Measuring the Value of Time for Methadone Maintenance Clients: Willingness to Pay, Willingness to Accept, and the Wage Rate[*]

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Three measures of the value of time – willingness to pay for a reduction in travel time, willingness to accept a monetary compensation to forgo it, and the wage rate – are evaluated and compared. Willingness to pay (WTP) and willingness to accept (WTA) were estimated from the two-part regressions of time price, using contingent valuation methods with primary survey data. The regressions confirm the validity of both WTP and WTA as values of time. Comparisons of WTP and WTA with the wage rate find systematic differences.

Classification codes: C12, C13, C81, I12, I18
Keywords: value of time, willingness to pay, willingness to accept, substance abuse treatment

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1. Introduction

Opiate use represents a significant problem throughout the United States. In Michigan the number of heroin users, for example, more than doubled between 1977 and 1992, from 39,000 to 81,000 [1]. Statistics from Detroit reflect a 40% increase in number of heroin users during the same period.

Since the mid-1960s research findings and legislative actions have acknowledged that law enforcement alone cannot eliminate addiction and medical intervention is necessary to solve the nation's narcotic addiction problem. Methadone treatment is one of the most widely used modes of treatment for opiate addiction among different types of services available. Currently, the Food and Drug Administration has approved two types of pharmacotherapy for use in treating opiate dependency: methadone and levo-alpha-acetylmethadol (LAAM).

Methadone maintenance is an unusual and possibly unique health care model. First, clients are required to attend a clinic every day, so treatment attendance becomes essential for clients' compliance and treatment effectiveness. Second, treatment attendance has implications for waste of resources in terms of staff time and the underutilization of equipment. Therefore, it is important that the factors contributing to an irregular attendance be clearly understood.

National and local health authorities have recognized that methadone can be a highly effective tool: (1) for reducing drug use, as well as heroin-related death, disease and crime [2-4]; and (2) for substantial savings in government expenditures devoted to those problems [5-8]. For instance, a RAND study [8] found that treatment of drug users was far more effective in reducing drug-related crime than were government efforts to seize illicit drugs. According to that study, every dollar spent on treatment leads to a $7.46 reduction in crime-related spending and lost productivity. The RAND study also found that treatment is far cheaper than interdiction,

enforcement, and prosecution. Incarcerating an adult for one year costs up to $37,000. In contrast, residential substance-abuse treatment costs an average of $14,600 and outpatient treatment costs an average of $2,300. Furthermore, treatment of drug users can reduce medical costs related to drug addiction. It has been estimated that each dollar spent on drug treatment will save $7 in medical costs [9].

Unfortunately, the ratio of methadone patients to opiate addicts is about two to ten in the United States [10]. This ratio is even smaller for Michigan, at one to ten [11]. RAND research [2] on drug use in Detroit metropolitan area emphasized the "...overriding need to bring intravenous drug users into contact with the medical system and to keep them [there]." Nadelmann and McNeely [10] argue that to attract and to retain a higher proportion of opiate drug users in treatment, methadone should be made as easily available to addicts as possible, especially when it is safe and relatively inexpensive.

Both political and economic barriers stand in the way. Methadone itself is an addictive drug, and opponents at both the state and national levels have viewed increased funding for methadone maintenance programs as condoning addictive behavior. Within urban areas local residents have opposed the siting of clinics, reacting to the presence and potential concentration of heroin addicts. Both forms of opposition have reduced the availability of treatment facilities.

For potential program participants who seek treatment the barriers relate to treatment cost. Out-of-pocket costs are modest, since at most clinics, the daily methadone dose is dispensed either free of charge or for a nominal fee. However, the out-of-pocket transportation costs, and, more importantly, the travel, waiting time, and treatment time costs of obtaining treatment (up to two hours per day) on a daily basis may be substantial, and possibly prohibitive.

The existence or magnitude of economic barriers to treatment for addicts has not been

addressed in methadone provision research. This article is part of a larger study that investigates the effects of personal costs, especially time price, of methadone maintenance on clients' treatment attendance. If the economic barriers can be appropriately identified and measured, some way of minimizing or even eliminating them is possible.

We derive two alternative measures of time value in obtaining methadone maintenance – willingness to pay (WTP) for reduction in travel time requirement and willingness to accept (WTA) monetary compensation for a non-reduction in travel time requirement, from a survey explicitly designed to address this issue. Both measures are based on contingent valuation methods that are used extensively in environmental economics.

This is the first attempt to measure and to compare WTP and WTA in valuing health care time price. Using contingent valuation methods, we calculate and compare values of WTP and WTA. We also compare WTP and WTA to the wage rate as a proxy for the value of time, finding that the wage rate tends to under-predict WTP for those with high WTP, and to over-predict WTP for those with low WTP.

2. Willingness to pay, willingness to accept, and valuation of time

In measuring the value of time, analysts often assign the wage rate for working clients and as the reservation wage rate for non-working clients [12, 13]. Wage rate and the value of time, however, are not equivalent. Cauley [14] lists several factors that may break the equality between wages and the value of time, including not working for market wages, paid sick leave, direct utility or disutility of time spent consuming medical care, and reduction of the opportunity cost of time due to illness. Moreover, an unemployed person may value time differently from the wage he or she could earn.

The contingent valuation method (CV) uses survey methods to ascertain individuals'

valuations of hypothetical alternatives, most often when market data are not available. CV methods for measuring willingness to pay have been used extensively in health care demand studies [15-18]. However, willingness to pay for time requirements in health care has been used in empirical health care demand analysis only by Tilford [19] who applied the concept to measure the value of time in elderly health care demand. Willingness to accept analysis has seldom been used at all in health care economics. Mitchell and Carson [20] provide an early review of willingness to pay studies and Olsen and Smith [21] provide a more recent review.

In the context of CV methods, WTP corresponds to the maximum amount an individual would be willing to pay to secure the reduction in travel time requirement. WTA corresponds to the minimum amount the individual would be willing to accept to forgo the reduction in travel time requirement.

Although empirical work using various types of interview procedures has produced evidence of disparities between WTP and WTA measures [22 – 25], it is not known whether there is any significant disparity between WTP and WTA in the context of the value of time in obtaining health care. This study investigates potential differences between WTP and WTA as the measures of the value of time spent traveling to the treatment program.

WTP per hour was estimated from a client's time price per trip as derived through a self-administered questionnaire (Appendix 1). The time price was based on the two hypothetical choices offered to the client to spend:

(1) twice as long as the actual travel time to the treatment program and ($24 - 2T^{travel} - T^{clinic}$) amount of time at either work or leisure, where T^{travel} is a travel time and T^{clinic} is a time spend at the treatment program; or

(2) no time on travel to the treatment program and ($24 - T^{clinic}$) amount of time at either

work or leisure.

If the second choice (Questionnaire item 13) were preferred to the first (Questionnaire item 12), a client would be willing to pay a positive amount for the second choice, i.e. for the elimination of travel time to the treatment program.

The time price measured by WTA was based on a hypothetical offer of a monetary compensation to a client to forgo the reduction in travel time (questionnaire item 14). If travel time has an opportunity cost for a client, then the client would be willing to accept a positive amount of compensation for a non-reduction in travel time.

In an alternative formulation, Johansson [26] seeks to show how market prices can be used to evaluate medical treatments with a rich model in which a priced input such as bus tickets is essential for the production of unpriced medical care such as mammography screening. Using this approach, researchers can estimate the contingent valuation of the screening if they are able to estimate the compensated demand functions for the priced input, in this case the bus tickets.

Our problem is somewhat more complex because travel time represents an unpriced input that is also essential for the production of medical care, here methadone treatment. Theoretical treatment of this problem is beyond the scope of this study, but a topic for further research.

Individual attributes including age, income, employment status, race, gender, and marital status are expected to be important in explaining the time price measured either by WTP or WTA. Measurements of time price are related to estimation of demand parameters. That is why we expect the relationship to be negative with respect to quantity, and positive with respect to income [27]. Other covariates represent “taste” variables. Labor theory predicts that age has a quadratic effect, where initially an increase in age leads to a higher value of time [28].

Other researchers distinguish a “scarcity value” for on-site time and a “commodity value” of time by treating time as both a constraint and as a choice variable in recreation demand models. Willman [29]

arbitrarily allocated costs between the two uses. McConnell's [30] framework offers a consistent treatment of time as both a component of the constraints to recreation trips and as an element influencing the utility derived from them. His formulation implies a nonlinear budget constraint with both trips and time-on-site per trip treated as endogenous variables. On site time's economic value is captured through the demand for trips, because every trip is assumed to be the same length. Smith [31] provides a good discussion of these issues.

We include travel mode, travel time, and travel cost to control for the possibility that the travel to a treatment program is a time consuming, costly, and unpleasant experience. Travel mode may address some issues of the commodity value of time.

3. Data and Sampling

Borisova conducted the study in four methadone maintenance clinics in the Detroit Metropolitan Area from March through July 1999. Study data were collected from the clinics' processing records, and through a self-administered questionnaire (Appendix 1). Data collection took place once each week on random days over a four-week period in each clinic when neither weather conditions nor holidays were likely to interfere with attendance.

Clients were approached while they were waiting for their medication and were asked to participate in the study. For those who were interested, the nature and purpose of the study were explained. To increase the response rate clients were offered two dollars to participate, and were paid immediately after the questionnaire was filled out. Although the questionnaire was designed to be self-administered, clients were provided with any explanations necessary to answer the questions. In some cases, the questionnaire was read to the clients in a form of an interview.

Nine percent of the sample (44 of 504) did not appear during the study days. Thirty-four percent of the clients approached (157 of 460) refused to take part in the study. Thus, sixty-six percent of the clients approached (303 of 460) filled out the questionnaire that was used for

constructing explanatory variables. Data related to socioeconomic and demographic characteristics were obtained from the clinics' processing records.

(Table 1 – Variable Definitions and Sample Means)

Table 1 presents the variable definitions and sample means. The sample was about one-third African-American and 47% female. Almost one-quarter of the sample was married. Mean age was 41.8 years. Reported family income was approximately $18,000. Mean round trip travel time was about 81 minutes, and out-of-pocket travel cost was $3.36 per trip.

(Figure 1 – Survey Distributions of Time Price Calculated Using WTP and WTA)

Two measures of time price were derived from the questionnaire. The mean estimate of the time price per round trip (from question 13) calculated using WTP is $4.35 (standard deviation of 5.42). The mean estimate of the time price per round trip (from question 14) calculated using WTA is $5.68 (standard deviation of 7.62).

4. Estimating WTP and WTA with Survey Data

In this section time price regressions are estimated to examine effects of individual attributes on two different time price measures. Since no actual travel time was specified in the questions the answer should produce the time price specific to each client. WTP and WTA values are then calculated from the time price regression estimates and then compared to each other. Estimated WTP and WTA values are also compared to wage estimates from regression analysis using similar attributes.

Posnett and Jan [32] show the importance of distinguishing between gross wage and after-tax wage. The wage rate was defined as reported gross wage rate for employed clients and as the reported reservation wage for non-working clients. The reservation wage is a hypothetical wage that would just attract a non-working client to take a job.

As shown in Figure 1, of the 303 clients included in the regressions, approximately 38% of reported time prices measured by WTP and 33% of reported time prices measured by WTA are zeros. For those reporting positive values, the distribution is positively skewed. When a distribution of dependent variable includes both zeros and positive values and zero values represent reported data rather than missing values, many believe that the most appropriate estimating approach is a two-part model [18, 19, 33, 34]. In the case of censored data the Tobit model might be more appropriate for the estimation.

In the two-part model, a probit specification is estimated first to determine whether someone has a positive value of the dependent variable, followed by an OLS regression on the natural logarithm of the dependent variable conditional on its positive value:

$$I = aX + n \qquad n \sim N(0,1) \qquad (1.a)$$

$$\ln(Y \mid I > 0) = bX + u \qquad u \sim i.i.d. \qquad (1.b)$$

In equation (1.a), I is a dichotomous event where dependent variable Y is positive if $I > 0$ and zero otherwise. X is the vector of explanatory variables, and are parameter vectors to be estimated. Error term u in equation (*1.b*) is not normally distributed because of the long right tail in the distribution of Y. A consistent estimate of the expected untransformed Y is provided by:

$$E(Y) = p\, s \exp(bX) \qquad (2)$$

$$p = Prob(Y > 0) = F(aX) \qquad F \sim normal\ c.d.f.$$

$$s = \sum [\exp(\hat{u})] / n$$

where s is the "smearing" estimate developed by Duan [35], and n is a number of cases with positive outcomes.

(Table 2 - Probit - Decision to Pay (Accept) a Positive Amount *v.* Paying (Accepting) Nothing)

Table 2 demonstrates how individual attributes affect individuals' stated responses regarding decisions to pay for reductions in travel time and to accept compensation to forego the reduction. Focusing on WTP result first, clients who were in treatment programs longer were substantially less likely to have a positive time price. Clients with longer travel times were more likely to have a positive time price.

Turning to WTA results, older clients were substantially more likely to have a positive time price. The same is true for African-American clients with higher income levels. Similar to WTP results, clients with longer travel time were more likely to have a positive amount for time price. No other significant differences were found.

(Table 3 - OLS Estimates of Time Price Measured by WTP And by WTA Conditional on Paying (Accepting) Positive Amount.)

Table 3 presents estimates and summary statistics from the conditional time price equations. In these equations the dependent variables are the logarithms of the time prices measured by WTP and WTA respectively. Elasticities for continuous variables and percent changes for the dichotomous variables are reported in the table as well.

Income, age, race, gender, travel cost and travel time all have similar effects on time price regardless of time value specification. Income has a positive and statistically significant effect on time price measured by WTP. For time price measured by WTA, the income effect is positive as well, although it is statistically insignificant. The estimated income elasticities range from 0.08 to 0.09. These are similar to values found by Tilford [19] in his investigation of WTP for reduction in doctor's office waiting time.

Travel time is a major predictor of the time price measured by WTP. In fact, clients with longer travel times report higher time prices. The effect is statistically significant with an elasticity of 0.22. Travel cost is correlated with greater time price as well, although the effect is

not statistically significant. Travel mode has an opposite effect in two equations. Clients who travel by bus report lower time price measured by WTP but higher time price measured by WTA than do clients who travel by car. Clients who walk or bicycle to their treatment program report higher time price in both regressions.

African - American clients report 22% higher time prices than do Caucasian clients after controlling for income and travel time. The effect is statistically significant. Women report 2% (4%) lower time price measured by WTP (WTA) than do men, although the effect is not statistically significant.

Age is negatively related to both time prices with elasticities ranging from -0.18 to -0.21. (age elasticities are calculated from both the age and the age squared terms). Age squared has a negative effect as predicted by the labor theory [28].

The employment status effect is not consistent. Employed clients report almost a 5% greater time price measured by WTP and less than 1% lower time price measured by WTA than do unemployed clients (both impacts are calculated with the employment dummy variable and the employment interaction with income, evaluated at the mean income). The difference in the employment status effect in two equations may contribute to the difference between WTP and WTA values.

In general, the results are plausible for both equations with an R^2 of 0.188 for time price measured by WTP and 0.136 for time price measured by WTA regressions. Both regressions predict mean values well. The smearing retransformation predicts mean time price measured by WTP to be $5.71 and mean time price measured by WTA to be $6.37. The actual values are $4.35 and $5.68 respectively. The differences between predicted and actual mean values are not statistically significant.

WTP and WTA values for per hour of travel time were obtained from the predicted values of the time price regressions. On average, WTP is lower than WTA. The mean value of WTP is $7.32 and the mean value of WTA is $8.65. A direct comparison of WTP and WTA reveals that 38% of the clients had higher WTP and 62% had higher WTA. The correlation between them is 0.76 and statistically significant at the 0.0001% level or better.

(Table 4 - The Impacts of Individual Attributes on Wages)

Yet another evaluation of WTP and WTA formulations can be done by investigating the impacts of variables included in WTP and WTA regressions (excluding those variables related to travel) in the wage equation. Table 4 reports the estimates of individual attributes on clients' wages. Age and gender effects have the same sign in WTP and WTA equations. Race and marital status are opposite in sign in the WTP equation. Employment status, marital status, race, and length of time in treatment program are opposite in sign in WTA equation.

Wage rate overstates WTP by $1.78 and WTA by $0.44 on average. The difference between mean values of the wage rate and WTP is statistically significant. This result differs from Cauley [14] who found that on average the wage equals the value of time.

(Table 5 – Differences Between Wages and WTP, WTA)

To determine the difference among three measures of the value of time, WTP and WTA were directly compared to the wage rate in Table 5. First, wages and WTP were compared for different ranges of WTP then wages and WTA were compared for different ranges of WTA. Both comparisons provide similar results. When value of time is small, the wage significantly overstates WTP and WTA by about $6. As the value of time increases, the wage significantly understates both WTP and WTA. The difference increases as value of time goes up.

5. Time Price of Obtaining Methadone Maintenance

One of the economic barriers to the regular treatment attendance is the client's time price, defined as a sum of travel and waiting times evaluated at the value of time. Reduction in time price may induce (more) regular treatment attendance. We use the estimated WTP to calculate the reduction in client's time price as the travel time is decreased.

(Table 6 - Time Price Simulation for Different Travel Times)

Table 6 provides the time price simulation for different travel times. Calculated from the equation (2), the second column of Table 6 shows the time price positive association with client's travel time. For example, the time price for clients traveling 120 minutes is almost twice as high ($5.60) as for clients traveling 10 minutes ($3.22). Column 3 shows WTP values derived from time price estimates. The WTP is obtained by differentiating the log (TIME PRICE) regression, and WTP per hour is calculated and plotted at interval midpoints. There is generally a negative association between WTP and client's travel time. These values are plotted in Figure 2. (Writing the equation as $\log P = aT - bT^2$, $a, b > 0$, where P is time price and T is travel time, the WTP function may rise over some intervals. Because $\frac{d\text{WTP}}{dT} = \frac{d^2P}{dT^2} = (a - 2bT)\frac{dP}{dT} - 2bP$, for small values of T and P, $\frac{d^2P}{dT^2}$ may be positive.)

(Figure 2 - Travel Time, Willingness to Pay, and Time Price)

Consider for example a client who incurs the mean round-trip time price of 80 minutes (recall that mean out-of-pocket travel cost was $3.36 per trip). Table 6 indicates that the total time price for an 80-minute trip is $4.89, so the entire round-trip cost is $8.25. Thus time price accounts for 59% of the total round-trip costs. If one can reduce the client's travel time in half (from 80 to 40 minutes), the time price is reduced from $4.89 to $3.96 (or by 19%), and the total trip cost is reduced from $8.25 to $7.32, or by 11%. Estimating time price elasticities is beyond the scope of this article, but Borisova [36] finds plausible values.

6. Conclusions and Policy Implications

There has been a substantive debate in the drug abuse treatment literature about ways to attract clients to treatment settings. Because the out-of-pocket treatment costs are often heavily subsidized, travel and waiting times assume considerable importance.

It has long been recognized that a primary limitation in determining the effect of time in health care research is the proper measure of its valuation. Many factors may distort the equality between the wage rate and the value of time, especially in health care, and especially for patients who are not working. This study has sought an alternative measure of the value of time in obtaining methadone maintenance.

Regressions of WTP and WTA on individual attributes have confirmed the validity of either WTP or WTA as valuations of time in obtaining methadone maintenance. Income, age, gender, and other individual attributes have the anticipated and consistent effects in both regressions. Employment status and travel mode variables, however, provide inconsistent effects.

The wage rate is not correlated with either WTP or WTA. Furthermore, the wage rate overstates both WTP and WTA for individuals with low value of time and understates them for individuals with higher value of time. Subsequent work will compare the wage rate and WTP in relating treatment compliance to time price.

One major limitation of this study is that WTP and WTA values were obtained by open-ended questions. Due to the nature of the willingness-to-pay and willingness-to-accept concepts, the unknown diversity of responses and the lack of preexisting surveys in the field, this problem were unavoidable. Subsequent studies, taking advantage of this study's findings, might sharpen the questions, and the resulting findings.

Our best estimates of WTP suggest that time price account for over half of the total trip

costs for those undergoing methadone maintenance treatment. Since the trip costs constitute the largest share of the individual's total treatment costs, interventions that would reduce the time price, and hence trip costs, might improve both treatment initiation and treatment compliance. Work in progress by Borisova [36] suggests that policies of this type may be effective because reduced travel time appears to improve compliance by methadone treatment clients.

APPENDIX 1

QUESTIONNAIRE

1. ID number: _____

2. How do you usually get here and leave?

   _ Walked / bicycle
   _ Drove myself
   _ Got a ride
   _ Church van and such
   _ Bus
   _ Taxi

3. How much time does it usually take you to travel here?

   _____hours _____minutes

4. How much do you usually pay for your round-trip transportation?

   $ _____

5. How much time do you usually spend at the clinic every day?

   _____hours _____minutes

6. How much money do you pay for each visit?

   $ _____

7. To come here, how much money does it usually cost you for childcare or for care of another person?

   $ _____

8. Are you employed?

   _ No
   _ Yes

   Wage rate per hour: $_____

9. If you are NOT employed, what is the LOWEST wage per hour it would take for you to accept a job?

   $ _____

10. What is your weekly household income from all sources?

    $ _____

11. If you had to pay here for each visit, what is the MOST money you would be ***willing to pay***?

    $ _____

12. If it took you ***twice*** as long as usual to travel to this clinic and if you had to pay, what is the MOST money you would be ***willing to pay*** for each visit?

    $ _____

13. If this clinic were moved right NEXT DOOR to where you live for your convenience and if you had to pay, what is the MOST money you would be ***willing to pay*** for each visit?

    $ _____

14. If this clinic were moved back to its original place and offered you money for your inconvenience, what is the LEAST money you would be ***willing to receive*** for each visit?

    $ _____

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Table 1

Mean Values of Variables Used in Time Price and Wage Regressions

VARIABLES	MEAN †	MEAN ‡	
		TP_WTP | TP_WTP>0	TP_WTA | TP_WTA>0
TIME PRICE measured by WTP	4.35	7.02	-
TIME PRICE measured by WTA	5.68	-	8.47
WAGE RATE	9.14	-	-
AFRICAN-AMERICAN	0.3300	0.3245	0.3498
WOMEN	0.4700	0.4734	0.4778
EMPLOYED	0.4521	0.4521	0.4384
MARRIED	0.2400	0.2500	0.2562
AGE	41.8000	41.7766	42.3153
AGE SQUARED	1808	1802	1845
CLINIC 1	0.3201	0.2447	0.2562
CLINIC 2	0.3267	0.4362	0.3744
FAMILY INCOME	18,065	18,147	17,489
RACE *INCOME	5,254	5,457	5,854
EMPLOYED *INCOME	10,888	10,557	9,961
TREATMENT WEEKS	80.5100	74.1755	79.0099
TRAVEL TIME	81.3729	86.7979	89.1626
TRAVEL TIME SQUARED	12056	12891	13759
TRAVEL COST	3.3600	3.4747	3.6135
BUS	0.1848	0.1755	0.2020
OTHER TRANSPORTATION	0.0165	0.0213	0.0197
OBSERVATIONS	303	188	203

† values used in probit time price equations and in wage equation.
‡ values used in conditional time price equations.

Table 2

Probit Estimates of Decision to Pay (Accept) a Positive Amount Versus Paying (Accepting) Nothing

VARIABLES	Pr (TIME PRICE_WTP>0)		Pr (TIME PRICE_WTA>0)	
	parameter	**t-ratio**	**parameter**	**t-ratio**
INTERCEPT	-1.3314	-0.89	-2.0989	-1.47
AFRICAN-AMERICAN	-0.1169	-0.38	-0.3864	-1.25
WOMEN	0.0038	0.02	0.6947	0.42
EMPLOYED	0.1661	0.61	0.2046	0.74
MARRIED	-0.0577	-0.30	0.0242	0.13
AGE	0.0586	0.82	0.1010	1.49
AGE SQUARED	-0.0008	-0.88	-0.0011	-1.35
CLINIC 1	-0.0911	-0.38	-0.3385	-1.43
CLINIC 2	0.8884	3.65***	0.2354	0.10
FAMILY INCOME	1.05E-05	0.93	2.33E-05	0.21
RACE *INCOME	1.33E-05	1.12	2.37E-05	1.85*
EMPLOYED *INCOME	-1.65E-05	-1.29	-1.59E-05	-1.24
TREATMENT WEEKS	-0.0013	-1.53	-4.81E-05	-0.06
TRAVEL TIME	0.0105	2.69***	0.0083	2.23**
TRAVEL TIME SQUARED	-2.49E-05	-2.12**	-1.86E-05	-1.58
TRAVEL COST	-0.0361	-1.06	-0.0057	-0.35
BUS	-0.4072	-1.59	-0.1913	-0.76
OTHER TRANSPORTATION	0.5179	0.73	0.2553	0.37

OBSERVATIONS	303	303
-2*LOG LIKELIHOOD	176.7703	177.2236
PSEUDO R^2	0.1212	0.0777
P	0.6217	0.6697

***. Statistic is significant at the 0.01 level (2-tailed)

**. Statistic is significant at the 0.05 level (2-tailed)

*. Statistic is significant at the 0.10 level (2-tailed)

Table 3

OLS Estimates of Time Price Measured by WTP and Time Price Measured by WTA Conditional on Paying (Accepting) Positive Amount

VARIABLES	log (TIME PRICE_WTP)			log (TIME PRICE_WTA)		
	parameter	t-ratio	impact+	parameter	t-ratio	impact+
INTERCEPT	0.2160	0.46	-	0.0280	0.06	-
AFRICAN-AMERICAN	0.1750	1.97**	0.2230	0.1660	1.81*	0.2266
WOMEN	-0.0160	-0.32	-0.0229	-0.0240	-0.48	-0.0370
EMPLOYED	0.1050	1.32	0.0488	-0.0150	-0.18	-0.0055
MARRIED	-0.0098	-0.17	-0.0140	0.0410	0.72	0.0632
AGE	0.0115	0.50	-0.2120	0.0290	1.27	-0.1784
AGE SQUARED	-1.80E-04	-0.64	-	-3.80E-04	-1.35	-
CLINIC 1	0.1190	1.51	0.1700	-0.0289	-0.37	-0.0446
CLINIC 2	-0.0738	-1.11	-0.1060	0.0924	1.38	0.1425
FAMILY INCOME	7.05E-06	2.56**	0.0755	3.99E-06	1.40	0.0910
RACE *INCOME	-3.60E-06	-1.03	-	-3.63E-06	-0.97	-
EMPLOYED *INCOME	-6.51E-06	-1.88*	-	1.05E-06	0.27	-
TREATMENT WEEKS	3.86E-05	0.14	0.0045	-2.28E-04	-0.84	-0.0283
TRAVEL TIME	3.54E-03	3.09***	0.2150	9.81E-04	0.87	0.0477
TRAVEL TIME SQUARED	-1.04E-05	-2.90***	-	-3.69E-06	-1.09	-
TRAVEL COST	0.0151	1.42	0.0726	0.0155	1.58	0.0803
BUS	-0.0118	-0.15	-0.0169	0.0792	1.08	0.1221
OTHER TRANSPORTATION	0.1020	0.61	0.1460	0.0333	0.19	0.0514

OBSERVATIONS	188	203
F STATISTIC	2.321***	1.712**
R^2	0.188	0.136
ADJUSTED R^2	0.107	0.056
	0.3126	0.3268
E(Y)	5.71	6.37
SMEARING ESTIMATE	1.25	1.29

+ elasticity for continuous variables and percentage change for dichotomous variables are calculated with respect to the probability of having positive WTP and WTA amounts.

***. Statistic is significant at the 0.01 level (2-tailed)

**. Statistic is significant at the 0.05 level (2-tailed)

*. Statistic is significant at the 0.10 level (2-tailed)

Table 4

The Impacts of Individual Attributes on Wages

VARIABLES	**ln (WAGE)**	
	parameter	**t-ratio**
INTERCEPT	1.8877	4.67***
AFRICAN-AMERICAN	-0.0815	1.56
WOMEN	-0.1998	-4.25***
EMPLOYED	0.2828	5.89***
MARRIED	-0.0260	-0.50
AGE	0.0084	0.42
AGE SQUARED	-8.57E-05	-0.35
TREATMENT WEEKS	5.77E-06	0.02

OBSERVATIONS	303
F STATISTIC	10.99***
R^2	0.2069
ADJUSTED R^2	0.1880
	0.3926
E(Y)	9.09

***. Statistic is significant at the 0.01 level (2-tailed)
**. Statistic is significant at the 0.05 level (2-tailed)
*. Statistic is significant at the 0.10 level (2-tailed)

Table 5

Differences between Wages and WTP, WTA

WTP range	**N**	**Mean difference between WAGE and WTP**	**t-ratio**	**WTA range**	**N**	**Mean difference between WAGE and WTA**	**t-ratio**
0 < WTP ≤ 5	34%	5.66	24.33	**0 < WTA ≤5**	38%	5.77	23.33
5 < WTP ≤ 10	37%	2.09	7.50	**5 < WTA ≤ 10**	41%	1.33	6.15
10 < WTP ≤ 15	17%	-2.72	-6.03	**10 < WTA ≤ 15**	12%	-2.36	-5.91
15 < WTP	12%	-11.12	-8.35	**15 < WTA**	8%	-13.69	-6.62

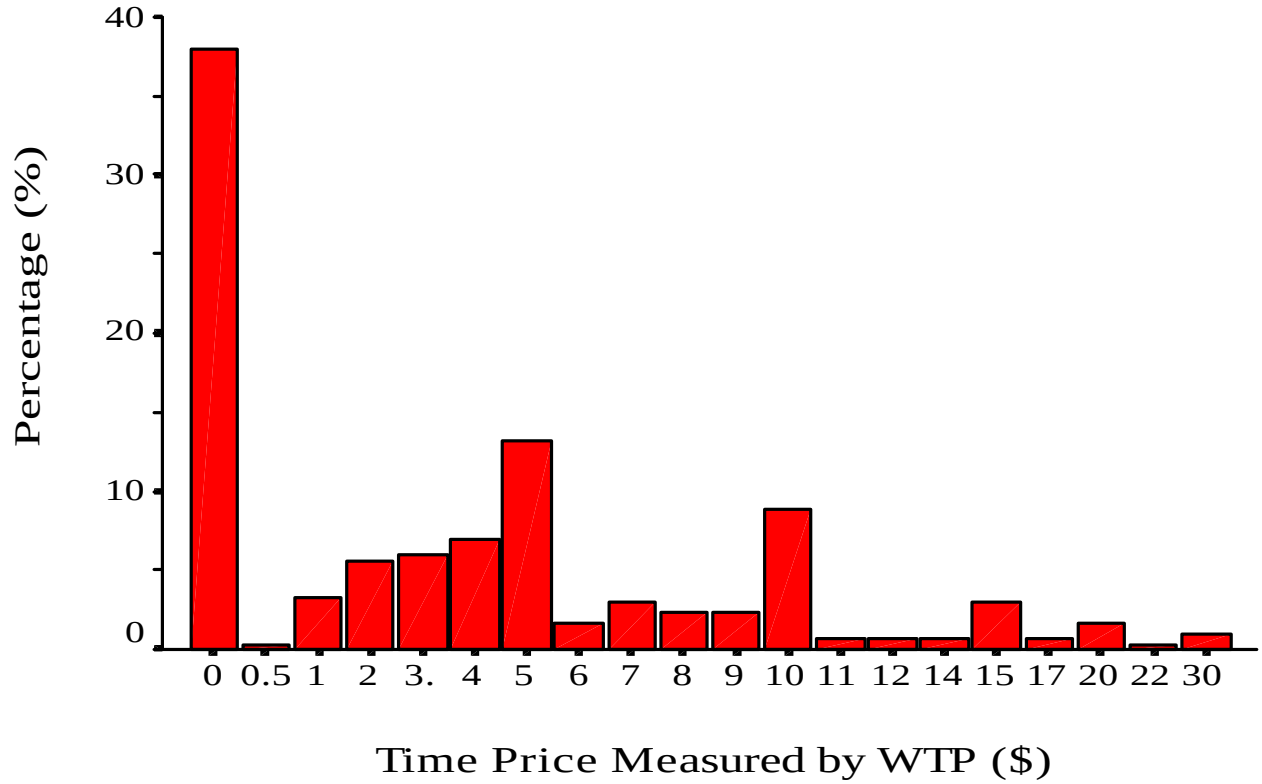
Table 6

Time Price and WTP Simulation for Different Travel Times

(1) Travel Time	(2) Time Price	(3) WTP per Hr.
0	$2.97	
10	3.22	10.02
20	3.46	1.48
30	3.71	1.49
40	3.96	1.49
50	4.21	1.46
60	4.45	1.43
70	4.67	1.37
80	4.89	1.30
90	5.10	1.22
100	5.28	1.12
110	5.45	1.00
120	5.60	

Figure 1

Survey Distributions of WTP and WTA



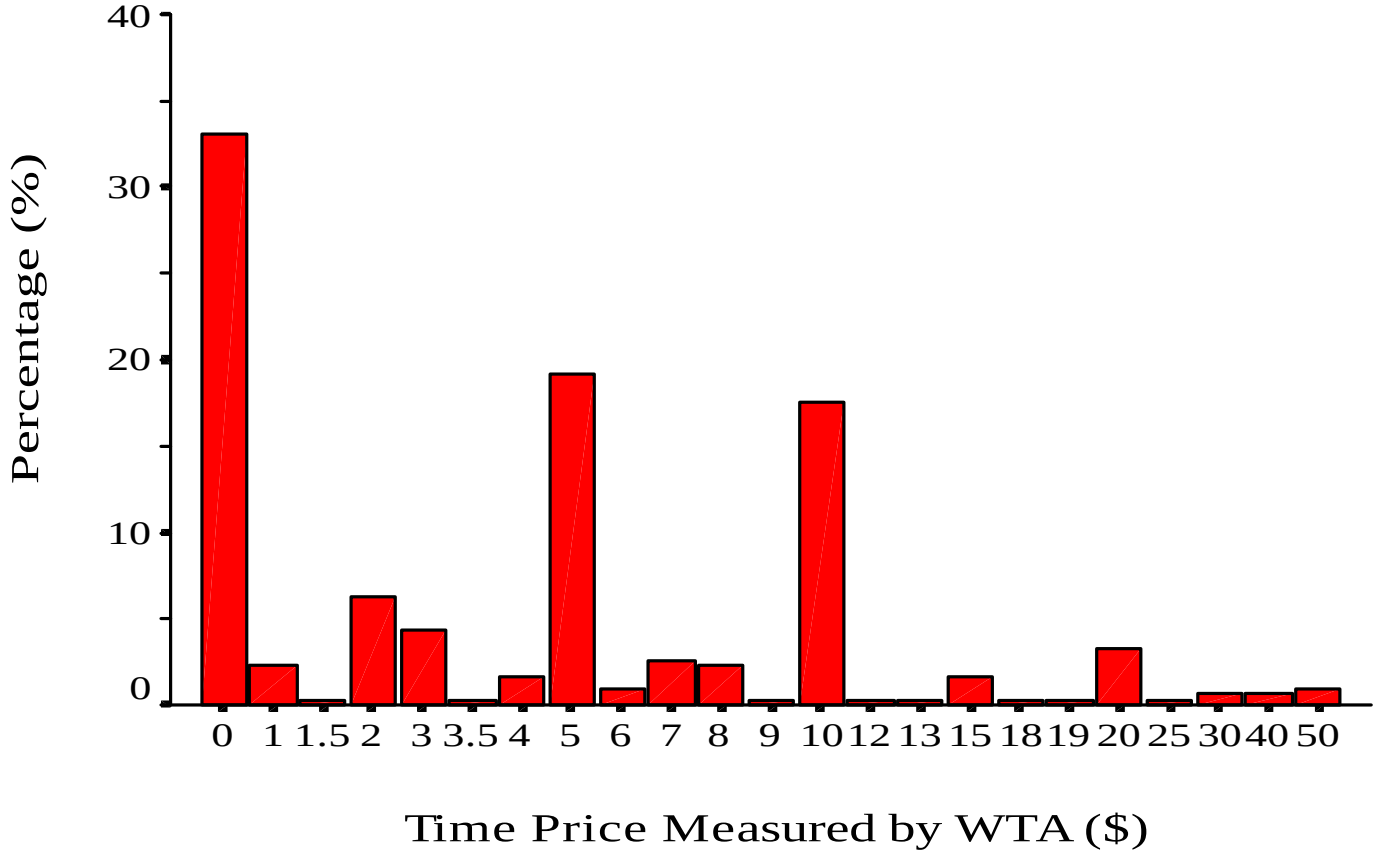
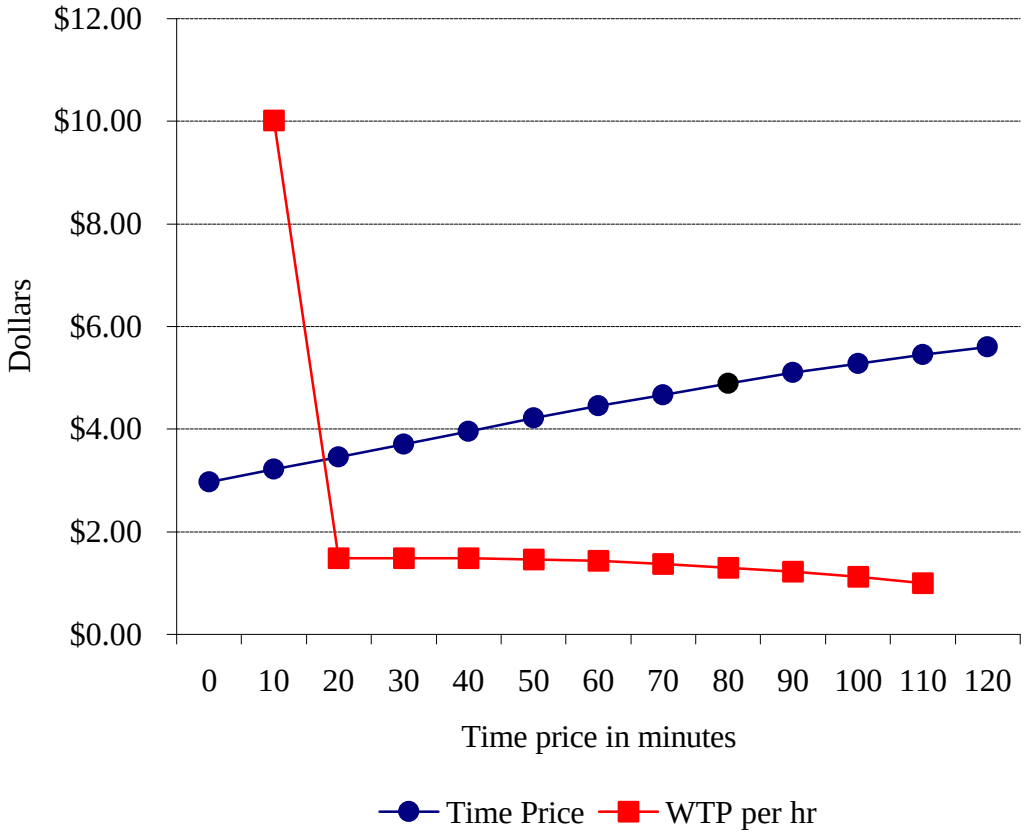


Figure 2

Travel Time, WTP and Time Price



Definition of Variables

TIME PRICE	estimated per round trip using Willingness to Pay (Questionnaire item 13) or Willingness to Accept (Questionnaire item 14) measures, specific for each client.
WTP	maximum amount an individual would be willing to pay to secure the reduction in travel time requirement, estimated per hour of travel.
WTA	minimum amount the individual would be willing to accept to forgo the reduction in travel time requirement, estimated per hour of travel.
WAGE RATE	measured as a gross wage per hour for employed clients and as a reservation wage per hour for non-working clients.
FAMILY INCOME	measured as a gross yearly family income from all sources.
TREATMENT WEEKS	number of weeks spent in treatment program by each client.
TRAVEL TIME	round trip travel time to a treatment program by each client.
TRAVEL COST	client's out-of-pocket transportation expenses to and from the treatment program.
TRAVEL MODE	type of client's usual transportation used to travel to the treatment program; choices included bus, car, taxi, walk, bicycle, church van.