DISCUSSION PAPER SERIES

IZA DP No. 8491

Waiting To Give

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September 2014

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zur Zukunft der Arbeit
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IZA Discussion Paper No. 8491
September 2014

ABSTRACT

Waiting To Give*

We estimate the effect of an increase in time cost on the return behavior of blood donors. Using data from the Australia Red Cross Blood Service, we ask what happens when pro-social behavior becomes more costly. Exploiting a natural variation in which donor wait times are random, we use the length of time a donor spends waiting to make his donation as our measure of cost. Our data allows us to go beyond measures of satisfaction and intention and estimate the effect of wait time on return behavior. We estimate that a 38% increase (20 minutes or one standard deviation) in the average wait would result in a 14% decrease in donations per year. Our results thus indicate that waiting is not merely frustrating, but has significant negative long-term social costs. Further, relying only on satisfaction and intention data masks not only the magnitude of the effects but also heterogeneous responses to increased wait time: the return behavior of males is more elastic than females and donors display diminishing sensitivity in the domain of losses. Finally, we discuss the implications of our findings for organizations that operate with a large and diffuse volunteer donor base.

JEL Classification: D04, D12, D61, D64, I18

Keywords: pro-social behavior, time cost, blood donation

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* We received many helpful suggestions from seminar participants at the University of Sydney and the Russell Sage Summer Institute, as well as comments from Barton Hamilton, Nicola Lacetera, David K. Levine, Mario Macis, Nicholas Papageorge and Robert Pollak on an earlier draft. We greatly appreciate the generous financial support of the Australian Research Council, #1095222 and the Australian Red Cross Blood Service (Blood Service) for their continuous support. We appreciate the support from many Blood Service personnel including Perfecto Diaz, David Irving, Geoff Smith and Dan Waller who have generously given their time and energy with institutional details, guidance and service. We would like to acknowledge the Australian Red Cross Blood Service and Australian governments that fully fund the Blood Service for the provision of blood products and services to the Australian community.

1 Introduction

When deciding whether to engage in pro-social behavior, individuals weigh both the benefits and costs. Benefits ranging from increased social status and personal feelings of warm glow are weighed against the opportunity cost of time. Economists have almost exclusively examined this decision from the benefits' side and specifically focused on the effectiveness of incentives to encourage pro-social behavior (Fehr and Gächter, 2000; Fehr and Falk, 2002; Gneezy and Rustichini, 2000; Lacetera et al., 2013, 2014). In pro-social settings, individuals do not always respond to incentives as standard economic theory predicts (Gneezy et al., 2011). In particular, individuals are less responsive to increased benefits when pro-social behavior is highly intrinsically motivated (Deci et al., 1999) or when there are social status concerns (Ariely et al., 2009; Bénabou and Tirole, 2006).

This paper asks, what happens when pro-social behavior becomes more costly? We do so in the context of blood donations, where an individual obtains new information about the donation process each time he donates (e.g., how he felt after the donation, the degree of discomfort and the length of time he waited) and this new information can then affect future donation decisions. Wait time, in particular, is a cost incurred by all donors, is observable and exogenously varies, providing a good test of whether longer waits (i.e., higher costs) affect future behavior.

We hypothesize that, ceteris paribus, longer waits will have a negative effect on: (1) donors' reported satisfaction with their experience; and (2) donors' future donation behavior. The second hypothesis is motivated by (1) assuming donors update future wait time expectations based on current experience (i.e., a longer current wait, ceteris paribus, indicates longer future waits) and (2) that volunteer donors respond to costs and benefits in standard ways, i.e., donate more (less) when the benefits (costs) increase. Field studies have found a positive significant relationship between economic reward offers and blood donations (Lacetera et al., 2013), but none have examined the effects of donor costs.

The first hypothesis is supported by the findings that longer waits incite customer frustration and annoyance and lead to lower service evaluations in non-pro-social contexts (Dube-Rioux et al., 1989; Hui and Tse, 1996; Taylor, 1994). However, previous wait time research has had to rely on service evaluation and future intentions as proximal outcome measures since return behavior at the individual level has been unavailable. Hence, our results offer the first test that dissatisfaction with waiting will affect not only attitudes but also future behavior such as delayed returns or not returning at all.

Access to actual behavioral data means that we are not forced to rely on satisfaction and intentions data to draw inferences on actual behavior (Card et al., 2012). This is particularly advantageous as stated preferences may not support, and at worst may contradict, revealed preferences. Extensive research in psychology finds that stated preferences align with aspirations and goals while revealed preferences may reflect more pragmatic concerns and greater responsiveness to costs (Glasman and Albarracín, 2006; Sheeran, 2002). The difference between stated intentions and actions may be further exacerbated by social desirability biases in an altruistic context. For instance, Levitt and List (2007) report a gap between subjects' stated preferences for pro-social behavior in the laboratory and their actual behavior in the field. In the context of blood donations, Glynn et al. (2003) report that survey respondents indicate that offering health-related services would be an effective incentive to donate blood and lottery tickets would not. Subsequently, Goette and Stutzer (2008) offer incentives for blood donations and find that cholesterol tests are ineffective, while lottery tickets are effective.

We use data from the Australian Red Cross Blood Service (the Blood Service), supplemented by survey data, collected across four centers in July 2009 to test the effect of wait time on three outcomes: satisfaction, intention to donate and actual return donation behavior. The return data is the key component of our contribution and highlights the institutional features of the Blood Service that make it particularly suitable for our question. Namely, in Australia, the Blood Service has a monopoly on all blood product collection and thus, unlike most countries including the United States, we need not be concerned that individuals switch to alternative donation services in response to experiences with the Blood Service (Lacetera et al., 2012). Additionally, unlike other studies, we follow donors for nearly four years after the survey and thus our results are not driven by an arbitrary stopping time or truncated observation.

We report two main sets of findings. First, longer waits negatively affect future donation behavior. In particular, we find that donors who experienced longer waits are less likely to return and to have a longer average delay before their next donation. In Australia, whole blood donors can donate every 12 weeks. Given the time frame of eligibility, delayed returns translate into substantial losses in the expected number of yearly donations. Based on our estimates, we calculate that if donors waited one standard deviation longer than average (20 minutes) this would result in a loss of approximately 14% (77,000 of the 604,007) of whole blood donations in Australia.

We also detect two further effects of wait time costs on future donation behavior. There is also evidence that donors display diminishing sensitivity in the domain of losses (Tversky and Kahneman, 1991, 1992): an additional minute of waiting is costlier, in terms of return behavior, for donors with the shortest waits times than for donors with the longest wait times. Additionally, we observe that longer waits not only delay returns, but also affect the type of donation that is made when a donor returns. We find that longer waits cause whole blood donors to be less likely to convert to a plasma donation at their next donation. This is important because most countries experience much greater plasma than whole blood shortages and thus converting donors from whole blood to plasma is a goal of many blood collection agencies (Slonim et al., 2014).[1]

[1]In fact, worldwide plasma shortages are so severe that many countries, including Australia, rely on importing plasma from the United States. Slonim et al. (2014) give a comprehensive review of the benefits of plasma donation over whole blood donation. For instance, plasma donors can give more plasma and make donations more frequently

Second, while we draw similar overall conclusions from the survey responses to satisfaction and future intentions as with the actual return behavior, we also show that there are two major shortcomings of relying on the satisfaction and intention data. First, without the actual return data, we would not be able to calibrate the magnitude or costs of the effects of longer waits. Second, the survey responses do not reflect the heterogeneity we capture in the actual return behavior. In particular, longer wait times are associated with delayed returns for males, but not females. Specifically, longer waits are associated with lower levels of satisfaction for all types of donors, but the dissatisfaction only translates to delayed returns for males.

The gender difference we find in return behavior indicates differences in elasticity–male return behavior is more responsive than female return behavior to changes in time cost. The finding that male demand for altruism is more elastic than female demand is also supported in the literature (Andreoni and Vesterlund, 2001; Andreoni et al., 2003; Conlin et al., 2003). Additionally, we find differences between stated satisfaction and return behavior for women; in particular, women express dissatisfaction with the wait, but the dissatisfaction does not carry over to delayed return. This difference in survey statements and actual behavior for women, but not men, has also been observed in response to incentives; Lacetera and Macis (2010) find that female survey respondents reported being less likely to donate if offered an incentive to donate blood, whereas Lacetera et al. (2014) find that women were more likely to donate in response to incentive offers.

2 Design

2.1 Institutional Details

To give whole blood in Australia, a donor must not have made a whole blood donation within the preceding 12 weeks.[2] Thus, a donor who donates only whole blood can make 4 or 5 whole blood donations per year. The eligibility requirements for other blood products are often individual-specific and depend on the health needs of the donor. Table I classifies the type of donation by blood product–whole blood and other. For our purposes, we will focus only on whole blood.[3]

When a donor arrives at the donation center, he registers at the front desk, completes a short personal history survey and then waits in the lobby until he is escorted to the processing interview where his eligibility is assessed via an interview with the Blood Service staff. If deemed eligible,

than whole blood donors. Further, recipients can receive plasma donations from a donor of any blood type.

[2]In Australia, there are several requirements to be an eligible whole blood or plasma donor, however only the requirements relevant to our study will be discussed here. See http://www.donateblood.com.au/ for a full description of the eligibility requirements in Australia.

[3]We do not study the behavior of donors who give anything other than whole blood mainly because the number of these donors that we observe is too small. We also do not study donors who give for therapeutic reasons since their donations are the result of health conditions that require they give blood. We also do not study less common blood product donations since they do not have the same standard window of eligibility as whole blood that is key for our identification of delayed return behavior.

he is directed to a second waiting room and waits until a staff member calls him into the donation room where he begins his donation. The centers record the time the donor registers with the front desk upon arrival and the time the needle is inserted to begin the draw of blood. We consider the total wait time to be the number of minutes that elapse from the time the donor registers at the front desk to the time the needle is inserted.

During a whole blood donation, 470 milliliters of whole blood are extracted in a procedure that lasts approximately 8-12 minutes. When his donation is complete, he exits the donation room and enters the recovery room where drinks and food are provided. The donor is encouraged to remain in the recovery room for at least 15 minutes for precautionary health reasons, but is free to leave at will.

Australia provides an ideal setting in which to study blood donor behavior at the individual level because the Blood Service has a monopoly on donation services. We are thus able to very precisely measure the effects of wait time on future donations no matter what blood product a donor supplies or where the donor supplies the blood product anywhere within Australia.[4]

2.2 Data

We administered a field survey from July 8 to July 31, 2009 in four donation centers in the greater Sydney region.[5] Trained surveyors administered the survey in the recovery room after the donation process. The survey took approximately 5-10 minutes to complete and 98% of donors completed the survey, resulting in 1,370 completed surveys.[6]

We then matched the respondents with administrative data provided by the Blood Service. The administrative data include donation histories after July 2009 so that it is possible to identify when, if ever, survey respondents returned and the blood product donated upon return. Table I shows that of the 1,370 survey respondents 1,251 donors were successfully matched to an administrative record.[7] Of those 1,251, 73% donated whole blood, 20% donated plasma and 7% gave another blood product.

Since blood products require varying time lapses between donations, it is necessary to know the type of blood product the donor gave when (if ever) he returned to analyze return behavior. Because converting to plasma signifies a a willingness to incur a higher cost (the length of the actual "needle in" time is four times longer for plasma than for whole blood), we separately analyze

[4]From the researcher's perspective, the lack of alternative donation organizations means that we do not have to be concerned with past donors choosing to make their future donation with another organization (Cairns and Slonim, 2011; Gross, 2005). This is a particularly important feature when studying the effect of costs and benefits on subsequent donation behavior. As shown in Lacetera et al. (2012), donors will substitute across donation locations in search of the best donation experience.

[5]See Supplementary Materials for a copy of the survey instrument.

[6]The 98% response rate is not surprising in this context; the blood service encourages donors to remain up to 15 minutes before leaving the center, thus the survey offers them something to do before leaving.

[7]Unsuccessful matches occurred due to invalid donor numbers.

return behavior for donors who switch to plasma in their subsequent donation and those who do not. Of 916 whole blood donors in July 2009, 65 observations were dropped due to missing outcome data and implausible wait times (see below for a further discussion), 649 returned to donate whole blood, 73 returned to donate plasma, and 127 had not returned within 44 months after the survey date, our last collection of data (henceforth referred to as never returned).

Insert Table I here.

For the majority of our analyses, we will focus on the 776 individuals who matched to administrative records, have a complete record on all outcomes, donated whole blood during our survey time and subsequently returned to donate whole blood or did not return (we later examine donors who returned to donate plasma). Table II describes these 776 donors in our survey sample. The average time spent waiting before the donation begins was 43 minutes (median of 39 minutes) and donors arrived throughout the day (morning, lunch, and afternoon) in relatively similar proportions. The average survey respondent has made an average of 1.4 donations per year. Slightly less than half of our survey respondents are female and the average donor is 44 years old. Nearly all of the survey respondents made their donation at two of the four donation centers.[8]

Insert Table II here.

Our results focus on three outcomes: satisfaction, intention and return behavior. Satisfaction is measured by the donor's response to the question "How satisfied were you with the overall experience today?" where 1 indicated "Not at all satisfied" and 7 indicated "Completely satisfied". Intention to donate is measured by the donor's response to the question "What is the likelihood that you will donate again in the next 6 months?" where 0 indicated "No Chance" and 10 indicated "Completely certain". Figure I shows the heavy left skew of the responses to these two survey questions, which is a common feature in satisfaction and intention survey responses (Peterson and Wilson, 1992).

Insert Figure II here.

We analyze return behavior from two perspectives. First, we examine whether whole blood donors return to donate whole blood. Second, we analyze return behavior from the perspective of blood product conversion; specifically, we examine whether a whole blood donor converts to plasma.

Our measure of wait time is taken from the administrative data and is recorded as the difference, in minutes, between the registration time (i.e, arrival time) and the start of donation (i.e., "needle in" time). This includes the time the donor spends completing paper work and waiting for the

[8]We focused our collection efforts at the busiest of the four centers.

eligibility interview, the interview time (which we observed lasts about 8 minutes with little variance since it involves a standard set of questions), and then the time after the interview before the needle is inserted to begin the blood draw.[9] Figure II shows the distribution of wait time in minutes. Interpretation of the estimates is facilitated by subtracting the average wait time, $\overline{\text{Wait}}$. Thus our measure of wait is

$$\widetilde{\text{Wait}} = Wait - \overline{Wait}$$

Insert Figure I here.

2.3 Econometric Specification and Hypotheses

We estimate a proportional hazards model to study the effect of wait time on the return behavior of whole blood donors for three main reasons. First, unlike a discrete choice model (i.e., return or not return), the hazard model does not require us to choose a "return date", which will always be chosen arbitrarily.[10] Second, since 86% of whole blood donors in our survey do eventually return to donate, the main issue is how long their return is postponed. A delayed return following an unpleasant experience has long-lasting repercussions, as all subsequent donations must also be pushed back to satisfy eligibility requirements. Third, the hazard model accounts for the non-normality of the duration distribution (see Figure III) and the right censoring of the data.[11]

Further, we parameterize the baseline hazard in order to estimate when donors will return to donate. Donors face a decreasing hazard of returning to donate–on a given day a donor who has not yet returned is less likely to return than he was on any of the preceding days, as is clearly displayed in Figures 3(a) & 3(b). The Weibull distribution captures the decreasing risk and allows for predictions about return behavior.[12]

Insert Figure III here.

Thus, we estimate the following survival function via maximum likelihood

$$S(t) = \exp(-t^p \exp(\beta_0 - \beta_1 \widetilde{\text{Wait}})) \tag{1}$$

[9]We dropped 10 observations whose wait times appeared to be data entry errors: four donors with recorded wait times less than 8 minutes and 6 donors with recorded wait times beyond 2 hours. A wait time of less than 8 minutes seems technically impossible given the time for an eligibility interview, and the wait times over two hours are more than four standard deviations above the average wait time. The results that follow are not sensitive to the exclusion of these 10 observations.

[10]Tables 1 and 2 in Supplementary Materials reproduce the main results (Table III and Table V shown below) but are estimated with a probit model and four arbitrary time periods for return–50 days, 1 year, 2 years and 3 years.

[11]Our use of the proportional hazards metric is justified by testing the Schoenfeld residuals in which we cannot reject the null that the hazards are proportional (p-value > 0.92) (Grambsch and Therneau, 1994).

[12]We obtain very similar estimates with the Weibull distribution as with a semi-parametric model in which we do not specify a distribution for the baseline hazard.

where p is the shape parameter of the Weibull distribution and β_1 is the parameter that governs the relationship between wait time and survival.[13]

We hypothesize that longer wait times decrease the baseline hazard; that is, the longer a donor waits the less likely he will return on any particular day given he has not yet returned to donate. Our hypothesis assumes that donors update expected future wait times based on the current wait time. In particular, the longer the current wait, then the greater the future expected wait, which translates to a higher expected donation cost. Finally, our hypothesis also assumes donors have diminishing marginal utility over the total number of donations they will make over some arbitrary period of time (e.g., per year). Thus a higher expected cost will (weakly) lower the total number of donations a utility-maximizing donor will make, and consequently increase the delay between donations.

Hypothesis 1. *Longer wait times have a negative effect on the hazard rate, $exp(\beta_1) < 1$ or $\beta_1 < 0$.*

To study the effect of wait time on satisfaction and intention we estimate an ordered probit model, which takes into account the ordinal nature of the discrete survey responses (Aitchison and Silvey, 1957; McKelvey and Zavoina, 1975). The survey responses are highly left-skewed and raise questions about whether the data satisfy the proportional odds assumption of the ordered probit. We present the findings from the ordered probit in the body of the paper and estimates for the less restrictive generalized ordered probit can be found in Table 3 in Supplementary Materials, which provide qualitatively identical conclusions.

We estimate the probability that a donor states each level of satisfaction by maximum likelihood. We model the probability of a donor i choosing response m as

$$P[\text{satisfaction} = m] = \Phi(\mu_m - \alpha_1 \widetilde{\text{Wait}}) - \Phi(\mu_{m-1} - \alpha_1 \widetilde{\text{Wait}}) \tag{2}$$

We hypothesize that the reaction to wait time in the pro-social context will be similar to the reaction observed in the non-pro-social contexts (Dube-Rioux et al., 1989; Hui and Tse, 1996; Taylor, 1994). Specifically, we hypothesize that a longer wait will decrease the donor's satisfaction with his experience.

Hypothesis 2. *Longer wait times have a negative effect on satisfaction, $\alpha_1 < 0$.*

Similarly, we estimate the probability that a donor states each level of intention to donate by maximum likelihood and model the probability of a donor i choosing response m as

$$P[\text{intention} = m] = \Phi(\mu_m - \gamma_1 \widetilde{\text{Wait}}) - \Phi(\mu_{m-1} - \gamma_1 \widetilde{\text{Wait}}) \tag{3}$$

[13]In our context, the survival analysis language can be misleading. A survival refers to the event in which a donor does not return to donate and a failure refers to the event in which a donor returns to donate. Thus, a decrease in the hazard means a decrease in the probability of returning to donate.

Hypothesis 3. *Longer wait times have a negative effect on intention to donate, $\gamma_1 < 0$.*

Overall, we hypothesize that wait times negatively affect all outcomes. Donors who wait longer are more likely to report feeling less satisfied, less likely to intend to donate again and more likely to have adverse return behavior, either a delayed return or a cessation of donation activities.

Consistent with laboratory (Andreoni and Vesterlund, 2001), empirical (Andreoni et al., 2003) and field evidence (Conlin et al., 2003) which find that females are less responsive to price changes in altruistic settings, we hypothesize that female return behavior will be less responsive to wait time than male return behavior.

Hypothesis 4. *Male return behavior is more sensitive to wait time than female return behavior.*

Throughout the analysis below, we have clustered the standard errors at the blood center level. We have chosen this type of clustering because most recruitment and donor retention activity, which we do not observe, occurs at the center-level and the center clusters account for any unobservable center-specific activity.

3 Results

3.1 Main Findings

Table III reports estimates of the effect of wait time from equations 1-3 on our three outcomes of interest. The dependent variable in the first column, "Likelihood to Return", is the number of days past eligibility until the donor returns and thus we are estimating the likelihood of returning at time t given no return prior to time t. The dependent variable in columns (2) and (3) is the probability of reporting a higher level of satisfaction and intention to donate, respectively. The marginal effects are calculated at the means and represent the change in the probability of reporting the highest level of satisfaction or intention. The effect of wait time is estimated in columns (1)-(3) without controls, and in columns (4)-(6) with controls.

The negative coefficients on $\widetilde{Wait}$ (with and without controls) displayed in Table III support hypotheses 1-3. Column (1) indicates that wait time has a negative effect on the return behavior of donors. Conditional on being eligible, but having not returned to donate, we estimate that a donor who experiences a wait that is 20 minutes (one standard deviation) longer than average is 12% (=-0.006*20) less likely to return on any given day.[14]

Columns (4)-(6) include a set of control variables: donation history (average number of yearly donations), gender and age. Column (4) shows that older and more frequent donors have higher

[14] Column (1) also suggests that donors face a decreasing baseline hazard (estimated shape parameter, $\hat{p} = .41 < 1$, and significant at the 5% level). Specifically, the probability that a donor returns at time t, conditional on having not yet returned, is decreasing in t. This means that for each day a donor does not return, the probability that he returns on a given day decreases.

baseline hazards than younger and infrequent donors, while female donors have a lower baseline hazard than male donors. Being over the age of 65 increases the baseline hazard of a donor by 53%, which likely reflects lower opportunity costs due to retirement. An additional one donation per year of past donations increases the baseline hazard by 49%, while being female decreases the baseline hazard of a donor by 17%.[15]

The effect of wait time in column (4) is similar to the estimate in column (1): a whole blood donor with a wait time that is one standard deviation above the average (20 minutes longer than average) is 14% less likely to return to donate on day t, conditional on having not returned before day t, than a donor who experiences the average wait time.[16]

Result 1. *The return behavior of whole blood donors is negatively affected by longer wait times. An increase in wait time of one standard deviation (20 minutes) above average reduces the likelihood that a donor returns on any given day by 14%.*

Insert Table III here.

Columns (2) and (5) of Table III show the negative effect of wait time on reported satisfaction. Converting the parameter estimates to their marginal effect, we find that an increase in wait time of one standard deviation above the average results in a decrease in the likelihood of reporting the highest level of satisfaction by 8 percentage points.[17]

Result 2. *The satisfaction of donors is negatively affected by longer wait times. An increase in wait time of one standard deviation (20 minutes) above average reduces the likelihood of a donor reporting the highest level of satisfaction by 8 percentage points.*

Column (3) and (6) report similar effects of wait time on the donor's intention to return–an increase in one standard deviation above the average wait time corresponds to a 6 percentage point decrease in the probability that a donor is 'Completely certain' he will donate again in the next six months.

Result 3. *Intentions of donors are negatively affected by longer wait times. An increase in wait time of one standard deviation (20 minutes) above average reduces the likelihood of a donor reporting that he is 'Completely certain' to donate again by 6 percentage points.*

Table III shows that the negative, significant effect of wait time on both satisfaction and intention to return are overall consistent with the effect on actual return behavior. However,

[15]We also estimated the effect of wait time on return behavior using ordinary least squares and obtain qualitatively equivalent results, see Table 4 in Supplementary Materials.

[16]We also examined the possibility that the survey instrument affected return behavior. We ran a similar analysis, but included donors who donated 10 days before and 10 days after our survey and found that the survey had no effect on return behavior.

[17]Given the propensity for positivity biases in satisfaction surveys (Peterson and Wilson, 1992), we feel this estimate is reasonable.

observing the actual return behavior lets us, for the first time, also detect the magnitude of this effect. Moreover, Table III shows similar effects of past donation history and age on satisfaction, intentions and actual return behavior, but a notable gender difference; women stated being both more satisfied and having a greater intention to return, but indeed have a lower propensity to actually return. Thus, the survey response data masks potentially important heterogeneity that we further explore below.

Last, despite our expectation that more frequent donors would be less responsive to wait time than less frequent donors (assuming that more frequent donors would update future wait time expectations less), the results of estimates that interact wait time with donation history show no heterogeneity in response to wait time between more and less frequent donors.

3.1.1 Social cost of longer wait times

The estimates in Table III suggest that increasing the expected cost to donate can have large implications on the blood supply. To see the implications visually, we plot the survival function ($S(t)$) in Figure IV, which shows the probability that a donor has not returned to donate by time t. Alternatively, $1-S(t)$ gives the probability that a donor has returned by time t; $1-S(t)$ can thus be interpreted as the proportion of donors who have returned at time t. To calculate the change in donations due to a one standard deviation increase in wait time, we calculate the expected number of donations under an average wait time and under a wait time that is one standard deviation longer (20 minutes).

To calculate the change in donations due to a longer wait, we take into consideration differences in donation frequency.[18] In particular, we consider donors who are among the first 25% of donors to return to donate as frequent donors and donors who are among the last 25% to return to donate as infrequent donors. The estimates that follow are based on the the estimated coefficients from column (4) of Table III and are calculated at the mean of each independent variable. We estimate that frequent donors will donate 3 or more times per year and the least frequent donors will donate no more than once per year. The donors who are among the middle 50% to return will donate 1-3 times per year. Using administrative data from the Blood Service, we estimate that there were roughly 330,290 whole blood donors in Australia in 2009, resulting in 604,007 donations.[19]

Next, we ask what effect a one standard deviation increase (approximately 20 minutes) in the average wait time would have on the number of expected yearly donations for the average donor. Figure IV shows the shift in the the survival function caused by an additional 20 minute wait. The three sets of parallel vertical lines indicate the extra days of delay estimated for donors who

[18] An alternative approach would be to consider all donors to be like the median donor in terms of donation frequency.

[19] In our survey data, 8% of donors donate 3 or more times per year (top 25%), 47% donate 1-3 per year (middle 50%) and about 45% donate less than once per year (bottom 25%). We used donation data from the previous 9 years to determine each donor's average donations per year.

return among the first 25%, the middle 50% and the bottom 25% of donors, respectively. A 20 minute increase in the wait of the most frequent donors results in an estimated four day delay in their return donation. However, for the middle 50% and the bottom 25% of donors, a 20 minute increase in the average wait results in a delay of 23 and 94 days, respectively. Table IV weights across the different donor frequency types and estimates that a one standard deviation increase in wait time results in 77,000 fewer donations per year. This implies that an increase in wait time by 38% corresponds to a decrease in donations by 14%, resulting in an estimated elasticity of -.36.[20] Similarly, a decrease in wait time by one standard deviation corresponds to an expected increase in donations by 13% and results in an estimated elasticity of -.21.

Longer wait times not only reduce the expected number of donations per year, but the time spent waiting is also valuable as it could be allocated to alternative activities. In fact, the main insights of Becker (1965) apply; the social cost of requiring a donor to wait 20 minutes longer on average has two components–a loss in donations and a loss of about 20 million minutes of time (equivalent to about 170 years of full time work).

Insert Table IV here.

Insert Figure IV here.

3.2 Heterogeneity in Wait Time Effects

Wait time appears to have a differential effect on outcomes for female donors, contributing to the growing literature on gender differences (Croson and Gneezy, 2009). To explore this heterogeneity further, we present estimates of the effect of wait time for men and women separately. Table V shows that men are significantly more elastic in their response to costs than women (χ^2, $p < .01$)– male whole blood donors delay their return when the wait is longer. We estimate that a 38% increase in the time cost of donation corresponds to a 22% reduction in the number of whole blood donations made by men, resulting in an elasticity of -.58. On other hand, we estimate that women are perfectly inelastic; women do not change the number of whole blood donations in response to the change in time cost.

Result 4. *Longer waits times have a larger, negative effect on male return behavior than on female return behavior. An increase in wait time of one standard deviation (20 minutes) reduces the likelihood that a male donor returns on any given day by 21% and has no significant effect on female return behavior.*

[20] Given the pro-social context, no alternative blood collection agencies and the lack of a close substitute for donating blood, it is not surprising that the calculated elasticity of demand to donate appears inelastic when compared to standard consumer theory contexts.

Longer waits result in lower satisfaction for both men and women, but the dissatisfaction does not translate to delayed returns for females. Discrepancies between survey responses and blood donation behavior for women have also been observed with regards to incentive offers; Lacetera and Macis (2010) report that female survey respondents stated that they were less likely to donate if offered a small monetary incentive. However, Lacetera et al. (2014) find female donors responded positively when offered, versus when not offered, gift cards. Similarly, we find that women state that they are less satisfied with longer waits, but this does not translate to changes in the timing of their donations.

Insert Table V here.

3.3 Additional Findings

The above analysis shows that longer wait times lead to a delay in future donation that has substantial consequences on total yearly donations, that the responses to wait times are heterogenous across gender, and that survey responses to satisfaction and intention to return are able to directionally predict these main effects, but cannot capture the heterogeneity. In this section, we explore three extensions. First, we have implicitly assumed throughout that the marginal cost is linear in time. This section will explore possible heterogeneity in the distributional effects of wait time. Second, the above analysis excludes donors who returned to donate a different blood product. We reserve this unique return behavior for a separate analysis to deal with the additional implications. Third, we examine the possibility that wait time is not exogenous; in particular, it is possible that some donors strategically choose the day and time to reduce wait times. If strategic timing were correlated with donors who have shorter time gaps between donations (e.g., more active donors), then ignoring the endogeneity could result in mistakenly attributing the delayed return behavior to longer wait times.

3.3.1 Distributional Effects of Wait Time

Our main analysis assumes a linear effect for each extra minute of waiting. However, it is possible that an extra minute has a differential effect on utility, and consequently the likelihood to return, that depends on the length of the donor's wait. In particular, we conjecture that donors display diminishing sensitivity in the domain of losses (Tversky and Kahneman, 1991, 1992), and thus an additional minute of waiting will have a more negative impact on the utility of a donor with a shorter wait than on a donor with a longer wait. Diminishing sensitivity is an intuitively likely explanation since an extra minute of waiting when a donor incurs a short wait will constitute a higher fraction of the overall wait than an extra minute of waiting during a long wait. For the range of wait times we observe, this fraction can vary substantially; for example, an extra minute waiting for a donor with a 15 or 60 minute wait results in an extra 6.7% or 1.7% waiting, respectively, a fourfold relative difference in the fraction of time waiting.

In our setting, diminishing sensitivity is identified by observing donors' return behavior following a short wait versus a long wait. If an additional minute of wait time imposes a larger negative utility cost on short-wait donors, then we expect that an extra minute of wait time corresponds to a more delayed return for short-wait donors than an extra minute of wait time for long-wait donors.

Hypothesis 5. *An additional minute of waiting is relatively costlier for donors with the shortest waits times than donors with the longest wait times, $\delta_3 < 0$.*

To investigate the diminishing sensitivity hypothesis, we compare the effect of an extra minute of wait on the return behavior of donors in the bottom $x\%$ of the wait time distribution to donors in the top $x\%$ of the wait time distribution by estimating the following equation:

$$S(t) = \exp(-t^p \exp(\beta_0 - \delta_1 \widetilde{Wait} - \delta_3(1_{p\leq x}) - \delta_3(1_{p\leq x} \times \widetilde{\text{Wait}}) - \Psi X)) \tag{4}$$

where $1_{p\leq x}$ is an indicator variable that takes a value of 1 if the donor's wait time was in the bottom $x\%$ of the distribution and 0 if the donor's wait time was in the top $x\%$ of the distribution and X is a set of controls fully interacted with $1_{p\leq x}$.[21]

Table VI presents the estimates of equation 4 for $x \in \{20, 25, 30, 35, 40, 45\}$. The negative significant estimates on the interaction term for the Bottom 25%, Bottom 30% and Bottom 35% provide support for the diminishing sensitivity hypothesis: each additional minute of wait time reduces the probability that a donor with a short wait returns on any given day by 1-2% more than it does for a donor with a long wait. It it interesting that we do not observe a significant effect for the comparison of the bottom and top 20%. It is possible that we do not have enough power (since these are the smallest groups we compare) or could be due to a latitude of acceptance (Sherif et al., 1958) in which all donations in the bottom (top) 20% are short (long) enough that they are all seen as short (long).

Following the same method used in Section 3.1.1, we estimate that a 20 minute increase in wait time (this represents a 57% and 25% increase in time cost for the Bottom 30% and the Top 30%, respectively) would result in a 48% reduction in whole blood donations for donors with wait times in the Bottom 30% and a 21% reduction in whole blood donations for the Top 30%.

Insert Table VI here.

[21]The complete list of coefficient estimates are shown in Table 5 in the Supplementary Materials.

3.3.2 Change in Donation Type

Our main findings focused on the effect of wait time on whole blood donors who returned to donate whole blood or did not return. We excluded whole blood donors who return to donate plasma due to the nature of their return, but we address their return decision in this section.

We estimate the effect of wait time on blood product conversion using the binary probit model in equation 5 via maximum likelihood.

$$Pr[\text{convert to plasma} = 1] = \Phi(\theta_1 \widetilde{\text{Wait}}) \tag{5}$$

We hypothesize that longer waits will reduce the probability that a whole blood donor converts to plasma because a longer wait increases the expected cost of plasma donation.

Hypothesis 6. *Longer wait times negatively affect the likelihood that a whole blood donor converts to plasma.* $\theta_1 < 0$.

Column (1) estimates the probability of converting to plasma for all whole blood donors and column (2) estimates conversion for all whole blood donors conditional on returning to donate some blood product.

The estimates in Table VII show that longer wait times significantly reduce the likelihood that whole blood donors will convert to making a plasma donation. The marginal effects reported in columns (1) and (2) imply that an increase in the wait by one standard deviation (20 minutes) above average reduces the probability that a whole blood donor converts to plasma by 1.4 percentage points.

Insert Table VII here.

Insert Figure V here.

3.3.3 Strategic Timing

Next, we examine a the possibility that wait time is endogenously determined by strategic donors.[22] Since there is some variation in wait time throughout the week, a potential concern for our identification is whether there are certain types of donors that strategically time their donations. In particular, if more frequent (e.g. experienced) donors strategically time their donation in order to obtain a short wait time, then our results inaccurately attribute longer waits to delayed return.

To examine this potential endogeneity, Figure V plots average wait time in minutes versus the average number of past whole blood donations per year. Each point on the graph represents

[22] Table 6 in Supplementary Materials shows that the length of the donor's wait time is independent of the control variables used.

a donation center, time of day and day of week.[23] The diameter of each point represents the number of individuals who gave at the center on the specific day of week and time of day. A downward sloping line (frequent donors giving during shorter wait times) would signal a potential threat to our identification strategy. However, Figure V shows no obvious relationship between past donations and wait time, which is confirmed by an insignificant coefficient when regressing the mean wait time on the mean average donation frequency (p-value=.40).[24] Thus, we conclude that wait time is exogenous and there is no evidence that frequent donors are strategically timing their donation so as to obtain a shorter wait time.

4 Conclusion

This paper estimates the effect of wait time on the satisfaction, intention to donate and actual return behavior of blood donors. We estimate that whole blood donors have a time cost elasticity of -.36: for a 38% increase in wait time there is a 14% decrease in whole blood donations. Thus, longer wait times entail substantial social costs.

Our main contribution is the use of actual return data, which is only possible given our context– the Blood Service's monopoly on blood collection implies that we are able to precisely track and measure individual donation behavior and need not worry about donors substituting across alternative blood collection organizations. This means that our data allows us to go beyond measures of satisfaction and intention to estimate the effect of wait time on subsequent donations.

The effect of an increase in the cost to donate is estimated using individuals who have revealed a preference for blood donation. Thus, we expect that our results underestimate the population effect since only individuals who are not sufficiently time-pressured choose to donate blood and individuals for whom the time cost is most restrictive are not active donors. Additionally, we expect our results would underestimate the population effect if the most time-pressured donors strategically time their arrival to obtain a shorter wait, thereby curtailing the cost of donation.

Our results contribute to the literature on the external motivations for pro-social behavior. While the literature has mainly focused on the effects of a change in the benefits of such behavior, we examine the effect of a change in costs. Our results suggest that the management of the cost of pro-social behavior, in addition to the benefits, may be an additional or alternative tool for policy-makers and organizations to encourage pro-social behavior.

[23]For this analysis we only used donors from the two large donation centers (Clarence and Parramatta), which accounts for over 90% of our observations. Further, we also focus only on donations given Monday-Friday since there were only 7 Saturday donations.

[24]We estimated the relationship between the mean wait time at Clarence and Parramatta on a given day of the week and time of day and the average number of yearly lifetime whole blood donations using ordinary least squares and clustering at the day of week-time of day level-center level. This results in 26 observations and clusters: 5 (days of week) $\times$ 3 (times of day) $\times$ 2 (centers)=30; but no data from Parramatta on Monday and no data from Clarence on Monday evenings: 30-4=26.

We have focused on wait time as an important cost that volunteers incur when donating blood products. There are, however, many other costs associated with volunteering that deserve attention in future research. In the context of blood products, reducing the distance donors have to travel and lowering discomfort and (perceived) safety risks may also be viable approaches to encourage blood donation. Moving beyond blood donation and examining the effect of costs in other contexts would also be a fruitful avenue to further our understanding of pro-social motivations.

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Tables

TABLE I: DONORS IN OUR SAMPLE

Survey respondents			1370
Matched to administrative data			1251
July 2009 Donation Type			
Whole Blood			916
Return Donation Type			
WB or No Return		841	
No missing outcome data	776		
Return	649		
No Return	127		
Plasma		73	
Other product		2	
Other			335
Plasma		245	
Autologous		3	
Apheresis Platelets		46	
Therapeutic		41	

TABLE II: SUMMARY STATISTICS

	mean	sd
Actual Wait Time (min)	43.09	.68
Average Yearly Donations	1.37	.04
Female	.46	.02
Age	44.25	.58
Center Locations:		
Clarence	.59	.02
Elizabeth	.03	.01
Liverpool	.03	.01
Parramatta	.35	.02
Morning Arrival (0700-1100)	.35	.02
Lunch Hour Arrival (1100-1300)	.36	.02
Afternoon Arrival (1300-1700)	.28	.02
Observations	776	

Table III: Average Effect of Wait Times

	Likelihood to Return	Satisfaction with Experience	Intent to Donate	Likelihood to Return	Satisfaction with Experience	Intent to Donate
$\widetilde{\text{Wait}}$	-0.006***	-0.01***	-0.01***	-0.007***	-0.01***	-0.008***
	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)	(0.001)
Donation History	.	.	.	0.49***	0.01	0.38***
				(0.02)	(0.05)	(0.05)
Female	.	.	.	-0.17***	0.12***	0.22***
				(0.05)	(0.02)	(0.03)
Older than 65 years	.	.	.	0.53***	0.27***	0.4
				(0.07)	(0.02)	(0.24)
Constant	-2.00***	.	.	-3.05***	.	.
	(0.12)			(0.18)		
Observations	776	776	776	776	776	776
Ancillary Parameter ($\hat{p}$)	0.41	.	.	0.49	.	.
Marginal effect at max outcome		-.004***	-.003***		-.002***	-.03***

Col (1) & (4) Coefficients of Survival model with Weibull parametrization; Col (2), (3), (5) & (6) Coefficients of Order Probits (not marginal effects). Center fixed effects included. Robust Standard Errors clustered at the center level in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on $\widetilde{Wait}$ are one-tailed; all other coefficient tests are two-tailed.

Table IV: Social Cost of Waiting, whole blood donors only

Donors in AUS 330,290	75% (3+/yr)	50% (1-3/yr)	25% (0-1/yr)
# Donors	27,666	153,653	148,971
# Donations, Ave.Wait	105,189	357,219	141,600
# Donations, + 20 min Wait	100,981	311,574	113,754
# Lost Donations	4,208	45,645	27,846
Days donation delayed	4	23	94
Total Donations Lost 77,698			

Table V: Average Effect of Wait Times, Gender Differences

	Likelihood to Return	Satisfaction with Experience	Intent to Donate
$\widetilde{Wait}$ × Male	-0.01***	-0.009***	-0.008**
	(0.002)	(0.002)	(0.003)
$\widetilde{Wait}$ × Fem	-0.0008	-0.02***	-0.007**
	(0.003)	(0.003)	(0.003)
Donation History	0.48***	0.02	0.38***
	(0.02)	(0.04)	(0.05)
Female	-0.16***	0.13***	0.21***
	(0.02)	(0.04)	(0.04)
Older than 65 years	0.55***	0.26***	0.4
	(0.06)	(0.04)	(0.24)
Constant	-3.07***	.	.
	(0.2)		
Observations	776	776	776
Ancillary Parameter ($\hat{p}$)	0.5	.	.
Marginal effects			
Wait× Male		-.003***	-.002***
Wait× Fem		-.006***	-.001**
χ^2 test: Wait× Male=Wait× Fem	40.86***	2.32	.05
(standard error)	(.00)	(.13)	(.82)

Col (1) Coefficients of Survival model with Weibull parametrization; Col (2) & (3) Coefficients of Order Probits (not marginal effects). Center fixed effects included. Robust Standard Errors clustered at the center level in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on Wait Time are one-tailed; all other coefficient tests are two-tailed.

Table VI: Distributional Effects of Wait Times

$\widetilde{Wait}$	-0.01*** (0.001)	-0.02*** (0.0004)	-0.01*** (0.001)	-0.01*** (0.0006)	-0.02*** (0.002)	-0.01*** (0.005)
Bottom 20% × $\widetilde{Wait}$	-0.001 (0.01)	.	.	.	.	.
Bottom 25% × $\widetilde{Wait}$	.	-0.01** (0.006)	.	.	.	.
Bottom 30% × $\widetilde{Wait}$	.	.	-0.01** (0.005)	.	.	.
Bottom 35% × $\widetilde{Wait}$	.	.	.	-0.02** (0.007)	.	.
Bottom 40% × $\widetilde{Wait}$	.	.	.	.	-0.001 (0.009)	.
Bottom 45% × $\widetilde{Wait}$	.	.	.	.	.	-0.003 (0.01)
Constant	-3.00*** (0.25)	-2.49*** (0.21)	-2.39*** (0.13)	-2.44*** (0.12)	-2.12*** (0.28)	-2.25*** (0.4)
Observations	318	398	463	538	607	708
Ancillary Parameter ($\hat{p}$)	0.52	0.52	0.5	0.49	0.49	0.5

Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on Wait are one-tailed; all other coefficient tests are two-tailed.

Table VII: Average Effect of Wait Times on Blood Product Conversion, survey respondents

	Whole blood donors P[Convert to Plasma=1]	
$\widetilde{\text{Wait}}$	-0.0007*** (0.0002)	-0.0006*** (0.0002)
Donation History	0.01*** (0.002)	0.003 (0.003)
Female	-0.01*** (0.004)	-0.01** (0.005)
Older than 65 years	-0.08*** (0.007)	-0.1*** (0.008)
Observations	848	721
Conditional on Returning	No	Yes

Probit, marginal effects reported for blood product conversion. Center fixed effects included. Robust Standard Errors clustered at the center level in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels of a one-tailed test, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on $\widetilde{Wait}$ are one-tailed.

Figures

Figure I: Satisfaction and Intention, survey responses

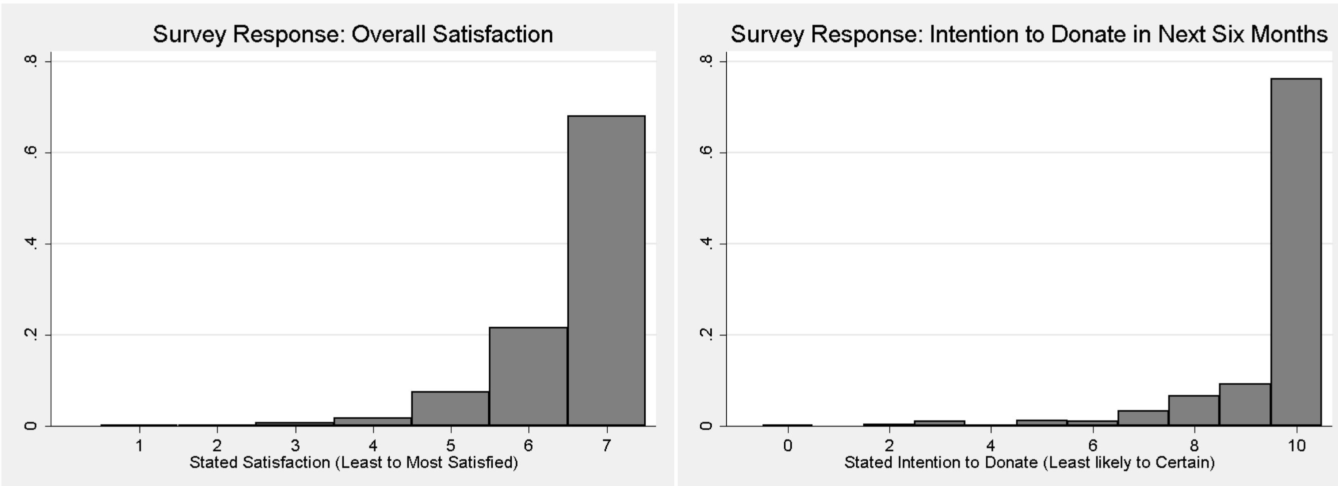
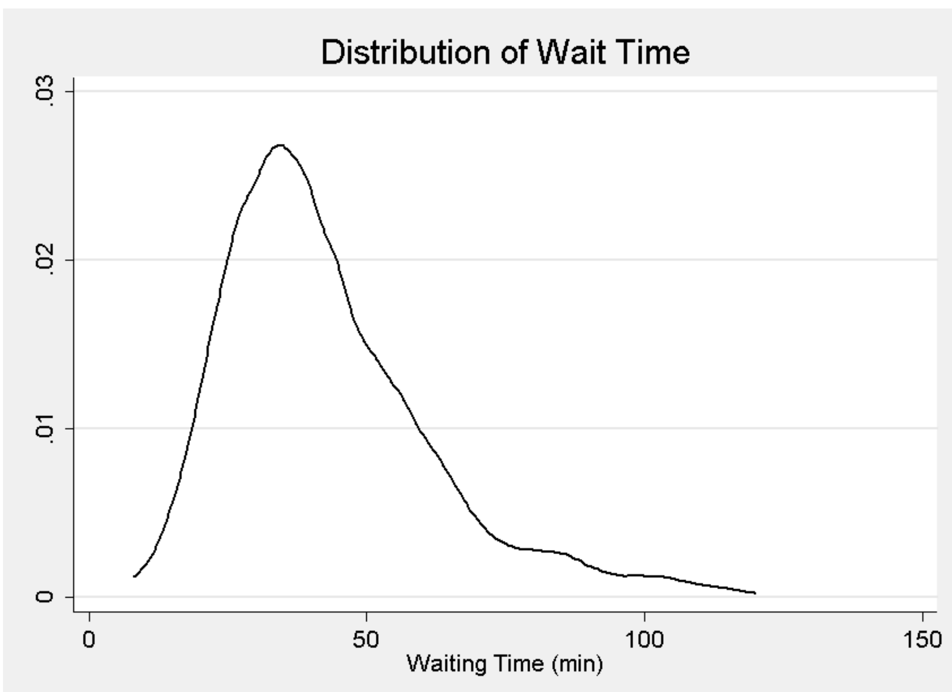
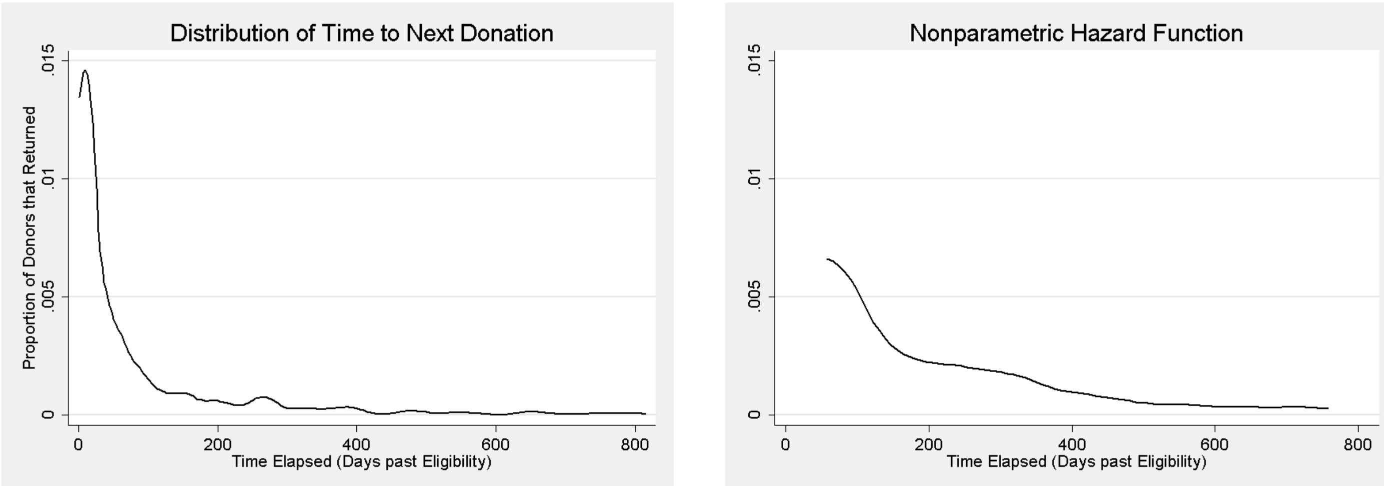


Figure II: Distribution of wait time

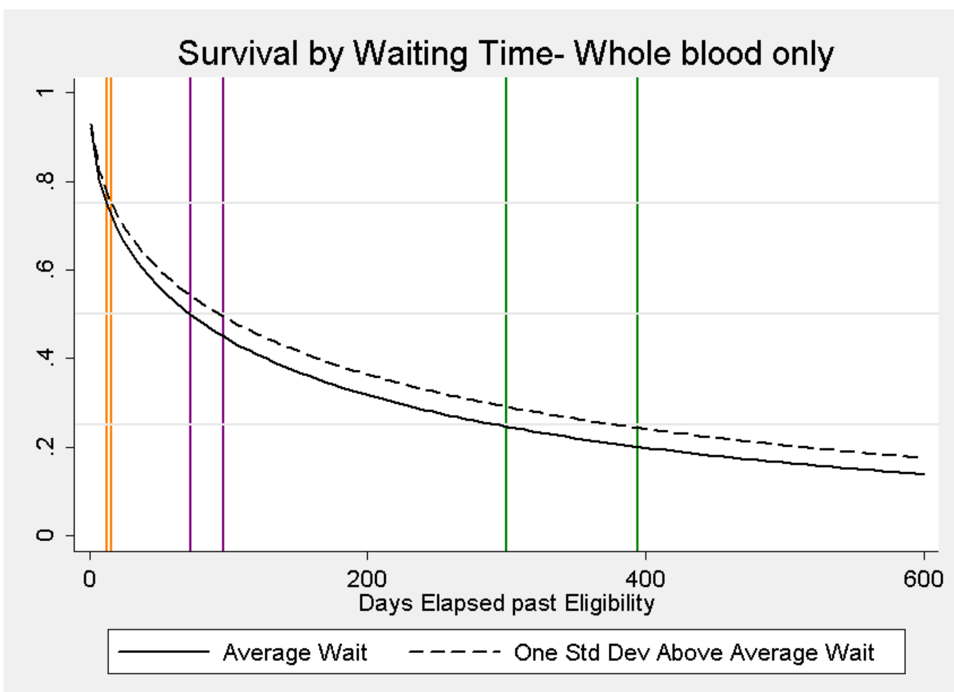




(a) (b)

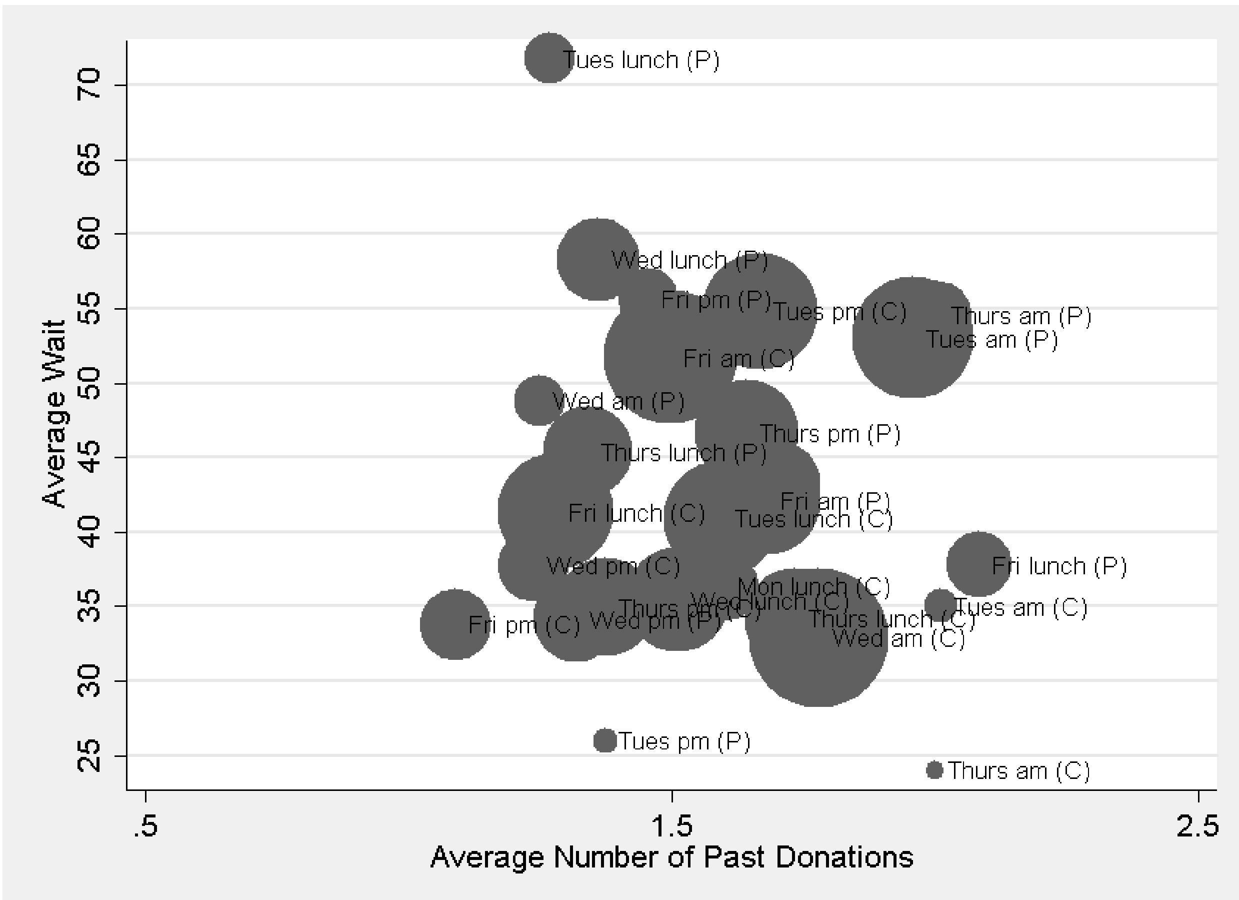
Figure III: Figure 3(a) Time until return donation. Figure 3(b) Estimated Non-Parametric Hazard Function.

Figure IV: Estimated Survival Curve



The estimated survival curves at the average (42 min) and one standard deviation above average (+ 20 min). Vertical lines indicate the estimated day of return for the first 25%, the middle 50% and the bottom 25% of donors.

Figure V: Average Wait Time and Donation Frequency, by day of week and time of day



Average wait by day-time combination plotted against average number of yearly donations. The label "(C)" indicates the Clarence center and the label "(P)" indicates the Parramatta Center.

Supplementary Material for:
Waiting To Give

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Ellen Garbarino
Stephanie A. Heger
Robert Slonim

September 1, 2014

The supplementary material contains two sections. The first four pages present the Supplementary Tables 1-6. The remaining pages in this document present the full survey that we conducted with all donors.

Table 1: Return Behavior, Probit

	Return in 50 days	Return in 1 year	Return in 2 years	Return in 3 years
$\widetilde{\text{Wait}}$	-0.0007	-0.0007***	-0.0002**	-0.0002***
	(0.001)	(0.0002)	(0.0000859)	(0.0000729)
Donation History	0.19***	0.15***	0.13***	0.12***
	(0.004)	(0.004)	(0.002)	(0.001)
Female	-0.02*	-0.006	-0.007***	-0.004
	(0.01)	(0.02)	(0.002)	(0.004)
Older than 65 years	0.19***	0.09***	0.04*	0.04*
	(0.04)	(0.03)	(0.03)	(0.03)
Observations	776	776	776	776

Marginal effects reported. Outcome: probability of returning within various time frames after eligibility. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on $\widetilde{Wait}$ are one-tailed.

Table 2: Return Behavior and Gender differences, Probit

	50 days	1 year	2 years	3 years
$\widetilde{Wait}$ × Male	-0.001	-0.001***	-0.001***	-0.001***
	(0.001)	(0.0004)	(0.0001)	(0.0002)
$\widetilde{Wait}$ × Fem	-0.0000816	-9.08e-06	0.001***	0.001***
	(0.0008)	(0.0000987)	(0.0002)	(0.0002)
Donation History	0.19***	0.15***	0.13***	0.12***
	(0.004)	(0.005)	(0.001)	(0.0008)
Female	-0.02*	-0.007	-0.01*	-0.006
	(0.01)	(0.03)	(0.005)	(0.01)
Older than 65 years	0.19***	0.09***	0.04*	0.04*
	(0.04)	(0.03)	(0.02)	(0.02)
Observations	776	776	776	776

Marginal Effect of probit reported. Outcome: probability of returning within various time frames after eligibility. Robust Standard Errors clustered at the center level in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on $\widetilde{Wait}$ are one-tailed.

Table 3: Generalized Ordered Probit

	Satisfaction	Intent
Equation 1		
$\widetilde{Wait}$	0.64	-0.04*
Constant	-15.39	2.59***
Equation 2		
$\widetilde{Wait}$	-1.32$***$	-.06$***$
Constant	73.75***	2.49***
Equation 3		
$\widetilde{Wait}$	-0.02***	-.10***
Constant	2.58***	1.48***
Equation 4		
$\widetilde{Wait}$	-0.02***	-0.001
Constant	2.04***	2.27***
Equation 5		
$\widetilde{Wait}$	-0.01***	-0.01***
Constant	1.30***	1.95***
Equation 6		
$\widetilde{Wait}$	-0.001***	-0.01***
Constant	.47***	1.80***
Equation 7		
$\widetilde{Wait}$		-0.01
Constant		1.45***
Equation 8		
$\widetilde{Wait}$		-0.01*
Constant		1.06***
Equation 9		
$\widetilde{Wait}$		-0.004***
Constant		.72***
Observations	776	776
Controls	No	No

Robust Standard Errors clustered at the center level in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on $\widetilde{Wait}$ are one-tailed.

Table 4: Return Behavior, OLS

	Delay in Return	Delay in Return
$\widetilde{\text{Wait}}$	1.76***	.
	(0.25)	
$\widetilde{Wait} \times$ Male	.	3.38***
		(0.28)
$\widetilde{Wait} \times$ Fem	.	-0.36
		(1.00)
Donation History	-180.55***	-178.55***
	(13.87)	(14.00)
Female	25.56***	25.00
	(5.79)	(15.52)
Older than 65 years	-122.70***	-125.52***
	(10.62)	(6.77)
Constant	538.90***	539.89***
	(24.41)	(31.05)
Observations	776	776
R^2	0.23	0.24

OLS coefficients reported. Outcome: number of days delayed beyond eligibility before return donation. Robust Standard Errors clustered at the center level in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on $\widetilde{Wait}$ are one-tailed.

Table 5: Distributional Effects of Wait Times

	x=20%	x=25%	x=30%	x=35%	x=40%	x=45%
$\widetilde{Wait}$	-0.01***	-0.02***	-0.01***	-0.01***	-0.02***	-0.01***
	(0.001)	(0.0004)	(0.001)	(0.0006)	(0.002)	(0.005)
Bottom x% × $\widetilde{Wait}$	-0.001	-0.01**	-0.01**	-0.02**	-0.001	-0.003
	(0.01)	(0.006)	(0.005)	(0.007)	(0.009)	(0.01)
Bottom x%	0.26	0.2	-0.02	0.09	-0.54	-0.47
	(0.49)	(0.4)	(0.21)	(0.22)	(0.34)	(0.49)
Bottom x% × Donation Hist	0.09	0.1	0.14**	0.11*	0.13*	0.15*
	(0.17)	(0.19)	(0.06)	(0.07)	(0.07)	(0.08)
Bottom x% × Fem	-0.67***	-0.62***	-0.53***	-0.46***	-0.31***	-0.26***
	(0.12)	(0.21)	(0.14)	(0.1)	(0.02)	(0.05)
Bottom x% × Age 65	0.16	-0.1	-0.9***	-0.6**	-0.46	-0.35
	(0.21)	(0.37)	(0.3)	(0.27)	(0.36)	(0.43)
Donation History	0.49***	0.47***	0.39***	0.42***	0.42***	0.43***
	(0.07)	(0.07)	(0.008)	(0.007)	(0.009)	(0.02)
Female	0.21***	0.13**	0.1*	0.12**	0.02	0.0007
	(0.06)	(0.06)	(0.06)	(0.05)	(0.02)	(0.03)
Older than 65 years	1.25***	1.25***	1.21***	1.04***	0.84***	0.74***
	(0.1)	(0.12)	(0.19)	(0.18)	(0.08)	(0.04)
Constant	-3.00***	-2.49***	-2.39***	-2.44***	-2.12***	-2.25***
	(0.25)	(0.21)	(0.13)	(0.12)	(0.28)	(0.4)
Observations	318	398	463	538	607	708
Ancillary Parameter ($\hat{p}$)	0.52	0.52	0.5	0.49	0.49	0.5

Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively. Given that we have a directional hypothesis for the effect of wait time, the estimates on Wait are one-tailed; all other coefficient tests are two-tailed.

Table 6: Determinants of Wait Time

	Wait Time (minutes)
Donation History	-1.28
	(1.48)
Female	-0.7
	(2.40)
Older than 65 years	1.05
	(0.52)
Constant	50.14***
	(3.25)
Observations	776

Outcome: Length of wait time in minutes. Robust Standard Errors in parentheses and *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

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Survey of Donation Wait Time Experiences

Please answer all questions truthfully. There are no right or wrong answers. We want to learn your thoughts about your donation experience today.

1. The first set of questions refers to <u>your overall experience</u> today from the time you arrived until now:

	Not at All Satisfied 1	2	3	4	5	6	Completely Satisfied 7
How satisfied were you with the *<u>overall experience</u>* today?	☐	☐	☐	☐	☐	☐	☐
How satisfied were you with the *<u>quality of the service</u>* you received from the Australian Red Cross Blood Service today?	☐	☐	☐	☐	☐	☐	☐
How satisfied were you with the *<u>total length</u>* of time it took to donate today?	☐	☐	☐	☐	☐	☐	☐

2. The next two questions refer to your future intentions:

What is the likelihood that you will donate again *<u>in the next 6 months</u>*?

No Chance 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ Practically Certain

How likely would you be to recommend donating to your friends and family?

Not at All Likely 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ Very Likely

3. Approximately, how many times have you donated any blood products (for example, whole blood, plasma, platelets) in the last year?

________ times

4. Did you have an appointment today? Yes ☐ No ☐

If yes, what time was your appointment? ___________

And when did you arrive?

Before your appointment time ☐ => If so, about how many minutes before? ________

On time ☐

After your appointment time ☐ => If so, about how many minutes after? _________

5. The next questions are about your <u>waiting experience</u>:

Before arriving, how long did you <u>*expect*</u> to wait **before your eligibility interview** *(the eligibility interview is when the Donor Services Staff asked you questions to determine if you could donate blood today)*? ______ minutes

Without looking at the time, how long do you think you <u>*actually*</u> waited **before your eligibility interview**? ______ minutes

Before arriving, how long did you <u>*expect*</u> to wait **from the end of your eligibility interview** till the **beginning of the blood draw?** ______ minutes

Without looking at the time, how long do you think you <u>*actually*</u> waited **from the end of your eligibility interview** till the **beginning of the blood draw**? ______ minutes

Before arriving, how long did you <u>*expect*</u> the **donation process** to take from arrival at the centre to entering the recovery room? ______ minutes

Without looking at the time, how long do you think this **donation process** <u>*actually*</u> took today? ______ minutes

How <u>*acceptable*</u> was the <u>*total wait time*</u> you experienced today?

Completely Unacceptable 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ Completely Acceptable

If you have donated in the past, how did your wait time today compare to a typical past visit?

Previously Much <u>Shorter</u> 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ Previously Much <u>Longer</u>

How many other people were waiting to donate while you were waiting to donate today?

None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6-7 ☐ 8-10 ☐ 11-15 ☐ 16-20 ☐ More than 20 ☐

How did your wait time today compare to the wait time of the other people in the waiting room?

Waited LESS Than Others 1 ☐ 2 ☐ 3 ☐ 4 ☐ SAME 5 ☐ 6 ☐ 7 ☐ Waited MORE Than Others

What did you do while you waited (for example, took a nap, called a friend on my mobile, read a book/magazine/paper, just relaxed, snacked, etc.)?

____

____

Did you come alone or with others? Alone ☐ with Others ☐

If you came with others, how many and who were they (for example, came with three friends, brought my child, came with partner)?

____

How many of them also donated? (for example, 2 friends did, child too young, partner donated)?

____

How did you feel about waiting experience today?

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
It was pleasant	☐	☐	☐	☐	☐	☐	☐
It was enjoyable	☐	☐	☐	☐	☐	☐	☐
It was fair	☐	☐	☐	☐	☐	☐	☐
It was reasonable	☐	☐	☐	☐	☐	☐	☐

How did you feel ***<u>while you were waiting today</u>*****?**

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
I felt relaxed	☐	☐	☐	☐	☐	☐	☐
I felt calm	☐	☐	☐	☐	☐	☐	☐
I felt annoyed	☐	☐	☐	☐	☐	☐	☐
I felt angry	☐	☐	☐	☐	☐	☐	☐
I felt frustrated	☐	☐	☐	☐	☐	☐	☐
I felt upset	☐	☐	☐	☐	☐	☐	☐
I felt tense	☐	☐	☐	☐	☐	☐	☐
I felt content	☐	☐	☐	☐	☐	☐	☐
I felt worried	☐	☐	☐	☐	☐	☐	☐

If you had to wait today, why do you think you had to wait?

____

How common do you think this reason is for making people wait to donate?

Very Uncommon	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐	Very Common

To what degree could the Red Cross Blood Service solve this problem?

Not Much They Could Do	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐	A Lot They Could Do

Were you offered an explanation for the delay? Yes ☐ No ☐

If yes, how satisfactory was the explanation you were given?

Not at All Satisfactory	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐	Completely Satisfactory

6. ***The next set of questions refers to your <u>attitudes towards donating blood</u>:***

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
Blood donation is something I rarely even think about.	☐	☐	☐	☐	☐	☐	☐
I would feel a loss if I were forced to give up donating blood.	☐	☐	☐	☐	☐	☐	☐
For me, being a blood donor means more than just donating blood.	☐	☐	☐	☐	☐	☐	☐
Blood donation is an important part of who I am.	☐	☐	☐	☐	☐	☐	☐
I feel a moral obligation to give blood.	☐	☐	☐	☐	☐	☐	☐
I feel a personal responsibility to give blood.	☐	☐	☐	☐	☐	☐	☐
It is a social obligation to give blood.	☐	☐	☐	☐	☐	☐	☐

7. These questions refer to your attitude toward the Australian Red Cross Blood Service:

	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
The Blood Service has high integrity.	☐	☐	☐	☐	☐	☐	☐
The Blood Service can be counted on to do what is right.	☐	☐	☐	☐	☐	☐	☐
The Blood Service is perfectly honest and truthful.	☐	☐	☐	☐	☐	☐	☐
The Blood Service has fast efficient procedures.	☐	☐	☐	☐	☐	☐	☐
The Blood Service is highly competent.	☐	☐	☐	☐	☐	☐	☐
The Blood Service knows what they are doing.	☐	☐	☐	☐	☐	☐	☐

8 Were you asked to make an appointment for a future donation? Yes ☐ No ☐

If "No", how likely would you be to make a new donation appointment if asked?

Very Unlikely 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ Very Likely

If "Yes", did you make (or will you be making) an appointment? Yes ☐ No ☐

If you were asked to make an appointment but chose not to, why did you not want to make an appointment for a future donation?

____

9. And finally a few questions about yourself:

Are you Male or Female? Male ☐ Female ☐

What year were you born (for example, 1962)? ___________

	Minimal Time Pressure 1	2	3	4	5	6	Intense Time Pressure 7
On a <u>*typical day*</u>, how *time pressured* (i.e., over-scheduled, too, busy, rushed) do you feel?	☐	☐	☐	☐	☐	☐	☐
<u>*Today*</u>, before you came to donate, how time pressured did you feel?	☐	☐	☐	☐	☐	☐	☐
How time pressured do you feel <u>*currently*</u>?	☐	☐	☐	☐	☐	☐	☐