-sky protection community at large, we allowed anybody involved in it, no matter where they resided, to complete the survey.

The survey was completed by 29 respondents, though not all respondents answered all questions. Some questions were skipped altogether when a response was required, whereas some were not answered due to the answer the respondent gave to the previous question, which meant that the following question did not require a response. In particular, if the respondent answered “no” to question #1, then a response was not required to question #2. Likewise, if the respondent answered “no” to question #3, then a response was not required to #4, and if question #5 was answered in the negative, then an answer to #6 was not required. There were no instances where a respondent responded to a question that they should not have responded to. However, two of the respondents refused to put down a

numerical dollar answer to question #2 and instead typed a statement noting that their donation amount would “depend on the particular program being implemented by McDonald Observatory.” We recorded a \$0 amount for those two respondents with the belief that they would be willing to only donate to the fund given specifics as to the program being implemented, which we did not provide in this survey.

Summary Statistics

Some summary statistics of responses to select questions follows. Note that the total number of responses to a particular question was determined to be the actual number of responses given for that particular question. In other words, non-responses were not counted as responses.

Yes/No Question Statistics (Table 1)

Question	“Yes” Responses	“No” Responses	Total Responses	Fraction Responding “Yes”	Percentage Responding “Yes”
#1	24	5	29	24/29	82.76%
#3	19	7	26	19/26	73.08%
#5	17	10	27	17/27	62.96%
#6	12	5	17	12/17	70.59%
#10	16	12	28	16/28	57.14%

The above summary statistics table tells that 82.76% of respondents would donate money to a voluntary charitable fund operated by McDonald Observatory whose proceeds would be used to aid local residents and businesses in using outdoor lights that mitigated light pollution in the area (question #1).

73.08% of respondents would donate money, on a monthly basis, to a voluntary trust fund established by their local utility provider whose proceeds would be used to mitigate nighttime sky brightening (question #3). Note here that this question tells the respondent to assume that they live in Fort Davis, Marfa, or Alpine even though they might not. This will introduce bias into our sample because those not living in one of these three towns are not directly familiar with the cost of living and the average income of the area. Thus, respondents living elsewhere might agree to donate money to the utility company assuming that they have the incomes they currently have, which may or may not be an accurate reflection of their incomes (and thus their willingness to donate money) in Fort Davis, Marfa, or Alpine.

62.96% of respondents would accept the addition of a \$3 mandatory fee onto their monthly electricity bill with the proceeds being used to replace street lighting in Fort Davis, Marfa, and Alpine to lights that mitigate nighttime sky brightening (question #5). Again, the survey asks the respondent to assume that they live in any of these three towns, which will introduce bias into the sample.

When the mandatory fee in question #5 was increased to \$6 (question #6), the support rate was 70.59% conditional on the fact that those answering question #6 had responded “yes” to question #5. In other words, having supported a \$3 monthly fee, we wanted to see what kind of support there was for a \$6 monthly fee. In addition, all those responding “yes” to question #5 also answered question #6, which is to say that there were no non-responsive answers to question #6.

57.14% of respondents classify themselves as “amateur astronomers.” This is a demographic question that will be further used later on in our analysis.

Donation amount summary statistics (Table 2)

Question	Number of Respondents	Mean Donation WTP (in \$)	Standard Deviation (in \$)	95% CI (in \$)	T-statistic (H ₀ =0, H _a ≠0)	P-value
#2	24	70.21	99.09	28.37, 112.05	3.47	0.0021**
#4	19	12.05	14.19	5.21, 18.89	3.70	0.0016**

The test statistic of a difference in means t-test is statistically significant at the **1% significance level

The mean WTP amount that respondents would be willing to donate to the McDonald Observatory trust fund is \$70.21 with a standard deviation of \$99.09 (question #3). When a difference in means t-test is carried out with a null hypothesis that the mean donation amount is \$0, we find evidence to reject this null hypothesis at the 1% level. In addition, we are 95% confident that the true mean population donation amount to the McDonald Observatory trust fund is between \$28.37 and \$112.05.

The mean WTP amount that respondents would be willing to donate to their utility company trust fund on a monthly basis is \$12.05 with a standard deviation of \$14.19 (question #4). Again, the difference in means t-test against the null of \$0 is rejected at the 1% level. Furthermore, we are 95% confident that the true mean population donation amount to the utility company trust fund is between \$5.21 and \$18.89.

Note here that there is more variance around the mean WTP on question #2 compared with question #4. In addition, our 95% confidence interval (CI) is higher and wider for the McDonald fund than for the utility company fund.

However, we cannot make any firm conclusions here as to which organization is the preferred administrator of the trust fund since the amount donated to the McDonald fund is a onetime donation whereas the donation to the utility trust fund is a monthly event. If we were to assume, for a moment, that respondents would be willing to donate the amount they specified to the utility company for an entire year (but no longer than that), then we could simply multiply their responses by 12 and determine their yearly contribution.

This would yield a yearly contribution of: **(Table 3)**

Question	Yearly Mean WTP Donation (in \$)	Yearly Standard Deviation (in \$)	Yearly 95% CI (in \$)	T-statistic (H ₀ =0, H _a ≠0)	P-value
#4	144.63	170.25	62.58, 226.69	3.70	0.0016**

The test statistic of a difference in means t-test is statistically significant at the **1% significance level

The yearly mean donation amount for the utility company’s trust fund is \$144.63 per respondent. We are 95% confident that the true population mean of yearly donations among dark-sky advocates is between \$62.58 and \$226.69. As before, the null hypothesis of \$0 is rejected at the 1% level.

Demographic summary statistics (Table 4)

# of Males (percentage of total responses)	# of Females (percentage of total responses)	# of “No Responses” (non-response rate out of 29 respondents)	Total Responses (response rate out of 29 respondents)
20 (74.07%)	7 (25.93%)	2 (6.90%)	27 (93.10%)

Note: Males dominated the response pool and the response rate was high.

Table 5

Mean Age (in years)	Standard Deviation of Age (in years)	Number of responses (out of a possible 29)	95% CI of Age (in years)
54.48	9.40	27	50.76, 58.20

Note: We are 95% confident that the true population mean age of dark-sky advocates is between 50.76 and 58.20 years old.

Survey question #9 asked respondents to list their city and state of permanent residence. In order to use these responses in a meaningful way, the distance (in miles) from downtown Alpine, Texas to the respondent’s city of residence was found and recorded.¹ In the event that the respondent only gave their state of residence, their state’s capital city was used as a proxy for the distance calculation. When the respondent lived in Alpine, their recorded distance was 0 miles. Alpine was chosen as the basis for these calculations since it is region’s largest city in population terms.

Table 6

Mean Distance (in miles)	Standard Deviation of Distance (in miles)	Number of responses (out of a possible 29)
245.81	366.10	28

Note: There were 2 respondents who resided outside of Texas. 14/28 (50%) of respondents resided in Alpine, Texas.

¹ Google Maps was used to locate the distance (maps.google.com)

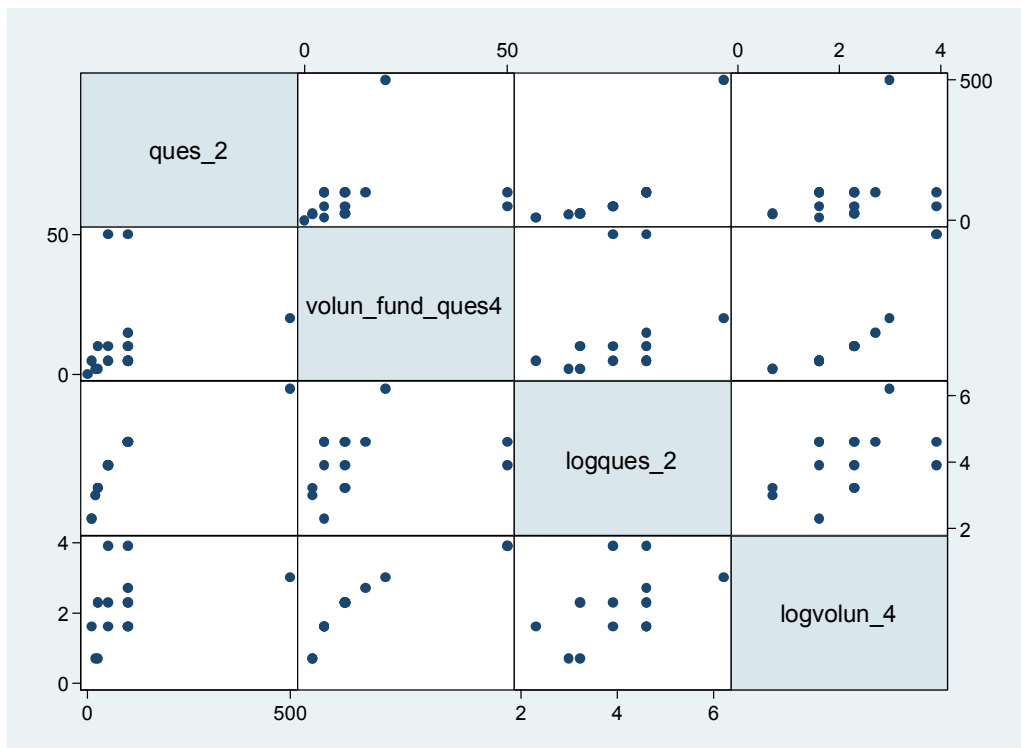
Data Analysis

Question#2 Analysis

We begin with question #2 on the survey, which is the amount of money (in dollars) on an annual basis that respondents would be willing to donate to a trust fund (WTP) established by McDonald Observatory in order to aid local residents and businesses in changing their outdoor lighting designs to those that mitigate light pollution. We found that the mean donation amount is \$70.21 per year, which is significantly greater than \$0 at the 1% level. It should be noted here that question #2 was only to be answered if the respondent answered “yes” to question #1. In this sample, there were no instances where a respondent answered “no” to question #1 and answered question #2.

First, is there a relationship between the amount respondents are willing to donate to the McDonald Observatory trust fund and the utility company trust fund? To answer this, we constructed a scatterplot matrix of question #2, question #4, and their log transformed values (Graph 1).

Graph 1



As evidenced from Graph 1 above, there is a linear relationship between the log transformed question #2 responses and the log transformed question #4 responses. That is to say, there exists a linear relationship between the amounts respondents are willing to donate to the McDonald trust fund and the utility company trust fund.

We next ran a simple OLS regression of these two log transformed variables.

Regression Table 1

Dependent variable: log transformed question #2 (donation amount to McDonald fund)

Regressor	Values
Logvolun_4 (X_1)	0.43** (0.24)
Intercept	3.14* (0.57)
R^2	0.1852
n	16

The coefficient is statistically significant at the *1% and **10% significance levels

Regression Table 1 allows us to conclude that a 1% increase in the amount of money donated to the utility trust fund (logvolun_4) yields a 0.4315% increase in the amount of money donated to the McDonald Observatory trust fund (logques_2). In short, as dark-sky advocates increase their donations to the utility company trust fund, they will also increase their donations to the McDonald trust fund.

Next, we would like to know how demographic information predicts the donation amount to the McDonald trust fund (question #2).

Regression Table 2

Dependent variable: log transformed question #2 (donation amount to McDonald fund)

Regressor	(1)	(2)	(3)	(4)
Gender (X_1)	0.68 (0.46)	0.86*** (0.46)	0.65 (0.47)	-0.04 (0.45)
Distance_9 (X_2)		0.00 (0.00)	0.0008 (0.0005)	0.0009* (0.0004)
Astro_10 (X_3)			0.58 (0.39)	0.78* (0.33)
Ques_8 (X_4)				-0.05** (0.01)
Intercept	2.68** (0.84)	2.18* (0.88)	2.24* (0.86)	6.30** (1.51)
Summary Statistics				
R^2	0.0967	0.1934	0.2829	0.5364

Adj. R^2	0.0515	0.1084	0.1634	0.4273
n	22	22	22	22

Standard errors are given in parentheses under coefficients. The individual coefficient is statistically significant at the *5%, **1%, or ***10% significance levels using a two-sided test

Using the demographic data collected in the survey with *gender* being a dummy variable (1 for female and 2 for male), *distance_9* being the distance in miles from Alpine, TX, *astro_10* being a dummy variable (1 for amateur astronomer, 0 otherwise), and *ques_8* being the age of the respondent, we find that *distance_9*, *astro_10*, and *ques_8* are all significant coefficients at the 5% level or lower in (4), which is the best fit for the dependent variable and yields the highest R^2 out of all regressions. Note that *gender* is only significant in regression (2).

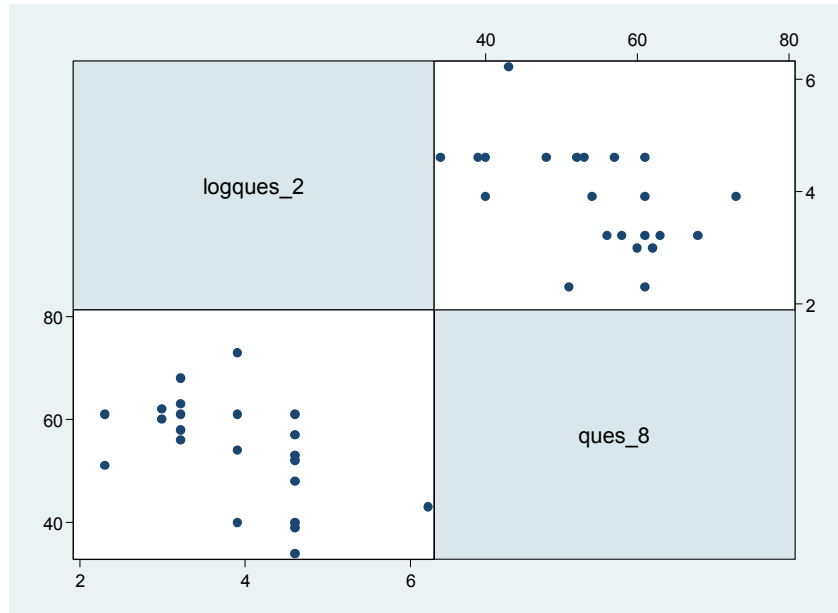
While *distance_9* is significant at the 5% level, the magnitude of its impact is quite small even on a log adjusted dependent variable as we have here. It is slightly positive, which is to say that a 1 mile increase in the distance from Alpine results in a 0.09% increase in donation amount to the McDonald fund holding all other variables constant in (4).

The coefficient *astro_10* is positive and significant in (4), which means that respondents who are amateur astronomers will give 118.15% more to the McDonald trust fund than those who are not amateur astronomers.²

The coefficient *ques_8* (Age) is negative and significant in (4). Thus, for every 1 year age increase, the donation amount to the McDonald fund drops by 5%. This seems counterintuitive and warrants further investigation. A scatterplot matrix of *logques_2* and *ques_8* illustrates that a negative relationship between the two variables only exists for those between the ages of 50 and 60.

Graph 2

² $100[\exp(\text{astro}_{10})-1]$; see Hardy, Regression with Dummy Variables



Scatterplot matrix of logques_2 and ques_8 (age)

For those aged below 50 years old, there is almost no linear relationship between the two variables with the exception of one outlier data point. In addition, for those over 60 years old, the relationship between age and donation to the McDonald trust fund is positive; opposite what it is for those between 50 and 60. Thus, age is an important predictor of the amount that is donated to the McDonald trust fund, but not a linear predictor. More work is warranted here.

Question #1 Analysis

We will next look at question #1 in the survey, which is a dichotomous choice question asking whether respondents would be willing to donate to a trust fund operated and setup by McDonald Observatory whose proceeds would be used to fund projects in the local community that would mitigate overall sky brightening.

From Table 1, we know that the support rate for the McDonald trust fund is 82.76% among dark-sky advocates.

A logit or probit regression is necessary here to determine the significant explanatory variables for *ques_1*.

Running a linear regression of the amount respondents are willing to donate to the utility trust fund (*volun_fund_ques4*) against *ques_1* yields no statistically significant coefficients.

Does being an amateur astronomer impact respondent's choice to support the McDonald fund? 12/16 (75%) of those who classify themselves as "amateur astronomers" supported the McDonald fund while

11/12 (91.67%) of those who do not classify themselves as “amateur astronomers” support the McDonald fund.

To compare the results of those who supported the McDonald trust fund and the utility company trust fund, we created a response matrix table of these two questions. Non-responses on either question were thrown out completely to ensure accuracy.

Matrix Table of Question #1 and #3 responses (Table7)

Question #3 (volunteer utility fund)

	Yes	No	No Response	Total
Question #1 Yes	17	5	(2)	22
No	2	2	(1)	4
No Response	0	0	0	0
Total	19	7	(3)	26

Notes:

1. There were 2 respondents who would neither donate to McDonald nor the utility. 2/26 = 7.7%
2. 17 respondents would donate to both trust funds. 17/26 = 65.4%
3. 5 respondents would donate to McDonald, but not to the utility fund. 5/26 = 19.2% (these are the respondents we lost by changing the payment vehicle)
4. 24/26 (92.3%) of respondents support the McDonald trust fund that also responded to question #3 (if using all observations for question #1; 24/29 (82.8%)).
5. 19/26 (73.1%) of respondents support the utility trust fund.

Next, we would like to look at the relationship between question #1 and question #5 (asking if respondents would support a mandatory \$3 fee on their utility bill). Another matrix table was created to organize the results. Non-response answers were thrown out completely from both questions.

Matrix Table of Question #1 and #5 (Table 8)

Question #5 (mandatory \$3 monthly fee on utility bill)

	Yes	No	No Response	Total
Question #1 Yes	14	8	(2)	22
No	3	2	(2)	5
No Response	0	0	0	0
Total	17	10	(4)	27

Notes:

1. 2/27 (7.4%) of respondents would neither support the McDonald trust fund nor pay the \$3 monthly fee
2. 14/27 (51.9%) of respondents support the McDonald trust fund and will pay the \$3 monthly fee
3. 8/27 (29.6%) of respondents support the McDonald fund, but will not agree to pay the \$3 monthly fee (respondents lost to payment vehicle change)
4. 17/27 (63%) of respondents support the \$3 monthly fee

Question #4 Analysis

We will now analyze question #4 (donation amounts to the utility company trust fund). We ran an OLS linear regression using both the log and non-log transformed *volun_fund_ques4* as our dependent variable against *gender*, *distance_9*, *ques_8*, and *astro_10*, but found no statistically significant coefficient values. That is to say that none of these variables are good linear predictors of *volun_fund_ques4*.

However, we discovered in Table 1 (page 2) that there is a significant linear relationship between the log transformed *volun_fund_ques4* and *ques_2*. Review the analysis under Table 1 for the nature of that relationship.

One interesting finding is that the relationship between age (*ques_8*) and *volun_fund_ques4* is non-linear in nature. Respondents under the age of 50 are willing to donate more to the fund than those between 50-60 (approximately), and those over 60 are willing to donate more than those in the 50-60 age cohort. However, since the mean age of the respondents was 54.48 years old, this finding could simply be attributable to the lack of data from those under 50 and over 60. A further survey should target both younger and older groups.

Question #5 Analysis

We now turn our attention to the first mandatory fee question; question #5. This question asked the respondent if they would be willing to support and pay a mandatory fee of \$3 on their monthly utility bill if the proceeds of such a fee were to be used to replace street lighting with ones that mitigated nighttime sky brightening.

Below is a table of results to this question. Note that there were 3 non-responses to this question. The response rate was 93.10%.

Question #5 (Table 9)

Number of "Yes" Responses	Number of "No" Responses	Total Number of Responses	Fraction of "Yes" Responses	Percentage of "Yes" Responses
17	10	27	17/27	63%

So, the support rate for the \$3 monthly fee on respondent's utility bill is 63%.

Question #6 Analysis

Question #6 is identical to #5 except that the mandatory fee was raised from \$3 to \$6. From economic theory, we should lose some respondents who are willing to pay this higher amount assuming that their willingness to pay is between \$3 and \$6 per month. In addition, it is important to note here that only those respondents answering “yes” to question #5 were asked to answer #6. There were no instances of a respondent answering #5 “yes” and not responding to #6 (either “yes” or “no”).

Question #6 (Table 10)

Number of “Yes” Responses	Number of “No” Responses	Total Number of Responses	Fraction of “Yes” Responses	Percentage of “Yes” Responses
12	5	17	12/17	70.59%

So, the support rate for the \$6 monthly fee on respondent’s utility bill among those who answered “yes” to question #5 is 70.59%. However, what is the support rate for the \$6 fee among all respondents who responded to question #5?

Since there were 27 respondents to question #5 (table 9) and 12 “yes” responses to question #6 (table 10), then the overall support rate among all responding respondents is 12/27, or 44.44%. Thus, when the mandatory utility fee was raised from \$3 to \$6 per month, the support rate went from 63% to 44.44%, which is a loss of 5 respondents.

Willingness to Pay (WTP) Analysis

Based on the results from questions #5 and #6, we know that 5 (18.52%) respondents have a willingness to pay somewhere between \$3 and \$6. Furthermore, 10 (37.04%) respondents have a willingness to pay less than \$3 per month. Finally, 12 respondents (44.44%) have a willingness to pay at least as great as \$6 per month to protect the dark-skies in Alpine, Ft. Davis, and Marfa.

Since we know that the number of respondent’s supporting the fee decreased by 29.41% as the fee rose from \$3 to \$6 (a 100% increase), we can calculate the corresponding price elasticity, which is -0.294.³ This elasticity value is above -1 and close to zero, which indicates that the support of these mandatory fees to the utility company is rather inelastic in nature between these two price points. So, when the fee increases by 1%, the quantity of support will fall by 0.294%.

Based on the results from question #4, respondent’s mean WTP is \$12.05 per month. In addition, based on the results of question #2, respondent’s mean lump sum WTP to a dark-sky fund is \$70.21.

How does the WTP in this survey depend on the payment vehicle? Let us compare the amounts that respondents are willing to donate to the utility trust fund to the amount they are willing to pay in

³ -29.41%/100%=-0.294

mandatory fees to the utility company. There are 15 respondents whose willingness to donate to the utility fund was at least \$3 and 10 respondents whose is at least \$6. Again, 5 respondents must have a willingness to donate between \$3 and \$6.

Of those respondents whose willingness to donate to the utility trust fund was at least \$3, 14 of them were also supportive of the \$3 mandatory fee. That means that 1 respondent was willing to donate at least \$3 to the utility trust fund, but was not willing to pay a \$3 mandatory fee per month. This might be taken as evidence of a protest to the change in payment vehicle.

Likewise, of those respondents whose willingness to donate to the utility trust fund was at least \$6, 8 of them were also supportive of the \$6 mandatory fee. Thus, 2 respondents are willing to donate at least \$6 per month to the fund, but not willing to pay a \$6 monthly fee. Further protest to the payment vehicle perhaps?

Of interest too are the 4 respondents who were NOT willing to donate at least \$6 to the utility trust fund, but who are willing to pay the \$6 mandatory fee. Why would this be the case? Why would a respondent be willing to pay a mandatory fee greater than the amount they said they would donate to the trust fund? Both trust funds are identical in what they support and fund in regards to dark-sky protection efforts. It is possible that respondents simply thought of an amount they would donate for question #4 that was not their true willingness to pay. Then, when they saw the \$6 per month amount in question #6, believed that amount to be keeping with their preferences. In short, it is possible that a flat out question asking a respondent's willingness to pay produces amounts that are below their true willingness to pay. Such a working theory would explain why these 4 respondents would be willing to pay a fee greater than their donation amount when simply asked for one.

Or, it is possible that respondents were unaware of what their true willingness to pay was, but when given an amount, they compared that with what they believed to reasonable and in keeping with their true willingness to pay against the amounts given in the survey (\$3 and \$6).

Conclusions

In this survey we determined the mean WTP of dark-sky advocates for protection of the night skies in the Alpine, Ft. Davis, and Marfa areas of West Texas. We determined a lump sum WTP to a trust fund operated by the McDonald Observatory to be \$70.21 per respondent. In addition, we determined that respondent's mean WTP per month to a utility company trust fund is \$12.05. When given a dichotomous choice question of a WTP amount per month to the utility company in the form of a mandatory fee, we found that 37.04% of respondents have a WTP less than \$3 per month and 44.44% have a WTP of at least \$6 per month. This would place the median WTP amount (50th percentile) somewhere between \$3 and \$6 per month.

We find that 82.76% of respondents would be willing to donate to a trust fund established and operated by the McDonald observatory whose proceeds would be used to protect the night skies around the observatory. 73.08% of respondents would be willing to donate to the same trust, but operated by their

local public utility company. Thus, the support rate is higher for the observatory's trust fund than that of the utility company. This might indicate some form of protest to the payment vehicle change.

The support rate for a \$3 monthly mandatory fee on respondent's utility bill is 62.96% while the support rate among all respondents for a \$6 fee is 44.44%. This means that the price elasticity of demand for dark-sky protection efforts is -0.294, which is relatively inelastic. This is a surprising result, but cannot be taken too seriously since this survey suffered from a low sample size (n=29).

There is a positive, though not perfect correlation between donations to the McDonald trust fund and the utility company trust fund. As donation amounts to one fund increase, so do donation amounts to the other fund. This is consistent with economic theory.

In our regression of the log transformed donation amount to the McDonald trust fund against distance, age, and amateur astronomer status, we found that those living further from the observatory were willing to donate more holding other variables constant. In addition, those who claimed to be amateur astronomers were willing to donate a whopping 118.15% more to the trust fund compared with non-amateur astronomers. The independent variable age had a unique and interesting relationship with the dependent variable that depended on age range. Gender had no significant effect on donation amounts.

Running an OLS regression using the donation amount to the utility company trust fund as the dependent variable against the same demographic independent variables yielded no statistically significant coefficients even when log transformations were done. This is a surprising outcome that warrants more investigation and may be a by-product of the low sample size in this survey.

In future economic surveys of this nature, it will be important to perform in-person interviews so that the WTP elicitation questions can be modified to incorporate more varied amounts. In addition, a larger sample size is a must.

Appendix

Survey Instrument

This survey is for research purposes only. Please do not put your name anywhere on the survey instrument. All survey responses will remain anonymous and your specific information will not be shared with any third parties.

The survey consists of 10 questions

In recent years, the night-sky surrounding the Fort Davis, Marfa, and Alpine, Texas areas has increased in brightness due to the proliferation of outdoor lights. Such brightening is often called light pollution. This brightening blocks out stars in the night-sky, which negatively impacts astronomical observations made at the nearby multi-million dollar McDonald Observatory; a major astronomical observing center operated by the University of Texas system.

If McDonald Observatory established a voluntary charitable fund whose proceeds would be used to aid local residents and businesses in using outdoor lights that spilled less light into the night-sky (and therefore mitigated the nighttime brightening), would you be willing to donate to this fund?

Yes

No

If you answered **yes** to the above question, how much money would you be willing to donate to the fund on an *annual* basis? Please bear in mind that the money you can spend on products that you would normally purchase would decrease through such a donation.

If you don't live in Fort Davis, Marfa, or Alpine, let us assume that you do for the moment. Say that your local electricity provider adds a box on your *monthly* bill where you can donate money to be used by the provider to replace existing street lighting in your area with lights that mitigate nighttime sky brightening. Would you be willing to donate money to this fund?

Yes

No

If you answered **yes** to the above question, how much money would you be willing to donate to the fund on a *monthly* basis? Please bear in mind that the money you can spend on products that you would normally purchase would decrease through such a donation.

Continue to assume that you live in Fort Davis, Marfa, or Alpine. Now, instead of having a donation box on your monthly electricity statement, your local electricity provider adds a mandatory **\$3 fee** to your *monthly* bill in order to replace existing street lights in your area with lights that mitigate nighttime sky brightening. Would you support the addition of such a mandatory fee?

Yes

No

If you answered **yes** to the above question, would you still support the addition of a fee if the fee were **\$6** per month?

Yes

No

What is your gender?

Male

Female

What is your age?

What city **AND** state do you live in on a permanent basis?

Do you consider yourself an amateur astronomer?

Yes

No

END OF SURVEY