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Re-Evaluating Subsidies for Services That Carry no Positive Externalities: A Benefit-Cost Analysis of Convenience Loop Busing versus Walking

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I. Introduction

The University of Toledo (UT) is a public university located in the city of Toledo, which is in the northwest corner of Ohio. In 2011, the University enrolled over 23,000 students, and according to Collegeboard.com (Accessed April, 2011), 21% of the nearly 18,000 undergraduates live on campus. With such a high enrollment total, the University offers many amenities to its students including a recreation center, health clinic, food court with popular fast food restaurants, and an extensive busing system.

Currently, the University of Toledo provides busing not only to-and-from campus, but also around the campus. The university has multiple satellite campuses including a Health Science Campus, Scott Park Campus, and classrooms at the Toledo Museum of Art. These campuses are within 5-10 miles of the Main Campus, and busing provides an opportunity for students and faculty to commute to-and-from these campuses –many of whom do not have any other form of transportation to get to these satellite campuses. This form of busing is not being analyzed for the purposes of this paper. Furthermore, students with disabilities have no-cost access to ParaTransit services that provide transportation by-appointment from the numerous classroom facilities on and off campus.

Instead, this paper focuses on loop busing (Blue Loop and Gold Loop) around campus. Currently, four buses circle the campus continuously throughout the day. Blue Loop runs clockwise around campus, and Gold Loop runs counter-clockwise around campus. Each bus takes approximately 24 minutes to complete a circuit, and the buses are spaced out so that a Blue Loop bus will arrive at a stop every 12 minutes, and the same for a Gold Loop bus. The buses are spaced out so that at common stops like the Student Union and Transportation Center, a loop bus will arrive every six minutes. Students are employed by the university to operate these vehicles.

However, the UT campus is self-contained, meaning that it is essentially a large continuous plot of land –approximately two thirds of a mile by two thirds of a mile. It is clearly defined when a student is on-campus and a student is off-campus. Therefore, with a relatively small campus that doesn't sprawl, one can walk at a reasonable pace and cross the two furthest points on campus in about fifteen minutes. Considering a loop bus trip from one end of campus to the other would be approximately equal to walking time (assuming a rider doesn't have to wait for a bus), the main benefits from riding the loop bus is convenience. Also considering the positive externalities of walking, a loop busing policy may not be efficient for the university community.

Currently, busing is paid for in three ways: from student fees (roughly 75%), parking pass revenues (roughly 15%), and charter revenues (roughly 10%). Money for loop busing comes from an allocation of funds generally reserved for Transit Services and then spent according to the aims of students and administrators. By gaining revenue from all students but only spending it on those who use loop busing, loop busing is essentially a subsidized program. This keeps the private cost per rider artificially low ($0), since the cost of busing is diffused over the wider population.

The goal of this paper is to assess the social benefit that riders are actually gaining from utilizing the loop busing service and then comparing them to the social costs of operating the service. The direct costs of loop busing are straightforward: fuel costs, labor costs, and maintenance costs and are all relatively easy to calculate. The opportunity cost of riding the bus rather than walking (the calories that aren't being expended) and the environmental impact of burning diesel fuel for hours every day are more difficult to calculate.

One of the difficult challenges of any benefit-cost analysis is measuring benefits that constituents receive from the policy in question. The value of these benefits can be estimated using nonmarket valuation techniques, in particular the contingent valuation method. While the contingent valuation method is widely used in areas such as environmental economics (Loomis, 2006; Lockwood and Tracy, 1995), transportation (Painter et al., 2002), and health economics (Weimer et al., 2009), we believe this is the first application of the contingent valuation method to value subsidized loop busing. Specifically, this study uses a contingent valuation question to elicit each individual's willingness to pay (WTP) for a semester-long bus pass for loop busing around the UT campus. This paper uses a survey of students to estimate the benefits of loop busing and then explores the costs associated with the service. This benefit-cost analysis can then be used to educate policymakers about the efficiency of loop busing.

Next, in section II we review the design and administration of the survey, then we discuss the resulting data in section III. Section IV discusses our empirical analysis using the Turnbull distribution-free estimator, and Section V aggregates our WTP estimates to the university community benefits, and Section VI completes the benefit-cost analysis by estimating the societal costs, and finally Section VII concludes.

II. Survey Design

A sample of undergraduate economics students were asked to complete the "Bus Ridership Survey" which can be found as an appendix to this paper. Two professors administered the survey in their principles of economics courses. These courses are general education courses with a diverse group of students from all majors, colleges, and year in school.

A pretest survey was administered to ensure students understood the survey and to also adjust (downward) the bid values in the final survey. The survey was one page and contained twelve questions regarding respondents' familiarity with the loop service, their usage habits, class rank, housing status, car ownership, and exercise habits. The contingent valuation question was at the end of the survey and was worded as follows:

"Right now BLUE/GOLD Loop buses are funded by student fees. Instead, if the University charged students to purchase a BLUE/GOLD LOOP pass which would be required in order to ride, would you have been willing to pay $X this semester for this pass? All other bus services would not require the semester pass, but students without the pass would not be able to ride BLUE/GOLD LOOP buses."

In accordance with contingent valuation methodology, the value of X was varied across the surveys. In addition, respondents were also asked how they would respond to the referendum if the policy were in effect for the immediately previous semester. Upon review of results, however, results from the "previous semester" vote were omitted due to potential recall bias. There was not any appreciable difference in responses between the two semesters.

Care was taken to ensure that respondents were familiar with the good they were being asked to value (semester loop bus pass), and comments and feedback were asked for at the end of the survey. Issues of consequentiality are an important consideration in contingent valuation. Respondents must believe that there is some consequence that results from the outcome of a study. Polome, et al. (2006) describe four conditions for consequentiality: (1) provision of the public good is credible; (2) the decisionmaker may not disregard the survey results; (3) payment for the good is enforceable; and (4) the respondent cares about the public good. However, Herriges, et al. (2010) have shown that as long as respondents believe the survey will have a minimal impact on policymaking decisions, willingness to pay (WTP) distributions will be statistically significant. Those who believe the survey will have no effect on policymaking decisions had statistically different estimates of WTP, resulting in a knife-edge impact. Careful planning was done to ensure that the survey used for this study resulted in consequentiality for the respondents.

III. Data

In order to estimate benefits, observations were classified into two groups: riders and non-riders. Riders were respondents who stated in the survey that they took one or more trips per week on the loop busing. If respondents stated they took no trips per week they were placed in the non-riders group. The assumption is that those who took zero trips per week would have a willingness to pay of $0. That is, if a respondent was not riding the bus when it is free for them to do so, it must be because they do not value riding the bus and have WTP (use value) equal to $0. We expect nonuse value and option value to be negligible.

Table 1 shows the summary statistics for the full sample of 198 students. It also divides the students into non-riders, 144 of the respondents (73%), and riders, 54 of the respondents (27%). Riders took an average of 3.6 trips per week. Approximately 44% percent of riders said they rode at least partly because it was faster than walking, 88% of riders said they rode at least partly because of cold or inclement weather, 17% said they simply preferred riding the bus than walking, and just over 2% listed some other reason for riding the bus. The average wait for riders was just over ten minutes, and the average length of their trip was about seven minutes[1]. Riders were more familiar with the loop routes than non-riders (3.5 for riders as opposed to 0.8 for non-riders on a 0-5 scale). It is not surprising that non-riders report being unfamiliar with the

[1] The larger maximum responses of 30 minutes for wait and length of trip may be due to recall bias or in these few instances conflating main campus loop busing with between campus university busing or other regional busing.

routes. This indicates that even though students know the routes are free and they can take the bus anytime, they perceive little benefit from doing so and exploring it as an option.

Sixty-eight percent of riders had a car on campus, as opposed to 83% of non-riders. That may be partly explained by the fact that a higher percentage of riders lived on campus (37%) than non-riders (30%). Students living on campus would be less likely to need an automobile. The average class rank of riders was 1.7 and 2.0 for non-riders. Riders exercise (5.4 hours per week) a little less than non-riders (6.2 hours per week). Riders also report taking a little longer to walk to their destination (13.5 minutes versus 10.7 minutes for non-riders) either due to walking slower or their destination is a little further away. Since non-riders took no trips, we do not show summary statistics related to bus riding for them.

Lastly, we summarize the voting behavior of our respondents. In the appendix we show the survey questions 9 and 10 asking each student if they would buy the semester bus pass at the given bid (purchase price of the semester long loop busing pass). In Table 2 we show that we randomly varied the bid price from $5 up to $200. Table 1 shows that the mean bid price for the riders was approximately $38 and only 30% of the riders stated they were willing to pay the given bid price they received. We included bids as low as $5, but no lower since we didn't consider bids less than $5 to be credible. Even at the lowest bid of $5 only about half of the riders stated yes they were willing to pay that amount for a pass, indicating little value for the loop busing service for many students.

Table 1. Summary Statistics

		Riders				NonRiders	Full Sample
Sample Size		54				144	198
Variable	Description*	**Mean**	Min.	Max.	Std. Dev.	**Mean**	**Mean**
Trips	= number of trips per week (Q1)	**3.61**	0.5	15	3.08	**0**	**0.98**
Familiar	= Familiarity with routes on 0-5 scale (Q2)	**3.45**	0	5	1.67	**0.76**	**1.49**
Faster	= 1 if respondent rode bus because it was faster than walking, 0 if otherwise (Q3)	**0.44**	0	1	0.47		
Cold	= 1 if respondent rode bus because of cold/inclement weather, 0 if otherwise (Q3)	**0.88**	0	1	0.31		
Prefer to Ride	= 1 if respondent rode bus because they preferred to ride (vs. walk), 0 if otherwise (Q3)	**0.17**	0	1	0.35		
Wait	= length of wait for bus in minutes (Q4)	**10.38**	0	30	6.30		
Length of Trip	= length of bus trip in minutes (Q5)	**7.22**	0	30	4.61		
Own Car	= 1 if have a car on campus, 0 if otherwise (Q6)	**0.68**	0	1	0.47	**0.83**	**0.79**
On Campus	= 1 if lives on campus, 0 if otherwise (Q7)	**0.37**	0	1	0.49	**0.30**	**0.32**
Class Rank	= 1 if freshman, 2 if soph., 3 if junior, 4 if senior or grad. student (Q8)	**1.70**	1	4	0.86	**1.96**	**1.89**
Bid	= bid value on survey (Q9)	**37.96**	5	200	46.89	**44.58**	**42.78**
Vote	= 1 if 'yes', 0 if 'no' (Q9)	**0.30**	0	1	0.46	**0.06**	**0.12**
Walk Time	= avg. length of trip in minutes to walk rather than ride bus (Q11)	**13.53**	0	45	7.44	**10.66**	**11.44**
Exercise	= hours per week spent exercising (Q12)	**5.35**	0	16	3.38	**6.16**	**5.94**

*For each variable in each row of the table we include in parentheses the corresponding survey question shown in the appendix, e.g., question 1 as (Q1).

IV. Empirical Analysis

Using the survey data, one can use the Turnbull distribution-free estimator (Haab and McConnell, 1997; Haab and McConnell, 2002; Carson et al. 2003; Egan et al., 2015) to estimate the WTP for a semester pass for loop busing. The Turnbull Estimator was used because, "it offers a conservative lower bound on willingness to pay for all non-negative distributions of WTP, independent of the true underlying distribution" (Haab and McConnell, 2002, page 74). All of the information needed to calculate the estimate on the lower bound on willingness to pay is available in Table 2 below.

The Turnbull estimator requires monotonicity in the bid values with a decreasing percent voting "yes" for each successively higher bid. We needed to pool back several bids in order to create monotonicity. Table 2 shows the original bids, as well as showing in bold the three remaining monotonically smoothed bid values.

Table 2. Original bid values and Turnbull monotonically smoothed bid values (in bold).

N=	Bid value	Turnbull %Yes	%Yes
10	**$5**	**0.56**	0.50
8	$10	Pooled	0.63
11	**$20**	**0.21**	0.00
9	$30	Pooled	0.22
2	$40	Pooled	0.50
7	$50	Pooled	0.43
4	**$100**	**0.00**	0.00
3	$200	Pooled	0.00
Avg.			0.30

To begin we utilize equation (3.28) from Haab and McConnell (2002),

$$E_{LB}(WTP) = \sum_{j=0}^{M^*} t_j (F_{j+1}^* - F_j^*) \tag{1}$$

where t_j denotes the *j* bid values, M^* is the total number of Turnbull monotonically smoothed (pooled back) bid values (the bold bid value in the table above), and F_j^* is the percent of respondents voting "no" who received the *j*th bid value, and F_{j+1}^* is the percent of respondents voting "no" who received the *j*th+1 bid value. This estimator represents the minimum expected willingness to pay for all distributions of WTP defined from zero to infinity. This means that no respondent can have WTP greater than the highest bid value. The estimated lower bound WTP is asymptotically normally distributed, and Haab and McConnell derive the variance as

$$V(E_{LB}(WTP)) = \sum_{j=1}^{M^*} \frac{F_j^*\left(1 - F_j^*\right)}{T_j^*}\left(t_j - t_{j-1}\right)^2, \tag{2}$$

where T_j^* is the total number of respondents for the *j*th bid value. Utilizing equation 3.28 to calculate the estimated lower bound WTP for a semester-long loop busing pass is,

$$E_{LB}(WTP_\infty) = .444*0 + .349*5 + .207*20 + .000*100 = \$5.88 \tag{3}$$

with a 95% confidence interval of $3.39 to $8.37. See Figure 1, which shows the piece-wise WTP contribution using the smoothed bids. Figure 1 demonstrates that the expected lower bound WTP estimate in equations (1) and (3) is summing up the bids, t_j, times the probability density in each bid interval, $(F_{j+1} - F_j)$, i.e., integrating the area under the WTP function, where the Turnbull lower bound estimator makes conservative assumptions about this integration.

While the Turnbull Estimator is used to estimate WTP, a bound probit model (Haab and McConnell, 2002) was also run to identify which explanatory variables are correlated with the riders "yes" response in the contingent valuation question. A bound probit model is similar to a standard probit model for analyzing a binary independent variable, here the respondent's 'yes' or 'no' response to purchasing the semester bus pass. The difference is that a bound probit model is specified so that any resulting WTP estimates are correctly bound to be nonnegative. We use the bound probit because it is difficult to include explanatory variables with the Turnbull estimator (Haab and McConnell, 2002). The bound probit results are in Table 3 below. The constant and variance coefficient were the only variables significant at a 0.05 level. The variable, "Prefer to Ride" (vs. walking) was statistically significant at the 0.10 level with those saying they preferred to ride the bus versus walking actually being less likely to state "yes" in the contingent valuation question. This indicates to us these respondents are just riding the bus because it is free to do so.

Table 3: Bound probit model results: N=54. LL = -21.46.

	coefficient	p-value
Constant	-4.02**	0.04
Faster	0.34	0.72
Cold	-1.51	0.33
Prefer to Ride	-2.55*	0.08
Wait	0.08	0.27
Length of Trip	0.15	0.24
Own Car	0.91	0.41
On Campus	0.95	0.28
Class Rank	-0.61	0.25
Walk Time	0.12	0.10
Exercise	-0.22	0.13
Variance	1.69**	0.03

V. Estimating Benefits

The Turnbull Estimator was used to estimate the per rider WTP for a semester-long loop bus pass. However, according to the sample of students surveyed, riders make up only 27.3% (54/198) of the student population. Therefore, in order to estimate benefits of loop busing to the entire student population, the equation would be Total Students x 0.273 x Mean WTP. The two components in determining the aggregate WTP for the student population are the number of riders in the population and the mean WTP per rider. Inserting values into the above equation results in an aggregate WTP of,

$$23{,}085 \times 0.273 \times \$5.88 = \$37{,}057 \quad (4).$$

The figure of 23,085 students is according to Collegeboard.com, which notes that its information is "supplied by the colleges themselves in response to the College Board's Annual Survey of Colleges, with some data provided via federal and state agencies." Since this paper assumes no non-use or option-use value of loop busing, $37,057 represents the total social benefit that loop busing provides to the university. However, again, the Turnbull distribution-free estimator is a lower bound on WTP from the data we have. Thus, it is reasonable that WTP and benefits could be greater than the approximately $37,000 we estimate[2].

VI. Estimating Costs

The costs of loop busing can be broken down into two categories. One category would be the direct expenditures spent on loop busing, including labor, maintenance, and fuel. The other category would be the negative externalities that occur from loop busing, including increased pollution. The reduction of walking could be viewed also as the reduction of a positive externality in a substitute market. That is, loop busing is a substitute for walking. For the purposes of this paper, we will first focus on the direct expenditures, and then provide a few thoughts on negative externalities and the reduction of positive externalities.

To estimate the cost of labor used in providing loop busing, one must first settle on a mean wage. In 2011, the time of the study, the range of wages earned by transit operators is $8-$10 per hour. Assuming an average wage of $9 is reasonable. In addition, this wage likely undervalues the true cost of the labor, because it does not include payroll taxes paid by the employer. The first Gold Loop bus, Gold Loop 1, operates from 7:30am until 4:02pm, a total of 8.75 hours (hours are rounded up to the nearest fifteen minutes). Gold Loop 2 and 3 operates

[2] As a reviewer points out, other benefits could include loop busing leading to higher class attendance, particularly on days with inclement weather.

from 9:18am until 10:32pm (until 7:20 on Fridays), a total of 13.5 hours (10.25 on Fridays). Blue Loop 1 operates from 9:12am until 3:24pm, a total of 6.25 hours. In addition, Blue Loop 2 operates from 9:24am until 7:12pm, a total of 10 hours.

These hour figures do not include the typical start-up and shut-down duties of the driver, as these buses would possibly be used on other routes. This allows for a more conservative estimate. A daily total of all labor involved in loop busing would then be 8.75 + 13.5 + 6.25 + 10 = 38.5. On Fridays, this total would be slightly less, 35.25. For the week, the total would be 4*38.5 + 35.25 = 189.25 hours. The loop service does not run on weekends. Over the course of 16 weeks of class, the total labor cost for a semester of loop busing would be 3,028 hours. At the conservative estimate of $9 per hour, a total labor cost of $27,252 is a reasonable total. Assuming start-up and shut-down duties would add 160 hours of labor per semester, at an additional cost of $1,440 at the $9 wage rate.

The next cost to estimate would be fuel. Since fuel mileage varies from bus to bus and depends on the driver, frequency of stops, and passenger load, it is difficult to estimate the exact fuel mileage for a fleet of loop buses. Fuel mileage estimates are difficult to come by, but in a 2004 report by CTTransit sponsored by the Connecticut Department of Transportation showed fleet fuel mileage estimates hovering around 3.5 miles per gallon (2004). In addition, on a more aggregate level, the Research and Innovative Technology Administration Bureau of Transportation Statistics notes in its Table 4-15: Bus Fuel Consumption and Travel that average miles traveled per gallon per bus for 2008 was 6.4, and has held steady between 5 and 7 miles per gallon since 1960 (Accessed April, 2011). This would include all buses including those on long-distance routes on highways and between cities. Buses on these routes would be expected to have higher mpg figures, and pull the average up from inter-city or inter-campus buses that would carry lower mpg figures due to more frequent starts and stops –sometimes minutes at a time idling for UT loop busing. Due to the findings above, a reasonable assumption of fuel economy would be 5 miles per gallon.

Each loop around campus is scheduled to take 24 minutes. Therefore, 2.5 loops can be accomplished in an hour, and 7,570 loops can be accomplished in the 3,028 hours that loop busing operates per semester. Assuming that each route is 3 miles long (conservative, as records sheets can show that five loops can take about 18 miles), the result is 22,710 miles driven by loop buses in a semester. Using the 5mpg estimate from above, it would take 4,542 gallons of diesel (22,710/5) to fuel the loop buses for a semester. In 2011, a conservative price for diesel fuel is $3 per gallon, assuming the university receives a bulk discount over retail rates. For context, the average Ohio price of diesel according to AAA's fuel gauge report was $4.16 on April, 26, 2011 (fuelgaugereport.aaa.com). At this conservative rate of $3 per gallon, fuel costs for a semester would be approximately $13,626 ($3*4,542).

Adding the labor cost ($27,252) to the fuel cost ($13,626) results in costs exceeding our lower bound estimates of the benefits of loop busing on a semester basis ($40,878 > $37,057). This is without considering the additional maintenance costs, and negative externalities from pollution. Also, this does not include the reduction in positive externalities in the market for a substitute –walking. Regarding the negative externalities from fuel consumption Parry, Walls, and Harrington (2007) estimate the external cost is $2.28 per gallon assuming fuel economy of 21 miles per gallon. We know of no references for the external costs specifically for buses but they are certainly higher than for the average vehicle due to much lower miles per gallon and more emissions. Moreover, there are congestion negative externalities from having buses pulling in and out of busy student walkways. Recently, the price of diesel fuel is a little lower ($2.60) than our assumed cost of $3, but if we included the extra $2.28 for external costs, the true social cost today is closer to $5 per gallon.

Moreover, is the reduction in walking that occurs when members of the UT community choose to ride the bus rather than walk. Since busing carries an artificially low cost because it is subsidized by all students, it becomes a more attractive option than walking. Compounding this issue is that many students regard the service as “free,” so that “free” busing carries no costs. What these riders fail to realize (besides that they pay for busing with their fees and parking pass purchases) is that there is another cost to riding a bus –the opportunity cost, which includes the health benefits of walking.

While there may be some small aesthetic benefits to walking around campus such as simply being outside, seeing other students, or viewing plants, flowers, and buildings, but the greater benefit from walking comes in the form of the burnt calories. The Centers for Disease Control notes that a 154 pound person burns approximately 140 calories per half hour from walking at a 3.5 mile per hour pace (Accessed April, 2011). According to this study’s respondents, riders stated an average walk time of 13.7 minutes for trips that they take by bus. That means that these riders are missing out on burning nearly 64 calories every time they choose to ride the bus rather than walk, assuming they walk at a 3.5mph pace. The health benefits of physical activity is well documented (HHS, 2001). Those who exercise reduce coronary heart disease by 30 to 40% (AHA, 2014). If all adults achieved very modest levels of physical activity, the estimated nation-wide savings would be $76.6 billion annually (ARC, 2000).

VII. Conclusion

Using a contingent valuation survey we estimated the social benefits of loop busing for one semester at a Midwestern public university to be approximately $37,000. By making reasonable and conservative assumptions regarding fuel mileage and prices, as well as wages, fuel and labor costs alone tallied approximately $41,000 per semester. With labor and fuel costs alone exceeding the social benefit of loop busing, the maintenance and pollution costs combined with the reduction of positive externalities from walking further underscore the possible inefficiency of this policy.

We cannot definitively conclude the inefficiency of the loop busing system since we both conservatively estimated the societal benefits and costs. While 73% of our student sample do not use the bus and of the 27% that does, many indicate low WTP, there are still some students who indicate WTP up to about $50 per semester. Our lower bound WTP estimate is about $6 per rider. If this estimate increases, as is reasonable, then we would have to monetize and estimate the pollution and congestion negative externalities and the exercise positive externalities to have a complete picture of the efficiency of the loop busing.

However, even if the loop busing system is efficient currently, it may not be the most efficient use of limited university resources. Even staying within transportation and busing, other possibly higher valued uses could be free busing from nearby student housing to campus, which would reduce students driving to campus, reduce parking congestion on campus, and would be subsidizing walking, which the students would now do once they are on campus without their car.

To summarize, we have demonstrated how a simple contingent valuation survey and resulting benefit-cost analysis can be illuminating towards a discussion of the efficient usage of our scarce resources. Students are using the busing service now because it is free to them. For a social benefit-cost analysis we need to know the benefit they receive from the service based on their willingness to pay. If the elasticity of demand for the service is sufficiently high, a small increase in price could substantially reduce the usage. We find that to be the likely case with freely provided convenience loop busing, where student riders had a lower bound estimated mean WTP of about $6 per semester for the service, an insufficient amount to cover basic direct costs. It is reasonable the estimated WTP and benefits of the loop busing could be higher but this has to be compared to the pollution and congestion negative externalities of the busing and the diminished positive externalities from less walking. And our lower worth for campus loop busing may be unique to the University of Toledo's campus, where a larger more spread out campus may need loop busing to transport students from class to class in a timely manner. In general, our methodology can be replicated for any subsidized service to verify positive net benefits.

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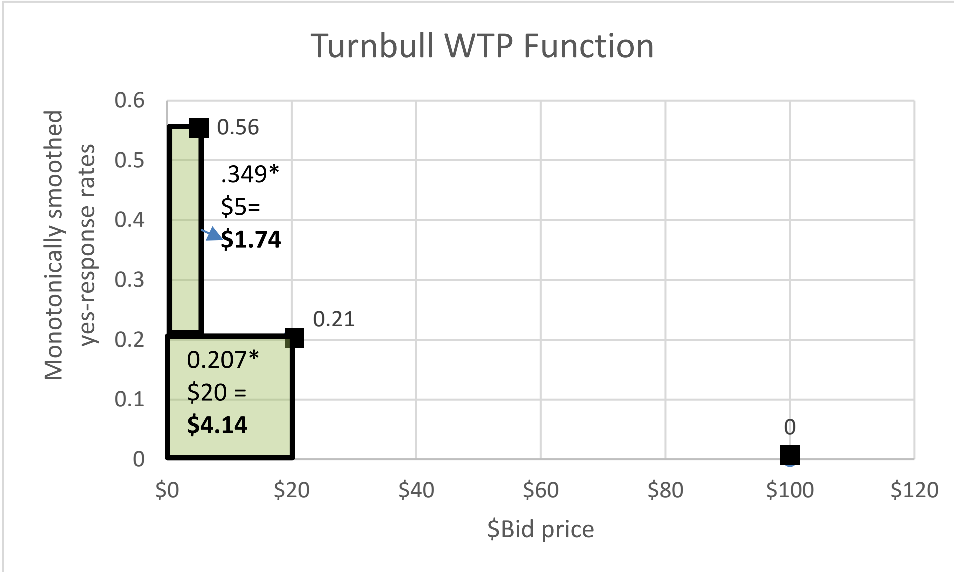
Figure 1. Turnbull WTP function showing the components of the $5.88 mean WTP estimate.



Appendix

Bus Ridership Survey

Please complete the following questions regarding you usage of the BLUE LOOP and GOLD LOOP services offered by the University of Toledo. **It is important that you only report information about your use of the BLUE LOOP and GOLD LOOP routes.** These are the buses that run ON-CAMPUS. Please do not report use of other OFF-CAMPUS routes. If you have any questions please raise your hand, and if a question does not apply to you, skip it.

Thank you for your participation in this survey. **What you're doing matters!** Information gained from this survey will be reported to the proper University officials in order to better serve the transportation needs of UT students.

1. In a typical week this semester, how many times a week do you ride BLUE LOOP and/or GOLD LOOP? _______

2. How familiar with these routes are you, with "0" being completely unfamiliar and "5" being extremely familiar? (Circle one)   0 1 2 3 4 5

3. For what reason(s) do you ride the BLUE/GOLD LOOP? (Circle one or more that best describes you)

   It's faster than walking   Cold/Inclement Weather   Prefer to ride than walk   Other:________

4. This semester, on average, how long did you wait for a LOOP bus? ________

5. This semester, what was the average length of your trip in MINUTES? ________

6. Do you own a car? (Circle one)   Yes   No

7. Do you live on campus or off campus? (Circle one)   On Campus   Off Campus

8. What is your class rank? (Circle one)   1st Year   2nd Year   3rd Year   4th Year or More

9. Right now BLUE/GOLD LOOP buses are funded by student fees. If the University did NOT charge all students a fee to fund the BLUE/GOLD LOOP buses, but instead required students to purchase a BLUE/GOLD LOOP pass which would be required in order to ride, would you have been willing to pay **$5 this semester** for this pass? All other bus services would not require the semester pass, but students without the pass would not be able to ride BLUE/GOLD LOOP buses. Note also that if too few students buy a semester pass then the BLUE/GOLD LOOP routes would likely be discontinued. (Circle one)

   Yes, I would have purchased a pass for $5 for *this semester*

   No, I would not have purchased a pass for $5 for *this semester*

10. How would you respond to Question 9 if this policy were in effect *last semester*? (Circle one)

   Yes, I would have purchased a pass for $5 for *last semester*

   No, I would not have purchased a pass for $5 for *last semester*

11. This semester, on average, how long -in MINUTES PER ONE-WAY TRIP- would it take for you to walk instead of riding to your destination? ________

12. On average, how many hours per week do you exercise? (Include walking, cardio, weightlifting, playing sports, etc.) ________

Any feedback on the survey is greatly appreciated. Pease write any comments on the back. Thanks!