

Online Appendix 1: Cobb-Douglas Specification of Social Preferences

As in the main text, consider an agent who is endowed with an amount w , which she has to divide into a payoff for herself (x) and a payoff for another agent (y), as in the classic dictator game:

$$(1) \quad x + y = w.$$

We allow utility to depend on the payoffs x and y as well as on the sharing environment:

$$(2) \quad U = U(D, x, y)$$

where D is a dummy variable equal to 1 if the environment allows sharing and 0 if the allocation of w is exogenously determined. That is, under $D = 1$ the agent decides how to split w with the other person. Under $D = 0$ the agent has no influence on how w is allocated. When $D = 0$, the individual is precluded from sharing and thus $y = 0$. It is possible that even with the opportunity to share (i.e. when $D = 1$), $y = 0$, but this depends on individual choice. We assume that utility is increasing in the endowment. Using equation (1), the utility function can be rewritten as $U = U(D, x, w - x)$.

We characterize an individual's propensity to share in the sharing environment with the parameter a . The agent allocates $y = aw$ to the other person and $x = (1-a)w$ to herself. Individuals with $a = 0$ have standard preferences and are *non-sharers*. Individuals with $a > 0$ have non-standard (social) preferences. They are either *willing sharers* or *reluctant sharers*. *Willing sharers* would pay to be in the sharing environment. *Reluctant sharers* would pay to avoid the sharing environment. That is, given the same endowment in the sharing and non-sharing environment, willing sharers prefer the sharing environment and reluctant sharers prefer the non-sharing one. However, both kinds of agents behave identically in the sharing environment if they have the same sharing propensity a .

Now, suppose that the endowments in the two environments differ. In the sharing

environment the individual is given w to divide, while in the non-sharing environment she receives a fixed amount w' , which cannot be shared. We parameterize an individual's willingness to pay by the endowment in the sharing environment \hat{w} at which she is indifferent between entering the sharing environment and opting out, given a fixed endowment w' outside the sharing environment. The higher \hat{w} is, the larger is the individual's disutility from being in the sharing environment. Individuals who have $\hat{w} < w'$ are *willing sharers* because they are willing to pay for the opportunity to share. Individuals with $\hat{w} \geq w'$ are *reluctant sharers*. They share when forced into a sharing environment, but are willing to pay to avoid that environment altogether. Put differently, they must be compensated with a higher endowed wealth, $\hat{w} > w'$ to voluntarily choose the sharing environment. *Non-sharers* share nothing by definition and are not willing to pay to avoid the sharing environment ($\hat{w} = w'$).¹

As in the main text, we can characterize the motivations for sharing as follows:

(3) $\arg \max_{x \in [0, w]} U(1, x, w - x) < w$ and $\max_{x \in [0, w]} U(1, x, w - x) > U(0, w, 0)$ for *willing sharers*;

(4) $\arg \max_{x \in [0, w]} U(1, x, w - x) < w$ and $\max_{x \in [0, w]} U(1, x, w - x) \leq U(0, w, 0)$ for *reluctant sharers*.

The premium that an individual is willing to pay to avoid the sharing environment relative to an outside option of w' is given by $\hat{w} - w'$, which is implicitly defined by

$$(5) U(1, x', \hat{w} - x') = U(0, w', 0)$$

¹ This is a simplifying assumption, not a general statement (but also not required for our analysis). The model can be generalized to allow a more subtle distinction of types. For example, agents who share nothing in the sharing environment may still pay something to avoid being put in that environment and, hence, have $\hat{w} > w'$. Other agents may get *some* utility from sharing but feel compelled to share too much in a sharing environment. As a result, such agents avoid the sharing situation (and thus share nothing) despite their preference for sharing. These agents have $\hat{w} > w'$. Additionally, individuals might be reluctant to share over some ranges of w and willing to share in other ranges. For brevity and simplicity we distinguish only the three basic types, based on their observable ("net") sharing decision.

where x' is the own payoff chosen in a sharing environment with allocation \hat{w} . The premium $\hat{w} - w'$ is positive for *reluctant sharers* and negative for *willing sharers*. We define

$$(6) \quad \lambda(w') = \hat{w}/w'.$$

Individuals prefer $D = 1$ to $D = 0$, i. e. they are *willing sharers*, if $\lambda < 1$. Individuals share under $D = 1$ but prefer $D = 0$ to $D = 1$, i. e. they are *reluctant sharers*, if $\lambda > 1$. Individuals of this latter group get more utility from the environment that does not permit sharing, but have an $a < 1$ and will thus share if in a sharing environment.

Special case: Modified Cobb-Douglas utility function

We consider a branched Cobb-Douglas utility function which allows for individuals to have the opportunity to share (or not). Its value depends on x , y , D , and a parameter λ^a , which we describe below, as follows:

$$(7) \quad U(D, x, y) = x^{(1-a)[D+(1-D)/(1-a)]} [y^a D + 1 - D] [D + (1-D)\lambda^a (1-a)^{(1-a)} a^a]$$

with $a \in [0;1]$. This seemingly complex function is nothing more than the summary of rather simple preferences under $D = 1$ and under $D = 0$. When $D = 1$, (7) becomes $U(1, x, y) = x^{(1-a)} y^a$, which is the standard Cobb-Douglas formulation. The optima of x and y , given this utility function, are $x^* = (1-a)w$ and $y^* = aw$ so that

$$(8) \quad U(1, x^*, y^*) = [(1-a)w]^{(1-a)} [aw]^a \\ = (1-a)^{1-a} a^a w$$

When $D = 0$, (7) becomes $U(0, x, y) = \lambda^a (1-a)^{(1-a)} a^a x$ and, with $x = w'$ and $y = 0$,

$$(9) \quad U(0, w', 0) = \lambda^a (1-a)^{1-a} a^a w'$$

This is also Cobb-Douglas, with one variable where the coefficient on x is 1. In this specification $\lambda(w') = \lambda^a$, which we obtain after solving for \hat{w}/w' in expression (5). *Willing sharers* have $\lambda(w') = \lambda^a < 1$, and thus $\lambda < 1$; *reluctant sharers* have $\lambda(w') = \lambda^a > 1$, and thus $\lambda > 1$. Note further that, under $D = 1$, the allocation of w to x and y does not depend on λ . Agents with equal a share the same amount aw , when placed into a sharing environment, though those with $\lambda > 1$ are *reluctant sharers* and those with $\lambda < 1$ are *willing sharers*.

Proposition 1 (cf. Prediction 2): *The lowest endowment \hat{w} , at which reluctant sharers enter the sharing environment increases in a .*

Proof of Proposition 1. The endowment \hat{w} at which agents are indifferent between the two environments is defined by (5). Comparing (8) to (9), this implies

$$(10) \quad w' = \lambda^a \hat{w}.$$

Differentiating (10) with respect to a shows that \hat{w} is increasing in a .

Online Appendix 2 – A Test of Predictions 1 to 3 on Broberg et al’s data

We reanalyze data from Broberg et al.s’ (2007) experiment, in light of our first three predictions (Prediction 4 is not relevant to their study).² Their data allows an analysis of the likely composition of self-selected participants in the sharing environment, based on individuals’ social preferences and on whether there is a cost or subsidy to entering the environment, though such an analysis is not performed in their paper. Our re-examination of their data, in conjunction with the results we report in our paper, yield complementary evidence supporting our predictions. Moreover, since the procedures used in the two experiments differ substantially (they use a BDM elicitation procedure, described below, whereas we use an explicit binary choice between two environments), this section demonstrates the robustness of our findings to alternative procedures and populations.

Description of Broberg et al.’s experiment

In Broberg et al.’s experiment, 119 subjects participated in a two-part experiment. In the first, part, each subject played a dictator game in which they allocated SEK 100 (w , approximately \$14) between him or herself and another anonymous student at the same university in Stockholm. We refer to the fraction allocated to the other player as a .

In the second part, subjects indicated a reservation price to exit the game (p^*). Following Becker et al.’s (1964) mechanism for incentive-compatible value elicitation, the experimenter then randomly drew a price (p). If the randomly-drawn price was equal to or higher than the reservation price ($p \geq p^*$), the subject received p and did not play the dictator game. Otherwise, the subject played the dictator game.

Using their data, we can classify all subjects as either non-sharers ($a = 0$), willing sharers ($a > 0, p^* > w$), or reluctant sharers ($a > 0, p^* \leq w$). In what follows, we assume that

² We thank Tore Ellingsen and Magnus Johannesson for providing us with their data.

any individuals who are indifferent at a given price opt out, since a willing sharer should strictly prefer to play the dictator game than opt out when sorting is costless.

Prediction 1

Our Prediction 1 states that the introduction of a costless sorting option decreases sharing. This is equivalent to positing the presence of reluctant sharers in the population.

The 119 subjects share on average SEK 27.15 when there is no sorting option, but aggregate sharing declines to SEK 5.16 per subject when sorting is available. This difference is highly statistically significant ($t_{118} = 10.50$, $p < 0.001$). Thus costless sorting leads to significantly less sharing, as we predict and also find in Experiments 1 and 2.

Interestingly, and as we also find in our experiments, sharing conditional on entering the sharing environment is higher for those who choose to enter (willing sharers) when entry is costless (SEK 34.11), than it is for the population as a whole.

Prediction 2

Prediction 2 states that introducing a subsidy increases aggregate sharing because more reluctant sharers enter the sharing environment; but that the subsidy primarily attracts non-sharers and those reluctant sharers who share the least. Thus, we predict that low subsidies could lead to lower conditional sharing than when there is no subsidy (we find this to be the case in our Experiment 2).

The table below reports the amount shared, by those who enter, for different values of the outside option at or below the value of the endowment ($w' \leq w$). As the table reveals, very few enter when there is no subsidy (15%), but those who do enter share a large amount (34.11). The introduction of a small subsidy ($w' = 90$) attracts more people but decreases mean sharing. As predicted, those who are first attracted by subsidies are those who share

smaller amounts. For example, those 26 subjects who re-enter when $w' = 90$, share only 13.12 on average.

Value of outside option (w')	Number (percentage) choosing to enter	Mean amount shared by entrants
No sorting	119 (100%)	27.15
100	18 (15%)	34.11
90	44 (37%)	21.70
80	53 (45%)	20.85
70	64 (54%)	22.89
60	73 (61%)	24.12
50	79 (66%)	24.63
40	109 (92%)	26.22
30	112 (94%)	27.19
20	112 (94%)	27.19
10	115 (97%)	27.27

Prediction 2 implies that there is a negative correlation between reservation price and amount shared, but *only for those who opt out when sorting is costless ($w = w'$)*. (Broberg et al. report only the correlation for their entire sample, which is 0.069 and statistically insignificant.) If we consider the correlation for those with reservation prices of 100 or below, we see that it is negative and statistically significant, as we predicted (-0.35 , $p < 0.001$).

Prediction 3

Finally, our third prediction deals with costly entry into the sharing environment. Here, we predict that fewer people enter, but that those who enter will share more than the population as a whole.

The table below reports outcomes as entry becomes costly ($w < w'$). As we predicted, costly entry leads to significantly fewer people entering the sharing environment. But those who enter share large amounts. For example, those who are willing to forego SEK 150 in order to play the SEK 100 dictator game share 49 percent of the endowment, which is higher

than for any other subset of the population. This is consistent with the fact that, for willing sharers, there is a positive and statistically significant correlation between amount shared and reservation price (0.75, $p = 0.001$).

Value of outside option (w')	Number (percentage) choosing to enter	Mean amount shared by entrants
No sorting	119 (100%)	27.15
100	18 (15%)	34.11
110	14 (12%)	37.79
120	12 (10%)	43.25
130	12 (10%)	43.25
140	12 (10%)	43.25
150	6 (5%)	49.00

Online Appendix 3: Sample Instructions for Experiment 1 (Between-Subjects Design)

The text in brackets and in italics appears only in treatments with sorting option.

General Instructions

Thank you for attending the experiment. The purpose of this session is to study how people make decisions. During the session, you are not permitted to talk or communicate with the other participants. If you have a question, please raise your hand and I will come to answer it.

During the session you will earn money. Everyone will receive €5 for their participation, which will be the minimum compensation for everyone. In addition, there exists a possibility that some may earn more money. At the end of the session the quantity that you have earned will be paid to you in cash. The payments are confidential; we will not inform any of the other participants of the quantity that you earn.

In a moment, you will receive an envelope. Once everyone has received an envelope, you may open it and you will see a card with a number. This is your identification number for the experiment. After looking at it, please keep this number since it will be used during the experiment. This number is private and should not be shared with anybody else.

In a moment, I will ask that all of the participants with even numbers, meaning 2, 4, 6, 8, etc., follow me outside this room. These participants will go to an adjacent area, where they will complete a brief questionnaire, and will receive the €5 payment from the experimenter for their participation. When leaving the room, please take all of your belongings.

Instructions for participants with odd numbers

In this experiment, each of you will [*decide whether to participate or not*] participate in an activity. [*That is, participating in the activity is optional*]. The activity is the following:

The activity: You will be paired with one of the participants who just left this room. That is, each of you will be paired with one of the participants with an even number (2, 4, 6,...). The pairings will be made randomly and anonymously, which means that nobody will know the identity of the person with whom he or she is paired. You will have to decide how to distribute €10 between yourself and the person with whom you are paired. That is, you will decide how much money, between €0.00 and €10.00, to give to the other person and how much to keep for yourself. For example, you may decide to give €9.00 to the other person and keep €1.00 for yourself, or you may instead decide to give €1.00 to the other person and keep €9.00 for yourself. You may select any distribution of the €10 between yourself and the other person, in increments of €0.10. The assigned amounts will be paid to you and to the other person (in addition to the €5 for participation).

Are there questions about the activity?

The participants in the adjacent area do not know anything about this activity. They received a questionnaire and were asked to complete it.

[*You must decide whether to participate or not participate in the activity.*]

- *If you opt to participate in the activity, you will be paired with one of the other*

participants and will distribute the €10 between yourself and this participant.] At the conclusion of the session the participant with whom you are paired will reenter this room and I will explain the activity to him or her. This participant will then discover how much money he or she received from you and how much you kept for yourself. You and the other participant will receive these quantities, plus the €5 for participation.

- *[If you opt not to participate in the activity you will not be paired with any other participant and you will not distribute any money. In this case you will receive a fixed amount of €10 (plus the €5 for participation), but you will not have the option to distribute this money. At the conclusion of the session, I will go to the adjacent area and I will pay €5 to the people who are not paired with anyone in this room. These people will not receive any information about the activity.]*

This session will now proceed as follows:

- 1) Each of you has an envelope [...two envelopes: one labeled “participate” and another “don’t participate”]. Please do not open this envelope [either envelope] yet.
- 2) *[If you decide to not participate in the activity, you will open the envelope labeled “don’t participate.” Inside this envelope is a sheet. Once you open the envelope, you will remove the sheet and write your participant number in the indicated space. You will receive €10.*
- 3) *If you decide to participate in the activity, you will open the envelope labeled “participate.”] Inside the envelope is a sheet with the number of the participant with whom you are paired and on which you will indicate how to distribute the €10 between the other person and yourself. Once you open the envelope, you will remove the sheet and will write your participant number in the indicated space. In addition you should look over the sheet to see the number of the participant with whom you are paired. You should then indicate how you wish to distribute the €10 between the other participant and yourself. The total of the two quantities should sum to exactly 10.00. If they do not sum to 10.00, then the other participant will receive the amount that you specify and you will receive the remainder.*
- 4) *[In either case,] Once you finish, place the sheet back in the envelope and I will collect the envelopes.*

At the end of the session, we will do the following:

- 5) The experimenter will go to the adjacent area and will bring the other participants. [...only those participants who are paired with someone who opted to participate in the activity. The rest of the participants in the adjacent area will not be paired, will receive the €5 for their participation and for them the experiment will have concluded.
- 6) *If you opted to participate in the activity, the participant with whom you are paired will reenter this room and will ...] These participants will receive a brief explanation of the activity. The participant with whom you are paired will receive the sheet that you completed, indicating how much money he or she received from you, out of the €10.*
- 7) The experimenter will then anonymously pay the other participants [*who are paired with someone in this room*] their total earnings, and will then pay you anonymously. This will conclude the experiment.

Are there questions? Once we answer any questions we will proceed to open the envelopes. *[Please open only one of the two envelopes.]*

Decision sheet

Number of the person with whom you are paired: _____

Your number (*please write your number in the space on the right*): _____

Amount of money to give to the other person: € _____.____
(in €0.10 increments)

Amount of money to keep for yourself: € _____.____
(in €0.10 increments)

(These two quantities must sum to €10.00)

Decision sheet

You have opted to not participate in the activity. You will not be paired with another participant. At the end of the session, you will receive €10 plus the €5 for participation.

Your number (*please write your number in the space on the right*): _____

Instructions for participants with even numbers

During the next few minutes, please complete the questionnaire on the attached sheet. After finishing, please wait a few minutes quietly for me to return. At that time, I will pay you the €5. In addition, it is possible that I will require the participation of some of you for a brief additional activity in the session.

While you wait, you may complete the payment receipt. Please leave the amount blank.

Final information for participants with even numbers

While you were out of this room, [*some of*] the participants here participated in an activity in which they distributed €10 between themselves and one of you. You are paired with one of these participants. This other participant decided how much money, from €0.00 to €10.00, to give to you and how much to keep for him- or herself. In a moment you will see a sheet on which this participant has indicated how much money to give to you. This amount, along with the €5 for participation, will be your payment for this session.