Judgments of Relative Value:

What Would You Offer, and What Would You Demand?

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ABSTRACT

An exchange can be elicited by fixing what a consumer receives and asking what they would offer, or by fixing what they give and asking what they would demand. For example, a consumer could be asked how much they would pay for a fixed number of units of the good or how many units of a good they would demand for paying a fixed dollar value. Across five preregistered studies (*N* = 3,119), offer elicitations imply higher received-per-given exchange rates than demand elicitations, and this asymmetry widens with magnitude. In both formats, elicited quantities increase sub-proportionally with fixed quantities. This shared response pattern explains the widening asymmetry and conflicts with standard two-sided valuation models. The findings hold across exchanges involving diverse resources, procedural variations, and choices with real monetary or charitable consequences. They also persist when offer and demand elicitations are yoked within participant, showing that the asymmetry cannot be attributed to participant heterogeneity. Together, the findings identify elicitation format as a general feature of exchange judgment, recast resource-specific explanations of time-money asymmetries as potential moderators of a broader effect, and clarify the role of elicitation format in WTP-WTA comparisons.

Keywords: preference elicitation, resource trade-offs, subjective value, procedural invariance, diminishing marginal utility, WTP-WTA

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How many minutes of audio advertising would you tolerate in exchange for being able to listen to 20 songs of your choice? What percentage of your salary would you forgo for the option to work from home two days per week? How many days of GPS location data would you share to receive two movie tickets?

Practitioners and academic researchers widely use such questions to study how people value exchanges. Each elicits a relative valuation: How much of one resource is worth a given amount of another? Such valuations help define the terms on which consumers are willing to exchange resources, a question central to marketing scholarship (Bagozzi 1975; 1978). They arise in many consequential settings. For example, the European Central Bank used the remote-work question above in its Consumer Expectations Survey and found that employees would accept an average pay reduction of 2.6% to work from home two days per week (Dias da Silva and Weissler 2025). Such valuations can inform decisions about prices, compensation arrangements, privacy policies, and public services.

Each exchange above, however, can also be elicited by fixing the other resource. Rather than asking how many days of GPS data someone would share for two movie tickets, one could ask how many movie tickets they would require to share seven days of GPS data. Rather than asking what percentage of salary someone would forgo to work from home two days per week, one could ask how many work-from-home days they would require to accept a 5% salary reduction. We call the first an *offer elicitation* because it elicits what the respondent would give, and the second a *demand elicitation* because it elicits what the respondent would receive.

The two formats appear to provide reciprocal ways to elicit the same underlying tradeoff. They are posed to the same party, preserve the resources and direction of exchange, and differ only in which quantity is fixed and which is elicited. Standard valuation models treat an exchange as balancing the subjective value of what is received against that of what is given up. If both formats recover this underlying valuation, they should yield the same exchange terms.

Yet prior research on time-money exchanges has documented departures from this reciprocity (Monga et al. 2017; Smitizsky et al. 2021). These studies find that the implied price of a consumer's time depends on whether time or money is elicited. For example, consumers imply different wage rates depending on whether they are asked, in Fixed-Money mode, how much time they would work for a fixed amount of money or, in Fixed-Time mode, how much money they would require for a fixed amount of time (Smitizsky et al. 2021). Explanations have emphasized properties specific to time and money, such as time scarcity and affective differences between them. We instead examine a more general resource-agnostic consequence of eliciting what consumers offer rather than what they demand.

Comparing offer versus demand elicitations requires comparing them at the same quantity of one resource. Because exchange rates can vary with magnitude, a group-level bridge—for example, using the median response to an offer elicitation as the fixed quantity in the corresponding demand elicitation—can create an aggregate asymmetry even if, at any given quantity, both formats would imply the same exchange rate for every consumer. We therefore use an individual-bridge procedure in which each participant's response to the first elicitation becomes the fixed quantity in that participant's second elicitation. This allows the two implied exchange rates to be compared at a common, participant-specific quantity.

Across five preregistered studies, we use this procedure to establish three empirical regularities. First, offer elicitations imply higher received-per-given exchange rates than demand elicitations. Second, this gap widens with exchange magnitude. Third, in both formats, elicited quantities increase sub-proportionally with fixed quantities. The findings persist across diverse domains; variations in order, timing, wording, and response format; and hypothetical and consequential responses.

The third regularity is central to interpreting the first two. One might expect offer and demand elicitations to activate different motives and thereby produce response patterns that diverge increasingly with magnitude. Yet the two response functions are strikingly similar in shape. Standard two-sided valuation accounts instead imply reciprocal response patterns: sub-proportional responding in one format entails super-proportional responding in the other. The shared sub-proportional pattern therefore reveals a deeper departure from two-sided valuation and, because the elicited quantity enters the two exchange rates on opposite sides of the exchange ratio, explains why the offer-demand gap widens with magnitude.

Our research also clarifies conventional comparisons of willingness to pay (WTP) and willingness to accept (WTA). WTP measures what a buyer would pay to acquire a resource, whereas WTA measures what a seller would require to relinquish it (Carmon and Ariely 2000; Horowitz and McConnell 2002; Kahneman, Knetsch and Thaler 1990; Knetsch and Sinden 1984). These measures reverse the exchange direction: money is given in WTP but received in WTA. They also vary elicitation format: WTP elicits an offer, whereas WTA elicits a demand. Conventional WTP-WTA comparisons thus vary both exchange direction and elicitation format.

METHODOLOGICAL AND THEORETICAL BACKGROUND

The methodological and theoretical background develops the logic underlying our analyses in three steps. We first define offer and demand response functions and explain the inverse-scaling restriction imposed when both elicitation formats recover the same two-sided valuation. We next show why the implied exchange rates must be compared at an aligned participant-specific quantity and introduce the individual-bridge procedure used in our studies. Finally, we explain how response scaling determines whether the exchange rates implied by the two formats converge or diverge as exchange magnitude increases.

Two-Sided Valuation and Response Functions

Let A denote the resource a participant gives Away and B the resource the participant gets Back. An offer elicitation fixes b^* units of B and asks how much A the participant would offer. The response is $a = f(b^*)$, where f is the participant's offer response function. A demand elicitation instead fixes a^* units of A and asks how much B the participant would demand. The response is $b = g(a^*)$, where g is the participant's demand response function.

We use the term *two-sided valuation model* for models in which an acceptable exchange for a given participant balances the subjective benefit of receiving B against the subjective cost of giving A. "Two-sided" thus refers to the two sides of that participant's tradeoff, not to the two parties to the exchange. Such models may evaluate utility over final holdings or represent receiving B as a gain and giving A as a loss. In either case, the quantity of one resource is chosen so its subjective value offsets that of the other.

Suppose a participant evaluates the two sides of the exchange through separable, participant-specific valuation functions F and G. The function $F(a)$ represents the subjective cost of giving a units of A, whereas $G(b)$ represents the subjective benefit of receiving b units of B. We impose no functional-form assumptions beyond requiring both functions to be strictly increasing and continuous, and we assume they are stable across elicitation formats. Because the functions are strictly increasing, each has an inverse. The inverse F^{-1} maps a given subjective cost to the amount of *A* that produces it, whereas G^{-1} maps a given subjective benefit to the amount of *B* that produces it. An acceptable exchange satisfies $F(a) = G(b)$.

In an offer elicitation, $G(b)$ gives the subjective benefit of the fixed amount of *B,* and F^{-1} identifies the amount of *A* whose subjective cost matches that benefit. The offer response function is therefore: $f(b) = F^{-1}(G(b))$. In a demand elicitation, $F(a)$ gives the subjective cost of the fixed amount of *A*, and G^{-1} identifies the amount of *B* whose subjective benefit matches that cost. The demand response function is therefore: $g(a) = G^{-1}(F(a))$.

If elicitation format does not change these valuations, the two formats solve the same relation in opposite directions and their response functions must be inverses. If a participant offers $f(b^*)$ units of *A* to receive b^* units of *B*, fixing that amount of *A* in the corresponding demand elicitation recovers b^*: $g(f(b^*)) = G^{-1}(F(F^{-1}(G(b^*)))) = b^*$. Likewise, if the participant demands $g(a^*)$ units of *B* for giving a^* units of *A*, fixing that amount of *B* in the corresponding offer elicitation recovers a^*: $f(g(a^*)) = F^{-1}(G(G^{-1}(F(a^*)))) = a^*$. For simplicity, this representation suppresses two details that do not affect the conclusion: with signed utility functions, the indifference condition can be written as $F(-a) = G(b)$, and valuations defined over final holdings would also include the participant's initial holdings as a parameter. In either case, format-invariant two-sided valuation requires reciprocal response functions.

We next express this reciprocal-response restriction in terms of how elicited quantities scale with fixed quantities. We estimate response elasticities using log-log regressions. For offer elicitations, we specify $\log a = \alpha_O + e_O \log b^*$, where e_O is the offer elasticity. For demand elicitations, we specify $\log b = \alpha_D + e_D \log a^*$, where e_D is the demand elasticity. Each elasticity indicates the percentage change in the elicited quantity associated with a 1% increase in the fixed quantity. An elasticity of 1 indicates proportional responding: doubling the fixed quantity doubles the elicited quantity. An elasticity below 1 indicates sub-proportional responding, whereas an elasticity above 1 indicates super-proportional responding.

At corresponding points, inverse response functions have reciprocal elasticities. Under the log-log response specifications, this implies $e_D = 1/e_O$. Sub-proportional responding in one format must therefore be accompanied by super-proportional responding in the other: if $e_O < 1$, then $e_D > 1$; if $e_D < 1$, then $e_O > 1$. Two-sided valuation models do not require either format to exhibit a particular scaling pattern. They require the two formats to exhibit reciprocal scaling. We illustrate this common restriction with two valuation benchmarks.

A Diminishing-Marginal-Utility Benchmark. Suppose the participant evaluates the exchange using a separable utility function over the remaining amount of *A* and the resulting amount of *B*, with diminishing marginal utility for both resources.

Under an offer elicitation, two forces produce sub-proportional responses. First, as the fixed quantity of *B* increases, each additional unit of *B* provides less utility. Second, as the participant offers more *A*, less *A* remains, making each additional unit increasingly costly to give up. Progressively larger quantities of *B* should therefore induce progressively smaller increases in the amount of *A* offered. The offer tradeoff function is consequently sub-proportional, implying $e_O < 1$. A demand elicitation solves the same tradeoff in the opposite direction. First, as the fixed quantity of *A* increases, each additional unit given creates a larger utility loss because less *A* remains. Second, each additional unit of *B* provides less utility. The amount of *B* demanded should therefore rise more than proportionally with the amount of *A* given. The demand response function is consequently super-proportional, implying $e_D > 1$.

Thus, diminishing marginal utility predicts sub-proportional offer responses and super-proportional demand responses.

A Reference-Dependent Diminishing-Sensitivity Benchmark. A reference-dependent value function, as in prospect theory, provides a different benchmark. Suppose receiving *B* is represented as a gain and giving *A* as a loss. Because our predictions concern how responses scale with magnitude, the relevant feature of prospect theory is diminishing sensitivity rather than loss aversion. A constant degree of loss aversion changes the amount of *B* required to compensate for giving *A*, but not how that tradeoff scales with magnitude. Prospect theory assumes diminishing sensitivity in both domains: as either the gain or the loss becomes larger, each additional unit has less subjective impact (Kahneman and Tversky 1979).

Whether the offer elicitation or demand elicitation response elasticity is below 1 depends on whether diminishing sensitivity is stronger for gains of *B* or for losses of *A*. Suppose it is stronger for gains of *B*. Doubling *B* then produces a smaller proportional increase in subjective gain than doubling *A* produces in subjective loss. In an offer elicitation, less than a doubling of *A* is therefore sufficient to balance a doubling of *B*, producing sub-proportional offer responses with $e_O < 1$. Conversely, because the subjective value of *B* grows relatively slowly, more than a doubling of *B* is needed to balance a doubling of *A* in a demand elicitation, producing super-proportional demand responses with $e_D > 1$

If diminishing sensitivity is stronger for losses of *A*, the pattern reverses with super-proportional offer responses and sub-proportional demand responses. Thus, like diminishing marginal utility it requires opposite scaling across the two elicitation formats.

Comparing Exchange Rates at an Aligned Quantity

Throughout the paper, we express exchange rates as units of *B* received per unit of *A* given. In an offer elicitation, if b^* units of *B* are fixed and participant *i* offers a_i, the offer-elicited exchange rate is $ER_i^O = \frac{b^*}{a_i}$. In a demand elicitation, if a^* units of *A* are fixed and participant *i*'s response is b_i, then the demand-elicited exchange rate is $ER_i^D = \frac{b_i}{a^*}$.

This notation does not make explicit an important point: an exchange rate is computed at a particular quantity and may vary with exchange magnitude. That is, the offer-elicited exchange rate for participant i is a function, not a number, and $ER_i^O = \frac{b^*}{a_i}$ is specifically the offer-elicited exchange rate for participant *i* at magnitude b^*.

To compare exchange rates implied by an offer elicitation and a demand elicitation, the two rates must be anchored to the same quantity of at least one resource. For example, suppose someone requires 20 chocolates for paying $20 in a demand elicitation and is willing to pay $30 for 60 chocolates in an offer elicitation. The difference in the implied exchange rates (1 chocolate per dollar versus 2 chocolates per dollar) does not necessarily indicate an asymmetry due to elicitation format. One rate is defined at 20 chocolates and the other at 60 chocolates, and the participant's exchange rate may vary across those quantities. How, then, should magnitude be held fixed when comparing exchange rates across elicitations?

Comparing Exchange Rates with a Median-Bridge Procedure. One approach uses what we call a median-bridge procedure. Suppose the demand elicitation is asked first. The researcher fixes a^* for all participants and observes their demand responses. The median response, $\tilde{b} = median(b_1, b_2, \ldots, b_n)$, is then fixed as b^* in the offer elicitation, and all participants are asked how much *A* they would offer to receive it. This procedure is straightforward to implement and can be used with separate samples: one sample supplies the quantity fixed in the second elicitation, and the two sets of responses can then be compared statistically.

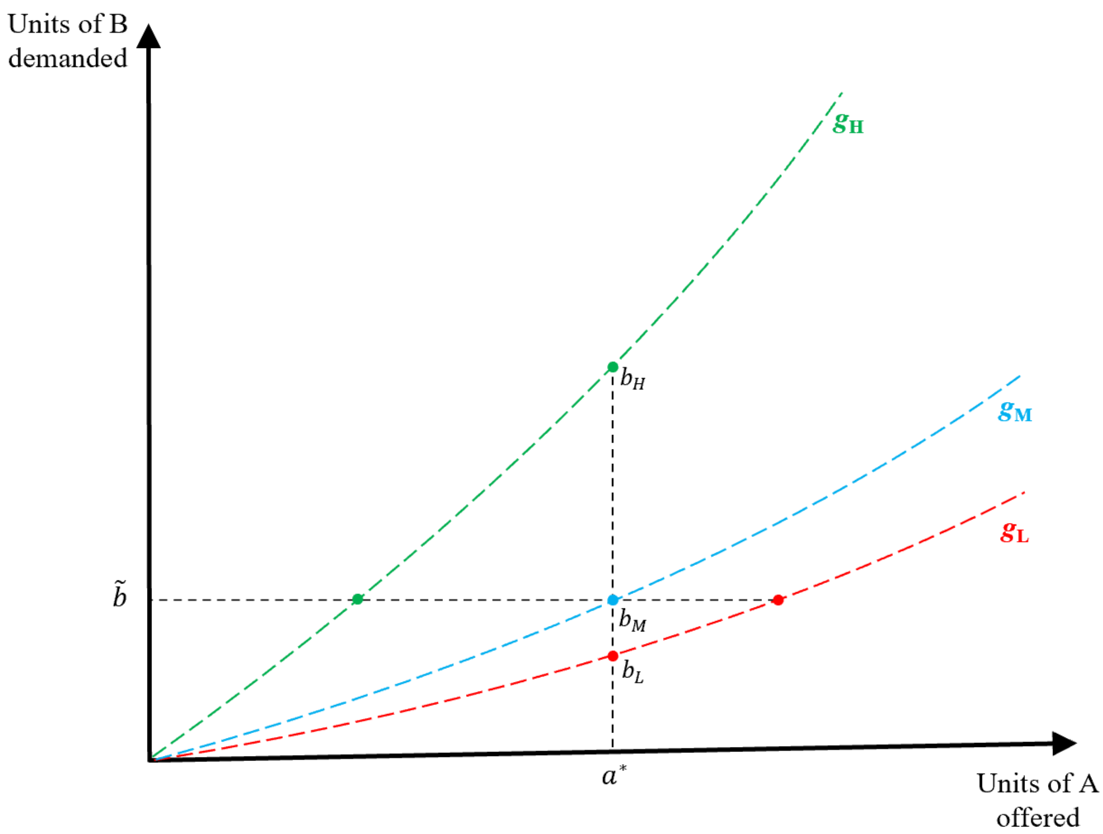
The median bridge does not, however, align the two rates for each participant. It preserves the initial quantity of *B* only for participants whose first response equals $\tilde{b}$. Participants with lower or higher initial responses are asked about a different quantity in the second elicitation. If their exchange rates vary with magnitude, this quantity misalignment can create an apparent aggregate asymmetry even when every participant has a stable tradeoff that is unaffected by elicitation format.

Figure 1 illustrates the problem. To separate it from between-sample differences, suppose the same three participants (L, M, and H) complete both elicitations. Each participant has a stable offer function and corresponding demand function. For example, L responds in a demand elicitation according to $b = g_L(a^*)$ and in the corresponding offer elicitation according to $a = g_L^{-1}(b_L)$. The participants first complete a demand elicitation at a^* and demand b_L, b_M, and b_H, where $b_L < b_M < b_H$. The median response is $\tilde{b} = b_M$, which is then fixed for all three participants in the offer elicitation.

For M, the vertical line at a^* and the horizontal line at $\tilde{b}$ identify the same point on the tradeoff curve. For L and H, they do not. Those participants instead move along their personal tradeoff curves. These movements mechanically change the implied rates whenever the curves are nonlinear. In the example shown, they produce a higher average demand-elicited rate than offer-elicited rate, even though elicitation format has no effect on any participant's responses. The Web Appendix provides a numerical example and shows that the median bridge can produce an apparent asymmetry in either direction.

FIGURE 1

THE MEDIAN-BRIDGE PROCEDURE CAN PRODUCE SPURIOUS DEMAND-GREATER-THAN-OFFER ASYMMETRIES



NOTE.—Illustrative demand response functions for participants L, M, and H such that the median-bridge procedure produces a higher average demand-elicited rate than offer-elicited rate even if each participant has a stable tradeoff function across elicitation formats. See text for details.

Comparing Exchange Rates with an Individual-Bridge Procedure. The problem with the median-bridge procedure is that heterogeneous responses and magnitude-dependent exchange rates move participants to unmatched points on their personal tradeoff curves. Our studies use an individual-bridge procedure that yokes the two elicitations so that each participant's response to the first elicitation becomes the fixed quantity in that participant's second elicitation.

Suppose the demand elicitation comes first. Participant i is asked how much B they would require for offering a^* units of A and responds b_i. The demand-elicited exchange rate is $ER_i^D = \frac{b_i}{a^*}$. The subsequent offer elicitation fixes that participant's own response, $b^* = b_i$ and asks how much A the participant would offer for b_i units of B. If the participant responds a_i, the offer-elicited exchange rate is $ER_i^O = \frac{b_i}{a_i}$. The two rates share the same participant-specific quantity b_i of B. With a stable tradeoff curve, no response noise, and no effect of elicitation format, the participant would respond $a_i = a^*$, and the two formats imply the same rate. The individual bridge therefore provides a direct test of the common restriction imposed by the two-sided valuation benchmarks: if the two response functions are inverses, the second elicitation should return the participant to the exchange specified in the first.

This individual-bridge procedure follows a broader tradition of research on procedural invariance using linked matching tasks. For example, Delquié (1993) used a double-matching procedure. Participants first adjusted one attribute of an incomplete two-attribute alternative until it matched a fully specified alternative. Their response was then fixed in a second task, in which they adjusted the other attribute. If the elicited tradeoff were invariant to which attribute was elicited, the second match should recover the attribute level presented in the first task. In general, it did not: the tradeoff implied by the second match was not reciprocal to the tradeoff implied by the first.

Our individual bridge applies the same participant-specific linking logic to directional exchanges rather than matches between multi-attribute alternatives. Delquié's participants compared two alternatives with nonzero levels on both attributes. Our participants instead evaluate a transfer giving resource *A* and receiving resource *B*. This structure allows the two directions to be framed as offer and demand elicitations and the resulting tradeoff to be expressed as units of *B* received per unit of *A* given.

Response Scaling and Exchange-Rate Asymmetries

Response elasticities determine how the exchange rates implied by each elicitation change with magnitude. Recall that exchange rates are expressed as units of *B* received per unit of *A* given, so *B* appears in the numerator and *A* in the denominator.

In an offer elicitation, *B* is fixed and *A* is elicited. When offer responses are sub-proportional, the denominator of the exchange rate therefore grows slower than the numerator, causing the offer-elicited rate to rise with magnitude. Proportional responding leaves the rate constant, whereas super-proportional responding causes it to fall.

In a demand elicitation, *A* is fixed and *B* is elicited. The implications of response scaling on exchange rates reverse. When demand responses are sub-proportional, the numerator of the exchange rate grows more slowly than the denominator, causing the demand-elicited rate to fall with magnitude. Proportional responding leaves the rate constant, whereas super-proportional responding causes it to rise.

Sub-proportional responding under both an offer elicitation and a demand elicitation is inconsistent with a two-sided valuation model. However, our empirical results identify such responding. We thus discuss the implications of such shared sub-proportional responding for exchange rates. The offer-elicited exchange rate rises with magnitude, while the demand-elicited rate falls. An individual bridge therefore produces increasingly divergent rates as the fixed quantity becomes larger; that is, the offer-to-demand exchange rate ratio, ER_i^O/ER_i^D, increases as the exchange becomes larger.

The framework consequently motivates three empirical analyses. First, the individual bridge tests whether offer and demand elicitations imply different exchange rates when aligned on a participant-specific quantity. Second, variation in the starting fixed quantity tests whether any asymmetry changes with exchange magnitude. Third, the offer and demand elasticities reveal whether the two formats exhibit the opposite scaling required by a two-sided valuation model or the shared sub-proportional scaling that produces increasing divergence of exchange rates.

OVERVIEW OF STUDIES

Study 1 begins with offer elicitations and, across nine diverse exchanges, tests whether offer-elicited rates exceed demand-elicited rates, whether the difference increases with exchange magnitude, and how responses scale in each elicitation format. Study 2 reverses the elicitation order. This reversal also makes the starting quantities in the demand elicitation randomly assigned, allowing demand-response scaling to be estimated independently of participants' earlier offer responses.

Study 3 replaces maximum-and-minimum questions with sentence-completion prompts and varies whether the fixed or elicited quantity appears first. Study 4 administers both formats in the same session and has each participant evaluate ten magnitudes of the same exchange, allowing the magnitude dependence and response-scaling results to be examined within participant. Study 5 tests the exchange-rate asymmetry when responses can determine participants' payments and a charitable outcome.

All studies were preregistered on AsPredicted.org, and sample sizes were determined in advance. We report all measures, manipulations, and exclusions and identify exploratory analyses where they appear. Detailed exclusion criteria and study-specific exclusions are reported in the Web Appendices. Materials, data, preregistrations, and code are available at https://researchbox.org/7776 (CODE: FABRQF).

STUDY 1: EXCHANGE-RATE ASYMMETRIES ACROSS DIVERSE EXCHANGES

Study 1 provides an initial test of the three empirical regularities using an offer-first individual bridge. Participants first stated how much of resource *A* they would offer for a fixed quantity of resource *B*. At least seven days later, they stated how much *B* they would demand in return for the amount of *A* that they had previously offered. The study included nine exchanges involving money, goods, time, prosocial outcomes, labor, and experiences (table 1). For each exchange, the quantity of *B* fixed in the first phase varied randomly across participants, allowing us to examine both the direction of the exchange-rate asymmetry and its relationship with exchange magnitude.

TABLE 1

STIMULI USED IN STUDIES 1 AND 2

Description	Offer Elicitation	Demand Elicitation
Suppose you are planning a trip to Europe for two weeks. You go to a currency exchange where you exchange dollars for euros.	To receive [b_i^*] euros, what is the maximum number of dollars you would want to provide?	To provide [a_i^*] dollars, what is the minimum number of euros you would want to receive?
Suppose you're buying toilet paper in bulk at a store.	To receive [b_i^*] rolls of toilet paper, what is the maximum number of dollars you would want to pay?	To pay [a_i^*] dollars, what is the minimum number of rolls of toilet paper you would want to receive?
Suppose you can make a donation to a charity that distributes mosquito nets to help prevent malaria.	To have [b_i^*] extra mosquito nets distributed, what is the maximum number of dollars you would want to donate?	To donate [a_i^*] dollars, what is the minimum number of extra mosquito nets you would want to have distributed?
Suppose your employer is considering a new vacation day policy.	To receive [b_i^*] extra vacation days per year, what is the maximum number of dollars of yearly salary you would want to give up?	To give up [a_i^*] dollars of yearly salary, what is the minimum number of extra vacation days per year you would want to receive?
Suppose there is a matching service so that if you teach basic computer skills to some members of your community then other members of the community help with cleaning your house.	To receive [b_i^*] hours of cleaning help, what is the maximum number of hours of computer-skills teaching you would want to provide?	To provide [a_i^*] hours of computer-skills teaching, what is the minimum number of hours of cleaning help you would want to receive?
Suppose you are asked to count the number of 0s that appear on a page and write down the total number at the bottom of each page. Once you complete a page, a new page will appear. You would have 60 seconds to complete each page and would need to reach a minimum threshold for accuracy.	To receive [b_i^*] dollars, what is the maximum number of minutes you would want to spend performing this task?	To spend [a_i^*] minutes performing this task, what is the minimum number of dollars you would want to receive?

Suppose you visit a food festival that offers free samples, but each comes with a waiting line.	To receive [b_i^*] free samples, what is the maximum number of minutes you would want to wait?	To wait [a_i^*] minutes, what is the minimum number of free samples you would want to receive?
Suppose you are stranded on an island. Fortunately, you are good at fishing and another person stranded on the island is good at gathering coconuts. Fish is an excellent source of protein, and coconuts are an excellent source of hydration and energy.	To receive [b_i^*] coconuts, what is the maximum number of fish you would want to provide?	To provide [a_i^*] fish, what is the minimum number of coconuts you would want to receive?
Suppose the best chef in the world offers you the following deal. They will cook you incredible dinners, each of which is more delicious than any dinner you've had before the chef came along. However, for some other dinners you agree to consume only bread and water.	To receive [b_i^*] chef's dinners, what is the maximum number of bread-and-water dinners you would want to eat?	To eat [a_i^*] bread-and-water dinners, what is the minimum number of chef's dinners you would want to receive?

NOTE.—The scenarios and corresponding offer and demand elicitations used in Studies 1 and 2.

Method

Study 1 used a two-phase, within-participant design. In phase 1, 1,000 Prolific participants completed an offer elicitation for each of the nine scenarios in table 1, presented in random order. For each scenario, participants were randomly assigned a quantity of resource B, b_i^* , from a scenario-specific range. They then indicated the maximum amount of resource A, a_i, that they would offer to receive b_i^*. The ranges of the possible fixed quantities appear on the x-axis of figure 2 and in table WA 1 of Web Appendix B.

At least seven days later, phase 1 participants were invited to complete phase 2. Neither the invitation nor the survey mentioned phase 1. Participants completed the corresponding demand elicitation for each scenario. The amount of A was fixed at that participant's phase 1 offer, such that $a_i^* = a_i$, and participants indicated the minimum amount of B, b_i, that they would require in return.

Of the 1,000 phase 1 participants, 861 completed phase 2 within the two-week response window. Participants were excluded if, in either phase, they completed the survey in less than 20 seconds, failed an attention check, or provided the same response in all nine scenarios. At the response-pair level, we excluded observations containing a zero and observations for which the log-transformed exchange rate was more than three standard deviations from the scenario-by-phase mean. The final sample consisted of 819 participants (M_{age} = 41; 51% female, 47% male) and 6,982 offer-demand response pairs. Detailed exclusions are reported in table WA 2 of Web Appendix B. All studies were approved by the institutional review boards of The University of Pennsylvania or KU Leuven.

Results

Analysis 1: Do Offer and Demand Elicitations Imply Different Exchange Rates?

The individual bridge in Study 1 follows $b_i^* \rightarrow a_i \rightarrow b_i$. Because the same amount of A appears in both rates, the offer-to-demand exchange-rate ratio simplifies to $ERR_i^{O/D} = \frac{ER_i^O}{ER_i^D} = \frac{b_i^*/a_i}{b_i/a_i} = \frac{b_i^*}{b_i}$. The rates are equal when $b_i = b_i^*$. A phase 2 demand below the phase 1 fixed quantity implies a higher offer-elicited rate. We analyze exchange-rate ratios on the log scale, where zero indicates equal rates and positive values indicate higher offer-elicited rates. Reversing the numerator and denominator would change only the sign.

Across all nine scenarios, most participants demanded less B in phase 2 than had been fixed in phase 1 (figure 2). Depending on the scenario, 58% to 88% of participants had a higher offer-elicited than demand-elicited exchange rate. In every scenario, this pattern was more common than the reverse (all sign-test *p*s < .001; table WA 3 in Web Appendix B).

Mean log exchange-rate ratios were also greater than zero in all nine scenarios (all *p*s < .001; table WA 4 in Web Appendix B). The corresponding geometric mean ratios (i.e., the exponentiated mean of the log exchange rate ratios) ranged from 1.10 to 8.84. The largest difference occurred in the mosquito-net donation scenario, where the offer-elicited exchange rate was nearly nine times the demand-elicited exchange rate on geometric average.

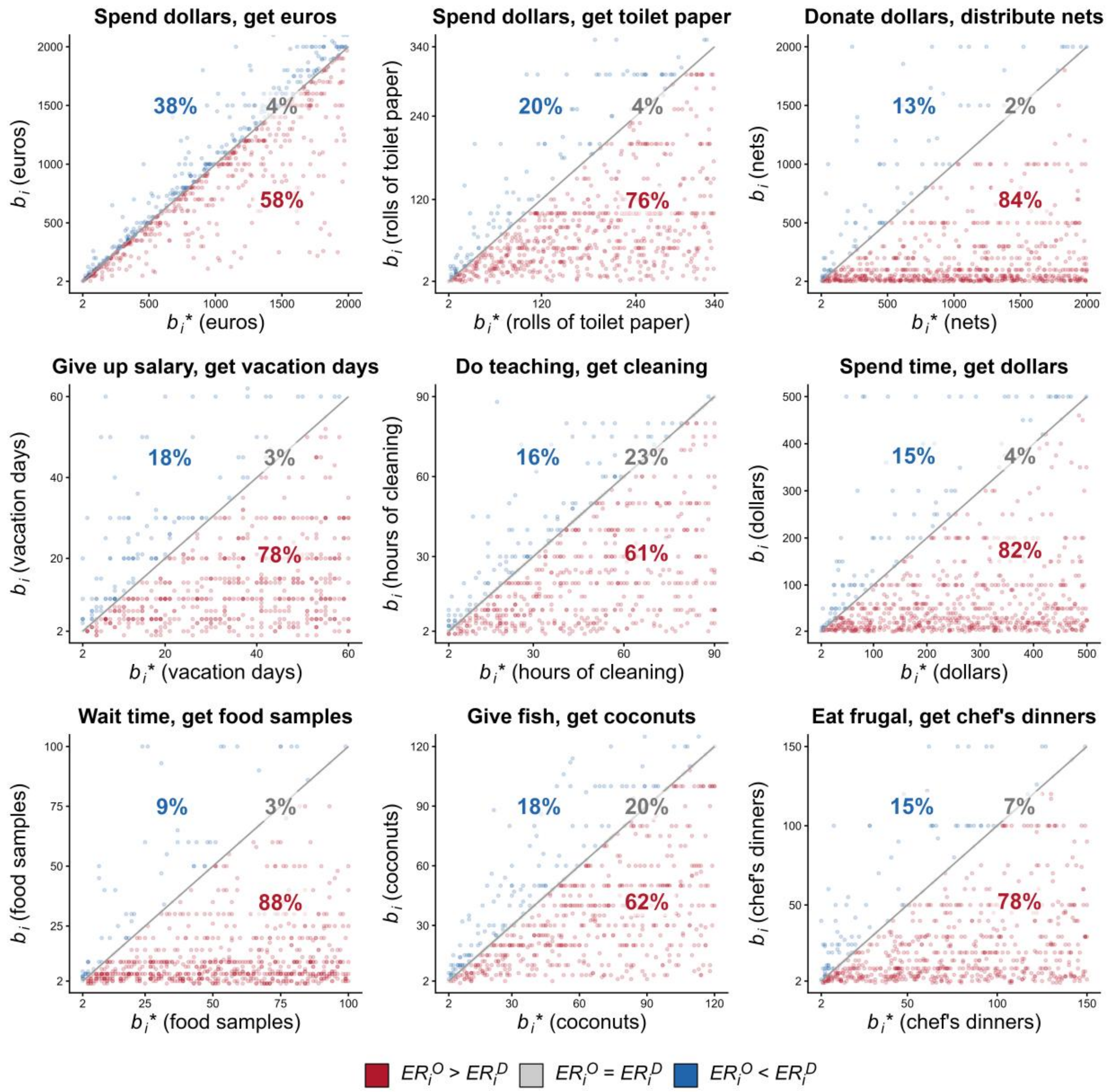
Study 1 therefore shows that offer elicitations imply higher exchange rates than demand elicitations, even when the rates are aligned through each participant's own response.

Analysis 2: How Does the Exchange-Rate Asymmetry Scale with Magnitude? Because b_i^* was randomly assigned within scenario, we can test whether the exchange-rate asymmetry changes with exchange magnitude. For each scenario, we regressed the log exchange-rate ratio on the mean-centered phase 1 fixed quantity, b_i^*. The ratio increased with b_i^* in all nine scenarios (eight *p*s < .001, "Spend dollars, get euros," $p = .04$; table WA 5 in Web Appendix B).

Figure 3 shows that fitted exchange-rate ratios generally remained above 1 across the observed ranges and increased as the fixed quantity became larger. Analyses by decile of b_i^* produced the same pattern (figure WA 2 in Web Appendix B). Thus, the offer-demand asymmetry generally widened with exchange magnitude and was not confined to a narrow range.

FIGURE 2

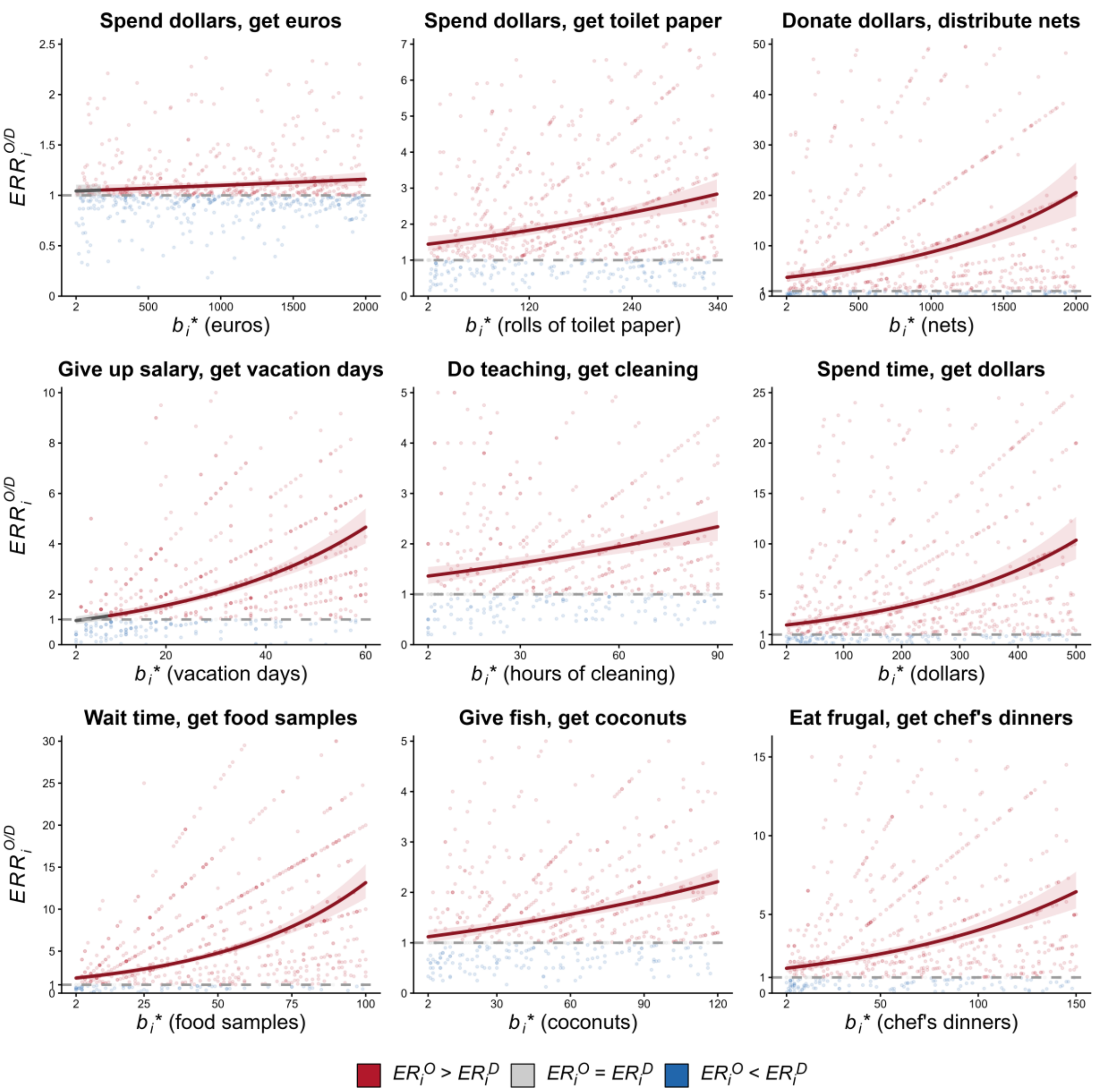
PHASE 1 FIXED QUANTITIES AND PHASE 2 DEMANDS IN STUDY 1



NOTE.—Each panel compares the quantity b_i of B demanded in phase 2 with the quantity of B fixed in phase 1, b_i^*. The 45-degree line indicates equal offer-elicited and demand-elicited exchange rates ($b_i = b_i^*$). Points below the line indicate a higher offer-elicited than demand-elicited exchange rate ($b_i < b_i^*$); points above the line indicate the reverse ($b_i > b_i^*$). Percentages report the shares of observations below, on, and above the 45-degree line.

FIGURE 3

EXCHANGE-RATE RATIOS BY PHASE 1 FIXED QUANTITY OF *B* IN STUDY 1



NOTE.—Points show observed offer-to-demand exchange-rate ratios, $ERR_i^{O/D} = ER_i^O / ER_i^D$, plotted against the phase 1 fixed quantity, b_i^*. Solid lines show fitted values from scenario-specific OLS regressions of $\log(ERR_i^{O/D})$ on mean-centered b_i^*, back-transformed to the ratio scale by exponentiation; shaded bands are 95% confidence intervals. The dashed horizontal line at 1 indicates equal rates. Values above 1 indicate a higher offer-elicited rate. The diagonal rays are because many participants responded with the same prominent round number.

Analysis 3: How Do Responses Scale in the Two Elicitation Formats? These analyses were exploratory and not preregistered for any study. We estimated offer and demand elasticities using log-log regressions of elicited quantities on fixed quantities.

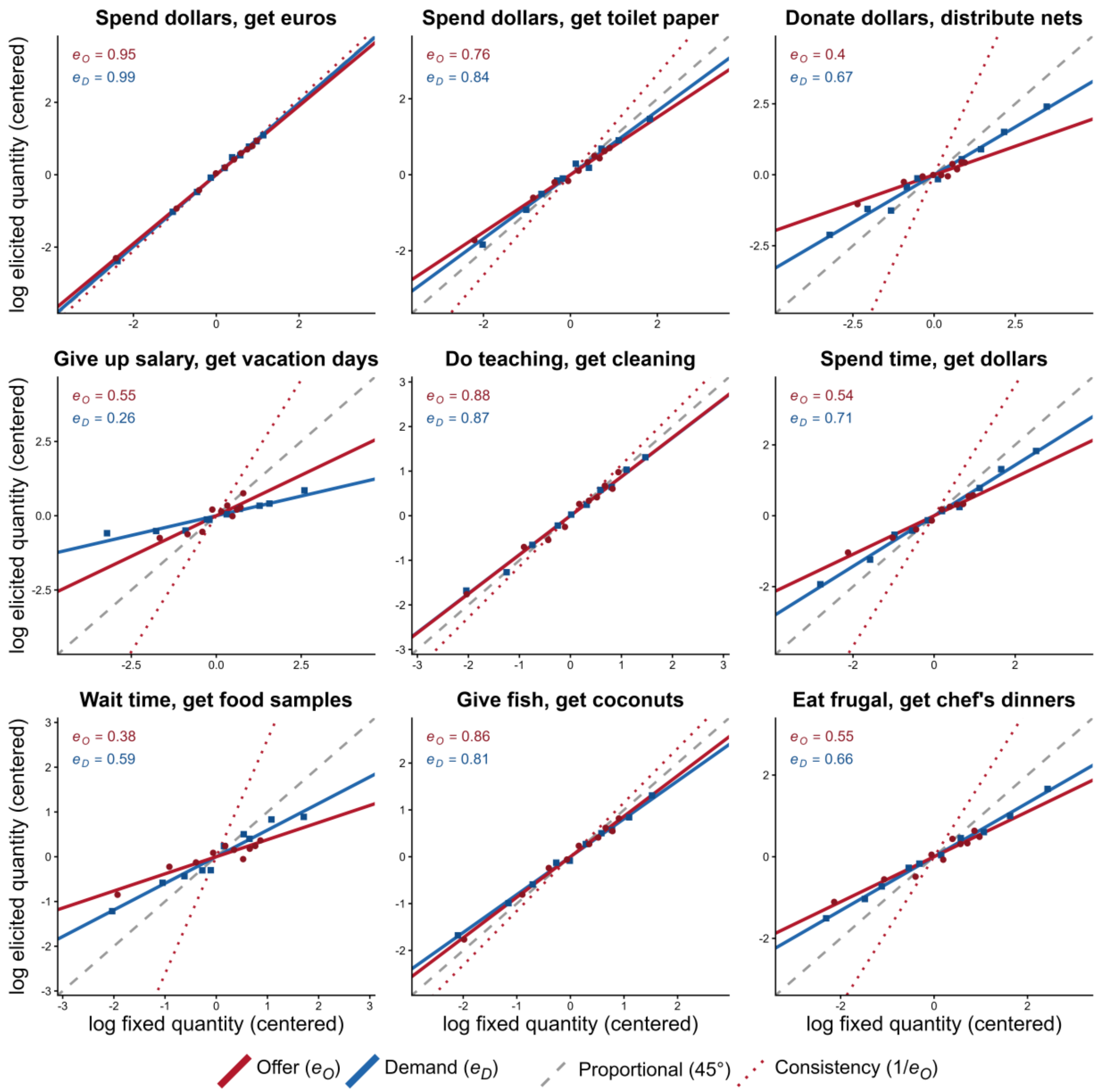
Figure 4 shows the estimated response functions. Offer elasticities were significantly below 1 in all nine scenarios (all *p*s < .001; table WA 6 in Web Appendix B), as reflected in slopes that are flatter than the 45-degree line. This indicates sub-proportional responding, consistent with the diminishing-marginal-utility benchmark. Demand elasticities were also below 1 in all nine scenarios and significantly so in eight (eight *p*s < .001, "Spend dollars, get euros," *p* = .33). Rather than increasing super-proportionally, as the same benchmark would imply, the amount demanded generally increased sub-proportionally with the amount given.

Thus, the two elicitation formats exhibited similar rather than opposite scaling patterns. This corresponds to the magnitude dependence in Analysis 2: sub-proportional offer responses make offer-elicited rates rise with magnitude, whereas sub-proportional demand responses make demand-elicited rates fall. The rates consequently diverge as the exchange grows.

An additional, format-invariance benchmark treats the offer and demand response functions as inverse descriptions of the same deterministic tradeoff relation. Under that benchmark, the demand elasticity would equal the reciprocal of the offer elasticity ($e_D = 1/e_O$). The inverse of the offer response function is shown by the dotted line in each panel of figure 4. Its slope is the reciprocal of the offer elicitation elasticity, and it lies on the opposite side of the 45-degree line to the offer elicitation line. The reciprocal offer elasticities ranged from 1.05 to 2.62, whereas the observed demand elasticities ranged from 0.26 to 0.99. Thus, the demand response functions resembled the offer response functions more closely than they resembled their mathematical inverses.

FIGURE 4

OFFER AND DEMAND RESPONSE ELASTICITIES IN STUDY 1



NOTE.—Each panel plots the centered log elicited quantity against the centered log fixed quantity for offer elicitations (elicited a_i against fixed b_i^*) and demand elicitations (elicited b_i against fixed a_i^*). Fitted slopes are the response elasticities; points show decile means. The dashed 45-degree line represents proportional responding. The dotted line represents the inverse-function benchmark for the demand response, with slope $1/e_O$. For display purposes only, axes are truncated at approximately the 99th percentile of their absolute centered values.

The response-scaling results were not driven by the assumed functional form used to estimate elasticities: decile means closely tracked the fitted functions (figure 4), adding quadratic terms to the log-log regressions revealed no systematic curvature, and nonparametric correlations between exchange rates and fixed quantities produced the same directional pattern (tables WA 7–8 in Web Appendix B).

The demand fixed quantities in this offer-first design were generated by participants' phase 1 responses and thus not randomly sampled. However, Study 2 reverses the elicitation order and randomly assigns those quantities. In Study 4, we will show similar patterns within participants.

Taken together, Study 1 establishes the three empirical regularities that organize the remaining studies: offer elicitations generally imply higher exchange rates, the asymmetry generally increases with exchange magnitude, and elicited quantities generally increase less than proportionally in both formats.

STUDY 2: REVERSING ELICITATION ORDER

Study 1 always administered the offer elicitation first. Study 2 reverses the order to determine whether the findings depend on that sequence. Participants first completed demand elicitations and, at least seven days later, completed the corresponding offer elicitations. The individual bridge therefore follows $a_i^* \rightarrow b_i \rightarrow a_i$. This reversal also makes the initial fixed quantities in the demand elicitation randomly assigned rather than generated by participants' earlier offer responses.

Method

Study 2 followed the procedure of Study 1, except that the elicitation order was reversed. In phase 1, 1,000 Prolific participants completed a demand elicitation for each of the nine scenarios in table 1, presented in random order. For each scenario, participants were randomly assigned a quantity a_i^* of resource A from a scenario-specific range and indicated the minimum amount of resource B, b_i, that they would require in return. The ranges of possible fixed quantities appear on the x-axis of figure 5 and in table WA 9 in Web Appendix C.

At least seven days later, phase 1 participants were invited to complete phase 2. For each scenario, the amount of *B* was fixed at that participant's phase 1 demand, such that $b_i^* = b_i$, and participants indicated the maximum amount of *A*, a_i, that they would offer to receive it. Of the 1,000 phase 1 participants, 779 completed phase 2. After applying the exclusions described in Study 1, the final sample consisted of 748 participants (M_{age} = 42; 52% female, 48% male) and 6,382 offer-demand response pairs. Detailed exclusions are reported in table WA 10 in Web Appendix C.

Results

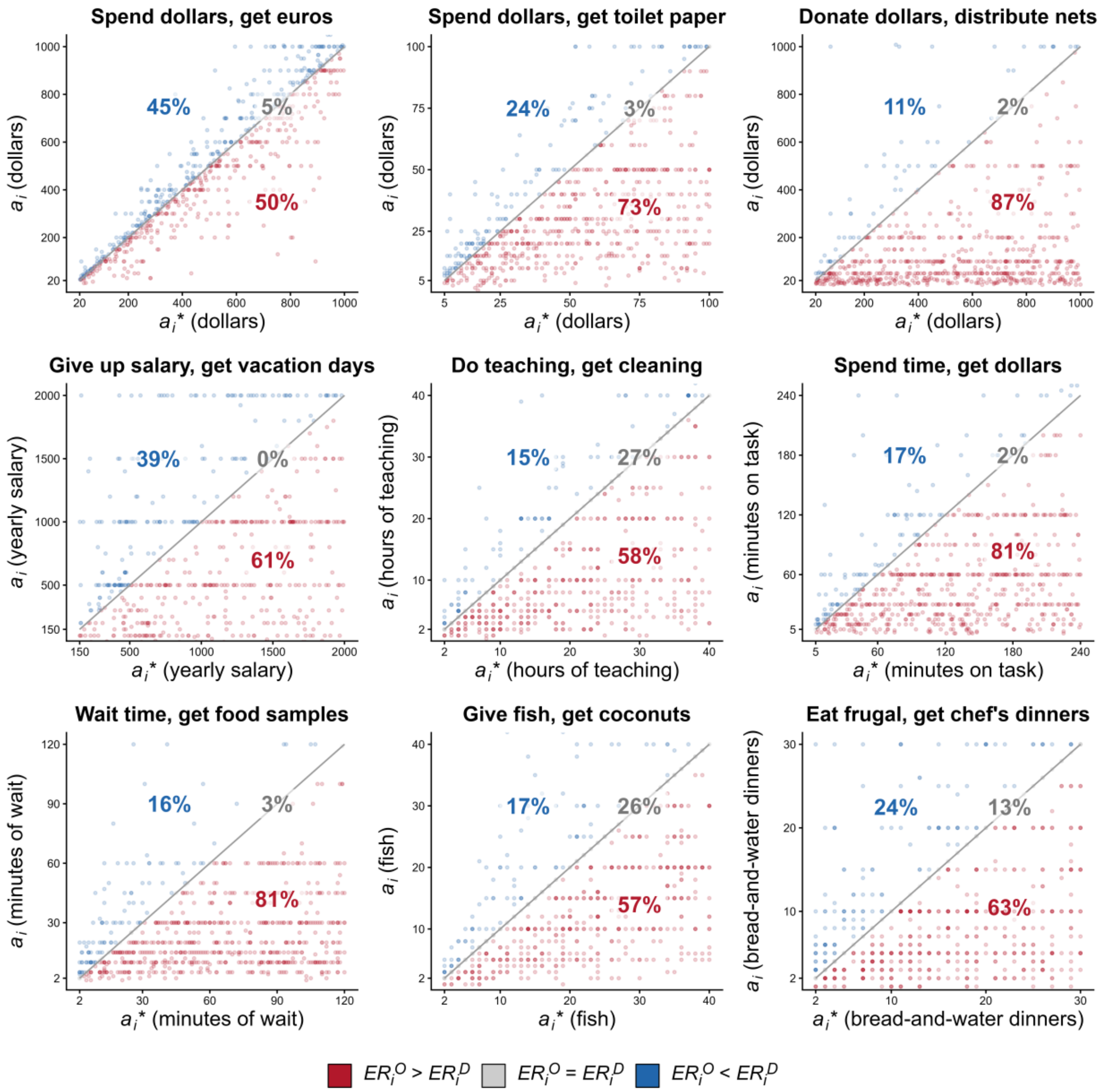
Analysis 1: Do Offer and Demand Elicitations Imply Different Exchange Rates? Because the two rates share the same quantity of *B* in Study 2, they are equal when the phase 2 offer returns to the phase 1 fixed quantity of *A*, $a_i = a_i^*$. An offer below that fixed quantity implies a higher offer-elicited exchange rate. Across scenarios, 50% to 87% of participants offered less A in phase 2 than had been fixed in phase 1 (figure 5). In eight of the nine scenarios, this pattern was significantly more common than the reverse (eight sign-test *p*s < .001, "Spend dollars, get euros," $p = .22$; table WA 11 in Web Appendix C). Mean log exchange-rate ratios were significantly greater than zero in all nine scenarios (all *p*s < .001; table WA 12 in Web Appendix C). Geometric mean exchange-rate ratios ranged from 1.07 to 5.03. Reversing the elicitation order therefore replicated the offer–demand exchange rate asymmetry.

Analysis 2: How Does the Exchange-Rate Asymmetry Scale with Magnitude? For each scenario, we regressed the log exchange-rate ratio on the mean-centered phase 1 fixed quantity, a_i^*. The log exchange-rate ratio increased significantly with a_i^* in eight of the nine scenarios (eight *p*s < .001; "Spend dollars, get euros," $p = .331$; table WA 13 in Web Appendix C). Figure 6 shows that fitted ratios generally remained above 1 across the observed ranges and increased as a_i^* became larger. Analyses by decile of a_i^* produced the same pattern (figure WA 3 in Web Appendix C). Thus, reversing elicitation order replicates the finding that offer-elicited and demand-elicited exchange rates generally diverge further as exchange magnitude increases.

Analysis 3: How Do Responses Scale in the Two Elicitation Formats? We estimated elasticities from the same exploratory log-log regressions as in Study 1. Figure 7 shows the estimated response functions.

FIGURE 5

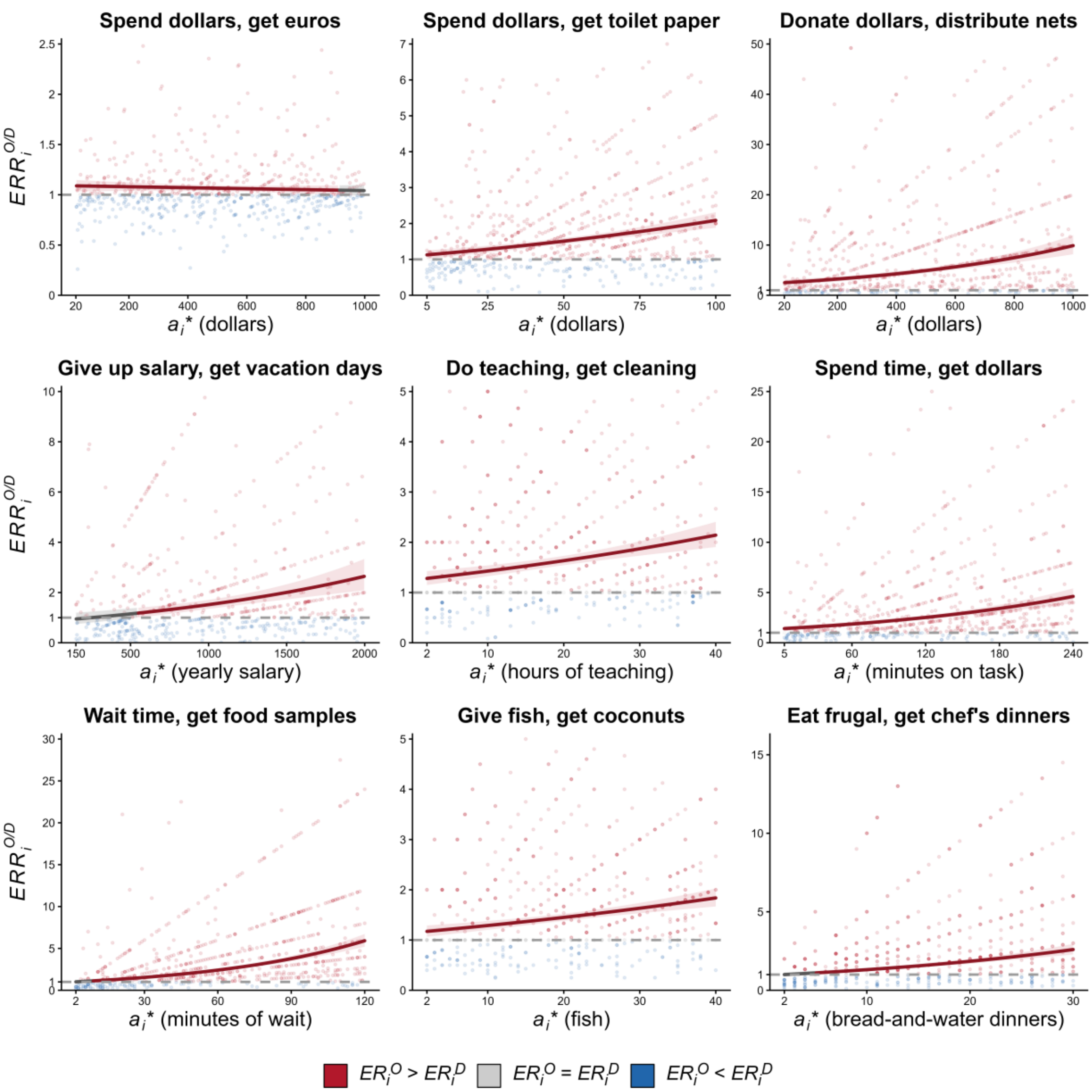
PHASE 1 FIXED QUANTITIES AND PHASE 2 OFFERS IN STUDY 2



NOTE.—Each panel compares the quantity of A offered in phase 2, a_i, with the quantity of A fixed in phase 1, a_i^*. The 45-degree line indicates equal offer-elicited and demand-elicited exchange rates ($a_i = a_i^*$). Points below the line indicate a higher offer-elicited exchange rate ($a_i < a_i^*$); points above the line indicate the reverse ($a_i > a_i^*$). Percentages report the shares of observations below, on, and above the 45-degree line.

FIGURE 6

EXCHANGE-RATE RATIOS BY PHASE 1 FIXED QUANTITY OF A IN STUDY 2



NOTE.—Points show observed offer-to-demand exchange-rate ratios, $ERR_i^{O/D} = ER_i^O / ER_i^D$, plotted against the phase 1 fixed quantity, a_i^*. Solid lines show fitted values from scenario-specific OLS regressions of $\log(ERR_i^{O/D})$ on mean-centered a_i^*, back-transformed to the ratio scale by exponentiation; shaded bands are 95% confidence intervals. The dashed horizontal reference line at 1 indicates equal rates. Values above 1 indicate a higher offer-elicited rate. The diagonal rays are because many participants responded with the same prominent round number.

Demand elasticities were below 1 in eight of the nine scenarios and significantly below 1 in seven (seven *p*s ≤ .003; "Spend dollars, get euros," *p* = .48; "Donate dollars, distribute nets," *p*

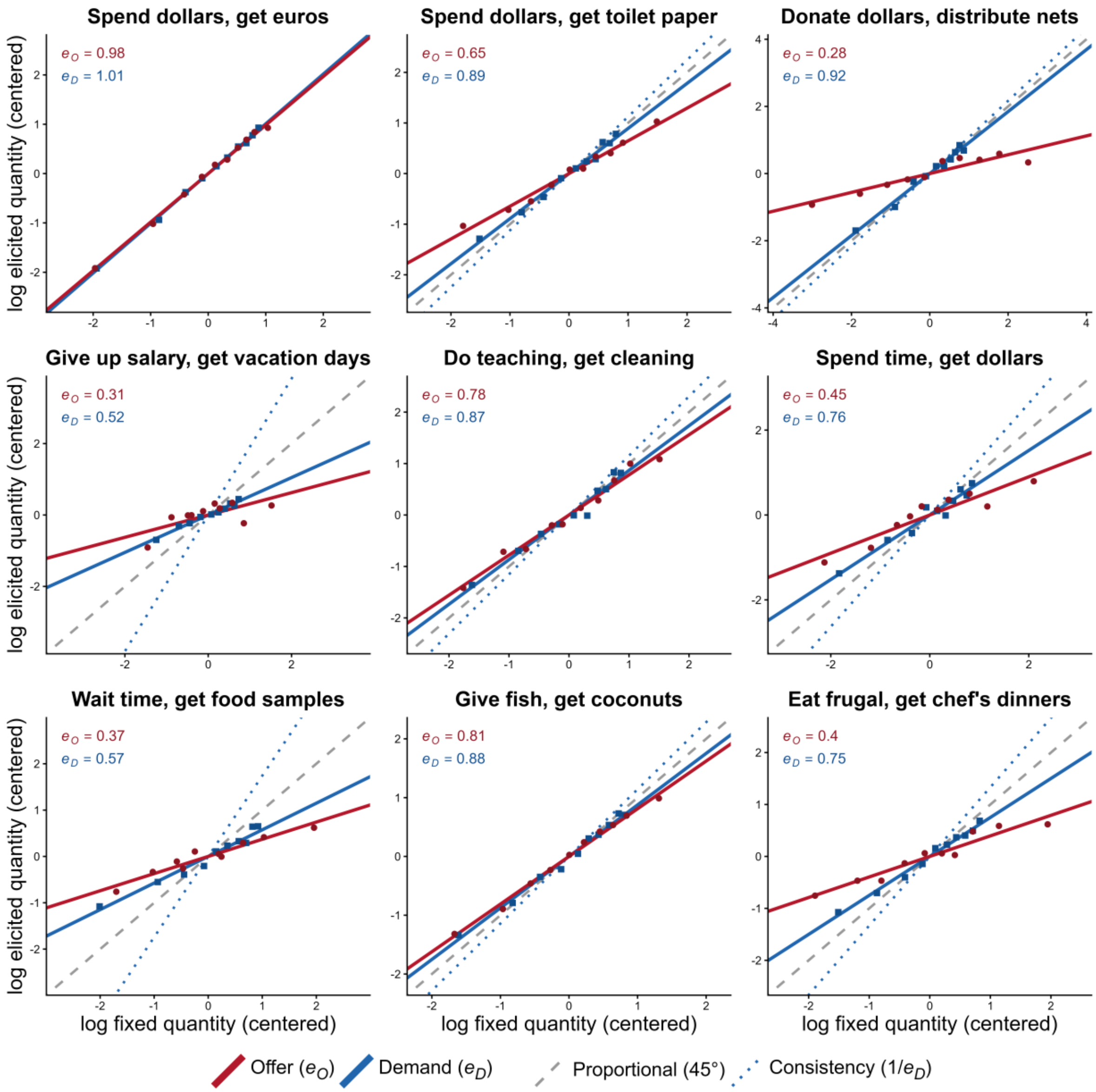
= .22). Demand responses therefore generally increased sub-proportionally even when demand magnitude was randomly assigned. Offer elasticities were also below 1 in all nine scenarios and significantly below 1 in eight (eight *p*s < .001; "Spend dollars, get euros," $p = .175$; table WA 14 in Web Appendix C). Under the format-invariance benchmark, offer elasticity would equal the reciprocal of demand elasticity. Demand elasticity reciprocals ranged from 0.99 to 1.91, whereas the observed offer elasticities ranged from 0.28 to 0.98 (figure 7).

The response-scaling results were not driven by the assumed functional form: decile means closely tracked the fitted functions (figure 7), adding quadratic terms revealed no systematic curvature, and nonparametric correlations produced the same directional pattern (tables WA 15–16 in Web Appendix C).

Study 2 replicates all three regularities after reversing the elicitation order. It also shows that sub-proportional demand responding is not an artifact of constructing demand magnitudes from participants' earlier offer responses.

FIGURE 7

OFFER AND DEMAND RESPONSE ELASTICITIES IN STUDY 2



NOTE.—Each panel plots the centered log elicited quantity against the centered log fixed quantity for demand elicitations (elicited b_i against fixed a_i^*) and offer elicitations (elicited a_i against fixed b_i^*). Fitted slopes are the response elasticities; points show decile means. The dashed 45-degree line represents proportional responding. The dotted line represents the inverse-function benchmark for the offer response, with slope $1/e_D$. For display only, axes are truncated at approximately the 99th percentile of their absolute centered values.

STUDY 3: AN ALTERNATIVE QUERY FORMAT

Studies 1 and 2 used maximum-and-minimum questions. Offer prompts asked for the maximum amount participants would provide, whereas demand prompts asked for the minimum amount they would require. Although the verbs used to describe demands (e.g., receive, get, earn, obtain) and offers (e.g., provide, pay, give up, donate) varied across scenarios, the asymmetry could reflect the wording or syntax of these questions rather than which quantity is fixed and which is elicited. Study 3 instead uses sentence-completion prompts that do not contain "maximum" or "minimum." It also varies whether the fixed or elicited quantity appears first in the prompt.

Method

Study 3 followed the two-phase, demand-first design of Study 2 and used the same nine scenarios and ranges of randomly assigned fixed quantities. In phase 1, 800 Prolific participants completed one demand elicitation for each scenario, presented in random order. At least seven days later, they completed the corresponding offer elicitations, with the fixed quantity in each offer elicitation yoked to that participant's phase 1 demand.

All elicitations used sentence-completion prompts (table WA 17 in Web Appendix D) with a variety of verbs. For example, rather than asking a maximum-or-minimum question, a prompt stated, "You provide [fixed quantity] dollars. You receive ___ euro(s)" or "You receive ___ euro(s). You provide [fixed quantity] dollars." The order of the two sentences was randomized, so the fixed quantity appeared first for some participants and the elicited quantity appeared first for others.

Of the 800 phase 1 participants, 723 completed phase 2. After applying the exclusions used in the previous studies, the final sample consisted of 696 participants ($M_{\text{age}} = 43$; 52% female, 47% male) and 5,973 offer-demand response pairs. Detailed exclusions are reported in table WA 18 in Web Appendix D.

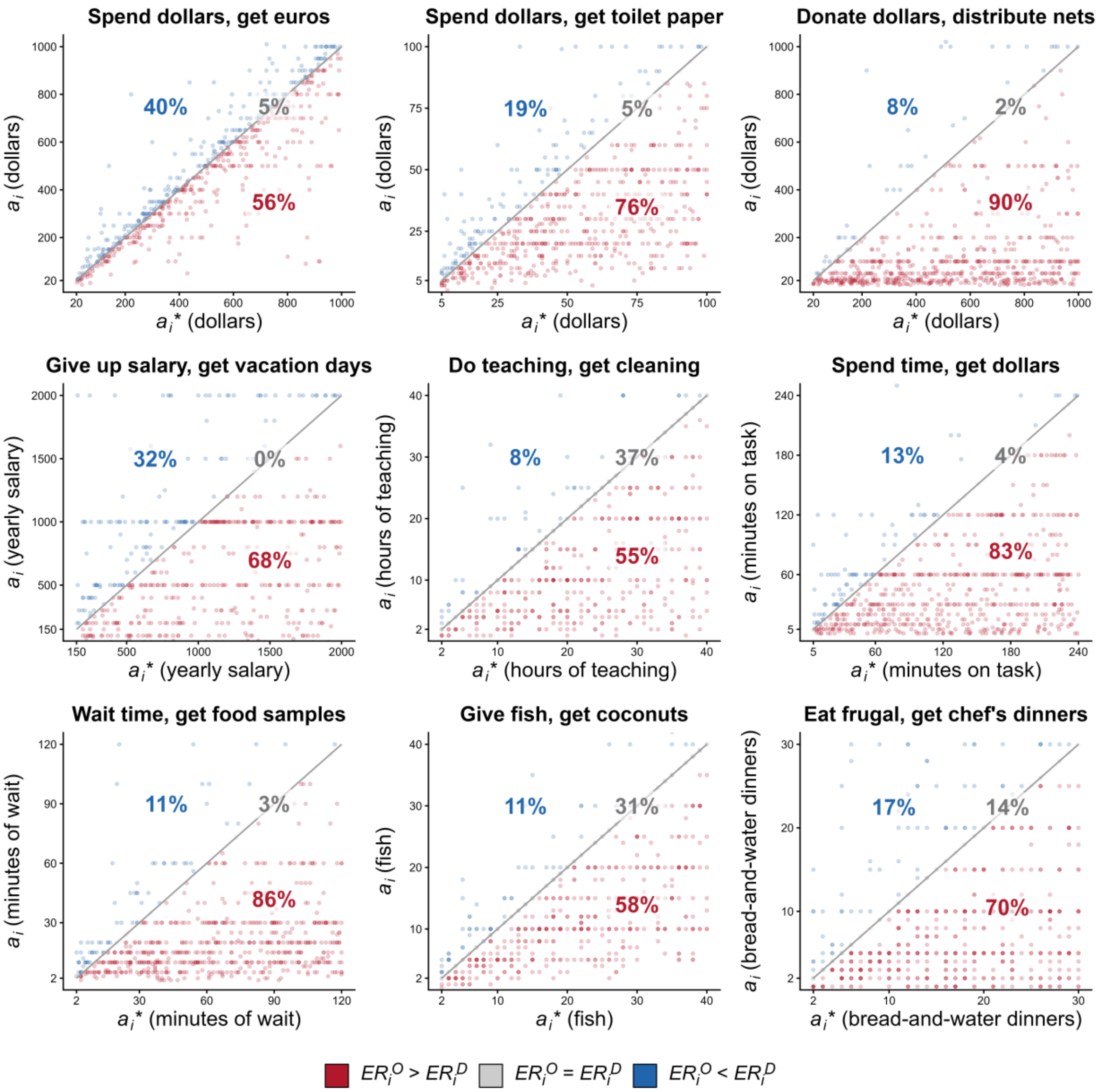
Results

Before moving to the main analyses, we examined whether exchange rates systematically differed depending on whether the fixed or elicited quantity appeared first in the prompt. Overall, exchange-specific t-tests revealed no systematic differences (table WA 19 and table WA 20), hence we report main analyses collapsed across prompt orders, and report analyses by prompt order in Web Appendix D.

Analysis 1: Do Offer and Demand Elicitations Imply Different Exchange Rates? In every scenario, most participants offered less A in phase 2 than had been fixed in phase 1 (figure 8). This pattern was more common than the reverse in all nine scenarios (all sign-test ps < .001; table WA 21 in Web Appendix D). Mean log exchange-rate ratios were also significantly greater than zero in every scenario (all ps < .001; table WA 22 in Web Appendix D), and geometric mean exchange-rate ratios ranged from 1.06 to 6.44. Study 3 therefore replicates the offer-demand asymmetry without maximum-and-minimum questions.

FIGURE 8

PHASE 1 FIXED QUANTITIES AND PHASE 2 OFFERS IN STUDY 3



NOTE.—Each panel compares the quantity of *A* offered in phase 2, a_i, with the quantity of A fixed in phase 1, a_i^*. The 45-degree line indicates equal offer- and demand-elicited rates ($a_i = a_i^*$). Points below the line indicate a higher offer-elicited exchange rate ($a_i < a_i^*$); points above the line indicate a higher demand-elicited exchange rate ($a_i > a_i^*$). Percentages report the shares of observations below, on, and above the line.

Analysis 2: How Does the Exchange-Rate Asymmetry Scale with Magnitude? The log exchange-rate ratio increased significantly with the phase 1 fixed quantity, a_i^*, in eight of the nine scenarios (eight *p*s < .001, “Spend dollars, get euros,” $p = .06$; table WA 23 in Web Appendix D). Ratios generally remained above 1 across the observed ranges and increased with magnitude (figure WA 4 in Web Appendix D). Analyses by decile of a_i^* produced the same pattern (figure WA 5 in Web Appendix D). Neither the asymmetry nor its relationship with magnitude depended substantively on whether the fixed or elicited quantity appeared first in the sentence-completion prompt (table WA 24, table WA 25, and table WA 26 in Web Appendix D).

Analysis 3: How Do Responses Scale in the Two Elicitation Formats? Turning to the responses themselves, both demand and offer elasticities are significantly below 1 in eight of the nine scenarios (figure WA 6 and table WA 27 in Web Appendix D). The only exceptions are the demand elasticity for “Donate dollars, distribute nets” ($p = .702$) and the offer elasticity for “Spend dollars, get euros” ($p = .233$). The reciprocal of the demand elicitation elasticities ranged from 0.98 to 1.71, but the offer elasticities ranged from 0.30 to 0.98. Decile means, quadratic specifications, and nonparametric correlations generally supported the same conclusion (tables WA 28–29).

Study 3 replicates the three empirical regularities under a different query format. The findings cannot be attributed to asking maximum rather than minimum questions, to using an interrogative rather than sentence-completion structure, or to presenting the fixed quantity before rather than after the elicited quantity.

STUDY 4: A WITHIN-PARTICIPANT TEST ACROSS EXCHANGE MAGNITUDES

Studies 1-3 varied exchange magnitude between participants. Those designs establish that the asymmetry is larger among participants assigned to larger exchanges, but they do not show whether it grows as the same person evaluates larger exchanges. They also estimate response scaling primarily across people and cannot reveal whether particular participants repeatedly exhibit the asymmetry across magnitudes.

Study 4 addresses these questions by having each participant evaluate the same exchange at ten fixed quantities. Both elicitation formats occur in the same session. The design therefore allows us to examine the prevalence of the asymmetry without a delay between elicitations, trace its relationship with magnitude within participant, assess its consistency within individuals, and estimate offer and demand response scaling within participant.

Method

Prolific participants (N = 600) were randomly assigned to one of four scenarios drawn from Studies 1 and 2. Participants completed both elicitation formats in a single session, with demand elicitations preceding offer elicitations.

Participants completed demand elicitations at ten fixed quantities of resource A. The ten values of A were equally spaced across the scenario-specific ranges used in Study 2 and were presented in random order, one per screen. At each value, participants indicated the minimum amount of resource B that they would require in return.

Immediately afterward, participants completed offer elicitations yoked to their demand responses. For each phase 1 response, the amount of B was fixed at the quantity that participant had demanded, and the participant indicated the maximum amount of A they would offer to receive it. If a participant gave the same demand response at multiple fixed values of *A*, that quantity of B appeared only once in the offer phase; in our analyses the resulting offer response was matched to each corresponding demand observation. Some participants therefore completed fewer than ten distinct offer questions while still contributing a matched observation at each applicable fixed value. Figure WA 7 in Web Appendix E provides additional details.

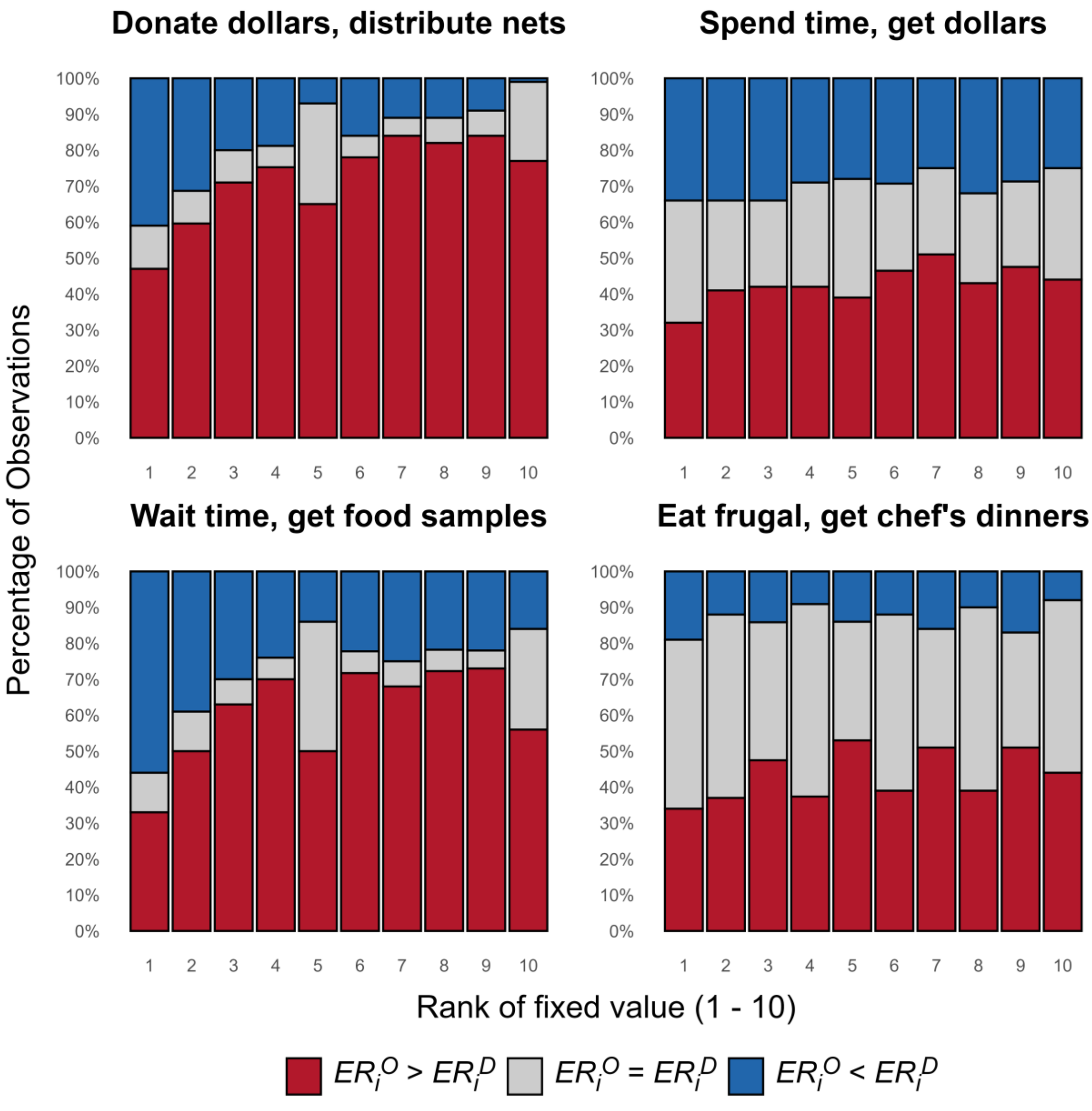
After exclusions (table WA 30 in Web Appendix E), the final sample consisted of 566 participants (M_{age} = 42; 51% female, 48% male) and 5,539 offer-demand response pairs. As preregistered, we did not apply the three-standard-deviation exclusion criterion for the analysis that tested the proportion of participants with higher offer-elicited than demand-elicited exchange rate across ten fixed values, since this involved only comparisons within participant. This analysis included 576 participants and 5,685 offer-demand response pairs.

Results

Analysis 1A: Does the Asymmetry Persist When Both Elicitations Occur in the Same Session? Figure 9 shows, for each scenario, the proportions of observations at each fixed value for which the offer-elicited exchange rate was higher than, equal to, or lower than the demand-elicited exchange rate. Pooling observations across the ten fixed values, higher offer-elicited exchange rates were more common than the reverse in all four scenarios (all sign-test *p*s < .001; table WA 31 in Web Appendix E). Depending on the scenario, 43% to 72% of observations had a higher offer-elicited exchange rate, compared with 13% to 30% that had a higher demand-elicited exchange rate. The offer-demand asymmetry therefore remained prevalent when the elicitations occurred in the same session.

FIGURE 9

DIRECTION OF THE EXCHANGE-RATE ASYMMETRY ACROSS FIXED VALUES IN STUDY 4



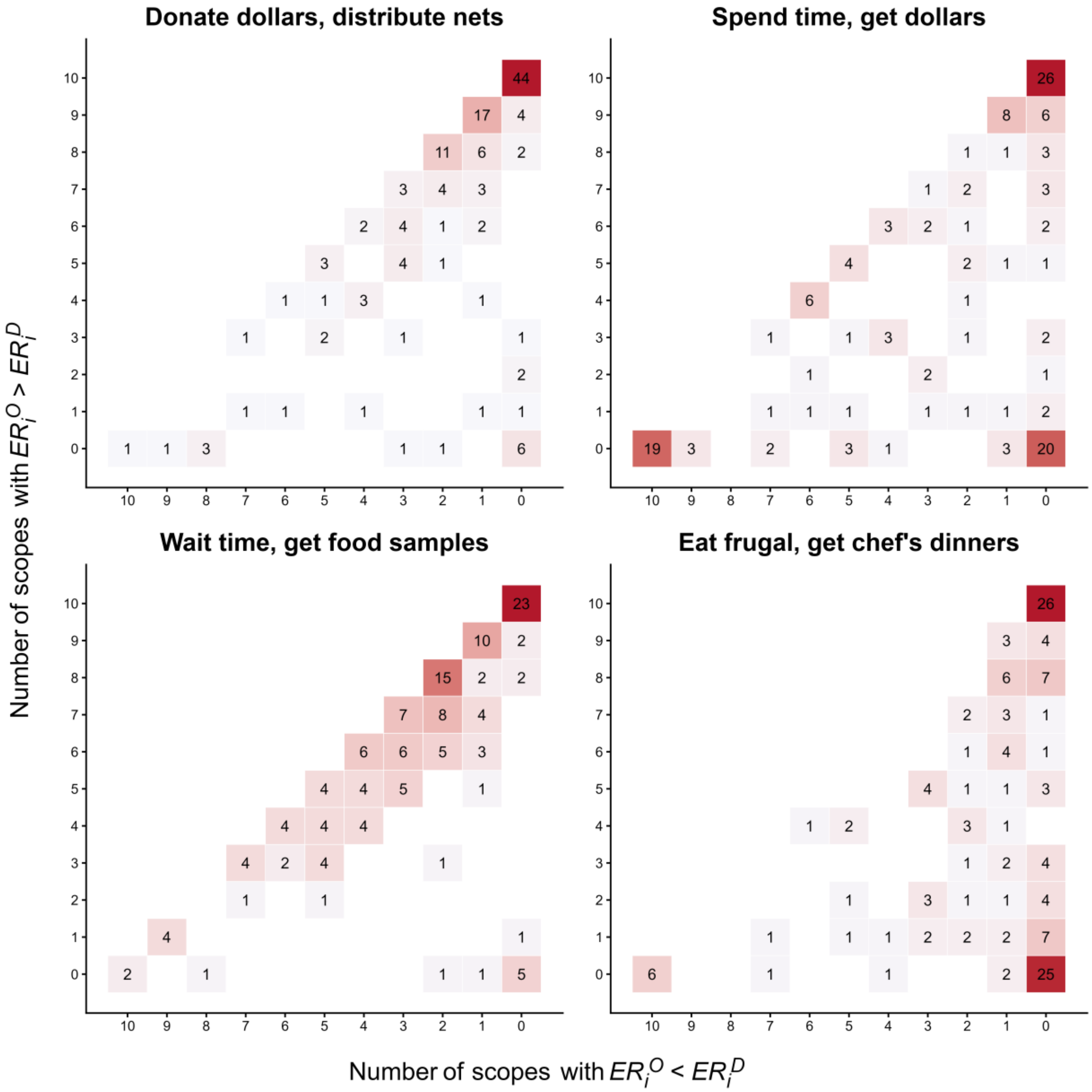
NOTE.—Bars show the proportions of observations at each fixed value (shown as ranks from 1 through 10) for which the offer-elicited exchange rate (ER_i^O) was lower than, equal to, or higher than the demand-elicited exchange rate (ER_i^D).

Analysis 1B: Do Individual Participants Repeatedly Exhibit the Asymmetry? For each participant, we counted the fixed values at which the offer-elicited exchange rate exceeded the demand-elicited exchange rate and the fixed values at which the reverse occurred. In every scenario, the distribution was concentrated toward higher offer-elicited exchange rates (figure 10). Across scenarios, 16% to 31% of participants exhibited a higher offer-elicited exchange rate at all ten fixed values.

For descriptive reference, ten independent comparisons that were equally likely to favor either direction would favor the offer-elicited rate at all ten with probability $.50^{10} = 0.00098$, or approximately 0.10%. Because repeated judgments from the same participant need not be independent, this value is best treated as a reference point rather than a literal chance model. Even with that qualification, the observed concentration is notable: the aggregate asymmetry was accompanied by substantial directional consistency within a subset of participants (table WA 35 in Web Appendix E).

FIGURE 10

CONSISTENCY OF THE EXCHANGE-RATE ASYMMETRY WITHIN PARTICIPANTS IN STUDY 4



NOTE.—Within each panel, each cell shows the number of participants who had higher offer-elicited than demand-elicited rates for the number of fixed values specified on the vertical axis and higher demand-elicited than offer-elicited rates for the number of fixed values specified on the horizontal axis. The top-right cell represents participants with a higher offer-elicited rate at all ten fixed values; the bottom-left cell represents participants with a higher demand-elicited rate at all ten. Color intensity is scaled within panel, so shading is only comparable within panels.

Analysis 2: How Does the Asymmetry Scale with Magnitude Within Participant? Figure 9 suggests that the asymmetry became more prevalent as the fixed quantity increased. Sign tests conducted separately at each fixed value supported this pattern, although the magnitude at which the asymmetry emerged differed across scenarios (table WA 32 in Web Appendix E). For the "Donate dollars, distribute nets" scenario, a higher offer-elicited exchange rate was significantly more common than the reverse beginning at the lowest fixed value ($p = .014$ for lowest value and $p < .001$ thereafter). In the "Wait time, get food samples" scenario, the asymmetry was significant beginning at the second-lowest value ($p < .001$). In the "Spend time, get dollars" scenario, a higher offer-elicited exchange rate was significantly more common beginning at the third-lowest value, although a higher demand-elicited exchange rate was significantly more common at the lowest value. In the "Eat frugal, get chef's dinners" scenario, a higher offer-elicited exchange rate was significantly more common beginning at the sixth fixed value (except at the eighth fixed value).

To test whether the size of the asymmetry varied within participant, we calculated the offer-to-demand exchange-rate ratio for participant i at fixed value j. We fitted a mixed-effects model separately for each scenario, regressing the log-transformed exchange rate ratio on the rank of the fixed value, coded from 0 to 9. Models included participant-specific intercepts and slopes and their covariance.

At a given fixed value, an estimated marginal mean of zero on the log-ratio scale indicates equal offer-elicited and demand-elicited exchange rates. In three of the four scenarios, the estimated marginal mean was significantly greater than zero at every fixed value (table WA 33 in Web Appendix E). In the "Eat frugal, get chef's dinners" scenario, it was significantly greater than zero only at the second-highest fixed value. More importantly, the asymmetry increases with magnitude within participant. The slope of the log rate ratio on fixed-value rank was positive and significant in all four scenarios (three ps $< .001$; "Donate dollars, distribute nets," $p = .028$; table WA 34 in Web Appendix E).

These results extend Studies 1-3: the magnitude dependence does not merely reflect differences between people assigned to smaller and larger exchanges. The offer–demand asymmetry generally becomes larger as the same participant evaluates progressively larger exchanges.

Analysis 3: How Do Responses Scale Within Participant? Finally, we examined whether the sub-proportional response scaling observed across participants in Studies 1-3 also emerged within participant. These analyses were exploratory and not preregistered. For each scenario and elicitation format, we regressed the log elicited quantity on the log fixed quantity using mixed-effects models with participant-specific intercepts and slopes and their covariance. The fixed-effect slopes provide the offer and demand elasticities (table WA 36 in Web Appendix E).

Offer elasticities were significantly below 1 in all four scenarios (all ps < .001). Demand elasticities were at or below 1 in all four and significantly below 1 in three ("Spend time, get dollars" and "Wait time, get food samples," ps < .001; "Eat frugal, get chef's dinners," $p = .009$; "Donate dollars, distribute nets," $p = .421$). The dominant within-participant pattern therefore matches the across-participant pattern observed previously: offer responses increased sub-proportionally, and demand responses did not exhibit the super-proportional growth implied by the diminishing-marginal-utility benchmark.

Because each participant evaluated only ten fixed values, separate participant-level elasticity estimates have limited precision. As a robustness check, however, we estimated an offer and demand elasticity for each participant (by regressing the log of their elicited values on the fixed values for each elicitation) and compared each estimate with 1. In all four scenarios, participants with offer elasticities significantly below 1 (sub-proportional responding) outnumbered those with offer elasticities significantly above 1. For demand elasticities, this was the case for three of the four scenarios (table WA 37 in Web Appendix E). Participant-level Spearman correlations between exchange rates and fixed quantities showed a similar pattern (table WA 38 in Web Appendix E).

STUDY 5: CONSEQUENTIAL EXCHANGE JUDGMENTS

Studies 1-4 relied on hypothetical judgments. Such judgments may receive less attention or produce responses that participants would not accept if their own resources and the specified outcomes were at stake. Study 5 tests whether the central exchange-rate asymmetry persists when participants' answers can determine both their compensation and a charitable outcome. Because the study uses one fixed charitable outcome, it tests the level asymmetry rather than its magnitude dependence or the scaling of the response functions.

Method

In phase 1, 400 Prolific participants completed an offer elicitation. Participants were told that they could receive a $5 bonus and indicated the highest amount of that bonus they would pay to have 20 soap bars distributed to a homeless shelter on their behalf: "To distribute 20 soap bars, what is the highest amount you would be willing to pay?"

Participants were informed that five participants would be randomly selected to have their decisions implemented and to receive the resulting bonus. Participants were told that the donation would be made provided their stated amount was higher than an amount that we predetermined. For selected decisions, the exchange was implemented if the stated payment exceeded \$2. If implemented, 20 soap bars were distributed and the participant received a bonus equal to \$5 minus the stated payment. Otherwise, no soap bars were distributed and the participant received the full \$5 bonus.

Seven days later, phase 1 participants were invited to complete phase 2. The payment was fixed at each participant's phase 1 offer, and participants stated the lowest number of soap bars they would require to be distributed in exchange for that amount: "To pay \$[phase 1 offer], what is the lowest number of soap bars you would require to be distributed?"

This decision was again consequential. Participants were again informed that five participants would be randomly selected to have their decisions implemented and to receive the resulting bonus. Participants were now told the donation would be made if their stated quantity was below a predetermined threshold. If the stated quantity was below 50 soap bars, the participant paid their phase 1 amount and received the remainder of the \$5 bonus; otherwise, the participant received the full bonus and no soap bars were distributed. Thus, phase 1 fixed the charitable outcome and elicited a payment, whereas phase 2 fixed that participant-specific payment and elicited the charitable outcome required in return. The implemented decisions resulted in \$30 in participant bonuses and 74 soap bars donated to a homeless shelter.

Of the 400 phase 1 participants, 355 completed phase 2 within two weeks. As preregistered, we conducted the analyses using two samples (see details in Web Appendix F). The broader sample excluded participants who offered \$0 in phase 1, leaving 290 participants. The more restrictive sample additionally excluded participants who failed at least one of two comprehension checks in either phase, leaving a final sample of 167 participants (M_{age} = 41.5; 43.7% female, 54.5% male). Table WA 39 and table WA 40 in Web Appendix F report sample and exclusion details.

Results

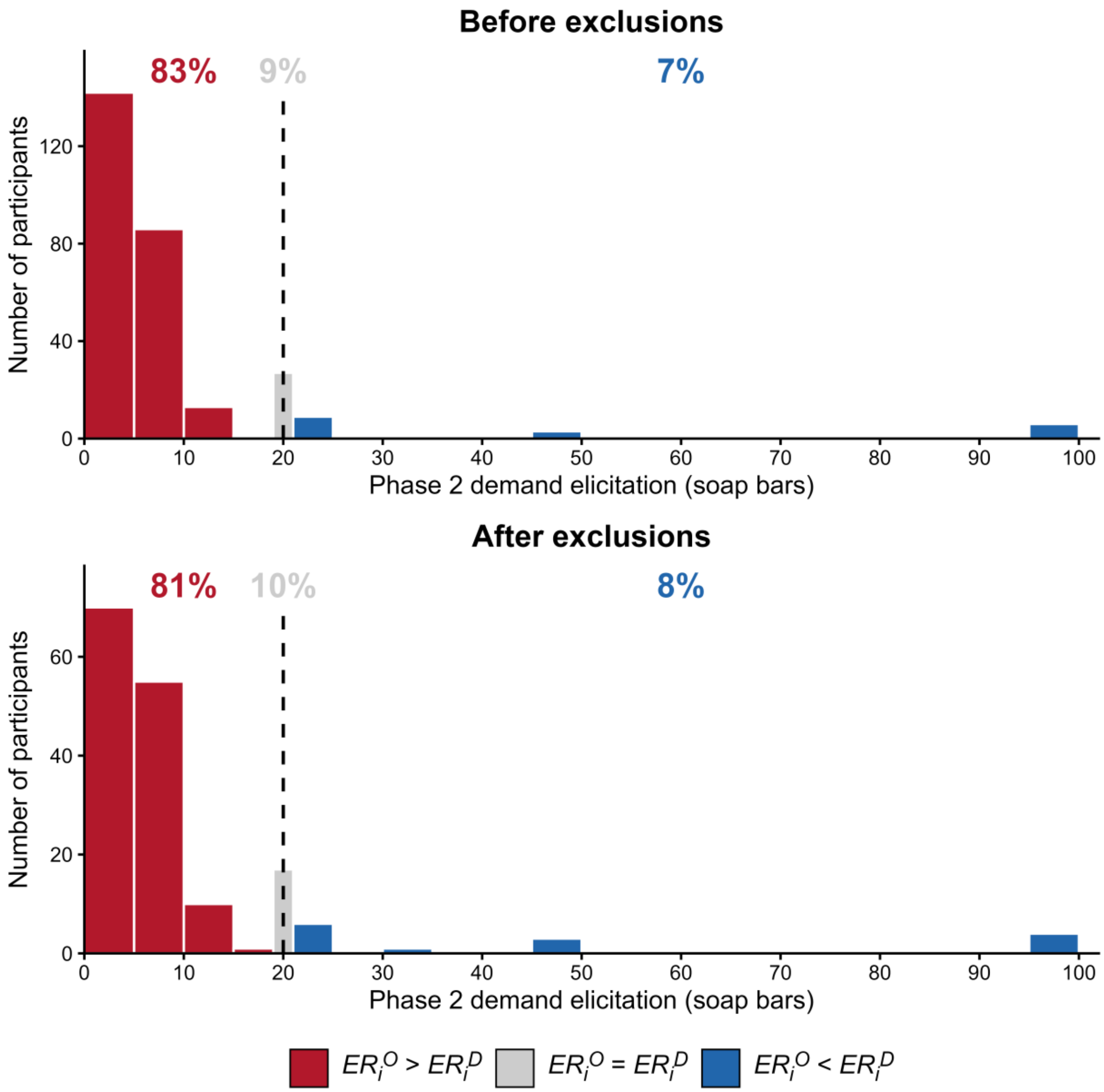
The offer-elicited and demand-elicited exchange rates are equal when the phase 2 demand is 20 soap bars; a demand below 20 soap bars implies a higher offer-elicited rate. The distribution of phase 2 offers is shown in figure 11.

In the comprehension-screened sample, 81% of participants demanded fewer than 20 soap bars, 10% demanded exactly 20, and 8% demanded more than 20. A higher offer-elicited exchange rate was therefore substantially more common than a higher demand-elicited rate (sign-test $p < .001$). The mean phase 2 demand was also substantially below 20 bars ($M = 11.64$, $SD = 16.34$, $Mdn = 8$). A one-sample t-test against 20 confirmed this difference ($t(166) = -6.61$, $p < .001$).

The results were similar in the broader sample that retained participants who failed the comprehension checks. In this sample, 83% demanded fewer than 20 soap bars, 9% demanded exactly 20, and 7% demanded more than 20 (sign-test $p < .001$). The mean phase 2 demand was again below 20 bars ($M = 10.58$, $SD = 15.27$, $Mdn = 6$, $t(289) = -10.51$, $p < .001$). Study 5 thus extends the central exchange rate asymmetry result to consequential choices.

FIGURE 11

DISTRIBUTION OF PHASE 2 DEMANDS IN STUDY 5



NOTE.—Panels show phase 2 demands in the broader sample (top) and comprehension-screened sample (bottom). The dashed line marks 20 soap bars, the quantity fixed in phase 1. Values below 20 imply a higher offer-elicited exchange rate, values at 20 imply equal exchange rates, and values above 20 imply a higher demand-elicited exchange rate. The bin at 20 contains responses of exactly 20; other bins group responses into five-bar intervals. Percentages report the shares below, at, and above 20 bars.

GENERAL DISCUSSION

Five studies established three linked regularities in exchange judgments. First, when people give resource *A* and receive resource *B*, offer elicitations generally lead to more *B* received per unit of *A* given than demand elicitations. Second, this difference generally increases with exchange magnitude. Third, in both formats, the elicited quantity generally increases sub-proportionally with the fixed quantity. Because the elicited quantity appears in the denominator of an offer-elicited *B*-per-*A* rate but in the numerator of a demand-elicited rate, this common response pattern moves the two rates farther apart as magnitude increases.

These regularities were measured via an individual-bridge procedure that ensured that exchange rates were compared at the same point across the two elicitations. They appeared across exchanges involving money, time, labor, consumer goods, experiences, barter, and prosocial outcomes; when either offer or demand was elicited first; when the questions were separated by at least a week or appeared in the same session; under alternative wording and response formats; when magnitude varied across participants and within the same participant; and in a study in which responses could affect payments and charitable outcomes. The effects were not equally large in every setting, and not every scenario exhibited every regularity. The convergence across designs nevertheless shows that the asymmetry is not confined to a particular resource, elicitation order, or implementation.

Reinterpreting Exchange-Rate Asymmetries

Our research builds on work showing that the implied price of time depends on how a time-money exchange is elicited. Monga, May, and Bagchi (2017) distinguished a money-elicitation format, in which people stated the minimum amount of money they would require for a fixed amount of time, from a time-elicitation format, in which they stated the maximum time they would provide for fixed compensation. Wage rates were higher in the time-elicitation format. Their explanation centered on time scarcity: because time is experienced as particularly scarce, requiring people to state time makes its scarcity more influential in judgment and reduces the amount of time they are willing to provide for a given payment.

Smitizsky, Liu, and Gneezy (2021) documented a closely related asymmetry in incentivized labor tasks but developed a different distinction. When time was fixed and money was elicited, participants were argued to evaluate time as an economic resource and to translate it into compensation at an approximately stable wage. When money was fixed and time was elicited, participants instead anticipated the experience of performing the work. Because the anticipated unpleasantness of working is affective and increasingly salient for longer or more boring tasks, people offered progressively less time per dollar. Consistent with this account, the difference between the formats was more pronounced for boring than for enjoyable work. When participants paid money to buy out of an upcoming task, the same pattern emerged, with relatively stable valuations in Fixed-Time mode but rising in Fixed-Money mode.

Our results qualify these accounts. Methodologically, we find similar time-money results even under our individual-bridge procedure. Beyond this, our results suggest a broader conceptual interpretation. Time scarcity and the anticipation of work may explain why the asymmetry is especially large in particular time-money settings. Our findings do not invalidate those mechanisms. They do suggest, however, that such mechanisms operate against a more general background: the same asymmetry in exchange rates appears when people exchange dollars for euros, labor for household help, frugal meals for chef-prepared meals, donations for social impact, and other resources for which the distinctive scarcity or phenomenology of time is not an evident common cause. Time-specific processes are therefore more naturally understood as moderators of a broader elicitation effect than as a complete explanation for the effect itself.

At the same time, domain generality should not be confused with domain invariance. Effect sizes in our studies differed substantially across scenarios. The asymmetry was comparatively small in the dollars-for-euros exchange, where a familiar external rate provides a strong calibration standard, and larger in several unfamiliar or prosocial exchanges, where a stable unit price is weak or absent. This heterogeneity suggests theoretically useful moderators, including market knowledge, unit-price availability, divisibility, moral meaning, and uncertainty about what constitutes a reasonable response. The common regularities define a phenomenon that these domain-specific processes may amplify, attenuate, or occasionally reverse.

The response-scaling results that we identify sharpen the contrast to resource-specific accounts of exchange asymmetries. Accounts of time-money exchange asymmetries have focused on the time-elicitation side: if the time people offer increases sub-proportionally with fixed compensation, the implied hourly wage rises. Our studies show that the other side of the mapping also requires explanation. When the surrendered resource is fixed, the compensation demanded also generally increases sub-proportionally. In a time-money exchange, this means that the wage implied by money demanded can fall as the amount of time surrendered increases. An account of these findings must therefore explain the pattern of both responses, not only why people become less willing to offer time as compensation grows.

Explaining the Three Regularities

We observed three regularities: (1) an offer elicitation generally produces a higher *B*-per-*A* rate than a demand elicitation at aligned magnitudes, (2) this difference generally grows with exchange magnitude, and (3) the elicited response generally grows less than proportionally in both formats. What psychological processes might produce this pattern?

Response compatibility provides a natural account of the first regularity. It can explain why offer-elicited rates exceed demand-elicited rates at an aligned magnitude, but not why the gap widens with magnitude or why responses are sub-proportional in both formats. The third regularity is therefore more central: shared sub-proportional scaling mechanically produces the second regularity and departs from the reciprocal scaling required by format-invariant two-sided valuation models. The main psychological question is thus what causes numerical responses to be compressed in both formats.

Response Compatibility. Tversky, Sattath, and Slovic (1988) argued that information receives greater weight when it is compatible with the required response. In direct matching, Delquié (1993) found that an attribute received greater relative weight when it served as the response currency (i.e., the dimension in which respondents expressed the tradeoff). Similarly, eliciting the loss rather than the gain in a 50/50 gamble yields substantially larger gain-loss ratios, consistent with the elicited quantity carrying extra weight (Harinck et al., 2012).

In an exchange context, if the elicited resource receives greater weight, fewer units of that resource are needed to balance the fixed resource. This logic predicts that at a specified magnitude the offer-elicited exchange rate will be higher than the demand-elicited exchange rate. In an offer elicitation, *A* is the response. If each elicited unit of *A* receives greater weight, the participant offers fewer units of *A* for fixed *B*, raising the *B*-per-*A* rate. In a demand elicitation, *B* is the response. If each elicited unit of *B* receives greater weight, the participant requires fewer units of *B* for fixed *A*, lowering the *B*-per-*A* rate. The resource receiving extra weight changes between formats, but both changes push the common rate in the same direction: offer above demand.

Compatibility alone, however, cannot account for the full pattern of our results. A constant response weight can shift a response function upward or downward without changing how rapidly it grows. It may therefore explain why offer rates are higher than demand rates at an aligned magnitude, but it does not explain why the gap widens with magnitude or why responding is sub-proportional in both formats.

The Diagnostic Importance of Sub-Proportional Responding. The second and third regularities are not independent. As discussed in the theory section, the third regularity implies the second. In an offer elicitation, *B* is fixed and *A* is produced. If the amount of *A* offered grows sub-proportionally as fixed *B* increases, then the ratio *B*/*A* rises with magnitude. In a demand elicitation, *A* is fixed and *B* is produced. If the amount of *B* demanded grows sub-proportionally as fixed A increases, then the ratio *B*/*A* falls with magnitude. Thus, the growing exchange-rate asymmetry is the rate-level expression of the response compression observed in both formats.

Moreover, as the theory section discussed, sub-proportional responding to both elicitation formats is inconsistent with a two-sided valuation benchmark, whether it assumes diminishing marginal utility or reference-dependent diminishing marginal sensitivity. The benchmark of sub-proportional responding under one elicitation format and super-proportional responding under the other is diagnostic rather than normative. We do not assume that one response must be correct or that respondents should solve an explicit utility equation.

The implication of diminishing marginal utility for super-proportional responding when expressing one's demands was pointed out by Baron and Greene (1996) in the context of contingent valuation. In one study they asked the normal contingent valuation question in reverse (how much risk someone would accept for a fixed amount of money) and did not find super-proportional responding, although they used only two values of the fixed quantity. As Frederick and Fischhoff (1998) discuss, super-proportional responding should also occur in willingness to accept judgments more generally under the diminishing marginal utility assumption, and this too has not been observed (Dubourg et al. 1994).

The important point is that a psychological account of how people respond to the exchanges that we presented is not a preference-based account of how people balance the values of both resources with stable value functions. Instead, the required psychological account is an account of how people, in both elicitation formats, construct numerical responses that compress the produced quantity. That is, exchange judgments resemble magnitude or scale judgments more than the solution of a two-sided utility equation.

Possible Sources of Response Compression. Several lines of work may help explain the response compression, although identifying its exact source falls outside the scope of the present paper and the effect is likely multiply determined. One possibility comes from work on valuation as attitude expression and diminishing sensitivity to scope (Kahneman, Ritov, and Schkade 1999), as well as Hsee and Rottenstreich's (2004) distinction between valuation by calculation and valuation by feeling. Calculation can preserve sensitivity to scope through a rule such as unit price multiplied by quantity. Feeling is sensitive to whether a valued stimulus is present but less sensitive to further increases in scope, producing a concave or nearly step-shaped mapping from scope to expressed value. If respondents treat the elicited resource partly as a scale on which to express an evaluation of the stated quantity, rather than fully incorporating the changing marginal value and opportunity cost of the response resource, the resulting numerical response may grow less than proportionally.

Psychophysical matching offers a related description of the scaling process. Exchange questions require respondents to map a magnitude in one domain onto a magnitude in another: dollars onto chocolates, time onto money, or effort onto household help. In cross-modal matching, the estimated relationship between two stimuli depends on which stimulus the experimenter controls and which the respondent adjusts. Stevens and Greenbaum (1966) described a regression effect in which respondents compress the range of the quantity under their control toward the center of the response range. Reversing stimulus and response therefore need not recover inverse functions and both mappings can consequently have elasticities below 1.

Work on nonlinear representations of numbers suggests other, compatible possibilities. If symbolic magnitudes are represented on a curved or otherwise compressed mental number line, differences among larger quantities may have less psychological resolution than equivalent differences among smaller quantities. This may be due to an inexact mapping of symbolic numbers to mental magnitudes (Schley and Peters 2014) or noisy logarithmic coding of the mental magnitudes themselves (Woodford 2020). Translating an evaluation into a numerical response could then inherit this compression.

More broadly, the observed sub-proportionality could reflect some combination of insufficient adjustment, expectations about normal answers, response bounds, or regression toward the center of a familiar response range. The present studies do not distinguish among these mechanisms.

Implications for WTP, WTA, and the Endowment Effect

Our results also bear on willingness-to-pay and willingness-to-accept research, but the connection requires separating two dimensions that conventional WTP-WTA comparisons confound. WTP and WTA ask about different sides of the exchange. A buyer gives money to acquire a good, whereas a seller relinquishes the good to receive money. The WTA-WTP gap has consequently been explained through differences between the exchange positions; for example, losses loom larger than gains, ownership changes the reference point or creates attachment, sellers and buyers focus on different forgone outcomes, goods differ in substitutability, and participants may understand or use valuation procedures differently (Kahneman, Knetsch, and Thaler 1990; Carmon and Ariely 2000; Horowitz and McConnell 2002; Plott and Zeiler 2005; Marzilli Ericson and Fuster 2014).

Offer versus demand elicitation is a separate dimension. Conventional WTP asks a buyer how much money they would offer for a fixed quantity of a good. Conventional WTA asks a seller how much money they would demand to relinquish a fixed quantity of that good. The standard comparison therefore jointly varies exchange position and elicitation format: it compares a buyer responding to an offer elicitation with a seller responding to a demand elicitation. The other two cells are equally meaningful. A buyer can be asked how much of the good they would demand for fixed money, and a seller can be asked how much of the good they would relinquish for fixed compensation.

The implication is not that elicitation format creates the endowment effect or necessarily inflates WTA relative to WTP. Reluctance to exchange endowed goods occurs without monetary valuation, and ownership, expectations, experience, and procedural understanding can all matter (Knetsch 1989; Plott and Zeiler 2005; Marzilli Ericson and Fuster 2014). Rather, conventional WTP-WTA comparisons observe one diagonal of a buyer-versus-seller by offer-versus-demand design. They therefore cannot reveal how much of a disparity is associated with exchange position, how much is associated with constructing one side of the exchange from the other, or whether the two components interact.

A full factorial design would sharpen the theoretical diagnosis. Carmon and Ariely (2000), for example, argued that buyers focus on money forgone whereas sellers focus on the benefits of the good relinquished. This mechanism concerns exchange position. Crossing the factors would show whether attention follows the resource forgone, the quantity fixed or elicited, or both. It would also test whether format dependence changes when the response is framed as payment, compensation, an acquisition requirement, or a quantity relinquished. Because the offer–demand asymmetry itself changes with magnitude, the decomposition may also differ across small and large amounts.

Consequential Valuation and Decision Making

The dependence of exchange rate on elicitation format matters whenever elicited exchange rates are used to estimate a population parameter and thereby set a price, compensation arrangement, donation appeal, or public-program threshold. In these settings, the concern is not simply that two phrasings produce statistically different answers. The elicitation format can change the terms an organization believes people will accept and whether an intervention appears to pass a decision rule.

Our consequential donation study provides an illustration. Participants first stated how much of a potential bonus they would pay for 20 soap bars to be distributed to a homeless shelter. When that payment was subsequently fixed and participants instead stated the number of bars they required, the mean response was 11.64 bars. A program delivering 15 bars for a specified donation amount may appear insufficient relative to the offer response but sufficient relative to the demand response. An organization that treats either answer as "the donor's exchange rate" could therefore reach different conclusions about the same program.

The concern extends beyond donation decisions, for example to economic measures used to inform policy. Georgarakos et al. (2025) elicited households' willingness to pay for macroeconomic stability via an offer elicitation by asking how much consumption they would permanently sacrifice to eliminate business-cycle volatility. The corresponding demand elicitation would instead fix the consumption sacrifice and ask how much reduction in volatility would justify it. Jarosch, Pilossoph, and Swaminathan (2025) measured desired labor supply by fixing a wage and asking respondents how many hours they would choose to work. Here, the reciprocal question would instead fix the hours and ask what wage or income would make those hours desirable. These examples share a common structure: only one side of an exchange is set by the researcher and the respondent responds with only the other. If the resulting valuation depends on which side is fixed and which is elicited, the implied tradeoff may partly reflect the elicitation format rather than only the resources and population under study.

An elicited exchange rate should therefore be understood as a joint product of preferences, the magnitude evaluated, and the direction of elicitation. This does not establish that one direction reveals a true rate and the other distorts it. Nor does it justify selecting the format that supports a preferred decision or averaging the two responses. Averaging assumes, without evidence, that the formats symmetrically bracket a latent value. Moreover, because the offer-demand gap changes with magnitude, a single average cannot characterize the discrepancy over the range relevant to a decision.

When an exchange rate informs a consequential decision, researchers should, where feasible, elicit both mappings at aligned quantities and across the range of magnitudes relevant to the decision. Reports should state which quantity was fixed, which was elicited, and how sensitive the population estimate is to that choice, and estimates should be linked to the consequential behavior of interest.

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JUDGMENTS OF RELATIVE VALUE:

WHAT WOULD YOU OFFER, AND WHAT WOULD YOU DEMAND?

WEB APPENDIX

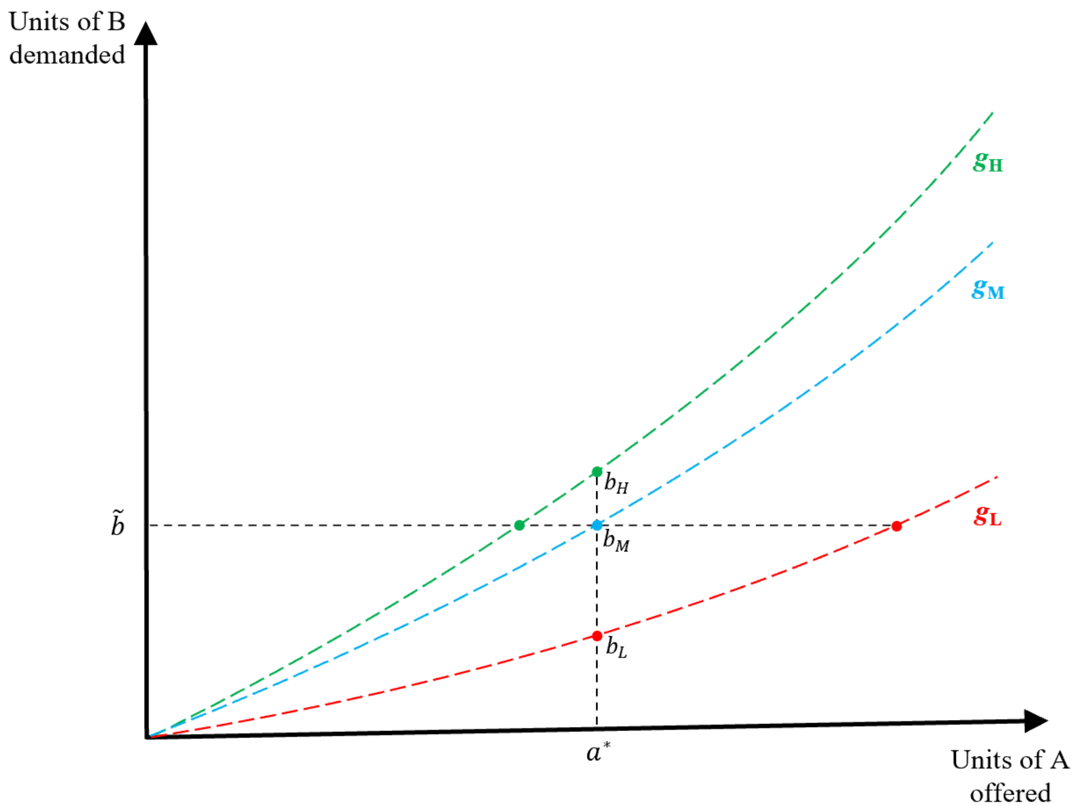
WEB APPENDIX A: METHODOLOGICAL BACKGROUND

Numerical example illustrating spurious demand-greater-than-offer exchange rate asymmetries. Suppose $a^* = 10$, and participants L, M, and H demand 10, 20, and 80 units of B respectively. Their demand-elicited exchange rates are therefore 1, 2, and 8 units of B per unit of A, and $\tilde{b} = 20$. Assume that there is no effect of elicitation format, each participant has a stable tradeoff function and answers consistently. For illustration, suppose that the three participants' tradeoff functions are $b_L = .10a^2$, $b_M = .20a^2$, $b_H = .80a^2$, respectively. These functions exactly reproduce their demand responses when a = 10: L demands 10 units of B, M demands 20, and H demands 80. If each participant were later asked about their own phase-1 quantity of B, each would offer 10 units of A.

The median bridge, however, asks all three participants how much A they would offer for $\tilde{b} = 20$. L would offer 14.14 units of A, M would offer 10, and H would offer 5. The resulting offer-elicited exchange rates are 1.41, 2, and 4. Thus, the average demand-elicited exchange rate is 3.67, whereas the average offer-elicited exchange rate is 2.47. The median-bridge procedure would therefore indicate that demand-elicited exchange rates exceed offer-elicited exchange rates even though every participant is perfectly consistent.

FIGURE WA 1

SPURIOUS OFFER-GREATER-THAN-DEMAND EXCHANGE RATE ASYMMETRIES



NOTE.—Illustrative demand response functions for participants L, M, and H such that the median-bridge procedure produces a higher average offer-elicited rate than demand-elicited rate even if each participant has a stable tradeoff function across elicitation formats.

WEB APPENDIX B: SUPPLEMENT TO STUDY 1

TABLE WA 1

RANGES OF OE FIXED VALUES IN STUDY 1

Exchange	Unit	Range
Spend dollars, get euros	Euros	[2; 2000]
Spend dollars, get toilet paper	Rolls of toilet paper	[2; 340]
Donate dollars, distribute nets	Mosquito nets	[2; 2000]
Give up salary, get vacation days	Vacation days	[2; 60]
Do teaching, get cleaning	Hours of cleaning help	[2; 90]
Spend time, get dollars	Dollars	[2; 500]
Wait time, get food samples	Number of food samples	[2; 100]
Give fish, get coconuts	Coconuts	[2; 120]
Eat frugal, get chef's dinners	Chef's dinners	[2; 150]

NOTE.—Per participant, we randomly sample a starting value, b_i^*, for each of the nine exchanges in phase 1 (offer elicitation; see table 1).

TABLE WA 2

OVERVIEW OF EXCLUSIONS IN STUDY 1

Exclusion	# Excluded	# Rows
Phase 1: Rows downloaded		1,004
No consent	-1	1,003
Too fast (< 20 sec)	-0	1,003
Same response to every scenario	-0	1,003
Failed attention check	-63	940
Attrition between phases	-76	864
Phase 2: Rows downloaded		861
No consent	-0	861
Excluded in Phase 1	-1	860
Too fast (< 20 sec)	-2	858
Same response to every scenario	-0	858
Failed attention check	-38	820
Duplicate response	-1	819
Participants after exclusions		819
Total exchanges		7,371
Exchanges with 0 response in Phase 1	-187	7,184
Exchanges with 0 response in Phase 2	-23	7,161
Log(ER) > mean + 3 SD in Phase 1	-60	7,101
Log(ER) < mean - 3 SD in Phase 1	-19	7,082
Log(ER) > mean + 3 SD in Phase 2	-37	7,045
Log(ER) < mean - 3 SD in Phase 2	-63	6,982
Exchanges in analysis		6,982
Participants in analysis		819

NOTE.—As pre-registered, we perform exclusions both at the participant level and at the exchange level. At the participant level, we excluded participants who failed the attention check in either phase, completed the survey in under 20 seconds, or provided the same response across all exchanges. We excluded exchange-level responses if participants answered 0 to either question in the exchange. We also log-transformed exchange rates and excluded exchange-level responses if the exchange rate in either phase was more than 3 SDs above or below the phase-specific mean for that exchange.

TABLE WA 3

SIGN TEST RESULTS IN STUDY 1

Exchange	***N***	**Proportions**			***p***
		$ER_i^O < ER_i^D$	$ER_i^O = ER_i^D$	$ER_i^O > ER_i^D$	
Spend dollars, get euros	770	.379	.040	.581	< .001
Spend dollars, get toilet paper	790	.201	.035	.763	< .001
Donate dollars, distribute nets	786	.128	.022	.850	< .001
Give up salary, get vacation days	674	.177	.034	.789	< .001
Do teaching, get cleaning	780	.163	.229	.608	< .001
Spend time, get dollars	795	.145	.035	.820	< .001
Wait time, get food samples	798	.090	.031	.878	< .001
Give fish, get coconuts	793	.184	.199	.617	< .001
Eat frugal, get chef's dinners	766	.148	.070	.782	< .001

NOTE.—For each exchange, the sign test compares ER_i^O and ER_i^D within participants by computing the sign of the difference ($ER_i^O - ER_i^D$). The three proportions report the share of participants for whom this difference is negative ($ER_i^O < ER_i^D$), zero ($ER_i^O = ER_i^D$), and positive ($ER_i^O > ER_i^D$), and sum to 1 within each exchange. The exact binomial (sign) test evaluates the null hypothesis that positive and negative differences are equally likely (.5), based only on the nonzero differences. Hence, ties ($ER_i^O = ER_i^D$) are excluded from the test.

TABLE WA 4

T-TEST RESULTS IN STUDY 1

Exchange	***N***	**LOG ERR**		***t***	***df***	***p***	e^M
		M	***SD***				
Spend dollars, get euros	777	0.10	0.42	6.22	776	< .001	1.10
Spend dollars, get toilet paper	789	0.71	1.00	19.99	788	< .001	2.04
Donate dollars, distribute nets	795	2.18	1.94	31.70	794	< .001	8.84
Give up salary, get vacation days	692	0.78	1.14	18.07	691	< .001	2.18
Do teaching, get cleaning	779	0.57	0.92	17.31	778	< .001	1.77
Spend time, get dollars	797	1.49	1.52	27.59	796	< .001	4.43
Wait time, get food samples	797	1.60	1.26	35.68	796	< .001	4.94
Give fish, get coconuts	791	0.45	0.81	15.53	790	< .001	1.57
Eat frugal, get chef's dinners	765	1.14	1.33	23.69	764	< .001	3.12

NOTE.—For each exchange, the natural logarithm of the exchange rate ratio $ERR_i^{O/D} = ER_i^O / ER_i^D$ is compared to 0 using a one-sample t-test. When log($ERR_i^{O/D}$) equals 0, this corresponds to $ER_i^O = ER_i^D$. M and SD are the mean and standard deviation of log($ERR_i^{O/D}$). The e^M column is the exponentiated mean, which equals the geometric mean of $ERR_i^{O/D}$. A value above 1 indicates $ER_i^O > ER_i^D$.

TABLE WA 5

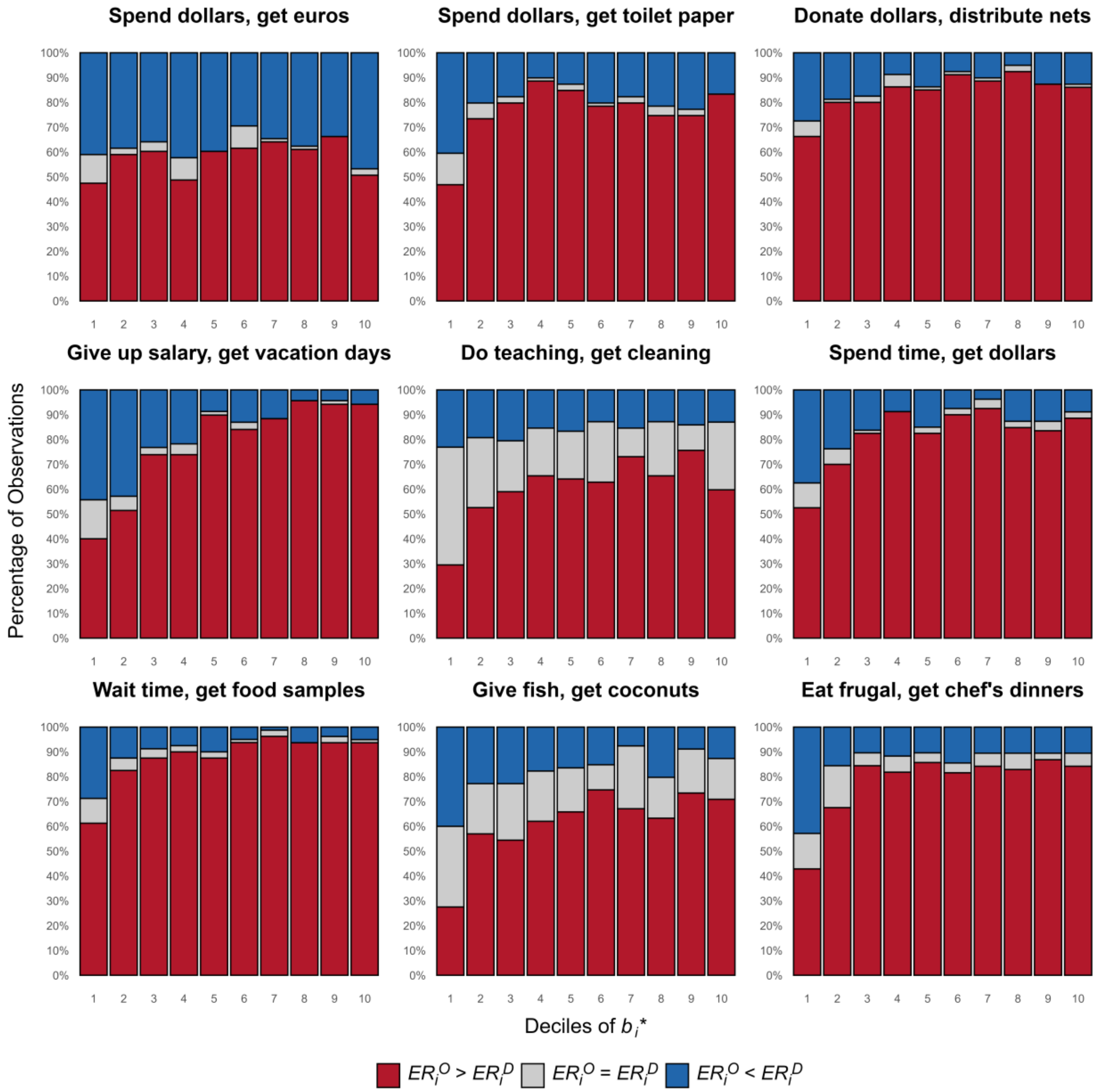
REGRESSION RESULTS IN STUDY 1

Exchange	β_0 [95% CI]	β_1 [95% CI]	$e^{\beta 0}$	$e^{\beta 1}$	p (β_1 vs. 0)	R^2
Spend dollars, get euros	0.095 [0.065, 0.124]	0.000 [0.000, 0.000]	1.10	1.000	0.040	0.01
Spend dollars, get toilet paper	0.713 [0.644, 0.781]	0.002 [0.001, 0.003]	2.04	1.002	< .001	0.04
Donate dollars, distribute nets	2.179 [2.049, 2.310]	0.001 [0.001, 0.001]	8.84	1.001	< .001	0.07
Give up salary, get vacation days	0.781 [0.703, 0.858]	0.027 [0.023, 0.032]	2.18	1.028	< .001	0.17
Do teaching, get cleaning	0.571 [0.507, 0.634]	0.006 [0.004, 0.009]	1.77	1.006	< .001	0.03
Spend time, get dollars	1.489 [1.389, 1.589]	0.003 [0.003, 0.004]	4.43	1.003	< .001	0.10
Wait time, get food samples	1.598 [1.520, 1.676]	0.020 [0.018, 0.023]	4.94	1.020	< .001	0.21
Give fish, get coconuts	0.448 [0.393, 0.503]	0.006 [0.004, 0.007]	1.57	1.006	< .001	0.06
Eat frugal, get chef's dinners	1.138 [1.048, 1.228]	0.009 [0.007, 0.012]	3.12	1.010	< .001	0.10

NOTE.—We regressed the log of the exchange rate ratio $ERR_i^{O/D} = ER_i^O / ER_i^D$ on the mean-centered b_i^* for each scenario. That is, $log\ ERR_i^{O/D} = \beta_0 + \beta_1(b_i^* - \overline{b_i^*}) + \varepsilon_i$. With this regression specification, the estimated intercept β_0 in each scenario is the mean log ERR of the scenario. Thus, the first column of this table is the same as the second column of table WA 4 and the third column of this table is the same as the seventh column of table WA 4. With respect to the slope, for every fixed unit of b_i^*, $ERR_i^{O/D}$ is multiplied by $e^{\beta 1}$. It is illustrative to compare the range of $ERR_i^{O/D}$ values over the interval of b_i^* ranges for each scenario.

FIGURE WA 2

STACKED BAR CHART OF EXCHANGE RATES IN STUDY 1



NOTE.—Percentage of observations in which the implied offer exchange rate (ER_i^O) is lower than, equal to, or higher than the implied demand exchange rate (ER_i^D), plotted across deciles of the sampled value within each exchange. For each exchange, sampled values are divided into ten within-domain deciles, and the stacked bars show the percentage of $ER_i^O < ER_i^D$, $ER_i^O = ER_i^D$, and $ER_i^O > ER_i^D$ within each decile. Percentages are computed within exchange × decile cells.

TABLE WA 6

ELASTICITIES IN STUDY 1

Exchange	***N***	**e_O [95% CI]**	**p (e_O vs. 1)**	**e_D [95% CI]**	**p (e_D vs. 1)**	**$1/e_O$**
Spend dollars, get euros	777	0.95 [0.93, 0.98]	< .001	0.99 [0.97, 1.01]	0.327	1.05
Spend dollars, get toilet paper	789	0.76 [0.70, 0.82]	< .001	0.84 [0.79, 0.89]	< .001	1.32
Donate dollars, distribute nets	795	0.40 [0.27, 0.53]	< .001	0.67 [0.62, 0.72]	< .001	2.49
Give up salary, get vacation days	692	0.55 [0.39, 0.70]	< .001	0.26 [0.22, 0.31]	< .001	1.83
Do teaching, get cleaning	779	0.88 [0.82, 0.93]	< .001	0.87 [0.83, 0.92]	< .001	1.14
Spend time, get dollars	797	0.54 [0.44, 0.65]	< .001	0.71 [0.67, 0.76]	< .001	1.84
Wait time, get food samples	797	0.38 [0.30, 0.46]	< .001	0.60 [0.53, 0.66]	< .001	2.62
Give fish, get coconuts	791	0.87 [0.80, 0.93]	< .001	0.81 [0.77, 0.85]	< .001	1.16
Eat frugal, get chef's dinners	765	0.55 [0.45, 0.65]	< .001	0.66 [0.61, 0.71]	< .001	1.81

NOTE.—For each exchange, e_O is the slope from the OLS regression of log a_i on log b_i^* (the elasticity of the offer-elicited quantity with respect to the randomly sampled fixed quantity), and e_D is the slope from the OLS regression of log b_i on log a_i^*. The final column reports the consistency benchmark for e_D implied by the offer-elicited elasticity. Every elasticity is significantly less than 1, by a t-test, at $p < .001$, except for the demand-elicited elasticity for the "Spend dollars, get euros" exchange ($p = .33$).

TABLE WA 7

QUADRATIC TERMS IN STUDY 1

Exchange	***N***	$\boldsymbol{\beta_2^O}$ **[95% CI]**	$\boldsymbol{p\ (\beta_2^O}$ **vs. 0)**	$\boldsymbol{\beta_2^D}$ **[95% CI]**	$\boldsymbol{p\ (\beta_2^D}$ **vs. 0)**
Spend dollars, get euros	777	0.004 [-0.012, 0.020]	0.620	-0.015 [-0.026, -0.003]	0.011
Spend dollars, get toilet paper	789	-0.003 [-0.048, 0.041]	0.885	-0.018 [-0.046, 0.009]	0.186
Donate dollars, distribute nets	795	-0.009 [-0.096, 0.078]	0.840	0.011 [-0.009, 0.030]	0.281
Give up salary, get vacation days	692	0.092 [-0.079, 0.264]	0.292	0.024 [0.005, 0.043]	0.012
Do teaching, get cleaning	779	0.062 [0.011, 0.112]	0.017	0.013 [-0.022, 0.048]	0.457
Spend time, get dollars	797	0.024 [-0.052, 0.100]	0.535	0.016 [-0.007, 0.040]	0.168
Wait time, get food samples	797	-0.089 [-0.166, -0.013]	0.022	0.003 [-0.037, 0.044]	0.881
Give fish, get coconuts	791	-0.015 [-0.070, 0.040]	0.586	0.021 [-0.006, 0.049]	0.131
Eat frugal, get chef's dinners	765	0.025 [-0.064, 0.113]	0.586	0.014 [-0.014, 0.042]	0.330

NOTE.—For each exchange, the table reports the coefficient on the quadratic term from log-log regressions that add a squared fixed-quantity term to the specifications in table WA6. For the offer elicitation, log a_i is regressed on log b_i^* and (log b_i^*)^2; for the demand elicitation, log b_i is regressed on log a_i^* and (log a_i^*)^2. A significant quadratic coefficient would indicate curvature in the log-log relationship and hence an elasticity that varies over the range of the fixed quantity. Quadratic terms are significant at $p < .05$ in only four of the eighteen regressions (offer: “Do teaching, get cleaning” and “Wait time, get food samples”; demand: “Spend dollars, get euros and “Give up salary, get vacation days”), in inconsistent directions, with none significant in both elicitations of the same exchange. This indicates no systematic departure from linearity, consistent with the decile means in Figure 4 tracking the fitted lines.

TABLE WA 8

SPEARMAN CORRELATIONS IN STUDY 1

		Offer		Demand	
Exchange	***N***	***Spearman ρ***	***p***	***Spearman ρ***	***p***
Spend dollars, get euros	777	0.096	0.007	-0.056	0.119
Spend dollars, get toilet paper	789	0.236	< .001	-0.226	< .001
Donate dollars, distribute nets	795	0.259	< .001	-0.425	< .001
Give up salary, get vacation days	692	0.179	< .001	-0.792	< .001
Do teaching, get cleaning	779	0.092	0.01	-0.175	< .001
Spend time, get dollars	797	0.247	< .001	-0.378	< .001
Wait time, get food samples	797	0.460	< .001	-0.373	< .001
Give fish, get coconuts	791	0.136	< .001	-0.339	< .001
Eat frugal, get chef's dinners	765	0.260	< .001	-0.443	< .001

NOTE.—Spearman rank correlations between elicited exchange rates and the fixed quantity, by scenario and elicitation. For each scenario, the offer elicitation correlates the offer exchange rate (b_i^*/a_i) with the fixed quantity b_i^*, and the demand elicitation correlates the demand exchange rate (b_i/a_i^*) with the fixed quantity a_i^*. Under proportional responding, both correlations are zero. Sub-proportional responding implies a positive correlation in the offer elicitation and a negative correlation in the demand elicitation. In the offer elicitation the fixed quantity is the numerator, so a linear increase in the numerator alongside a sub-linear increase in the denominator raises the ratio, producing a positive correlation between b_i^*/a_i and b_i^*; in the demand elicitation the fixed quantity is the denominator, so a linear increase in the denominator alongside a sub-linear increase in the numerator lowers the ratio, producing a negative correlation between b_i/a_i^* and a_i^*.

WEB APPENDIX C: SUPPLEMENT TO STUDY 2

TABLE WA 9

RANGES OF DE FIXED VALUES IN STUDY 2

Exchange	Unit	Sampling range
Spend dollars, get euros	Dollars	[20; 1000]
Spend dollars, get toilet paper	Dollars	[5; 100]
Donate dollars, distribute nets	Dollars	[20; 1000]
Give up salary, get vacation days	Dollars of yearly salary	[150; 2000]
Do teaching, get cleaning	Hours of teaching computer skills	[2; 40]
Spend time, get dollars	Minutes	[5; 240]
Wait time, get food samples	Minutes of waiting time	[2; 120]
Give fish, get coconuts	Fish	[2; 40]
Eat frugal, get chef's dinners	Dinners of bread and water	[2; 30]

NOTE.—Per participant, we randomly sample a starting value, a_i^*, from each of the 9 exchanges in phase 1 (demand elicitation; see Table 1).

TABLE WA 10

OVERVIEW OF EXCLUSIONS IN STUDY 2

Exclusion	# Excluded	# Rows
Phase 1: Rows downloaded		1,043
No consent	-1	1,042
Too fast (< 20 sec)	-2	1,040
Same response to every scenario	-0	1,040
Failed attention check	-61	979
Attrition between phases	-196	783
Phase 2: Rows downloaded		779
No consent	-0	779
Excluded in Phase 1	-1	778
Too fast (< 20 sec)	-0	778
Same response to every scenario	-0	778
Failed attention check	-29	749
Participants after exclusions		749
Total exchanges		6,741
Exchanges with 0 response in Phase 1	-38	6,703
Exchanges with 0 response in Phase 2	-159	6,544
Log(ER) > mean + 3 SD in Phase 1	-32	6,512
Log(ER) < mean - 3 SD in Phase 1	-52	6,454
Log(ER) > mean + 3 SD in Phase 2	-58	6,402
Log(ER) < mean - 3 SD in Phase 2	-20	6,382
Exchanges in analysis		6,382
Participants in analysis		748

NOTE.—As pre-registered, we perform exclusions both at the participant level and at the exchange level. At the participant level, we excluded participants who failed the attention check in either phase, completed the survey in under 20 seconds, or provided the same response across all exchanges. We excluded exchange-level responses if participants answered 0 to either question in the exchange. We also log-transformed exchange rates and excluded exchange-level responses if the exchange rate in either phase was more than 3 SDs above or below the phase-specific mean for that exchange.

TABLE WA 11

SIGN TEST RESULTS IN STUDY 2

Exchange	***N***	**Proportions**			***p***
		$\boldsymbol{ER_i^O < ER_i^D}$	$\boldsymbol{ER_i^O = ER_i^D}$	$\boldsymbol{ER_i^O > ER_i^D}$	
Spend dollars, get euros	719	.45	.05	.50	.220
Spend dollars, get toilet paper	736	.24	.03	.73	< .001
Donate dollars, distribute nets	732	.11	.02	.87	< .001
Give up salary, get vacation days	628	.39	.00	.61	< .001
Do teaching, get cleaning	730	.15	.27	.58	< .001
Spend time, get dollars	734	.17	.02	.81	< .001
Wait time, get food samples	736	.16	.03	.81	< .001
Give fish, get coconuts	740	.17	.26	.57	< .001
Eat frugal, get chef's dinners	721	.24	.13	.63	< .001

NOTE.—For each exchange, the sign test compares ER_i^O and ER_i^D within participants by computing the sign of the difference ($ER_i^O - ER_i^D$). The three proportions report the share of participants for whom this difference is negative ($ER_i^O < ER_i^D$), zero ($ER_i^O = ER_i^D$), and positive ($ER_i^O > ER_i^D$), and sum to 1 within each exchange. The exact binomial (sign) test evaluates the null hypothesis that positive and negative differences are equally likely (.5), based only on the nonzero differences. Hence, ties ($ER_i^O = ER_i^D$) are excluded from the test.

TABLE WA 12

T-TEST RESULTS IN STUDY 2

Exchange	***N***	**LOG ERR**		***t***	***df***	***p***	e^M
		MEAN	***SD***				
Spend dollars, get euros	719	0.063	0.353	4.788	718	< .001	1.07
Spend dollars, get toilet paper	736	0.429	0.744	15.651	735	< .001	1.54
Donate dollars, distribute nets	732	1.616	1.401	31.209	731	< .001	5.03
Give up salary, get vacation days	628	0.461	1.511	7.645	627	< .001	1.59
Do teaching, get cleaning	730	0.491	0.791	16.748	729	< .001	1.63
Spend time, get dollars	734	0.940	1.142	22.320	733	< .001	2.56
Wait time, get food samples	736	0.886	1.035	23.244	735	< .001	2.43
Give fish, get coconuts	740	0.382	0.681	15.254	739	< .001	1.47
Eat frugal, get chef's dinners	721	0.465	0.929	13.444	720	< .001	1.59

NOTE.—For each exchange, the natural logarithm of the exchange rate ratio $ERR_i^{O/D} = ER_i^O/ER_i^D$ is compared to 0 using a one-sample t-test. When log($ERR_i^{O/D}$) equals 0, this corresponds to $ER_i^O = ER_i^D$. M and SD are the mean and standard deviation of log($ERR_i^{O/D}$). The e^M column is the exponentiated mean, which equals the geometric mean of $ERR_i^{O/D}$. A value above 1 indicates $ER_i^O > ER_i^D$.

TABLE WA 13

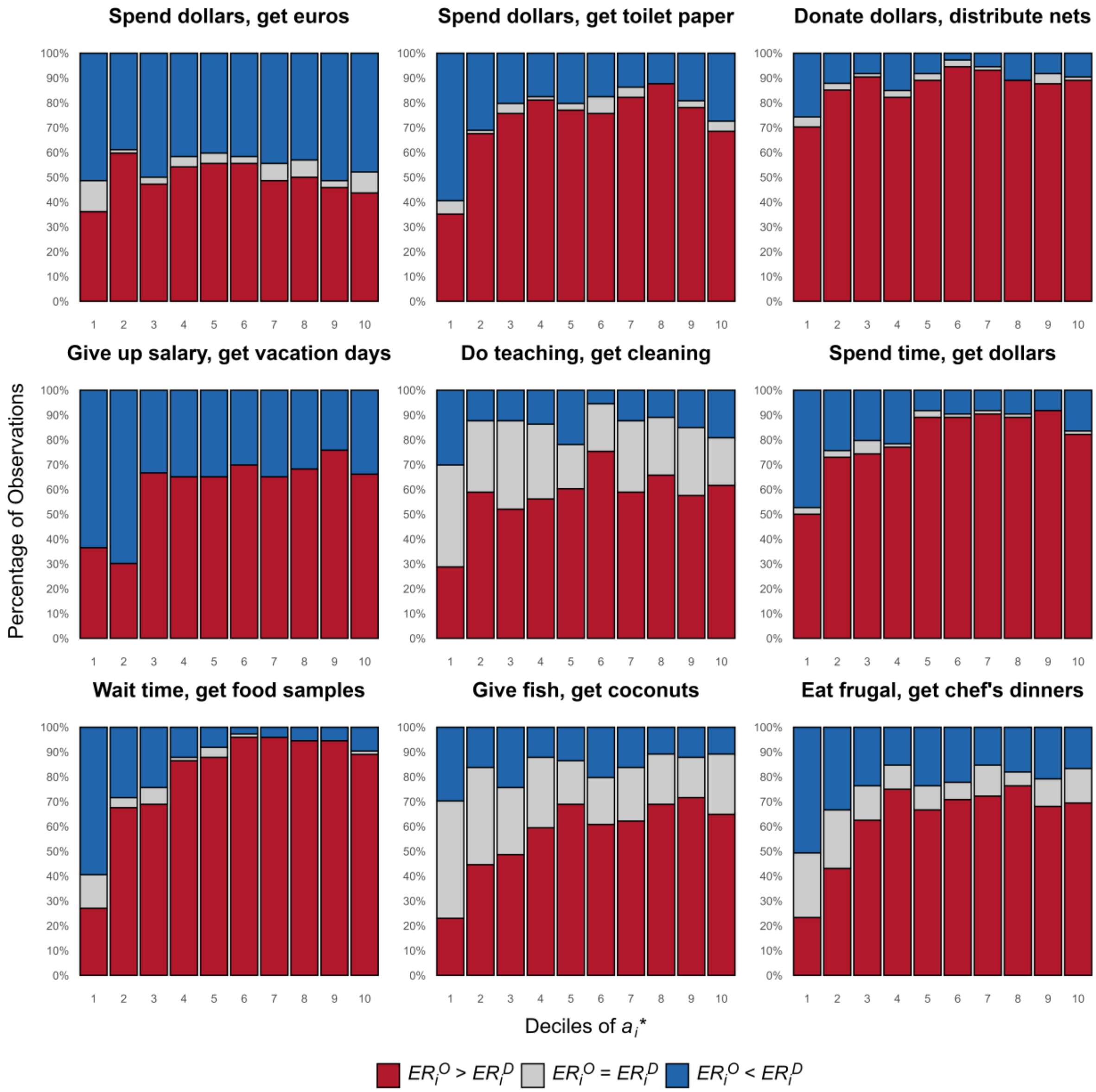
REGRESSION RESULTS IN STUDY 2

Exchange	β_0	β_1	$e^{\beta 0}$	$e^{\beta 1}$	p (β_1 vs. 0)	R^2
Spend dollars, get euros	0.063 [0.037, 0.089]	-0.000 [-0.000, 0.000]	1.065	1.000	0.331	0.001
Spend dollars, get toilet paper	0.429 [0.377, 0.481]	0.006 [0.005, 0.008]	1.536	1.007	< .001	0.058
Donate dollars, distribute nets	1.616 [1.519, 1.713]	0.001 [0.001, 0.002]	5.033	1.001	< .001	0.083
Give up salary, get vacation days	0.461 [0.345, 0.577]	0.001 [0.000, 0.001]	1.585	1.001	< .001	0.038
Do teaching, get cleaning	0.491 [0.434, 0.547]	0.014 [0.008, 0.019]	1.633	1.014	< .001	0.036
Spend time, get dollars	0.940 [0.861, 1.020]	0.005 [0.004, 0.006]	2.561	1.005	< .001	0.088
Wait time, get food samples	0.886 [0.822, 0.951]	0.015 [0.013, 0.017]	2.426	1.015	< .001	0.257
Give fish, get coconuts	0.382 [0.334, 0.430]	0.012 [0.007, 0.016]	1.465	1.012	< .001	0.037
Eat frugal, get chef's dinners	0.465 [0.401, 0.530]	0.034 [0.026, 0.042]	1.593	1.035	< .001	0.095

NOTE.—We regressed the log of the exchange rate ratio $ERR_i^{O/D} = ER_i^O/ER_i^D$ on the mean-centered a_i^* for each scenario. That is, $log\ ERR_i^{O/D} = \beta_0 + \beta_1(a_i^* - \overline{a_i^*}) + \varepsilon_i$. With this regression specification, the estimated intercept β_0 in each scenario is the mean log ERR of the scenario. Thus, the first column of this table is the same as the second column of table WA 12 and the third column of this table is the same as the seventh column of table WA 12. With respect to the slope, for every fixed unit of a_i^*, $ERR_i^{O/D}$ is multiplied by $e^{\beta 1}$. It is illustrative to compare the range of $ERR_i^{O/D}$ values over the interval of a_i^* ranges for each scenario.

FIGURE WA 3

STACKED BAR CHART OF EXCHANGE RATES IN STUDY 2



NOTE.—Percentage of observations in which the implied offer exchange rate (ER_i^O) is lower than, equal to, or higher than the implied demand exchange rate (ER_i^D), plotted across deciles of the sampled value within each exchange. For each exchange, sampled values are divided into ten within-domain deciles, and the stacked bars show the percentage of $ER_i^O < ER_i^D$, $ER_i^O = ER_i^D$, and $ER_i^O > ER_i^D$ within each decile. Percentages are computed within exchange × decile cells.

TABLE WA 14

ELASTICITIES IN STUDY 2

Exchange	***N***	**e_D [95% CI]**	***p* (e_D vs. 1)**	**e_O [95% CI]**	***p* (e_O vs. 1)**	**$1/e_D$**
Spend dollars, get euros	719	1.008 [0.986, 1.030]	0.476	0.984 [0.960, 1.007]	0.175	0.992
Spend dollars, get toilet paper	736	0.891 [0.819, 0.963]	0.003	0.646 [0.598, 0.694]	< .001	1.122
Donate dollars, distribute nets	732	0.923 [0.799, 1.046]	0.221	0.280 [0.222, 0.339]	< .001	1.084
Give up salary, get vacation days	628	0.524 [0.425, 0.623]	< .001	0.313 [0.175, 0.450]	< .001	1.909
Do teaching, get cleaning	730	0.867 [0.799, 0.936]	< .001	0.779 [0.734, 0.824]	< .001	1.153
Spend time, get dollars	734	0.760 [0.670, 0.850]	< .001	0.450 [0.386, 0.514]	< .001	1.315
Wait time, get food samples	736	0.574 [0.503, 0.646]	< .001	0.371 [0.310, 0.431]	< .001	1.741
Give fish, get coconuts	740	0.876 [0.820, 0.933]	< .001	0.811 [0.765, 0.856]	< .001	1.141
Eat frugal, get chef's dinners	721	0.750 [0.653, 0.848]	< .001	0.396 [0.339, 0.452]	< .001	1.332

NOTE.—For each exchange, e_O is the slope from the OLS regression of log a_i on log b_i^* (the elasticity of the offer-elicited quantity with respect to the randomly sampled fixed quantity), and e_D is the slope from the OLS regression of log b_i on log a_i^*. The final column reports $1/e_D$, the consistency benchmark against which e_O can be compared.

TABLE WA 15

QUADRATIC TERMS IN STUDY 2

Exchange	***N***	$\boldsymbol{\beta_2^D}$ **[95% CI]**	$\boldsymbol{p}$ **(**$\boldsymbol{\beta_2^D}$ **vs. 0)**	$\boldsymbol{\beta_2^O}$ **[95% CI]**	$\boldsymbol{p}$ **(**$\boldsymbol{\beta_2^O}$ **vs. 0)**
Spend dollars, get euros	719	0.016 [-0.005, 0.037]	0.138	-0.010 [-0.031, 0.011]	0.367
Spend dollars, get toilet paper	736	0.086 [-0.004, 0.175]	0.060	0.022 [-0.015, 0.058]	0.242
Donate dollars, distribute nets	732	-0.024 [-0.144, 0.095]	0.688	-0.030 [-0.059, -0.002]	0.034
Give up salary, get vacation days	628	0.007 [-0.140, 0.153]	0.930	-0.105 [-0.209, -0.001]	0.048
Do teaching, get cleaning	730	0.070 [-0.011, 0.150]	0.089	-0.006 [-0.043, 0.031]	0.755
Spend time, get dollars	734	-0.002 [-0.090, 0.086]	0.965	-0.054 [-0.089, -0.019]	0.003
Wait time, get food samples	736	0.080 [0.020, 0.141]	0.009	-0.033 [-0.074, 0.008]	0.119
Give fish, get coconuts	740	0.068 [0.002, 0.133]	0.043	-0.025 [-0.062, 0.013]	0.204
Eat frugal, get chef's dinners	721	0.042 [-0.087, 0.170]	0.526	-0.018 [-0.057, 0.022]	0.373

NOTE.—For each exchange, the table reports the coefficient on the quadratic term from log-log regressions that add a squared fixed-quantity term to the specifications in table WA 14. For the offer elicitation, log a_i is regressed on log b_i^* and (log b_i^*)^2; for the demand elicitation, log b_i is regressed on log a_i^* and (log a_i^*)^2. A significant quadratic coefficient would indicate curvature in the log-log relationship and hence an elasticity that varies over the range of the fixed quantity.

TABLE WA 16

SPEARMAN CORRELATIONS IN STUDY 2

Exchange	N	Demand		Offer	
		Spearman ρ	***p***	***Spearman ρ***	***p***
Spend dollars, get euros	719	0.059	0.115	0.093	0.012
Spend dollars, get toilet paper	736	-0.081	0.027	0.438	< .001
Donate dollars, distribute nets	732	-0.011	0.764	0.648	< .001
Give up salary, get vacation days	628	-0.321	< .001	0.430	< .001
Do teaching, get cleaning	730	-0.081	0.028	0.299	< .001
Spend time, get dollars	734	-0.175	< .001	0.519	< .001
Wait time, get food samples	736	-0.336	< .001	0.590	< .001
Give fish, get coconuts	740	-0.126	< .001	0.276	< .001
Eat frugal, get chef's dinners	721	-0.158	< .001	0.584	< .001

NOTE.—Spearman rank correlations between elicited exchange rates and the fixed quantity, by scenario and elicitation. For each scenario, the demand elicitation correlates the demand exchange rate (b_i/a_i^*) with the fixed quantity a_i^*, and the offer elicitation correlates the offer exchange rate (b_i^*/a_i) with the fixed quantity b_i^*. Under proportional responding, both correlations are zero. Sub-proportional responding implies a negative correlation in the demand elicitation and a positive correlation in the offer elicitation. In the demand elicitation the fixed quantity is the denominator, so a linear increase in the denominator alongside a sub-linear increase in the numerator lowers the ratio, producing a negative correlation between b_i/a_i^* and a_i^*. In the offer elicitation the fixed quantity is the numerator, so a linear increase in the numerator alongside a sub-linear increase in the denominator raises the ratio, producing a positive correlation between b_i^*/a_i and b_i^*.

WEB APPENDIX D: SUPPLEMENT TO STUDY 3

TABLE WA 17

STIMULI USED IN STUDY 3

Exchange	Demand Elicitation	Offer Elicitation
Spend dollars, get euros	You provide [a_i^*] dollars. You receive __ euro(s).	You receive [b_i] euros. You provide __ dollar(s).
Spend dollars, get toilet paper	You pay [a_i^*] dollars. You get __ roll(s) of toilet paper.	You get [b_i] rolls of toilet paper. You pay __ dollar(s).
Donate dollars, distribute nets	You donate [a_i^*] dollars. They distribute __ extra mosquito net(s).	They distribute [b_i] extra mosquito nets. You donate __ dollar(s).
Give up salary, get vacation days	You give up [a_i^*] dollars of yearly salary. You get __ extra vacation day(s) per year.	You get [b_i] extra vacation days per year. You give up __ dollar(s) of yearly salary.
Do teaching, get cleaning	You provide [a_i^*] hours of teaching computer skills. You receive __ hour(s) of cleaning help.	You receive [b_i] hours of cleaning help. You provide __ hour(s) of teaching computer skills.
Spend time, get dollars	You perform the task for [a_i^*] minutes. You earn __ dollar(s).	You earn [b_i] dollars. You perform the task for __ minute(s).
Wait time, get food samples	You wait [a_i^*] minutes. You obtain __ free sample(s).	You obtain [b_i] free samples. You wait __ minute(s).
Give fish, get coconuts	You provide [a_i^*] fish. You receive __ coconut(s).	You receive [b_i] coconuts. You provide __ fish.
Eat frugal, get chef's dinners	You eat [a_i^*] dinners of only bread and water. You get __ dinner(s) prepared by the chef.	You get [b_i] dinners prepared by the chef. You eat __ dinner(s) of only bread and water.

NOTE.—Scenarios used for Demand and Offer elicitations in Study 3. Introductions to each scenario were the same as in study 1-2 (table 1).

TABLE WA 18

OVERVIEW OF EXCLUSIONS IN STUDY 3

Exclusion	# Excluded	# Rows
Phase 1: Rows downloaded		825
No consent	-1	824
Too fast (< 20 sec)	-1	823
Same response to every scenario	-0	823
Failed attention check	-38	785
Attrition between phases	-59	726
Phase 2: Rows downloaded		723
No consent	-0	723
Excluded in Phase 1	-0	723
Too fast (< 20 sec)	-1	722
Same response to every scenario	-0	722
Failed attention check	-26	696
Participants after exclusions		696
Total exchanges		6,264
Exchanges with 0 response in Phase 1	-31	6,233
Exchanges with 0 response in Phase 2	-115	6,118
Log(ER) > mean + 3 SD in Phase 1	-33	6,085
Log(ER) < mean - 3 SD in Phase 1	-40	6,028
Log(ER) > mean + 3 SD in Phase 2	-57	5,988
Log(ER) < mean - 3 SD in Phase 2	-15	5,973
Exchanges in analysis		5,973
Participants in analysis		696

NOTE.—As pre-registered, we perform exclusions both at the participant level and at the exchange level. At the participant level, we excluded participants who failed the attention check in either phase, completed the survey in under 20 seconds, or provided the same response across all exchanges. We excluded exchange-level responses if participants answered 0 to either question in the exchange. We also log-transformed exchange rates and excluded exchange-level responses if the exchange rate in either phase was more than 3 SDs above or below the phase-specific mean for that exchange.

TABLE WA 19

DEMAND ELICITED EXCHANGE RATE BY PRESENTATION ORDER

Exchange	***N***	***M(ER*$_{\text{Demand}}$*)***		***diff***	***t***	***df***	***p***
		Elicited then fixed	***Fixed then elicited***				
Spend dollars, get euros	664	1.01	0.98	0.03	-1.47	662	0.14
Spend dollars, get toilet paper	674	1.35	1.37	-0.02	0.26	672	0.80
Donate dollars, distribute nets	675	1.15	0.73	0.42	-2.57	673	0.01
Give up salary, get vacation days	589	0.01	0.01	0.00	-0.59	587	0.56
Do teaching, get cleaning	675	0.94	0.89	0.04	-1.09	673	0.28
Spend time, get dollars	680	0.69	0.73	-0.04	0.47	678	0.64
Wait time, get food samples	673	0.27	0.28	0.00	0.08	671	0.93
Give fish, get coconuts	675	1.23	1.24	-0.01	0.15	673	0.88
Eat frugal, get chef's dinners	668	1.93	1.63	0.30	-1.67	666	0.10

NOTE.—Results of t-tests comparing exchange rates when the manipulation appeared in the first sentence (*elicited then fixed*) versus the second sentence (*fixed then elicited*).

TABLE WA 20

OFFER ELICITED EXCHANGE RATE BY PRESENTATION ORDER

Exchange	***N***	***M(ER*$_{\text{Offer}}$*)***		***diff***	***t***	***df***	***p***
		Elicited then fixed	***Fixed then elicited***				
Spend dollars, get euros	664	1.11	1.07	0.04	-0.75	662	0.45
Spend dollars, get toilet paper	674	2.15	2.34	-0.19	1.31	672	0.19
Donate dollars, distribute nets	675	14.40	11.17	3.23	-0.95	673	0.34
Give up salary, get vacation days	589	0.08	0.08	0.00	-0.21	587	0.84
Do teaching, get cleaning	675	1.55	1.42	0.13	-1.45	673	0.15
Spend time, get dollars	680	3.53	4.91	-1.37	1.47	678	0.14
Wait time, get food samples	673	1.04	1.05	0.00	0.02	671	0.99

Give fish, get coconuts	675	1.88	1.95	-0.07	0.62	673	0.54
Eat frugal, get chef's dinners	668	3.47	4.28	-0.82	1.76	666	0.08

NOTE.—Results of t-tests comparing exchange rates when the manipulation appeared in the first sentence (*elicited then fixed*) versus the second sentence (*fixed then elicited*).

TABLE WA 21

SIGN TEST RESULTS IN STUDY 3

Exchange	***N***	**Proportions**			***p***
		$ER_i^O < ER_i^D$	$ER_i^O = ER_i^D$	$ER_i^O > ER_i^D$	
Spend dollars, get euros	664	.40	.05	.56	< .001
Spend dollars, get toilet paper	674	.19	.05	.76	< .001
Donate dollars, distribute nets	675	.08	.02	.90	< .001
Give up salary, get vacation days	589	.32	.00	.68	< .001
Do teaching, get cleaning	675	.08	.37	.55	< .001
Spend time, get dollars	680	.13	.04	.83	< .001
Wait time, get food samples	673	.11	.03	.86	< .001
Give fish, get coconuts	675	.11	.31	.58	< .001
Eat frugal, get chef's dinners	668	.17	.14	.70	< .001

NOTE.—For each exchange, the sign test compares ER_i^O and ER_i^D within participants by computing the sign of the difference ($ER_i^O - ER_i^D$). The three proportions report the share of participants for whom this difference is negative ($ER_i^O < ER_i^D$), zero ($ER_i^O = ER_i^D$), and positive ($ER_i^O > ER_i^D$), and sum to 1 within each exchange. The exact binomial (sign) test evaluates the null hypothesis that positive and negative differences are equally likely (.5), based only on the nonzero differences. Hence, ties ($ER_i^O = ER_i^D$) are excluded from the test.

TABLE WA 22

T-TEST RESULTS IN STUDY 3

Exchange	***N***	**LOG ERR**		***t***	***df***	***p***	e^M
		MEAN	***SD***				
Spend dollars, get euros	664	0.060	0.361	4.305	663	< .001	1.06
Spend dollars, get toilet paper	674	0.484	0.659	19.078	673	< .001	1.62
Donate dollars, distribute nets	675	1.863	1.398	34.630	674	< .001	6.44
Give up salary, get vacation days	589	0.617	1.407	10.645	588	< .001	1.85
Do teaching, get cleaning	675	0.480	0.747	16.688	674	< .001	1.62
Spend time, get dollars	680	1.178	1.327	23.149	679	< .001	3.25
Wait time, get food samples	673	1.141	1.006	29.420	672	< .001	3.13
Give fish, get coconuts	675	0.398	0.605	17.097	674	< .001	1.49
Eat frugal, get chef's dinners	668	0.669	1.050	16.484	667	< .001	1.95

NOTE.—For each exchange, the natural logarithm of the exchange rate ratio $ERR_i^{O/D} = ER_i^O / ER_i^D$ is compared to 0 using a one-sample t-test. When $\log(ERR_i^{O/D})$ equals 0, this corresponds to $ER_i^O = ER_i^D$.

M and SD are the mean and standard deviation of log($ERR_i^{O/D}$). The e^M column is the exponentiated mean, which equals the geometric mean of $ERR_i^{O/D}$. A value above 1 indicates $ER_i^O > ER_i^D$.

TABLE WA 23

REGRESSION RESULTS IN STUDY 3

Exchange	β_0	β_1	$e^{\beta 0}$	$e^{\beta 1}$	p (β_1 vs. 0)	R^2
Spend dollars, get euros	0.060 [0.03, 0.09]	0.000 [-0.00, 0.000]	1.062	1.000	0.060	0.005
Spend dollars, get toilet paper	0.484 [0.44, 0.53]	0.008 [0.006, 0.010]	1.623	1.008	< .001	0.116
Donate dollars, distribute nets	1.863 [1.76, 1.97]	0.001 [0.001, 0.001]	6.442	1.001	< .001	0.043
Give up salary, get vacation days	0.617 [0.51, 0.73]	0.001 [0.001, 0.001]	1.853	1.001	< .001	0.088
Do teaching, get cleaning	0.480 [0.43, 0.54]	0.016 [0.011, 0.021]	1.616	1.016	< .001	0.056
Spend time, get dollars	1.178 [1.08, 1.27]	0.006 [0.004, 0.007]	3.248	1.006	< .001	0.084
Wait time, get food samples	1.141 [1.07, 1.21]	0.014 [0.012, 0.016]	3.131	1.014	< .001	0.223
Give fish, get coconuts	0.398 [0.35, 0.44]	0.008 [0.004, 0.012]	1.489	1.008	< .001	0.023
Eat frugal, get chef's dinners	0.669 [0.593, 0.746]	0.038 [0.028, 0.047]	1.953	1.038	< .001	0.085

NOTE.—We regressed the log of the exchange rate ratio $ERR_i^{O/D} = ER_i^O / ER_i^D$ on the mean-centered a_i^* for each scenario. That is, $log\ ERR_i^{O/D} = \beta_0 + \beta_1(a_i^* - \overline{a_i^*}) + \varepsilon_i$. With this regression specification, the estimated intercept β_0 in each scenario is the mean log ERR of the scenario. Thus, the first column of this table is the same as the second column of table WA 22 and the third column of this table is the same as the seventh column of table WA 22. With respect to the slope, for every fixed unit of a_i^*, $ERR_i^{O/D}$ is multiplied by $e^{\beta 1}$. It is illustrative to compare the range of $ERR_i^{O/D}$ values over the interval of a_i^* ranges for each scenario.

TABLE WA 24

SIGN TEST RESULTS BY PRESENTATION ORDER IN STUDY 3

Exchange	Placement	N	Proportions			p
			$ER_i^O < ER_i^D$	$ER_i^O = ER_i^D$	$ER_i^O > ER_i^D$	
Spend dollars,	Fixed then Elicited	336	.43	.05	.51	.145
get euros	Elicited then Fixed	328	.36	.04	.60	< .001
Spend dollars,	Fixed then Elicited	338	.19	.07	.74	< .001
get toilet paper	Elicited then Fixed	336	.19	.04	.77	< .001
Donate dollars,	Fixed then Elicited	340	.07	.01	.92	< .001
distribute nets	Elicited then Fixed	335	.08	.03	.88	< .001
Give up salary,	Fixed then Elicited	276	.31	.00	.69	< .001
get vacation days	Elicited then Fixed	313	.32	.00	.68	< .001
Do teaching, get	Fixed then Elicited	341	.07	.38	.55	< .001
cleaning	Elicited then Fixed	334	.09	.37	.54	< .001
Spend time, get	Fixed then Elicited	340	.14	.04	.82	< .001
dollars	Elicited then Fixed	340	.12	.04	.84	< .001
Wait time, get	Fixed then Elicited	341	.12	.02	.86	< .001
food samples	Elicited then Fixed	332	.10	.03	.87	< .001
Give fish, get	Fixed then Elicited	340	.09	.32	.58	< .001
coconuts	Elicited then Fixed	335	.12	.30	.58	< .001
Eat frugal, get	Fixed then Elicited	335	.12	.14	.75	< .001
chef's dinners	Elicited then Fixed	333	.22	.14	.65	< .001

NOTE.—The same sign tests are performed as in table WA 21, now once per presentation order.

TABLE WA 25

T-TEST RESULTS BY PRESENTATION ORDER IN STUDY 3

Exchange	Placement	*N*	LOG ERR *MEAN*	LOG ERR *SD*	*t*	*df*	*p*	e^M
Spend dollars, get euros	Fixed then Elicited	336	0.054	0.365	2.711	335	0.007	1.06
	Elicited then Fixed	328	0.067	0.357	3.386	327	< .001	1.07
Spend dollars, get toilet paper	Fixed then Elicited	338	0.481	0.643	13.768	337	< .001	1.62
	Elicited then Fixed	336	0.487	0.676	13.212	335	< .001	1.63
Donate dollars, distribute nets	Fixed then Elicited	340	1.906	1.357	25.886	339	< .001	6.73
	Elicited then Fixed	335	1.820	1.438	23.159	334	< .001	6.17
Give up salary, get vacation days	Fixed then Elicited	276	0.672	1.448	7.705	275	< .001	1.96
	Elicited then Fixed	313	0.569	1.370	7.347	312	< .001	1.77
Do teaching, get cleaning	Fixed then Elicited	341	0.481	0.741	11.986	340	< .001	1.62
	Elicited then Fixed	334	0.479	0.754	11.598	333	< .001	1.61
Spend time, get dollars	Fixed then Elicited	340	1.215	1.415	15.837	339	< .001	3.37
	Elicited then Fixed	340	1.141	1.234	17.047	339	< .001	3.13
Wait time, get food samples	Fixed then Elicited	341	1.129	1.031	20.215	340	< .001	3.09
	Elicited then Fixed	332	1.154	0.981	21.423	331	< .001	3.17
Give fish, get coconuts	Fixed then Elicited	340	0.395	0.585	12.440	339	< .001	1.48
	Elicited then Fixed	335	0.402	0.626	11.754	334	< .001	1.49
Eat frugal, get chef's dinners	Fixed then Elicited	335	0.816	1.043	14.310	334	< .001	2.26
	Elicited then Fixed	333	0.522	1.036	9.192	332	< .001	1.69

NOTE.—The same t-tests are performed as in table WA 22, now once per presentation order.

TABLE WA 26

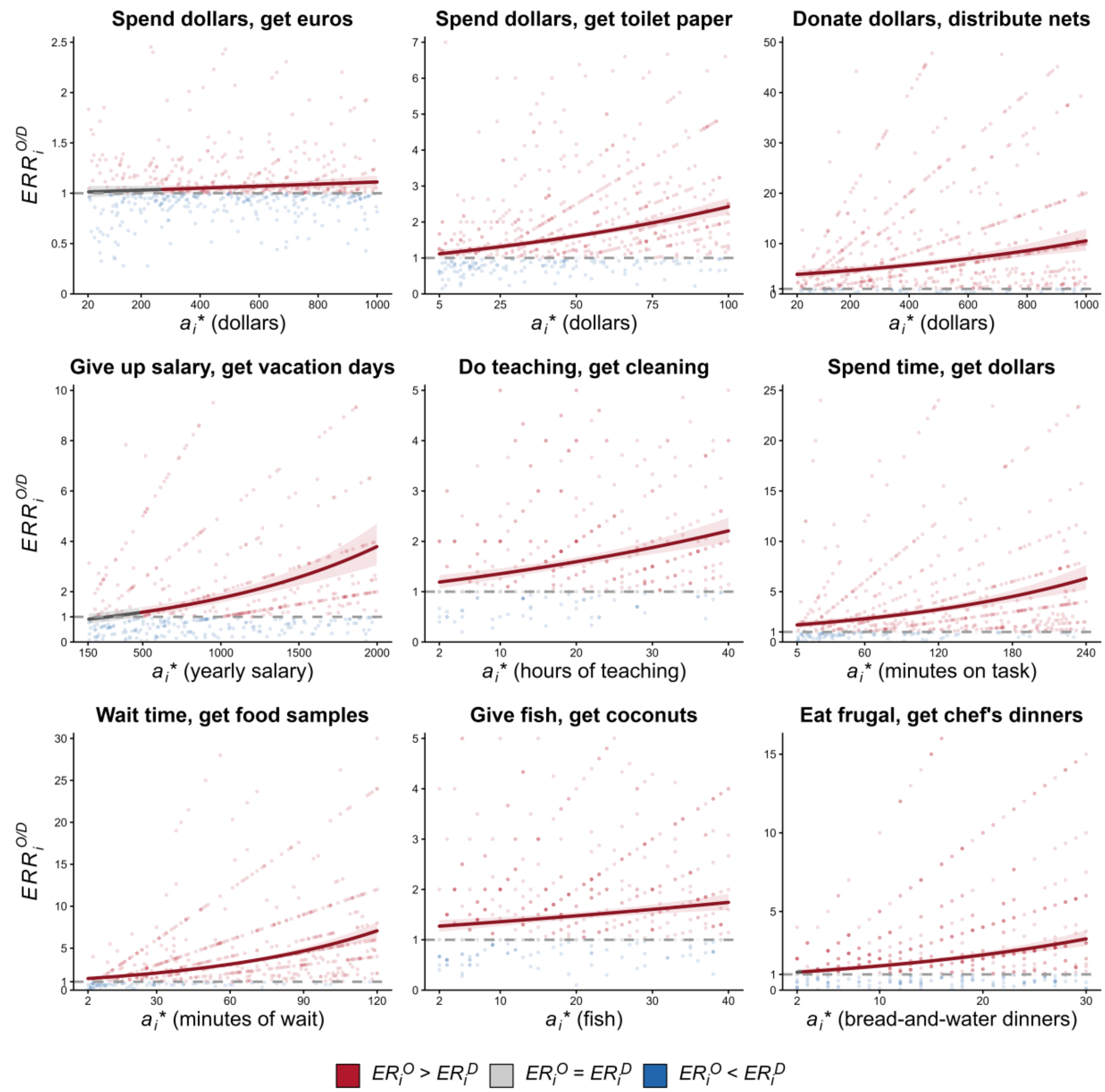
REGRESSION RESULTS BY PRESENTATION ORDER IN STUDY 3

Exchange	**Placement**	***N***	β_0	β_1	$e^{\beta 0}$	$e^{\beta 1}$	*p* (β_1 *vs. 0)*	R^2
Spend dollars, get euros	Fixed then Elicited	336	0.055 [0.016,0.094]	0.000 [-0.00, 0.000]	1.056	1.000	0.506	0.001
	Elicited then Fixed	328	0.064 [0.025, 0.102]	0.000 [0.000, 0.000]	1.066	1.000	0.047	0.012
Spend dollars, get toilet paper	Fixed then Elicited	338	0.468 [0.404, 0.533]	0.008 [0.006, 0.011]	1.597	1.008	< .001	0.121
	Elicited then Fixed	336	0.500 [0.432, 0.569]	0.008 [0.006, 0.011]	1.649	1.008	< .001	0.113
Donate dollars, distribute nets	Fixed then Elicited	340	1.912 [1.771, 2.052]	0.001 [0.001, 0.002]	6.763	1.001	< .001	0.060
	Elicited then Fixed	335	1.815 [1.662, 1.968]	0.001 [0.000, 0.001]	6.141	1.001	0.002	0.029
Give up salary, get vacation days	Fixed then Elicited	276	0.673 [0.507, 0.839]	0.001 [0.000, 0.001]	1.960	1.001	< .001	0.072
	Elicited then Fixed	313	0.568 [0.423, 0.712]	0.001 [0.001, 0.001]	1.764	1.001	< .001	0.105
Do teaching, get cleaning	Fixed then Elicited	341	0.476 [0.399, 0.552]	0.017 [0.010, 0.024]	1.609	1.017	< .001	0.062
	Elicited then Fixed	334	0.484 [0.405, 0.563]	0.016 [0.008, 0.023]	1.622	1.016	< .001	0.050
Spend time, get dollars	Fixed then Elicited	340	1.212 [1.068, 1.357]	0.006 [0.004, 0.008]	3.361	1.006	< .001	0.085
	Elicited then Fixed	340	1.144 [1.018, 1.270]	0.005 [0.003, 0.007]	3.139	1.005	< .001	0.083
Wait time, get food samples	Fixed then Elicited	341	1.117 [1.018, 1.217]	0.013 [0.010, 0.016]	3.056	1.013	< .001	0.183
	Elicited then Fixed	332	1.168 [1.077, 1.259]	0.015 [0.012, 0.017]	3.216	1.015	< .001	0.271
Give fish, get coconuts	Fixed then Elicited	340	0.391 [0.329, 0.453]	0.009 [0.003, 0.015]	1.478	1.009	0.002	0.029
	Elicited then Fixed	335	0.405 [0.338, 0.472]	0.008 [0.002, 0.014]	1.500	1.008	0.014	0.018
Eat frugal, get chef's dinners	Fixed then Elicited	335	0.787 [0.679, 0.895]	0.037 [0.024, 0.050]	2.196	1.038	< .001	0.081
	Elicited then Fixed	333	0.550 [0.442, 0.658]	0.035 [0.022, 0.048]	1.733	1.036	< .001	0.078

NOTE.—The same regressions are performed as in table WA 23, now once per presentation order.

FIGURE WA 4

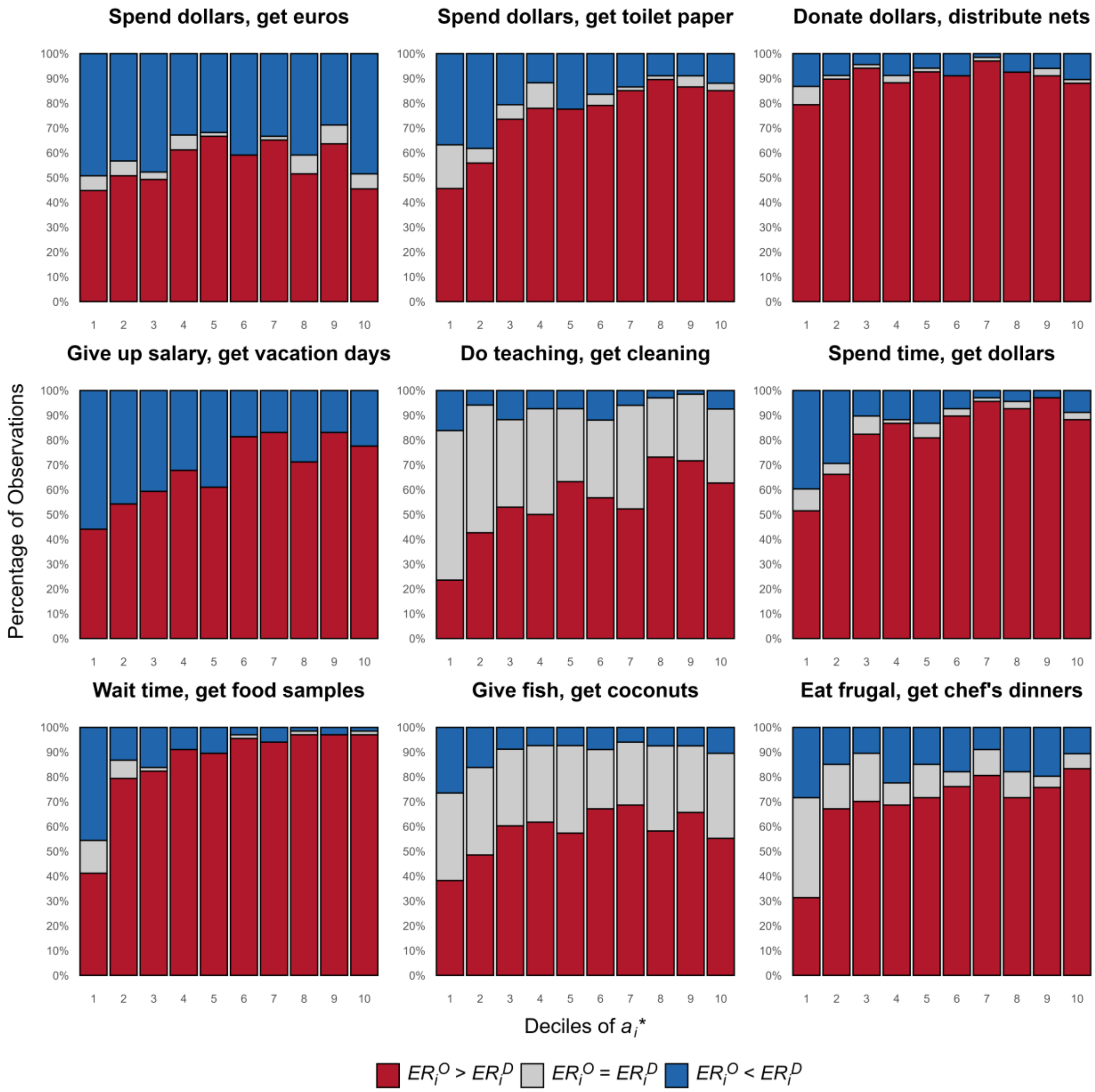
ERR BY PHASE 1 FIXED AMOUNT OF A IN STUDY 3



NOTE.—Each panel corresponds to one exchange scenario. Points show observed exchange-rate ratios $ERR_i^{O/D} = ER_i^O / ER_i^D$, where ER_i^O is the offer-elicited and ER_i^D the demand-elicited exchange rate for participant *i*, plotted against the phase 1 fixed value b_i^*. The solid line is the fitted value from a scenario-specific OLS regression of $\log(ERR_i^{O/D})$ on mean-centered a_i^*, back-transformed to the ratio scale by exponentiation; shaded bands are 95% confidence intervals. The dashed horizontal reference line at 1 indicates no elicitation asymmetry ($ER_i^O = ER_i^D$). Values above 1 indicate a higher offer- than demand-elicited exchange rate ($ER_i^O > ER_i^D$); values below 1 indicate the reverse ($ER_i^O < ER_i^D$).

FIGURE WA 5

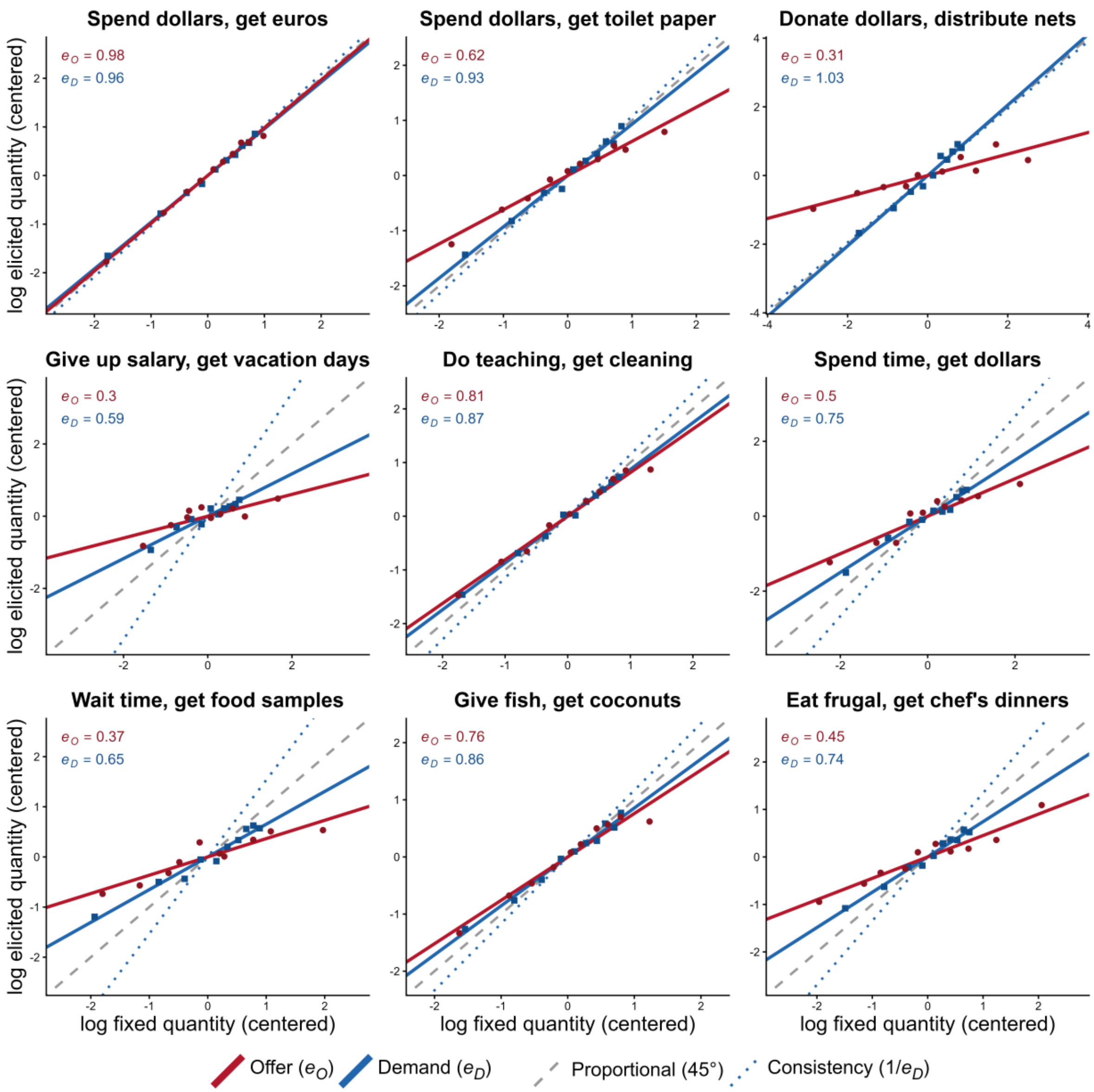
STACKED BAR CHART OF EXCHANGE RATES IN STUDY 3



NOTE.—Percentage of observations in which the implied offer exchange rate (ER_i^O) is lower than, equal to, or higher than the implied demand exchange rate (ER_i^D), plotted across deciles of the sampled value within each exchange. For each exchange, sampled values are divided into ten within-domain deciles, and the stacked bars show the percentage of $ER_i^O < ER_i^D$, $ER_i^O = ER_i^D$, and $ER_i^O > ER_i^D$ within each decile. Percentages are computed within exchange × decile cells.

FIGURE WA 6

ELASTICITIES IN STUDY 3



NOTE.—For each scenario, a regression of the log elicited quantity is shown against the log fixed quantity for both the demand elicitation (elicited b_i against fixed a_i^*) and the offer elicitation (elicited a_i against fixed b_i^*). Both variables are centered on their scenario-specific means. Every fitted line thus passes through the origin and lines differ only in slope, which correspond to elasticities. The squares and dots indicate the mean of elicited quantities at each decile. The dashed line is the 45-degree line (proportional responding). Lines with flatter slope (above the 45-degree line below the origin and above the 45-degree line above the origin) indicate sub-proportional responding. The dotted line is the consistency benchmark for the offer elicitation, with slope $1/e_D$. For display purposes only, axes are truncated at approximately the 99th percentile of absolute centered values.

TABLE WA 27

ELASTICITIES IN STUDY 3

Exchange	N	e_D [95% CI]	p (e_D vs. 1)	e_O [95% CI]	p (e_O vs. 1)	$1/e_D$
Spend dollars, get euros	664	0.961 [0.935, 0.986]	0.003	0.982 [0.954, 1.011]	0.233	1.041
Spend dollars, get toilet paper	674	0.931 [0.864, 0.998]	0.043	0.620 [0.577, 0.662]	<.001	1.075
Donate dollars, distribute nets	675	1.026 [0.894, 1.157]	0.702	0.313 [0.249, 0.376]	<.001	0.975
Give up salary, get vacation days	589	0.587 [0.484, 0.689]	<.001	0.303 [0.181, 0.424]	<.001	1.705
Do teaching, get cleaning	675	0.871 [0.805, 0.937]	<.001	0.812 [0.769, 0.856]	<.001	1.148
Spend time, get dollars	680	0.750 [0.658, 0.841]	<.001	0.501 [0.427, 0.575]	<.001	1.334
Wait time, get food samples	673	0.653 [0.571, 0.735]	<.001	0.365 [0.307, 0.423]	<.001	1.532
Give fish, get coconuts	675	0.856 [0.797, 0.915]	<.001	0.760 [0.708, 0.812]	<.001	1.168
Eat frugal, get chef's dinners	668	0.743 [0.629, 0.857]	<.001	0.451 [0.389, 0.513]	<.001	1.346

NOTE.—For each exchange, e_O is the slope from the OLS regression of log a_i on log b_i^* (the elasticity of the offer-elicited quantity with respect to the randomly sampled fixed quantity), and e_D is the slope from the OLS regression of log b_i on log a_i^*. The final column reports $1/e_D$, the consistency benchmark against which e_O can be compared.

TABLE WA 28

QUADRATIC TERMS IN STUDY 3

Exchange	N	β_2^D **[95% CI]**	p **(**β_2^D **vs. 0)**	β_2^O **[95% CI]**	p **(**β_2^O **vs. 0)**
Spend dollars, get euros	664	-0.002 [-0.027, 0.023]	0.883	-0.062 [-0.086, -0.038]	< .001
Spend dollars, get toilet paper	674	0.069 [-0.012, 0.151]	0.093	-0.046 [-0.078, -0.014]	0.005
Donate dollars, distribute nets	675	0.108 [-0.019, 0.235]	0.095	-0.028 [-0.060, 0.003]	0.076
Give up salary, get vacation days	589	-0.069 [-0.219, 0.081]	0.365	-0.055 [-0.140, 0.029]	0.197
Do teaching, get cleaning	675	0.017 [-0.058, 0.091]	0.659	-0.053 [-0.092, -0.014]	0.008
Spend time, get dollars	680	-0.016 [-0.102, 0.071]	0.723	-0.038 [-0.079, 0.002]	0.063
Wait time, get food samples	673	0.076 [0.001, 0.151]	0.047	-0.060 [-0.101, -0.020]	0.004
Give fish, get coconuts	675	0.041 [-0.029, 0.110]	0.252	-0.072 [-0.116, -0.028]	0.001
Eat frugal, get chef's dinners	668	0.046 [-0.098, 0.190]	0.533	-0.004 [-0.043, 0.036]	0.857

NOTE.—For each exchange, the table reports the coefficient on the quadratic term from log-log regressions that add a squared fixed-quantity term to the specifications in Table WA 27. For the offer elicitation, log a_i is regressed on log b_i^* and (log b_i^*)^2; for the demand elicitation, log b_i is regressed on log a_i^* and (log a_i^*)^2. A significant quadratic coefficient would indicate curvature in the log-log relationship and hence an elasticity that varies over the range of the fixed quantity.

TABLE WA 29

SPEARMAN CORRELATIONS IN STUDY 3

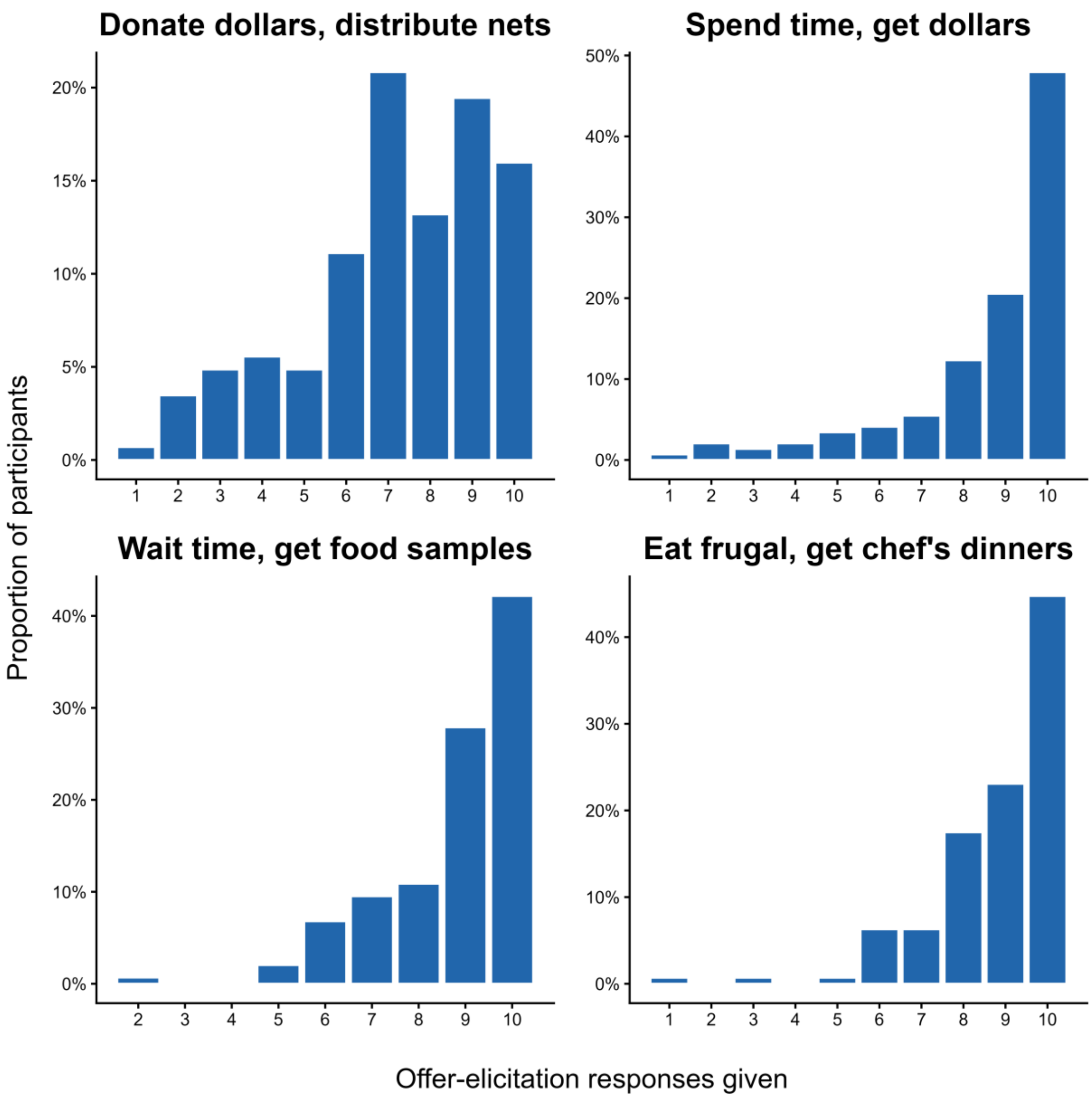
Exchange	*N*	Demand		Offer	
		Spearman ρ	***p***	***Spearman ρ***	***p***
Spend dollars, get euros	664	-0.070	0.072	0.058	0.134
Spend dollars, get toilet paper	674	-0.054	0.165	0.552	< .001
Donate dollars, distribute nets	675	0.057	0.141	0.615	< .001
Give up salary, get vacation days	589	-0.318	< .001	0.454	< .001
Do teaching, get cleaning	675	-0.104	0.007	0.289	< .001
Spend time, get dollars	680	-0.193	< .001	0.436	< .001
Wait time, get food samples	673	-0.259	< .001	0.616	< .001
Give fish, get coconuts	675	-0.121	0.002	0.281	< .001
Eat frugal, get chef's dinners	668	-0.148	< .001	0.548	< .001

NOTE.—Spearman rank correlations between elicited exchange rates and the fixed quantity, by scenario and elicitation. For each scenario, the demand elicitation correlates the demand exchange rate (b_i/a_i^*) with the fixed quantity a_i^*, and the offer elicitation correlates the offer exchange rate (b_i^*/a_i) with the fixed quantity b_i^*. Under proportional responding, both correlations are zero. Sub-proportional responding implies a negative correlation in the demand elicitation and a positive correlation in the offer elicitation. In the demand elicitation the fixed quantity is the denominator, so a linear increase in the denominator alongside a sub-linear increase in the numerator lowers the ratio, producing a negative correlation between b_i/a_i^* and a_i^*. In the offer elicitation the fixed quantity is the numerator, so a linear increase in the numerator alongside a sub-linear increase in the denominator raises the ratio, producing a positive correlation between b_i^*/a_i and b_i^*.

WEB APPENDIX E: SUPPLEMENT TO STUDY 4

FIGURE WA 7

OFFER-ELICITATION RESPONSE COUNTS ACROSS EXCHANGES



NOTE.—Figure represents the distribution of number of offer-elicitation responses per exchange. Each panel shows one exchange. Bars represent the proportion of participants (y-axis) giving a given number of non-missing offer-elicitation responses (x-axis), out of a maximum of 10 fixed values.

TABLE WA 30

OVERVIEW OF EXCLUSIONS IN STUDY 4

Exclusion	# Excluded	# Rows
Rows downloaded		639
No consent	-0	639
Too fast (< 20 sec)	-2	637
Failed attention check (demand)	-33	604
Failed attention check (offer)	-24	580
Participants after exclusions		580
Total exchanges		5800
Exchanges with 0 response in DE	-72	5728
Exchanges with 0 response in OE	-43	5685
Same response across all fixed values in DE	-22	5663
Same response across all fixed values in OE	-37	5626
Log(ER) > mean + 3 SD in Phase DE	-18	5608
Log(ER) < mean - 3 SD in Phase DE	-32	5576
Log(ER) > mean + 3 SD in Phase OE	-37	5539
Log(ER) < mean - 3 SD in Phase OE	-0	5539
Exchanges in analysis (across participants)		5539
Participants in analysis (across participants)		566
Exchanges in analysis (within participants)		5685
Participants in analysis (within participants)		576

NOTE.—As pre-registered we excluded participants who completed the survey under 20 seconds, gave identical responses across all exchanges, or failed either attention check. At the exchange-level, we excluded exchanges where participants stated 0 to either elicitation. We then performed different exclusions depending on the analysis: for the sign test and regression, exchange rates were log-transformed, and exchange-level responses were excluded if the logged exchange rate in either phase was more than 3 SDs from the phase-specific mean for that exchange. These were not performed for the binomial test.

TABLE WA 31

SIGN TEST IN STUDY 4

Exchange	*N*	Proportions			*p*
		$ER_i^O < ER_i^D$	$ER_i^O = ER_i^D$	$ER_i^O > ER_i^D$	
Donate dollars, distribute nets	1,377	.13	.44	.43	< .001
Spend time, get dollars	1,428	.27	.12	.61	< .001
Wait time, get food samples	1,342	.17	.11	.72	< .001
Eat frugal, get chef's dinners	1,392	.30	.27	.43	< .001

NOTE.—For each exchange, the sign test compares ER_i^O and ER_i^D within participants by computing the sign of the difference ($ER_i^O - ER_i^D$). The three proportions report the share of participants for whom this difference is negative ($ER_i^O < ER_i^D$), zero ($ER_i^O = ER_i^D$), and positive ($ER_i^O > ER_i^D$), and sum to 1 within each exchange. The exact binomial (sign) test evaluates the null hypothesis that positive and negative differences are equally likely (.5), based only on the nonzero differences. Hence, ties ($ER_i^O = ER_i^D$) are excluded from the test.

TABLE WA 32

SIGN TEST RESULTS PER FIXED VALUE OF A IN STUDY 4

Fixed (a^*)	***N***	**Proportions**			***p***
		$ER_i^O < ER_i^D$	$ER_i^O = ER_i^D$	$ER_i^O > ER_i^D$	
Donate dollars, distribute nets					
Donate 25 dollars	140	.19	.47	.34	.014
Donate 50 dollars	139	.12	.51	.37	< .001
Donate 75 dollars	139	.14	.38	.47	< .001
Donate 100 dollars	137	.09	.53	.37	< .001
Donate 125 dollars	139	.14	.33	.53	< .001
Donate 150 dollars	138	.12	.49	.39	< .001
Donate 175 dollars	137	.16	.33	.51	< .001
Donate 200 dollars	137	.10	.51	.39	< .001
Donate 225 dollars	136	.17	.32	.51	< .001
Donate 250 dollars	135	.08	.48	.44	< .001
Spend time, get dollars					
Spend 24 minutes	144	.56	.11	.33	.006
Spend 48 minutes	142	.39	.11	.50	.214
Spend 72 minutes	141	.30	.07	.63	< .001
Spend 96 minutes	143	.24	.06	.70	< .001
Spend 120 minutes	141	.14	.36	.50	< .001
Spend 144 minutes	143	.22	.06	.71	< .001
Spend 168 minutes	144	.25	.07	.68	< .001
Spend 192 minutes	143	.22	.06	.73	< .001
Spend 216 minutes	143	.22	.05	.73	< .001
Spend 240 minutes	144	.16	.28	.56	< .001
Wait time, get food samples					
Wait 12 minutes	137	.41	.12	.47	.523
Wait 24 minutes	137	.31	.09	.59	< .001
Wait 36 minutes	135	.20	.09	.71	< .001
Wait 48 minutes	135	.19	.06	.76	< .001
Wait 60 minutes	135	.07	.28	.65	< .001
Wait 72 minutes	133	.16	.06	.78	< .001
Wait 84 minutes	135	.11	.05	.84	< .001
Wait 96 minutes	134	.11	.07	.82	< .001
Wait 108 minutes	131	.09	.07	.84	< .001
Wait 120 minutes	130	.01	.22	.77	< .001
Eat frugal, get chef's dinners					
Eat 3 frugal dinners	137	.34	.34	.32	.916
Eat 6 frugal dinners	140	.34	.25	.41	.435
Eat 9 frugal dinners	140	.34	.24	.42	.285
Eat 12 frugal dinners	140	.29	.29	.42	.070
Eat 15 frugal dinners	140	.28	.33	.39	.121
Eat 18 frugal dinners	139	.29	.24	.46	.031
Eat 21 frugal dinners	138	.25	.24	.51	< .001
Eat 24 frugal dinners	138	.32	.25	.43	.141
Eat 27 frugal dinners	140	.29	.24	.48	.012

Eat 30 frugal dinners	140	.25	.31	.44	.010

NOTE.—For each exchange and fixed value (a^*), we run the same sign test as in Table WA 31.

TABLE WA 33

REGRESSION RESULTS PER FIXED VALUE OF A IN STUDY 4

Fixed (a*)	***N***	**LOG ERR**	***ERR***	***p***
		Donate dollars, distribute nets		
Donate 25 dollars	140	0.278 [0.125, 0.430]	1.320 [1.134, 1.538]	< .001
Donate 50 dollars	139	0.290 [0.140, 0.439]	1.336 [1.151, 1.552]	< .001
Donate 75 dollars	139	0.302 [0.154, 0.449]	1.352 [1.167, 1.567]	< .001
Donate 100 dollars	137	0.314 [0.168, 0.460]	1.369 [1.183, 1.584]	< .001
Donate 125 dollars	139	0.326 [0.180, 0.472]	1.386 [1.198, 1.603]	< .001
Donate 150 dollars	138	0.338 [0.192, 0.484]	1.402 [1.212, 1.623]	< .001
Donate 175 dollars	137	0.350 [0.203, 0.497]	1.419 [1.226, 1.644]	< .001
Donate 200 dollars	137	0.362 [0.214, 0.511]	1.437 [1.238, 1.667]	< .001
Donate 225 dollars	136	0.374 [0.223, 0.526]	1.454 [1.250, 1.692]	< .001
Donate 250 dollars	135	0.387 [0.232, 0.541]	1.472 [1.261, 1.718]	< .001
		Spend time, get dollars		
Spend 24 minutes	144	0.145 [0.056, 0.233]	1.155 [1.058, 1.262]	0.001
Spend 48 minutes	142	0.187 [0.101, 0.272]	1.205 [1.106, 1.313]	< .001
Spend 72 minutes	141	0.229 [0.144, 0.314]	1.257 [1.155, 1.369]	< .001
Spend 96 minutes	143	0.271 [0.185, 0.357]	1.311 [1.203, 1.429]	< .001
Spend 120 minutes	141	0.313 [0.224, 0.402]	1.368 [1.252, 1.494]	< .001
Spend 144 minutes	143	0.355 [0.263, 0.448]	1.427 [1.300, 1.565]	< .001
Spend 168 minutes	144	0.397 [0.299, 0.496]	1.488 [1.349, 1.641]	< .001
Spend 192 minutes	143	0.440 [0.335, 0.544]	1.552 [1.398, 1.723]	< .001
Spend 216 minutes	143	0.482 [0.370, 0.594]	1.619 [1.447, 1.811]	< .001
Spend 240 minutes	144	0.524 [0.404, 0.644]	1.689 [1.498, 1.904]	< .001
		Wait time, get food samples		
Wait 12 minutes	137	0.222 [0.119, 0.326]	1.249 [1.126, 1.385]	< .001
Wait 24 minutes	137	0.286 [0.188, 0.383]	1.331 [1.207, 1.467]	< .001
Wait 36 minutes	135	0.349 [0.255, 0.443]	1.417 [1.290, 1.558]	< .001
Wait 48 minutes	135	0.412 [0.319, 0.505]	1.510 [1.376, 1.657]	< .001
Wait 60 minutes	135	0.475 [0.381, 0.570]	1.608 [1.463, 1.768]	< .001
Wait 72 minutes	133	0.539 [0.440, 0.637]	1.713 [1.553, 1.890]	< .001
Wait 84 minutes	135	0.602 [0.497, 0.706]	1.825 [1.645, 2.026]	< .001
Wait 96 minutes	134	0.665 [0.553, 0.777]	1.944 [1.738, 2.175]	< .001
Wait 108 minutes	131	0.728 [0.607, 0.849]	2.071 [1.835, 2.338]	< .001
Wait 120 minutes	130	0.791 [0.660, 0.923]	2.206 [1.934, 2.516]	< .001
		Eat frugal, get chef's dinners		
Eat 3 frugal dinners	137	-0.087 [-0.269, 0.094]	0.916 [0.764, 1.099]	0.343
Eat 6 frugal dinners	140	-0.049 [-0.229, 0.130]	0.952 [0.795, 1.139]	0.587
Eat 9 frugal dinners	140	-0.011 [-0.190, 0.167]	0.989 [0.827, 1.182]	0.900
Eat 12 frugal dinners	140	0.027 [-0.153, 0.206]	1.027 [0.858, 1.229]	0.770
Eat 15 frugal dinners	140	0.065 [-0.117, 0.246]	1.067 [0.890, 1.279]	0.482
Eat 18 frugal dinners	139	0.103 [-0.082, 0.287]	1.108 [0.922, 1.332]	0.272
Eat 21 frugal dinners	138	0.141 [-0.048, 0.329]	1.151 [0.953, 1.390]	0.142

Eat 24 frugal dinners	138	0.179 [-0.015, 0.372]	1.196 [0.985, 1.451]	0.070
Eat 27 frugal dinners	140	0.217 [0.017, 0.417]	1.242 [1.017, 1.517]	0.034
Eat 30 frugal dinners	137	0.255 [0.047, 0.462]	1.290 [1.049, 1.587]	0.016

NOTE.—For each exchange, we fit a linear mixed-effects model predicting log(ERR) from the $a*$ value, using the bobyqa optimizer. The fixed value $a*$ took the levels 0 to 9, so that its lowest magnitude equaled zero. The model included a fixed effect of $a*$ as well as by-participant random intercepts and random slopes for $a*$. From each fitted model we obtained estimated marginal means at each of the ten scope levels, reporting the model-implied mean log(ERR) at each level along with its 95% confidence interval. ERR values and their confidence-interval bounds were obtained by exponentiating the corresponding log(ERR) estimates.

TABLE WA 34

EXCHANGE RATE RATIOS PER EXCHANGE

Exchange	β_0	β_1	$e^{\beta 0}$	$e^{\beta 1}$	*p* (β_1 *vs.* 0)	R^2
Donate dollars, distribute nets	0.278 [0.125, 0.430]	0.012 [0.001, 0.023]	1.320	1.012	0.028	0.797
Spend time, get dollars	0.145 [0.056, 0.233]	0.042 [0.030, 0.054]	1.155	1.043	< .001	0.688
Wait time, get food samples	0.222 [0.119, 0.326]	0.063 [0.048, 0.079]	1.249	1.065	< .001	0.739
Eat frugal, get chef's dinners	-0.087 [-0.269, 0.094]	0.038 [0.023, 0.053]	0.916	1.039	< .001	0.810

NOTE.—We regressed the log of the exchange rate ratio $ERR_i^{O/D} = ER_i^O / ER_i^D$ on a_i^* (a variable ranging from 0-9) for each scenario. That is, $log\ ERR_i^{O/D} = \beta_0 + \beta_1(a_i^*) + u_{0i} + u_{1i} * a_i^* + \varepsilon_i$, where u_{0i} and u_{1i} are participant-specific random deviations in the intercept and slope. With this specification, the estimated intercept β_0 in each scenario is the mean $log\ ERR_i^{O/D}$ at $a_i^* = 0$. With respect to the slope, for every fixed unit increase in a_i^*, $ERR_i^{O/D}$ is multiplied by $e^{\beta 1}$.

TABLE WA 35

PARTICIPANTS WITH $ER^O > ER^D$ AT ALL TEN FIXED VALUES

Exchange	*N*	N_{obs}	P_{obs}	P_0	*p*
Donate dollars, distribute nets	142	26	0.18	0.00098	< .001
Spend time, get dollars	147	23	0.16		< .001
Wait time, get food samples	142	44	0.31		< .001
Eat frugal, get chef's dinners	145	26	0.18		< .001

NOTE.—Results reflect a one-sample proportion test of the proportion of participants showing $ER_i^O > ER_i^D$ at all magnitudes a^* (P_{obs}) against chance ($P_0 = .50^{10} = 0.00098$).

TABLE WA 36

ELASTICITIES IN STUDY 4

Exchange	**N**	**e_D [95% CI]**	**p (e_D vs. 1)**	**e_O [95% CI]**	**p (e_O vs. 1)**	**1/e_D**
Donate dollars, distribute nets	1,419	0.980 [0.930, 1.029]	.421	0.911 [0.874, 0.947]	< .001	1.021
Spend time, get dollars	1,470	0.887 [0.846, 0.927]	< .001	0.866 [0.825, 0.906]	< .001	1.128
Wait time, get food samples	1,373	0.795 [0.719, 0.872]	< .001	0.824 [0.759, 0.889]	< .001	1.257
Eat frugal, get chef's dinners	1,423	0.937 [0.890, 0.984]	.009	0.843 [0.791, 0.895]	< .001	1.067

NOTE.—For each scenario, we estimated two elasticities using linear mixed-effects models with by-participant random intercepts and random slopes. The demand elasticity (e_D) was estimated by regressing $\log(b_i)$ on $\log(a_i^*)$, and the offer elasticity (e_O) by regressing $\log(a_i)$ on $\log(b_i^*)$. That is, for the demand model, $log\ b_i = \beta_0 + \beta_1 \log(a_i^*) + u_{0i} + u_{1i} * \log(a_i^*) + \varepsilon_i$, where u_{0i} and u_{1i} are participant-specific random deviations in the intercept and slope; the offer model has the analogous form with $\log(b_i^*)$ as the predictor. Because both variables are log-transformed, the estimated slope in each model is an elasticity: it gives the percentage change in the outcome associated with a 1% change in the predictor.

TABLE WA 37

INDIVIDUAL-LEVEL ELASTICITIES IN STUDY 4

Demand				
Exchange	**N**	**Median Slope**	**% sig sub**	**% sig super**
Donate dollars, distribute nets	142	1.000	22%	13%
Spend time, get dollars	147	0.914	33%	7%
Wait time, get food samples	139	0.855	45%	7%
Eat frugal, get chef's dinners	144	1.000	24%	27%
Offer				
Exchange	**N**	**Median Slope**	**% sig sub**	**% sig super**
Donate dollars, distribute nets	142	1.000	34%	10%
Spend time, get dollars	147	0.961	21%	7%
Wait time, get food samples	138	0.968	30%	10%
Eat frugal, get chef's dinners	143	0.943	24%	20%

NOTE.—For each participant in each scenario and elicitation, we regressed the log of their elicited quantities on the log of the fixed quantities and took the resulting slope as that participant's elasticity. Because each participant responded to only up to ten fixed values, power per participant is limited. A slope was treated as estimable only if at least three observations remained and the predictor took more than one distinct value; participants without an estimable slope were excluded. *N* is the number of participants with an estimable slope. "Median slope" is the median elasticity across those participants. "% sig sub" and "% sig super" are the percentages whose elasticity was significantly below 1 (sub-proportional) and significantly above 1 (super-proportional), respectively, each tested against 1 with a two-sided *t*-test at $\alpha = .05$.

TABLE WA 38

INDIVIDUAL-LEVEL SPEARMAN CORRELATIONS IN STUDY 4

Demand					
Exchange	**N**	**Median ρ**	**% sub-proportional (ρ < 0)**	**% super-proportional (ρ > 0)**	**% proportional**
Donate dollars, distribute nets	110	0.17	8%	16%	75%
Spend time, get dollars	140	-0.34	25%	9%	66%
Wait time, get food samples	133	-0.51	43%	10%	47%
Eat frugal, get chef's dinners	115	-0.16	25%	7%	68%
Offer					
Exchange	**N**	**Median ρ**	**% sub-proportional (ρ > 0)**	**% super-proportional (ρ < 0)**	**% proportional**
Donate dollars, distribute nets	101	0.20	25%	5%	70%
Spend time, get dollars	135	0.23	21%	5%	73%
Wait time, get food samples	117	0.26	30%	9%	61%
Eat frugal, get chef's dinners	117	0.29	27%	8%	65%

NOTE.—For each participant in each scenario, we computed a Spearman rank correlation between the per-unit exchange rate and the fixed quantity, separately for each elicitation. For the demand elicitation, the rate was defined as b_i/a_i^* and the fixed quantity as a_i^*; for the offer elicitation, the rate was defined as b_i^*/a_i and the fixed quantity as b_i^*. A correlation was computed only when a participant had at least three usable observations and both variables showed variation; otherwise it was omitted. In demand elicitation, a negative correlation (ρ < 0) indicates that the per-unit rate falls as the fixed quantity rises (sub-proportional responding), whereas a positive correlation (ρ > 0) indicates super-proportional responding. In offer elicitation, this interpretation reverses. We then summarized the distribution of these per-participant correlations within each scenario and elicitation. *N* denotes the number of participants with a computable correlation. Median ρ is the median of the per-participant correlations. Each participant was classified as sub-proportional (demand: significant negative correlation; offer: significant positive correlation), super-proportional (demand: significant positive correlation; offer: significant negative correlation), or proportional (non-significant correlation) using a significance threshold of .05, and the reported percentages give the share of participants in each category.

WEB APPENDIX F: SUPPLEMENT TO STUDY 5

TABLE WA 39

OVERVIEW OF EXCLUSIONS IN STUDY 5

Exclusion	# Excluded	# Rows
Phase 1: Rows downloaded		409
No consent	-0	409
Stated $0 in phase 1	-67	342
Failed comprehension check 1	-52	290
Failed comprehension check 2	-31	259
Phase 2: Rows downloaded		355
No consent	-0	355
Dropout (no DV response)	-7	348
Excluded in Phase 1	-126	222
Failed comprehension check 1	-42	180
Failed comprehension check 2	-13	167
Participants in analysis with exclusions		167
Participants in analysis without exclusions		290

NOTE.—As pre-registered, we excluded participants who reported a willingness to pay of $0 from their potential bonus in phase 1, as well as participants who failed at least one of the two comprehension checks administered at the end of each survey.

TABLE WA 40

OVERVIEW OF COMPREHENSION CHECK QUESTIONS

Offer elicitation	
Comprehension check 1	*Comprehension check 2*
To ensure that you understood the task:	To ensure that you understood the task:
Imagine that your stated amount was \$4.	Imagine that your stated amount was \$2.
If our predetermined amount was \$3, would the soap bars then be donated?	If our predetermined amount was \$3, would the soap bars then be donated?
Yes, the soap bars would be donated. No, the soap bars would not be donated.	Yes, the soap bars would be donated. No, the soap bars would not be donated.
Demand elicitation	
Comprehension check 1	*Comprehension check 2*
To ensure that you understood the task:	To ensure that you understood the task:
Imagine that your stated number was 5 soap bars.	Imagine that your stated number was 15 soap bars.
If our predetermined number was 10 soap bars, would the soap bars then be donated?	If our predetermined number was 10 soap bars, would the soap bars then be donated?
Yes, the soap bars would be donated. No, the soap bars would not be donated.	Yes, the soap bars would be donated. No, the soap bars would not be donated.

NOTE.—Comprehension check questions used in Study 5.