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Equity and Efficiency in the Organization of Firms

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Abstract

Using a series of laboratory experiments, this paper shows that fairness concerns of potential co-founders may lead to failure to undertake profitable joint production opportunities. Inefficiency occurs more often when equal division of the firm's profit would leave one co-founder worse-off relative to her outside option. We find that framing an opportunity as an employment relationship rather than a partnership significantly reduces these inefficiencies and increases subjects' welfare. Evidence from division of profits and communication logs from free-form negotiations between subjects suggest that only some subjects incorporate outside options to define fairness. Based on this, we provide a theoretical model of how fairness concerns affect the formation of new firms.

JEL Classification: C92, D91, L14, D83

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1 Introduction

It is frequently assumed that in environments with full information and without contractual frictions or income effects, individuals who have a profitable opportunity to enter into a new venture will do so (Coase, 1960; Hellmann, 2007). In fact, there is evidence that people exit well-paying jobs to found new ventures even when expected profits are not positive (e.g. Artinger and Powell, 2016). Despite the well established notion that profitable opportunities are generally pursued when individuals are aware of them and capable of doing so (Shane, 2001), social barriers to firm formation may restrict the capabilities of a potential entrepreneur to proceed with founding a venture. For instance, the formation of ventures may be dependent on whether a potential entrepreneur is connected to appropriate co-founders and early employees (Klepper and Sleeper, 2005). In this paper, we investigate an alternative barrier to firm formation; difficulties that arise during co-founder contract negotiations.

More specifically, using laboratory experiments, this paper aims to examine frictions that arise among people negotiating the terms of a new joint production agreement. The contribution of the paper is threefold. First, we demonstrate that while subjects do not engage in unprofitable joint ventures, they frequently fail to engage in profitable joint production. This failure is more likely when equality in profit sharing from the joint production is not individually rational. Second, we find that framing of a joint production opportunity affects how individuals exploit that opportunity even when there is no subsequent decision, such as how much effort to invest in the venture, to be made after agreeing to produce jointly. Third, we show that incorporation of outside options in defining fairness improves the efficiency level of joint production decisions.

To test whether opportunities to enter into profitable ventures are impacted by co-founders' negotiations with each other, we implemented a laboratory experiment in which subjects are randomly assigned into pairs and offered an opportunity to enter into joint production with their pair mate. To pursue this joint production opportunity, subjects have to agree to leave their current wage employment, and reach an agreement with their pair mate on how to produce and how to divide net profits. Pairs attempt to reach this agreement through free-form chat. If subjects agree with their pair mates on production and the division of profits, their share of the profits is their payoff for that period. If they cannot agree on what to do or agree to not engage in joint production, their payoffs default to their outside options. There is no uncertainty in terms of profits from any

of the production specifications or the outside options in this game. Moreover, choices, payoffs, and partners in one period have no bearing on the next period.

We compare pair performance under two organizational forms: a partnership and an employment relationship. Under partnership, pair mates are labeled as partners. They have to agree on the production option, how to share firm revenues if they engage in joint production, and each member of the pair has to bear the production cost for her product. Under employment relationship, one randomly chosen member is labeled as the owner of the firm. The owner and the employee have to jointly agree on a salary for the employee in order for joint production to occur. The employer receives the entire revenue and bears production costs for both products in addition to paying the employee's salary. All other particulars of the two organization forms are identical. Thus, the economic problems underlying the two organizational forms are identical, but they are framed differently.

For each organizational form, we vary the parameters of the profit opportunity from joint production and outside options across periods in both frames to obtain three *cases*. Case 1: Net profit from the profit maximizing joint production specification is less than the sum of the outside options. Case 2: Half of the maximum net profit from joint production exceeds each outside option. Case 3: Maximum net profit from joint production exceeds the sum of outside options but one outside option is larger than half of the net profit. While the efficient decision is not to engage in joint production in the first case, joint production is efficient in cases two and three. In the second case, equally sharing the maximum net profit from joint production makes both better off. In the third case, however, the net profit must be divided unequally to satisfy each player's individual rationality constraint.

In our experiments, subjects often make inefficient choices under both organizational forms. However, inefficient choices are almost exclusively made when joint production is optimal but subjects chose wage work over joint production. When choosing the outside option was optimal, subjects did not choose joint production. When joint production was optimal, subjects chose the optimal production specification conditional on choosing joint production. It is noteworthy that, the probability that inefficient choices were made went down by more than a third, from 34.4% to 22%, and players' welfare increased by more than 18%, on average, under the employment frame relative to the partnership frame. Under the partnership frame, more than 15% of the pairs that chose the optimal joint production mode in case 3, divided profits equally, violating one subject's

individual rationality constraint. These individual rationality violations do not occur under the employment frame. We find that owners under the employment frame did not earn more than the employees and we do not find any significant difference across the two frames in this respect.

We also study the chat logs between each pair of negotiators. In periods where forming a firm is optimal, we find that (1) if the first offer made during the negotiation provided benefits to both parties, the negotiation was more likely to end in firm formation, (2) the employment treatment causally increases the likelihood that the first offer would provide benefits to both parties, and (3) if the first offer provided benefits to both parties, the employment treatment had no further effect on firm formation.

We do not find compelling evidence that the differences across the two frames are caused by differences in cognition, differences in subject motivation, or differential bargaining power between owners and employees. Rather, our findings seem to be driven by a concern for fairness. Under the partnership frame, a higher likelihood of equal profit sharing and of equal division being mentioned in chats suggests that equal division of profits is focal for the subjects. In case 2, this concern does not lead to inefficient production choices but does often lead to equal division of profits, violating both the Nash bargaining solution with equal bargaining weights and the Shapley value solution. Similarly, in case 3, equal profit divisions do not lead to inefficient production choices but do lead to violations of individual rationality. Thus, in case 3, subjects face a tradeoff between accepting a division that makes someone worse off or rejecting their concern for equity in profit sharing. Equity concerns seem to be of high importance under partnership. Under the employment relationship, concern for fairness is primarily tied to outside options which ensures both subjects in each pair earns more than their outside options in joint production, and increases the likelihood that pairs optimally decide to enter into joint production.

We develop a model based on Fehr and Schmidt (1999) that rationalizes our findings by allowing different subjects to have different notions of fairness, and the proportion of subjects which hold these different notions may change as the framing changes. In this model, inefficient outcomes may occur in case 2 situations if one subject defines fairness as equal profit sharing and the other defines it relative to both players' outside options (i.e., equal surplus sharing). In case 3 situations, inefficient outcomes may occur if one or both players think of equal profit sharing as the fair outcome. We show that inefficient outcomes occur more frequently under case 3 than under case 2, which is what we observe in the data. By making the outside options more salient under the employment frame, if

it increases the likelihood that subjects would define fairness relative to outside options instead of in absolute terms under the employment frame, it would reduce the propensity of inefficient outcomes under that frame. This model also highlights how social preference such as inequity aversion makes Pareto improvement allocation harder to reach.[1]

Combined, our findings suggest that co-founders of a potentially profitable firm are concerned about efficiency and fairness in distribution. Pareto efficiency is independent of framing, whereas fairness is not. Changing the frame may change how "fair" a deal is to potential participants. When such framing effects are quantitatively significant, organizational design affects the efficiency and equity of engaging in joint production. We show that framing the joint production opportunity as an employment relationship results in more efficient but not more inequitable outcomes versus framing it as a partnership opportunity. Concerns for fairness and equity are well known in the behavioral economics literature (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000; Hoffman and Spitzer, 1985; Kahneman et al., 1986). We build on this to show that fairness in firm formation depends on the organizational design, even when the design difference arises only from framing. We demonstrate the practical advantage of an employment relationship relative to a partnership relationship when such fairness concerns are salient.

Our results are consistent with recent evidence that efficient joint production is difficult even in the absence of contractual frictions, impediments to bargaining, or income effects (Breza et al., 2017; Dessein and Santos, 2006; Hjort, 2014; Lyons, 2017), and, as discussed earlier, with research that shows fairness is not independent of framing (Hoffman and Spitzer, 1985; Kahneman et al., 1986). Our results also contribute to the entrepreneurship literature by demonstrating that how a co-founder agreement is framed may impact the likelihood of it being successful and the division of equity. This latter point may be of particular relevance given recent evidence that equal equity divisions may reduce performance and co-founder effort. For instance, Hellmann and Wasserman (2016) find a negative relationship between equal equity splits and valuations.[2] Moreover, we add to Kagan et al. (2017), who find a negative relationship between equal equity divisions and subjects' performance in the lab, by demonstrating that self-selection into an equal split agreement can be impacted by the proposed organizational design as well as by participants' perception of fairness

[1] A related paper is Charness and Rabin (2002), who investigate how social preference affects subjects' willingness to sacrifice own payoffs.

[2] This finding is consistent with anecdotal evidence that VC firms turn down potentially profitable opportunities when they do not think they can effectively work with start-up founders (e.g. Tower, 2011).

even when there is no actions to be taken (including effort choice) subsequent to the agreement.[3]

The remainder of our paper begins with a detailed description of our experiment design, followed by a description of our data and variable measurement and a presentation of our findings. We then present a theoretical model that explains our findings, and a conclusion that summarizes and discusses implications of our study.

2 Experimental Design

In our experimental setting, two subjects jointly decide whether to create a firm to produce jointly instead of staying with their outside wage options. The experiments were conducted between December 2016 and March 2017 at the University of Toronto and were programmed and conducted with the software *z-Tree* developed by Fischbacher (2007). Each laboratory session included an even number of subjects (ranging from 6 to 10) participated and was 20 periods long. The first five periods were considered practice periods and the remaining 15 periods were used to determine the earnings of the subjects.

In each period, each subject was randomly assigned the role of a chair maker or a table maker, and randomly and anonymously paired with one other subject who was assigned the opposite role. At the beginning of a period, each subject is assigned as currently employed at a specific wage which is reported to both subjects. The two subjects have the option of leaving their current jobs to jointly produce chairs and tables for a client. If they produce jointly, they will have to choose to produce chairs and tables using one of four production specifications. The purpose for having four production specifications in each period is, first, to allow for the possibility that participants'

[3]While the focus of this paper is to analyze the impact of organizational design and production possibilities on firm formation, as far as we know, this is one of the first papers to allow for unstructured cooperative bargaining as modeled by Nash Jr (1950) by letting bargainers chat among themselves in a free-form format. While Roth and Murnighan (1982), Isoni et al. (2014), and Luhan et al. (2013) present experiments with unstructured bargaining, interaction between participants is not completely free form. For instance, our experimental design is similar to Exley et al. (2016) who analyze anonymous pair-wise bargaining over profit-wage splits in the lab using a more structured bargaining protocol unlike the free-form chat program that we use. Moreover, they focus on the gender of the potential employee and find that women negotiate over their wage less frequently than men but perform better on average when they do negotiate. Perhaps even more closely related to our study is Andreoni et al. (2002) who also find that concerns about equality can lead to non-equilibrium outcomes in two-people public goods games. However, they do not investigate whether organizational design alters this relationship and do not allow for open chat between partners. A number of related papers demonstrate concerns for fairness in ultimatum games (e.g. Gantner et al., 2001; Kagel et al., 1996) that are consistent with our finding that subjects have strong preferences for fairness that, in some cases, dominate their preferences for personal gain. One difference between most papers on bargaining experiments and ours is that we systematically explore the effect of outside options, equal and unequal, on bilateral bargaining outcomes. A notable exception is Binmore et al. (1989), who present experimental results from alternating-offer bargaining with outside options and time discounting.

abilities to solve the optimal production problem conditional on forming a firm varies depending on the frame and parameters, and second, to more closely represent a "real-world" problem in which both how to produce and how to divide gains from production are made.

The amount the client is willing to pay (revenue) and the costs of producing chairs and tables under each specification are reported to both subjects. The revenue and cost functions, and the outside options are exogenously determined. Moreover, given that only revenues from joint production are presented and are not broken down by product or producer, there is no straight forward interpretation of a subject's contribution to the joint revenue. This is somewhat more realistic than some other experimental settings as a founder's contribution to the success of a firm is typically very hard to precisely estimate.

After observing the production possibilities and outside options, the subjects are first asked to find the most profitable specification using the revenue and cost information. A firm's net profit for a given specification is defined as revenue minus the production costs of chair and table for that specification. Revenue and costs from all production specifications were deterministic and there was no uncertainty in the production function. Again, because our *ex ante* focus was on figuring out what determines successful availing of joint production opportunities, we created a setting where profits depended both on revenue and costs and there were multiple production specifications. *Ex post*, we found that these issues did not have an important impact on the creation of a firm in our experiments.

After each subject individually reported the specification they believed would maximize firm's profit, a chat box that the two partners could use to discuss their plans for joint production for two and a half minutes would open up.[4] The chat was free form and used the chat feature of *z-Tree*. Figure 1 displays how the chat program appeared to subjects. During the chat, the subjects would decide on whether to produce jointly, production specification for the firm (if formed), and earnings of each subject from the firm (if formed). The exact structure of a subject's earnings depended on the framing of the roles of the two players within the firm. We will discuss that in detail below. Once the two paired subjects made a decision regarding joint production, they could voluntarily end the chat. If they did not end the chat before the stipulated time limit, the chat would end automatically and the chat window would close. Once the chat ended, each subject would indicate

[4]We allowed three minutes of chatting in the five practice periods. The time limit for chat was typically not binding.

whether they decided to produce jointly, or stay at their current jobs and not produce jointly, or could not reach an agreement. If paired subjects could not reach an agreement or decided to stay at their current jobs, the period would end and each would earn their outside options. If both indicated that they decided to produce jointly, they were first asked which production specification they had chosen, and, if both subjects' entries matched, they were asked about how they decided to allocate firm earnings. If paired subjects disagreed on either of these decisions, the period would end and they would earn their outside options. If they agreed on all decisions, they would earn their share of the new firm's profits.

Depending on the session, subjects were asked about how they decided to allocate firm earnings in two different ways. In the sessions under the *partnership* framing, each pair of subjects were referred to as partners. They would bear the cost of the product they produced (either chair or table) and would get a share of the revenue. Thus, under joint production, each subject's earning would equal the share of revenue that she received minus the cost of the product she produced. During the chat, they would negotiate the part of the revenue each would keep for herself. They would enter this amount after entering the production specification. Under the *employment* frame, on the other hand, the chair maker would be labeled as the owner and the table maker as the employee. In this frame, under joint production, the employee earned a salary determined by the two subjects during the chat. The owner would have to bear the salary and production costs of both the chair and the table, and earn the full revenue. The owner's (chair maker) net earning equaled revenue minus the employee's salary and the two production costs. Structure of the chat remained unchanged. The two subjects would chat to choose whether they wanted to produce jointly, which production specification to choose if they produce jointly, and the table maker's salary. During the reporting of the chat decisions at the end of the chat, both would enter the salary of the employee (table maker) instead of revenue shares. Given the rules of determining each player's earning, economic contents of the cooperative game under the two frames are the same. However, the nature of the firm is framed differently. Within a session, the framing remained unchanged across periods. Figure 2 summarizes the experimental design.

In a given period within a session, all subject pairs faced the same parameters and parameters across periods were different. Moreover, the set of parameters in the five practice periods were the same in every session and their sequence was also unchanged. For the 15 paid periods, we used the same set of parameters in all sessions under both framing. However, in each session, we

generated the sequence of the parameters over the periods randomly to control for any order effect. The parameters for a given period were chosen to represent three cases: i) case 1: net profit from the profit maximizing joint production specification is lower than the sum of the outside options, making staying with current jobs preferable to producing jointly, ii) case 2: net profit from the profit maximizing joint production specification is higher than the sum of the outside options and splitting the net profit equally makes each subject better off relative to her outside option, and iii) case 3: while net profit from the profit maximizing joint production specification is higher than the sum of the outside options, splitting the net profit equally makes one subject strictly worse off relative to her outside option. Thus, joint production is sub-optimal under case 1 and optimal under cases 2 and 3. Pareto improvements due to joint production can be achieved by splitting the net profit equally or unequally between the subjects under case 2, but it can only be achieved through unequal sharing of the net profit under case 3. A summary of our treatment groups is provided in Figure 3. We provide the full set of parameters subjects faced in Appendix C.

As there is no uncertainty in this game, subjects were aware of their earnings, denoted in points, from a period at the end of that period. Nonetheless, we reported the final outcome in terms of firm formation, chosen production specification, revenue share/table maker's salary, and earning of each player within the pair for subjects' review. After participating in 20 periods, two periods from periods 6 and 20 were randomly chosen to determine payments. The subjects were paid in cash according to their point earnings from those periods using the pre-specified exchange rate of \$1 for 10 points. Subjects spent around an hour and 45 minutes in the lab from the beginning of the experiment to payment and on average received slightly more than \$25. Note that the subjects received written instructions about the session and also a written guideline for appropriate chatting protocol. They also participated in a short survey about their degree majors and past experience with economic and psychology experiments before they were paid. Written instructions for the experiment under both framing and the chatting guidelines are provided in the Appendix C.

3 Data and Analysis Plan

In total, 124 undergraduate students participated in 13 lab sessions. Of these, 64 participated in 7 partnership framing sessions and 60 participated in 6 employment framing sessions. We do not use the five practice periods in any of our data analysis. With 15 paid periods in each session, we have

a total of 930 session-pair (1860 session-individual) observations that are evenly divided between the three cases.

We collected data on whether or not pairs chose to enter into joint production and, if so, which production specification they chose, how profits in joint production decision were divided, and the length and topics of pair chats. We also recorded whether each individual accurately indicated the optimal joint production decision before chatting with their partner as a measure of their cognitive ability. Data on chat characteristics were collected from the chat logs from each period and coded by a research assistant. The research assistant's output was randomly audited by one of the authors who agreed with the coding in all cases.

Our outcome variables of interest as well as our treatment indicators are summarized in Table 1. Table A1 presents sample means and standard deviations for all the variables presented in Table 1.

We also collected data on subject characteristics during post-session surveys. The three cases are randomly sequenced within a session such that all subjects in our sample participate in the same number of each case. Different subjects engage in different framing sessions. Table 2 demonstrates that there are differences in some, but not all, of the subject characteristics across the two session types. In particular, subjects in the employment frame are younger and have less experience participating in lab experiments. These differences are driven by the timing of recruitment for the two session types and suggest that subjects in the partnership sessions may earn more in the experiment because they have more education and more experience on average. However, as we report in section 4, subjects in the employment sessions earn significantly more on average for reasons that are inconsistent with differential capabilities. Moreover, controlling for these characteristics does not change our findings. Interestingly, there is no difference in subjects' perceived level of experiment difficulty or in whether or not they felt the allotted time per period was appropriate between the two frames suggesting that the frames did not come across to subjects as differentially onerous.

Our primary strategy for estimating the effects of cases and framing on outcomes is to compare mean outcomes across these conditions. To verify that our mean comparisons are not driven by differences in populations across the two session types, we also run regression analyses to test the effects of our treatment variables on outcomes conditional on subject characteristics and subject fixed effects. Once we have established the effects of our treatments on whether or not optimal outcomes were reached, individual rationality, and negotiation efficiency, we explore four explanations for our

findings. In particular, we examine whether our findings are affected by differences in cognition, low costs of making inefficient choices, differences in bargaining advantages across conditions, or by differences in perception about what is fair and acceptable. We report our estimates in section 4 below.

4 Results

We begin by presenting average outcomes across the three cases.[5] We then present average outcomes across the two frames, and across frame and case. We conclude this section by exploring possible explanations for our findings.

4.1 Outcomes by Case Type

Table 3 presents sample mean outcomes across the three cases. In all three cases subjects are able to calculate the optimal production specification before chat begins with very high probability. This suggests that the experiment did not require subjects to make particularly difficult calculations. Looking at the entire table, we find a number of notable patterns. First, pairs are almost always able to reach the optimal decision in situations where joint production is not optimal. That is, they typically do not produce jointly under case 1. Second, when joint production is optimal, pairs fail to do so under cases 2 and 3 in more than a quarter of the times. Third, when they enter into joint production under cases 2 or 3, they almost always choose the optimal joint production specification. Fourth, pairs reach optimal outcomes significantly less frequently under case 3 than under case 2. However, this does not arise from subjects being less likely to figure out the optimal production specification prior to chatting with the subject they are partnered with. In fact, they are able to identify the optimal production specification when joint production is optimal (cases 2 and 3) than when it is not (case 1). Taken together, these patterns suggest that the take-up of profitable joint production is hindered by bargaining failure even in a cooperative setting where the pair recognizes joint production is profitable. As suboptimality does not arise from choice of suboptimal production specification, we will focus on the effect of organizational design on joint production and profit sharing in our subsequent analysis.

[5] As a reminder, in case 1 periods, joint production is not optimal, in case 2 periods, joint production is optimal and equal earnings divisions are individually rational for both partners, and in case 3 periods, joint production is optimal but equal earnings divisions leaves one partner worse off than she would be in wage work.

The means presented in Table 3 support this interpretation by demonstrating that much less negotiation, measured by chat times, and disagreement occurs when outside options are optimal and that more chatting and disagreement occurs in case 3 than case 2. Not surprisingly, equal profit sharing occurs significantly more frequently in case 2. It occurs about 8% of the time in case 3 resulting in one pair member being worse off in joint production than they would be in their outside option. That it occurs at all in case 3 suggests a strong preference for equity among some subjects (Fehr and Schmidt, 1999). Interestingly, we find that the propensity of pairs equally splitting the surplus (earning the same gains from joint production relative to their outside options) is not statistically different under cases 2 and 3. This suggests that whether equal profit split makes both pair members better off (when joint production is optimal) does not seem to change people's attention to outside options.

4.2 Outcomes by Framing

Table 4 reports mean outcomes by session framing. These averages demonstrate that optimal outcomes occur significantly more frequently in the employment frame than the partnership frame and that this is driven by an increase in the frequency of joint production. Moreover, the averages are consistent with negotiation being more straightforward and successful in the employment frame. Specifically, chats by a pair conclude faster and they also had less disagreement with their partner in the employment than in the partnership frame. Furthermore, equal division of profit occurs less frequently and joint production outcomes make both members of a pair better off 10 percentage points more frequently in the employment frame. In contrast, divisions that lead both pair members to have the same surplus relative to outside options occur significantly more frequently in the employment frame; 26% of the time as opposed to 9% of the time in the partnership frame. Combined, these results suggest that framing the joint production opportunity as one with a single owner and an employee as opposed to one with two owners on its own provides significant help in overcoming difficulties in reaching an agreement that may arise in new firm creation.

A possible explanation for why the employment frame leads to more efficient bargaining and final outcome can be that the owner exercises control which the employee accepts. Members in a partnership may disagree more over who has the control of the joint production decisions. If this is the case, one would expect the owner to pocket most of the surplus, unlike under the partnership frame. However, Table 4 demonstrates that the chair producer, who is the owner in the employment

frame, earns the same share of joint production profits and surplus under both frames. This suggests that owners are not getting more bargaining power due to framing.

Another possible explanation for performance improvement under the employment frame is that subjects in the frame are better able to figure out what the optimal solution is. This explanation is consistent with significantly more individuals in the employment frame accurately choosing the optimal production specification prior to chatting than in the partnership frame. This is somewhat surprising given that the average subject characteristics presented in Table 2 are consistent with subjects in the partnership frame being of higher ability than those in the employment frame. However, the frame itself could improve cognition. We explore whether differences in cognition are driving our results in section 4.3.2.

Table 5 presents mean outcomes by both session framing and the three cases. These comparisons allow us to test whether the employment frame is differentially improving outcomes in what appears from Table 3 to be the more difficult periods, specifically case 3 periods where equal earnings sharing leaves one individual worse off. The results presented in Table 5 demonstrate that the employment frame increases the frequency of optimal outcomes by similar amounts in both case 2 and case 3. In particular, relative to the partnership frame, optimal outcomes in case 2 and case 3 periods are about 11 and 14 percentage points, respectively, higher in the employment frame. Reduction in mean chat length and failure to reach agreement in case 3 periods due to framing suggests that improvement in bargaining efficiency was particularly evident in case 3 periods. Consistent with this improvement in bargaining efficiency, equal split of the firm's profits falls from 15% in the partnership frame to less than 1% in the employment frame for case 3 periods. This contributes to a large reduction in the number of joint production outcomes that make one pair member worse off than her outside option. The employment frame also significantly reduces the frequency of equal profit sharing in case 2 periods where this is individually rational for both partners, suggesting that the frame may be altering subjects' views about how earnings should be divided.

The results we have presented so far demonstrate that, even in a transparent and frictionless environment, agreeing to produce jointly when it is efficient to do so is not trivial when equal profit sharing leaves one subject worse off. Forming profitable firms is easier when subjects in a pair are told that one of them is an owner and the other is an employee than when they are both told that they are partners. Furthermore, we find strong preferences for equal profit sharing when

joint production is framed as a partnership, but this preference is eliminated when an employer is coordinating with an employee. This suggests that, unlike efficiency, fairness concerns are not independent of the frame (Knez and Camerer, 1994; Starmans et al., 2017). Our evidence also suggests that negotiations are faster under the employment frame and this is not driven by a change in bargaining power. We dig into these findings further in the remainder of this section by testing their robustness to controlling for subject characteristics and pre-bargaining production decisions, and by analyzing chat logs to test for possible mechanisms driving our findings.

4.3 Robustness

4.3.1 Robustness of Treatment Effect Estimates

To verify that differences in subjects' characteristics or ability to accurately identify optimal production modes are not driving our findings, we estimate all treatment effects at the individual level using regressions that control for a subject's gender, year of study, lab experiment experience, age, and whether or not she accurately identified the efficient production mode in joint production before the bargaining period in each period. These results are presented in Appendix A. Specifically, columns 1, 3, and 5 of Table A2 present estimates of treatment effects on pair-level outcomes conditioning on individual pair-member characteristics from regressions run at the individual level. Table A3 presents estimates from similar regressions but with pair-level outcomes, conditional on joint production, as the dependent variables. Lastly, columns 1, 3, and 5 of Table A4 present estimates from regressions with individual pair-member characteristics as the dependent variables. These estimates demonstrate that our treatment effect estimates are not affected by conditioning on subject characteristics and ability. Moreover, they demonstrate that the differences in outcomes between the employment and partnership frames are not being driven by differences in cognition as measured by whether or not individuals select the optimal production mode before bargaining begins.[6]

To address concerns about unobservable differences between subjects in different frames, we also estimate the effects using regressions with subject fixed effects. These regressions, presented in the even numbered columns in Tables A2 and A4 of Appendix A, demonstrate that the mean comparisons discussed previously are also robust to controlling for individual fixed effects.

[6]When the dependent variable is binary, we present linear probability regressions for simplicity. However, all our results stay qualitatively unchanged if we use probit or logit regressions.

We also test whether the effects of the employment frame persist as subjects gain more experience. Specifically, we estimate the effects of interactions between the employment frame indicator and indicators for each quartile of paid periods in a session on pair level outcomes. Table A5 presents these estimates which show that there does appear to be learning over the course of the sessions. In particular, subjects in the last three periods are about 10 percentage points more likely to choose the optimal production specification than those in the first four paid periods of a session. However, while the interactions between employment framing and later session period indicators are negative in columns 2 and 3, they are not significant and not very large in magnitude. This evidence demonstrates that while the impact of the employment framing may diminish in magnitude over time, it continues to have a positive and significant impact on optimal outcomes even when subjects are more experienced.

4.3.2 Robustness of Interpretation

We have so far interpreted the patterns in our results as being consistent with preferences for fairness entering into production decisions. This interpretation is consistent with our findings on the impact of the employment frame. In particular, that subjects in the employment frame chat for less amount of time, are much less likely to divide firm profits equally between pair members, and are more likely to reach optimal joint and individually rational outcomes. However, one possible alternative explanation for our finding that subjects frequently make inefficient production decisions is that subjects are unable to identify the optimal outcomes. As we have already shown, this is unlikely for a couple of reasons. In particular, subjects are able to identify optimal production modes before bargaining begins in 90% of periods and conditioning on doing so does not change the results. Moreover, the frame has no impact on optimal outcomes when joint production is not optimal suggesting that subjects know whether joint production is optimal or not but reaching an agreement is what is difficult.

A second potential explanation for inefficient outcomes is that the gains from choosing optimal outcomes are low and subject motivation for doing so is low as a result. To test whether low potential gains from efficiency are driving our results, we include the potential absolute gains from choosing the optimal joint production specification relative to the sum of partner outside wages as a control in a regression that tests the effects of case 3 and the employment frame on optimal outcomes. These estimates, presented in Table 6, demonstrate that subjects do respond to larger

potential gains from optimal production but that accounting for this response does not impact our main results.

A third possible explanation for our findings is that despite knowing that joint production is optimal and having an incentive to reach that outcome, subjects cannot reach an agreement within the stipulated time and default to inefficient production as a result. This is unlikely to be the primary cause of our findings for several reasons. First, subjects rarely indicate that the chat ended without an agreement being reached; disagreements are indicated in 6% of the periods compared to a 20% occurrence of inefficient outcomes. Second, the employment frame does not offer the owner any bargaining advantages suggesting that improvements in outcomes are not caused by one pair member making all the decisions and bargaining no longer being necessary. Chat characteristic comparisons, presented and discussed in Section 4.4, demonstrate that more bargaining, measured as the number of proposals made by either pair member in a chat, occurs in the employment frame, and that chair producers (and owners) are as likely as table producers (or employees) to make the opening offer. Combined, our evidence is not consistent with a shift in bargaining advantages driving the positive impact of the employment frame on outcomes.

4.4 Chat Analysis

In this section, we first study logs of chat between the subjects to investigate what concerns affected their decisions. Second, we also use the chat logs to see if there is evidence in support of our model.

Comparisons of chat characteristics are presented in Table 7. The mean comparisons demonstrate that, despite chatting for less time, more proposals and counter-proposals are made in the employment frame than the partnership frame suggesting discussions are more efficient under the former. Similarly, first proposals are made faster in the employment frame. Running out of time before reaching an agreement is quite rare under either frame. There is some evidence that subjects are less likely to run out of time during chat under the employment frame in case 1. However, in cases 2 and 3, framing does not significantly affect whether or not pairs run out of time.

Consistent with the how participants are defining fairness differing across the two frames, equality of profit sharing is mentioned significantly less frequently in the employment frame than the partnership frame, particularly in case 3 periods. Moreover, outside options are mentioned less frequently in both case 2 and 3 periods in the employment frame suggesting that it was a more obvious default under that framing.

Our analysis of chat logs also demonstrates differences in how proposals were made across the two frames. In the employment frame, most proposals only include the share of firm profits the proposer is asking for whereas in the partnership frame almost all include both pair members proposed share. More notably, the first proposal made in a chat is significantly more likely to be incentive compatible for the subject receiving the offer in the employment frame across all three cases.[7]

To further analyze the impact of the employment frame on bargaining, we investigate how chat characteristics impact efficient joint production in Table 8. We assume that the first offer made in a chat reflects the negotiators views on fairness, and we restrict our focus to case 2 and 3 observations because joint production is not optimal in case 1. Column 1 of Table 8 shows that the mention of outside offers and the mention of profit equality significantly decreases the the likelihood of firm formation and the likelihood of success goes up if the first offer is made by the chair producer/owner. Moreover, having the first offer be incentive compatible is associated with a 17 percentage point increase in the likelihood of joint production. As expected, case 3 lowers the likelihood of success. Notably, with the inclusion of these chat variables, the effect of the employment frame treatment disappears.

In column 2, we only include one chat variable; whether or not the first offer exceeds the offer recipient's outside options. In case 2 and 3 periods, 87% of negotiations start with a first offer which provided gains to both parties. The estimated coefficient on this variable statistically significant and increases the probability of joint production by 17 percentage points relative to the mean joint production of 50% in chats for which the first offer was not incentive compatible. As in column 1, the inclusion of this chat variable reduces the magnitude and significance of the employment frame effect. We similarly test whether our other chat characteristic variables eliminate the effect of the employment frame on joint production and find that they do not. Estimates from these analyses are presented in Appendix Table A6.

To analyze the impact of the first offer being incentive compatible for the offer recipient more carefully, we instrument this variable with the employment frame treatment.[8] Column 3 presents

[7] In case 1, it is quite rare that an offers are made at all, as partners generally agree quite quickly not to produce jointly. However, even in those instances in which profit division offers are made, they are more likely to make the subject receiving the offer at least as well off as she would be in wage work under the employment frame.

[8] The employment frame is a reasonable instrument for whether or not the first offer made during bargaining makes the offer recipient at least as well off as her outside option first, because it is randomly assigned such that people more likely to make these types of offers did not select into it and second, it is a strong predictor of these types of offers. The instrument, however, is imperfect, because it may effect whether or not pairs produce jointly

our first stage estimates of the effect of the employment treatment on the probability that the first offer benefits both parties. Consistent with the mean comparisons in Table 7, the estimated coefficient of the treatment effect is 0.228 which is very large relative to a mean of 0.672 in the partnership frame. Column 4 presents our second stage estimates and demonstrates a very large positive relationship between the first offer being incentive compatible and efficient joint production. In fact, relative to the mean joint production outcome of 0.43 for those in the employment frame who do not start-off with this type of offer, making this type of offer almost completely eliminates the occurrence of efficient joint production failures.

Table 8 provide evidence in support of our interpretation of why the employment frame improves joint production outcomes under the assumption that the first offer is reflective of how negotiators view the economic opportunity and fairness concerns. We show that if the first offer benefits both parties, the firm is likely to form. Moreover, the employment frame significantly increases the probability that the first offer benefits both parties. Finally, we show that the employment frame does not further affect firm formation after controlling for whether the first offer benefits both parties.

4.5 Summary of Results

The findings presented in this section demonstrate that:

1. Subjects almost never produce jointly when not doing so is the optimal choice.

2. When joint production is optimal, independent of whether equal split of net profit makes both subjects better off, some pairs of subjects fail to produce jointly. However, such failure happens more frequently if equal split of net profit is not individually rational for one of the members of the pair.

3. Framing the joint opportunity as an employment opportunity rather than a partnership opportunity, significantly decreases these inefficiencies.

4. Increases in efficiency under the employment frame and evidence from chat logs are consistent with what allocation is considered fair in each frame. Subjects have a stronger preference for equal division of profit in the partnership frame which leads to lower take-up of profitable

through additional mechanisms other than by changing how the first offer during the bargaining period is structured.

opportunities that require unequal division of profits. Those in the employment frame have a stronger preference for divisions that are fair relative to outside options which leads to a higher take-up of the same profitable opportunities.

In the next section, we develop a theoretical model of bargaining under different conditions that is consistent with our empirical findings.

5 Interpretation of Results

Our results suggest that players have concerns for fairness when bargaining for a share of the net profit under joint production. If different players define fairness differently, this could lead to disagreement during bargaining. Changing the frame may also change a player's notion of fairness which in turn could affect bargaining outcomes. In this section, we present a theoretical model which incorporates individual notions of fairness which is able to rationalize the empirical findings of our study.

In this model, players are risk neutral when they receive their outside option which is bestowed upon them by the experimenter. However, when they decide on their earnings themselves through bargaining in a cooperative setting, fairness concerns arise.[9] We model player's utility when they negotiate based on the model by Fehr and Schmidt (1999).[10] In Fehr and Schmidt's model, players receive disutility from unfair income distributions. As there is no outside option in their model, fair division would imply equality of income. On the other hand, when players have potentially unequal outside options fairness may incorporate outside options as is done for calculating Shapley values. Below, we describe the particulars of a simple game that is consistent with our empirical setting where two players bargain over dividing a pie of value π. If they do not agree on a division of the pie, they receive their outside options which may be different for the two players. Note that, as subjects typically chose to produce optimally conditional on producing jointly in our experiment, we ignore that part of the experiment. Thus, we can restrict attention to a fixed size pie and focus on whether players can reach an agreement on how to share it and the division of the pie in case of agreement.

[9] Given that outside options are exogenously given, we believe it is more reasonable to assume that players do not have fairness concern when they receive outside options. This assumption simplifies the proofs and makes them slightly more general. Nonetheless, same results can be shown if we assume that players have fairness concerns when they receive outside options.

[10] Alternatively, we could use the model in Charness and Rabin (2002) to explain our results.

Suppose there are two players, denoted by 1 and 2. Player $i \in \{1,2\}$ has outside options $w_i > 0$. Now suppose that they are bargaining to share a pie of size π, giving up their outside option. If they stay with their respective outside options, player i's utility equals w_i. If they agree to share the pie and each accept $x_i \geq 0$ with $x_1 + x_2 = \pi$ then they give up their outside options. If they reach an agreement and player i receives x_i then her utility the bargaining outcome equals

$$u_i(x, w) = x_i - \alpha \left| x_1 - x_2 - \mathbf{1}_{O_i}(w_1 - w_2) \right|.$$

Here, $\alpha > 0$ and $\mathbf{1}_{O_i}$ is an indicator which equals 0 if for player i a fair outcome means equal division of π and equals 1 if for player i a fair outcome is equal division of the surplus $(\pi - w_1 - w_2)$.[11] That is, some players define fairness in terms of absolute payoffs and others define it in terms of surplus relative to outside options.[12] When both players have the same outside option (i.e., $w_1 = w_2$), player i's utility does not depend on $\mathbf{1}_{O_i}$. We assume that when players bargain about sharing the pie through the chat function, they quickly figure out whether the other player's fair outcome incorporates the outside options.

The two players choose to share the pie giving up their outside options if and only if there is some (x_1, x_2) such that $u_i(x, w) \geq w_i$ for both. If no such division of π exists then they stay with their outside options and get a utility of w_i. Below we provide some characterizations of the outcome of this cooperative game for the three different cases.[13]

Proposition 1. *We can characterize the outcomes under three different cases as following: i) When the size of pie is smaller than the sum of outside options then the players will always choose the outside options.*
ii) When $\pi > w_1 + w_2$ and $\frac{\pi}{2} > w_i$ for both $i \in \{1,2\}$, then there is a Pareto improving division of π for any α, if either both players or neither player incorporate outside options in fairness consideration. However, if one player incorporates outside options in fairness consideration and the other player does not, then there is a Pareto improving division of π only if α is low enough.
iii) When $\pi > w_1 + w_2$ and $\frac{\pi}{2} < w_i$ for some $i \in \{1,2\}$, then there is a Pareto improving division of π for any α, if both players incorporate outside options in fairness consideration. However, if at

[11] We do assume that the effect of inequality for a given player is independent of which player receives higher payoff or surplus, unlike in Fehr and Schmidt (1999). Nonetheless, this assumption is made only for expositional simplicity and does not affect the results qualitatively.
[12] Our results do not at all change if we also allow some players whose utility is not affected by any fairness concerns.
[13] The proofs are provided in Appendix B

least one player does not incorporate outside options in fairness consideration, then there may not be a Pareto improving division of π if α is high enough.

These characterizations suggest that players should optimally stick to the outside option under case 1, where staying with outside options is optimal, as we find in our data. Moreover, if sharing the pie is optimal, players are more likely to successfully bargain to share the pie when equal splitting of the pie makes both better off (case 2) than when equal splitting of the pie makes one player worse off relative to her outside option (case 3). This occurs from two sources. First, when both players' fair division is equal share of the π, agreement will always occur under case 2, but may not occur if α is high enough under case 3. Moreover, when only one player incorporates outside options in fairness consideration, the cutoff level of α for which agreement does not occur is lower under case 3. To illustrate the second scenario, Figures 4 and 5 present two cases, with $\pi = 420$ and $\alpha = 0.75$, where fair outcomes according to players 1 and 2 are equal division of surplus and equal division of π, respectively. That is, $\mathbf{1}_{O_1} = 1$ and $\mathbf{1}_{O_2} = 0$. In both cases, player 1 has a higher outside option than player 2 with $w_1 = 190$ and $w_2 = 170$ in Figure 4 (case 2) and $w_1 = 225$ and $w_2 = 135$ in Figure 5 (case 3). In the figures, the blue and red solid lines, respectively, represent players 1's and 2's utility from different values of x_1 when they share the pie; i.e., $x_2 = \pi - x_1$. The blue and red dashed lines, respectively, represent players 1's and 2's, respectively, outside options. If there is a range of x_1 for which both blue and red solid lines are above the corresponding dashed lines, then there is a division of the pie that makes both players better off than there outside options. The two figures show that there is an allocation that makes both better off in Figure 4, but not in Figure 5. We can generalize this intuition and show that, fixing the sum of the two players' outside options and the pie size, bargaining failure is less likely when both players' outside options are smaller than half of the pie (case 2) than when one player's outside option is more than half of the pie (case 3).

Proposition 2. *Bargaining failure is more likely in case 3 than in case 2.*

Propositions 1 and 2, combined, provide rationalization for our main result. Suppose the proportions of players who consider equal division of surplus is the fair allocation are p_p and p_e under the partnership and employment frames, respectively. As the employment frame makes the outside options more salient, we assume that $p_e > p_p$. Moreover, suppose the proportions p_p and p_e are not too small; specifically, $p_p + p_e > 1$. Then, successful bargaining will occur more frequently under the employment frame than the partnership frame for both cases 2 and 3.

Proposition 3. *Suppose more players believe that fair allocation is equal division of surplus under the employment frame, which makes the outside options more salient. The probability of optimal choice for both cases 2 and 3 increases under the employment frame.*

Overall, this model shows that our results are well explained by existence of people who value fairness, but vary in terms of whether they incorporate outside option in viewing what is fair. Nonetheless, this model does not explain the result that, under the partnership frame, sometimes partners decided to produce jointly and split the profit equally under case 3, making one partner worse off relative to her outside option. One elementary way to extend our model to deal with this finding is to give a pure payoff to being in a partnership. I.e., some players feel bad turning down partnerships even though they earn less in it.

6 Conclusion

This study provides novel evidence on the role of organizational design in bargaining outcomes. In particular, using evidence from a laboratory setting in which subjects are randomly and anonymously assigned into pairs, we demonstrate that framing a joint production opportunity as an employment relationship rather than a partnership significantly increases the incidence of profitable joint production. Moreover, using information from pairwise chat logs and from proposed and realized profit sharing arrangements, we are able to provide evidence suggesting that the difference in efficiency across the two frames is driven by a concern for fairness and not by differences in cognition, subject motivation, or changes in relative bargaining power. Under the partnership frame, a concern for fairness leads to equal division of profits being focal for the subjects, demonstrated by a much higher likelihood of equal profit sharing and of equal division mentions in chats than in the employment frame. Under the employment frame, a concern for fairness is primarily tied to outside options which ensures both subjects in a pair earns more than their outside options in joint production, and increases the likelihood that pairs optimally decide to enter into joint production.

A simple extension of the model presented in Fehr and Schmidt (1999) is able to explain our findings by allowing the definition of fair outcome to vary between players. This model also explains why, even in the employment frame, we see about 15% of pairs miss out on profitable joint production opportunities.

An important potential limitation of our empirical setting could be that as the incentives for effective coordination increase (consistent with most real-world entrepreneurial opportunities) fairness concerns may seem relatively less important. However, existing evidence from firm and entrepreneur-level data suggest fairness concerns may also scale in real-world situations. For instance, a recent report by the McKinsey Consulting Company (Rinaudo and Rosqig, 2016)[14] says that joint ventures take six to ten times longer to negotiate than acquisitions. They also say that a significant amount of negotiating time is taken up in negotiating the terms of the deal in joint ventures although the terms of the deal have relatively little effect on the value of the deal. In our experiment, the terms of the deal has no effect on the value of the deal. Yet negotiations under partnerships (joint ventures) take a longer time than in an employment relationship which may be considered more similar to a acquisition. More directly related to our study, Hellmann and Wasserman (2016) demonstrate that, in a survey of North American entrepreneurs, 30% of co-founding teams split equity equally and that teams with equal equity splits perform worse than those who did not because of an "outcome inequality aversion" but that this falls for teams who learn more about each other's relative contributions to the venture. Consistent with equal equity sharing being associated with worse outcomes, in a 2017 *Wall Street Journal* article, a Venture Capitalist identified the absence of a clear founding team leader as a primary reason she would avoid investing in a venture (Kornelis, 2017).

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Tables & Figures

Figure 1: Screenshot of Z-Tree Chat Box

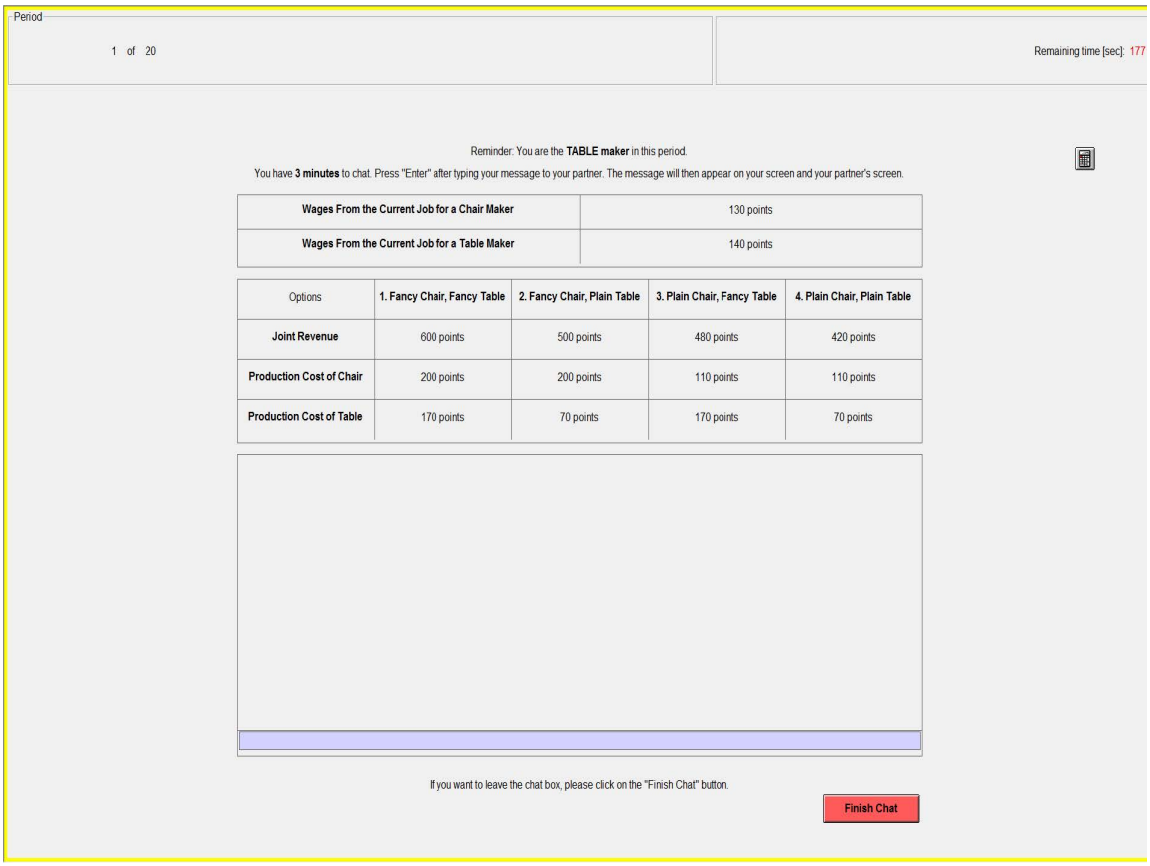

Figure 2: Experimental Design Summary

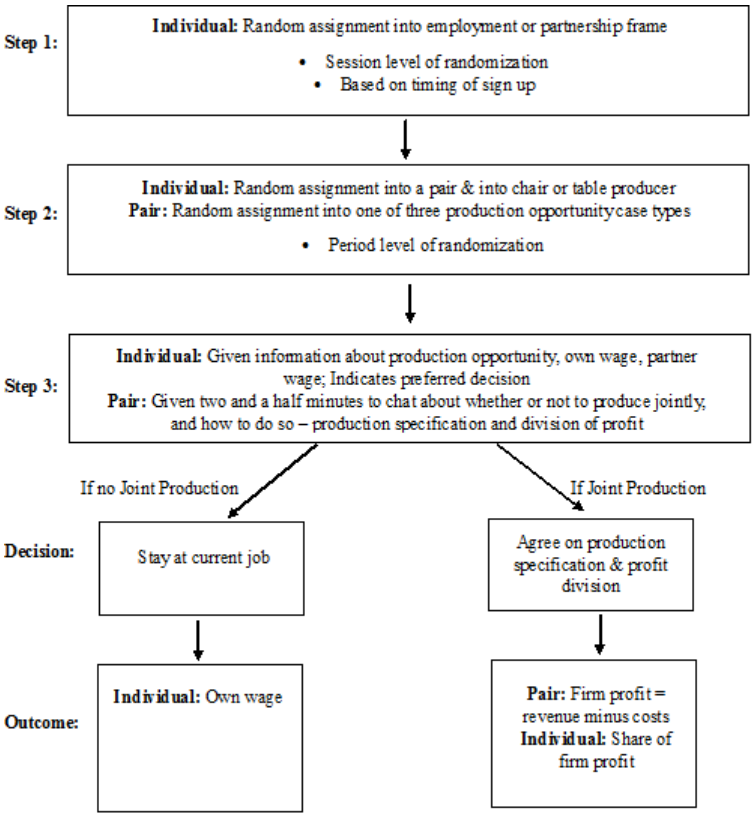

Figure 3: Treatment Groups Summary

	Partnership Frame: Split Revenues, Incur Own Costs	**Employment Frame:** Owner Earns Revenue, Incurs Production & Salary Costs, Employee Earns Salary
Case 1: Joint Production is not Optimal	N=320 Subjects, 160 pairs	N=300 Subjects, 150 pairs
Case 2: Joint Production is Optimal & Equal Profit Sharing is Individually Rational	N=320 Subjects, 160 pairs	N=300 Subjects, 150 pairs
Case 3: Joint Production is Optimal & Equal Profit Sharing is not Individually Rational	N=320 Subjects, 160 pairs	N=300 Subjects, 150 pairs

Figure 4: Utility Across Divisions of Pie - Case 2

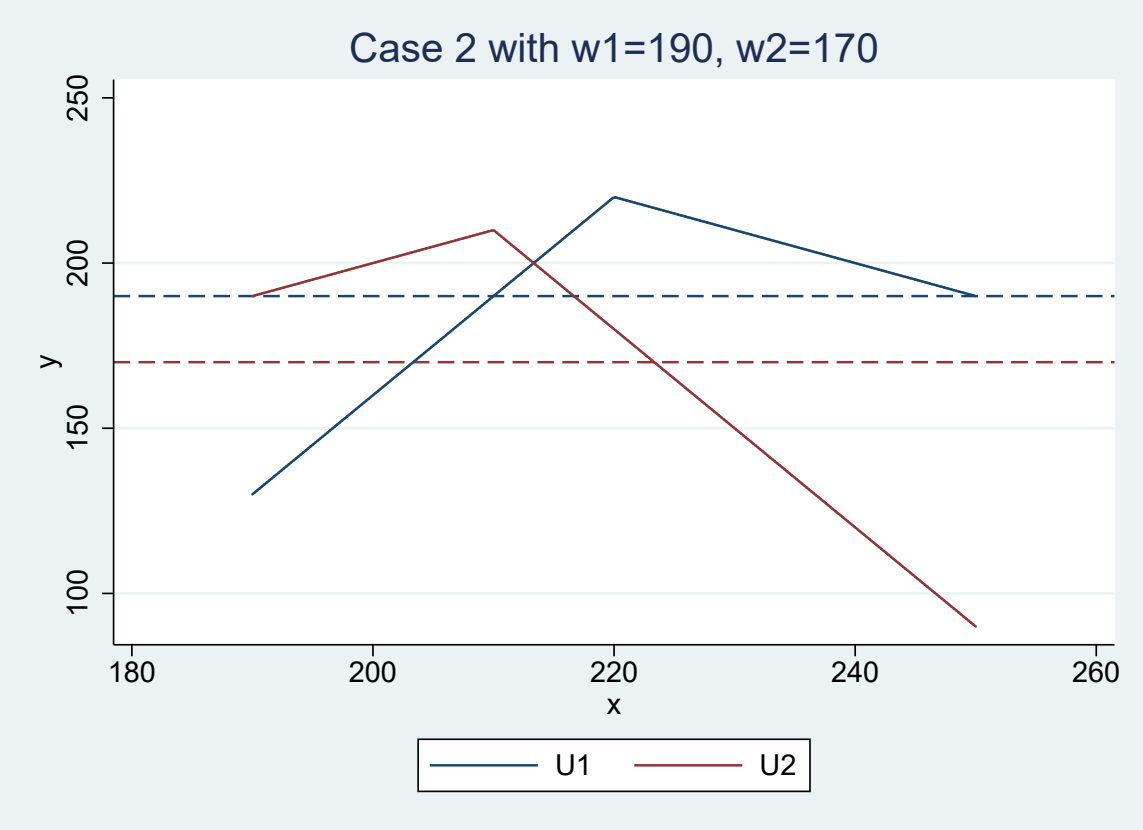

Figure 5: Utility Across Divisions of Pie - Case 3

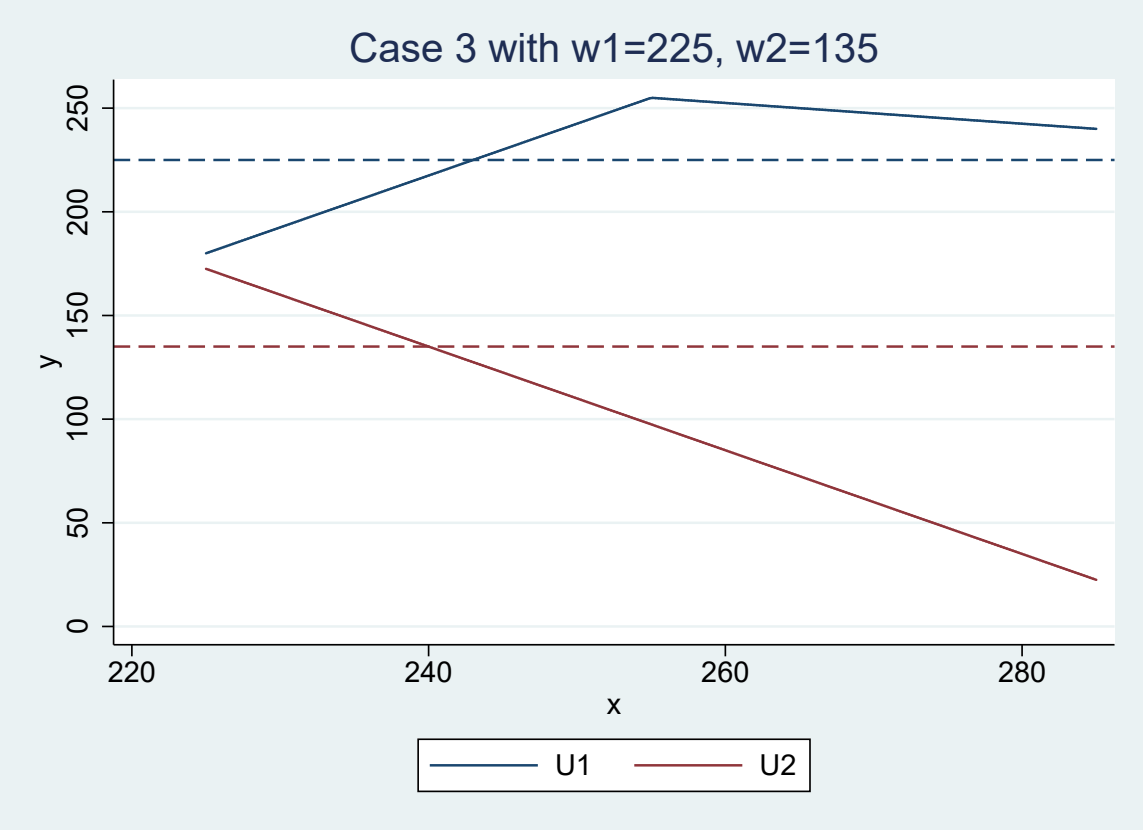

Table 1: Variable Definitions

Variable	Description
Outcome Variables: Pair Level of Observation:	
Joint Production	Equal to one if the pair enters into joint production, zero otherwise
Optimal Outcome	Equal to one if the pair chooses to produce jointly if optimal and also chooses the optimal joint production mode, or equal to one if the pair chooses to continue in wage work if joint production is not optimal, zero otherwise
Seconds Spent Chatting	Equals the number of seconds the pair spent chatting in a period
Both Gain From Joint Production	Equal to one if both pair members' earnings from joint production is (weakly) higher than they would have earned in wages had they decided not to produce jointly, zero otherwise; conditional on joint production
Equal Profit Split	Equal to one if pair members agree to divide net profit equally between each other, zero otherwise; conditional on joint production
Equal Surplus Split	Equal to one if member earns their own wage plus half of (profit − outside wages), zero otherwise; conditional on joint production
Chair Producer/Owner Profit Share	Equal to the share of firm profit allocated to chair producer (owner in employment frame); conditional on joint production
Chair Producer/Owner Surplus Share	Equal to the share of total firm surplus allocated to chair producer (owner in employment frame); conditional on joint production
Outcome Variables: Individual Level of Observation:	
Profit−Wage	Equal to the difference between the individual's earnings from joint production and her outside option wage, zero if outside option is chosen
Percent Gain from Joint Production	Equal to the percent difference between the individual's earning from joint production and her outside option wage, zero if outside option is chosen
Accurate Optimal Production Calculation	Equal to one if the individual accurately chooses the optimal production mode under joint production before the chat window begins, zero otherwise
Indicated Disagreement	Equal to one if individual indicates that they could not reach an agreement during the chat, zero otherwise
Outcome Variables: Chat Text Characteristics:	
Number of Proposals Made	Equal to the number of distinct proposals made during the chat
Mention of Equality of Division	Equal to one if equal earnings sharing is mentioned during the chat, zero otherwise
Chair Producer/Employer Makes First Offer	Equal to one if chair producer (owner in employment frame) makes opening offer during the chat, zero otherwise
Mention of Outside Option	Equal to one if either pair member mentions the outside option wage during the chat, zero otherwise
Time to First Proposal	Equal to the number of seconds before the first proposal is made by either pair member during the chat
First Proposal, Proposer's Share Only	Equal to one if the first offer made only mentioned the proposer's share of earnings, zero otherwise
Ran Out of Time Before Agreement Reached	Equal to one if negotiation is on-going when chat times out, zero otherwise
First Offer Incentive Compatible	Equal to one if the first offer made is incentive compatible for the subject receiving the offer & zero otherwise
Independent Variables:	
Case 1	Equal to one if joint production is not optimal, zero otherwise
Case 2	Equal to one if joint production is optimal and equal sharing of firm profits is individually rational for both pair members, zero otherwise
Case 3	Equal to one if joint production is optimal but equal sharing of firm profits makes one pair member worse off than her outside option, zero otherwise
Employer Framing	Equal to one if pair members are in an employer framing session, zero if pair members are in a partnership framing session

Table 2: Subject Characteristics by Framing

Characteristics	**Partnership**	**Employment**	p-value
Male	0.438	0.500	0.489
	(0.063)	(0.065)	
Work Experience	0.750	0.650	0.227
	(0.055)	(0.062)	
Age	20.516	19.533	0.029**
	(0.381)	(0.211)	
Year of Study	2.563	2.033	0.017**
	(0.142)	(0.166)	
Prior Economics Experiment Experience	0.500	0.217	0.001***
	(0.063	(0.054)	
Prior Psych Experiment Experience	0.469	0.483	0.872
	(0.063)	(0.065)	
Reported Perceived Level of Difficulty of Experiment Periods	1.969	1.967	0.980
	(0.054)	(0.063)	
Indicated Minutes for Periods was About Right	0.688	0.750	0.444
	(0.058)	(0.056)	
N	64	60	

Notes: Standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Outcomes by Case Type

	Case 1	**Case 2**	**Case 3**	p-value Case 2-Case 1	p-value Case 3-Case 2
Pair Level of Observation, Full Sample:					
Joint Production	0.026	0.765	0.668	0.000***	0.008**
	(0.009)	(0.076)	(0.027)		
Seconds Spent Chatting	52.464	99.981	110.655	0.000***	0.001***
	(2.428)	(2.295)	(2.155)		
N	310	310	310		
Pair Level of Observation, Conditional on Joint Production:					
Optimal Outcome		0.996	0.990		0.324
		(0.003)	(0.005)		
Both Gain from Joint Production		0.983	0.879		0.000***
		(0.008)	(0.023)		
Equal Profit Split		0.409	0.077		0.000***
		(0.032)	(0.019)		
Equal Surplus Split		0.190	0.164		0.482
		(0.026)	(0.026)		
Chair Producer Profit Share		0.504	0.492		0.229
		(0.004)	(0.010)		
Chair Producer Surplus Share		0.556	0.548		0.876
		(0.017)	(0.052)		
N		237	207		
Individual Level of Observation:					
Profit−Wage	-0.282	22.411	19.532	0.000***	0.035**
	(0.152)	(0.825)	(1.086)		
Accurate Optimal Production Calculation	0.876	0.926	0.906	0.003***	0.219
	(0.013)	(0.011)	(0.012)		
Indicated Disagreement	0.027	0.055	0.098	0.015**	0.004***
	(0.007)	(0.009)	(0.012)		
N	620	620	620		

Notes: Standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Outcomes by Framing

	Partnership Frame	**Employment Frame**	p-value
Pair Level of Observation, Full Sample			
Joint Production in Case 1	0.025	0.012	0.927
	(0.012)	(0.013)	
Joint Production in Cases 2 & 3	0.656	0.780	0.001***
	(0.027)	(0.024)	
Seconds Spent	95.405	79.38	0.000***
Chatting	(2.225)	(2.129)	
N	480	450	
Pair Level of Observation, Conditional on Joint Production			
Optimal Outcome	0.967	0.983	0.274
	(0.012)	(0.008)	
Both Gain from Joint Production	0.869	0.962	0.000***
	(0.023)	(0.012)	
Equal Profit Split	0.379	0.143	0.000***
	(0.033)	(0.023)	
Equal Surplus Split	0.089	0.261	0.000***
	(0.019)	(0.029)	
Chair Producer/Owner	0.512	0.501	0.552
Profit Share	(0.022)	(0.008)	
Chair Producer/Owner	0.552	0.568	0.749
Surplus Share	(0.051)	(0.018)	
N	214	238	
Individual Level of Observation			
Profit − Wage	12.766	15.083	0.024**
	(0.981)	(0.730)	
Accurate Optimal Production Calculation	0.874	0.933	0.000***
	(0.011)	(0.008)	
Indicated Disagreement	0.071	0.049	0.047**
	(0.008)	(0.007)	
N	960	900	

Notes: Standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Outcomes by Framing & Case Type

	Case 1			**Case 2**			**Case 3**		
	Partner	**Employ**	p-value	**Partner**	**Employ**	p-value	**Partner**	**Employ**	p-value
Pair Level of Observation, Full Sample									
Joint Production	0.025	0.027	0.9266	0.713	0.820	0.002**	0.60	0.740	0.000***
	(0.012)	(0.013)		(0.025)	(0.022)		(0.027)	(0.025)	
Seconds Spent	61.925	42.373	0.000***	103.969	95.727	0.073*	120.796	100.040	0.000***
Chatting	(3.753)	(2.812)		(3.304)	(3.150)		(2.827)	(3.048)	
N	160	150		160	150		160	150	
Pair Level of Observation, Conditional on Joint Production									
Optimal Outcome				0.991	1.000	0.300	0.979	1.000	0.128
				(0.009)	(0)		(0.015)	(0)	
Both Gain from				0.965	1.000	0.036**	0.792	0.955	0.000***
Joint Production				(0.017)	(0.000)		(0.042)	(0.020)	
Equal Profit Split				0.561	0.268	0.000***	0.156	0.009	0.000***
				(0.033)	(0.028)		(0.026)	(0.006)	
Equal Surplus Split				0.088	0.285	0.000***	0.083	0.234	0.000***
				(0.027)	(0.041)		(0.028)	(0.040)	
Chair Producer/Owner				0.493	0.515	0.003***	0.492	0.491	0.924
Profit Share				(0.007)	(0.003)		(0.015)	(0.014)	
Chair Producer/Owner				0.579	0.535	0.196	0.526	0.567	0.693
Surplus Share				(0.033)	(0.014)		(0.107)	(0.029)	
N				114	123		96	111	
Individual Level of Observation									
Profit − Wage	-0.328	-0.233	0.756	20.781	24.15	0.041**	17.843	21.333	0.108
	(0.219)	(0.212)		(1.316)	(0.960)		(1.757)	(1.231)	
Accurate Optimal	0.831	0.923	0.001***	0.894	0.960	0.002***	0.897	0.917	0.400
Production Calculation	(0.021)	(0.015)		(0.017)	(0.011)		(0.017)	(0.016)	
Indicated Disagreement	0.044	0.010	0.010**	0.053	0.057	0.847	0.116	0.080	0.137
	(0.011)	(0.006)		(0.013)	(0.013)		(0.018)	(0.016)	
N	320	300		320	300		320	300	

Notes: Standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Effect of Case Type, Employment Framing, and Potential Gains from Optimal Production Decision on Optimal Production Decision

Dependent Variable	**Joint Production**			
	(1)	(2)	(3)	(4)
Case Type 3	-0.103***	-0.103***	0.017	-0.104***
	(0.036)	(0.036)	(0.116)	(0.036)
Employment Framing		0.133***	0.132***	0.308***
		(0.036)	(0.036)	(0.116)
Absolute Profit Gain in Optimal Production	0.002**	0.002**	0.003***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Case Type 3 *			-0.002	
Absolute Profit Gain in Optimal Production			(0.002)	
Employment Framing *				-0.003
Absolute Profit Gain in Optimal Production				(0.002)
Constant	0.629***	0.565***	0.503***	0.481***
	(0.062)	(0.065)	(0.078)	(0.087)
Observations	620	620	620	620
R-squared	0.021	0.042	0.044	0.046
Mean dep var	0.711	0.711	0.711	0.711

Sample restricted to periods in which joint production is optimal. Joint production is equal to one if a pair enters into joint production, and zero otherwise. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Chat Characteristics by Session & Case Type

	Case 1			Case 2			Case 3		
	Partner	**Employ**	p-value	**Partner**	**Employ**	p-value	**Partner**	**Employ**	p-value
Pair Outcomes, Full Sample									
Number of Proposals Made	1.444	1.250	0.013**	1.574	2.527	0.000***	1.821	2.567	0.000***
	(0.057)	(0.052)		(0.070)	(0.122)		(0.083)	(0.117)	
Mention of Equality of Division	0.133	0.081	0.147	0.500	0.393	0.067*	0.242	0.127	0.010**
	(0.029)	(0.022)		(0.042)	(0.040)		(0.036)	(0.027)	
Chair Producer/Owner	0.521	0.439	0.164	0.511	0.513	0.964	0.586	0.593	0.896
Makes First Offer	(0.042)	(0.041)		(0.042)	(0.041)		(0.042)	(0.040)	
Mention of Outside Option	0.894	0.980	0.003***	0.369	0.227	0.008***	0.496	0.287	0.000***
	(0.025)	(0.012)		(0.041)	(0.034)		(0.042)	(0.037)	
Seconds Before First Offer	87.317	58.633	0.000***	62.473	52.520	0.000***	78.321	59.573	0.000***
	(4.717)	(3.039)		(2.016)	(1.373)		(2.350)	(1.646)	
First Offer Only Includes	0.119	0.700	0.000***	0.031	0.752	0.000***	0.080	0.833	0.000***
Offerer's Share	(0.051)	(0.085)		(0.015)	(0.036)		(0.023)	(0.031)	
Ran Out of Time Before	0.056	0.013	0.068*	0.071	0.067	0.887	0.157	0.093	0.100
Agreement Reached	(0.019)	(0.009)		(0.022)	(0.020)		(0.027)	(0.024)	
First Offer Incentive	0.824	0.953	0.000***	0.766	0.987	0.000***	0.771	0.967	0.000***
Compatible	(0.032)	(0.018)		(0.036)	(0.009)		(0.036)	(0.015)	
N	142	148		141	150		140	150	

Notes: Standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Incentive Compatible Offers, Framing, and Efficient Joint Production

Dependent Variable: Joint Production	**OLS**	**OLS**	**IV**	
			First Stage	**Second Stage**
	(1)	(2)	(3)	(4)
Case 3	-0.106***	-0.091**	-0.008	-0.090**
	(0.038)	(0.036)	(0.026)	(0.037)
Employment Framing	0.018	0.060	0.208***	
	(0.038)	(0.038)	(0.026)	
First Offer Incentive Compatible	0.241***	0.224***		0.517***
	(0.065)	(0.065)		(0.177)
Mention of Equality of Division	-0.100**			
	(0.042)			
Mention of Outside Option	-0.166***			
	(0.041)			
Chair Producer/Employer Makes First Offer	0.069*			
	(0.036)			
Constant	0.610***	0.547***	0.773***	0.327**
	(0.067)	(0.062)	(0.023)	(0.156)
F-Test			31.98	
Observations	580	581	581	581
R-squared	0.098	0.050	0.100	0.011
Mean dep var (baseline group)	0.672	0.500	0.761	0.500
Mean dep var (full sample)	0.728	0.728	0.871	0.728

Sample restricted to periods in which joint production is optimal. Joint production is equal to one if a pair enters into joint production, and zero otherwise. The baseline group in columns 1 and 3 is the sample in the partnership frame. The baseline group in columns 2 and 4 are the pairs for whom first offer incentive compatible is equal to zero. Column 3 reports estimates of the first stage of a two-staged least squares estimation in which an incentive compatible offer is instrumented with the employment frame treatment, and column 4 reports the second stage estimates of this estimation. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Appendix A Additional Tables

Table A1: Summary Statistics

	Mean	**(Std. Dev.)**	**Observations**
Outcome Variables: Pair Level of Observation:			
Joint Production	0.486	(0.5)	930
Optimal Outcome	0.799	(0.401)	930
Seconds Used in Chat	87.626	(47.613)	927
Both Gain from Joint Production	0.918	(0.274)	452
Equal Split of Profits	0.254	(0.436)	452
Equal Split of Surplus	0.179	(0.384)	452
Share of Profit to Chair Producer	0.506	(0.506)	452
Share of Surplus to Chair Producer	0.561	(0.554)	452
Outcome Variables: Individual Level of Observation:			
Earnings-Wage from Joint Production	13.887	(22.155)	1860
Accurate Optimal Production Calculation	0.903	(0.296)	1860
Indicate Disagreement	0.06	(0.238)	1860
Outcome Variables: Chat Text Characteristics:			
Number of Proposals Made	1.873	(1.188)	871
Mention of Equality of Division	0.246	(0.431)	871
Chair Producer/Employer Makes First Offer	0.527	(0.500)	871
Mention of Outside Option	0.540	(0.499)	870
Time to First Proposal	64.310	(24.813)	635
First Proposal, Proposer's Share Only	0.436	(0.496)	637
Ran Out of Time Before Before Agreement Reached	0.071	(0.257)	871
First Offer Incentive Compatible	0.881	(0.324)	871
Independent Variables:			
Case Type 1	0.333	(0.472)	930
Case Type 2	0.333	(0.472)	930
Case Type 3	0.333	(0.472)	930
Ownership Framing	0.484	(0.5)	930

Table A2: Effect of Case Type and Employment Framing
Pair Level Outcomes, Individual Level of Observation

Dependent Variable	**Joint Production**		**Optimal Production**		**Seconds Spent Chatting**	
	(1)	(2)	(3)	(4)	(5)	(6)
Case 2	0.680***	0.684***	-0.277***	-0.274***	42.599***	42.935***
	(0.027)	(0.027)	(0.027)	(0.027)	(3.498)	(3.423)
Case 3	0.568***	0.571***	-0.397***	-0.393***	59.489***	59.737***
	(0.029)	(0.029)	(0.029)	(0.029)	(3.306)	(3.155)
Employment Framing	-0.005		-0.009		-19.416***	
	(0.016)		(0.015)		(3.331)	
Employment Framing *	0.109***	0.107***	0.119***	0.118***	11.080**	10.941**
Case 2	(0.036)	(0.036)	(0.036)	(0.036)	(4.599)	(4.416)
Employment Framing *	0.146***	0.142***	0.164***	0.160***	-1.881	-2.166
Case 3	(0.039)	(0.039)	(0.039)	(0.039)	(4.412)	(4.228)
Accurately Calculated	0.113***	0.057	0.139***	0.081**	-8.879***	-14.260***
Optimal Production	(0.032)	(0.035)	(0.032)	(0.034)	(3.380)	(3.851)
Economics/Accounting Major	0.020		0.032		0.525	
	(0.022)		(0.022)		(2.480)	
Male	-0.007		-0.001		-0.454	
	(0.018)		(0.018)		(1.859)	
Age	0.000		0.001		-0.093	
	(0.004)		(0.004)		(0.498)	
Year of Study	0.010		0.009		0.362	
	(0.009)		(0.009)		(0.949)	
Prior Economics Experiment	-0.006		0.002		-2.555	
Experience	(0.019)		(0.019)		(2.071)	
Prior Psych Experiment	-0.014		-0.024		4.344**	
Experience	(0.018)		(0.018)		(1.888)	
Constant	-0.092	-0.024	0.817***	0.903***	69.653***	64.939***
	(0.085)	(0.032)	(0.084)	(0.031)	(9.989)	(3.861)
Subject Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	1,860	1,860	1,860	1,860	1,860	1,860
R-squared	0.446	0.498	0.139	0.223	0.321	0.413
Mean dep var	0.486	0.486	0.799	0.799	87.63	87.63

Analysis performed at the individual level. Joint production is equal to one if a pair enters into joint production, and zero otherwise. Optimal Production is equal to one if a pair enters into the optimal mode of production, and zero otherwise. Seconds Spent Chatting is equal to the number of seconds a pair spends chatting during the undirect chat section of a period. Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A3: Effect of Case Type and Employment Framing
Pair Level Outcomes Conditional on Joint Production, Individual Level of Observation

Dependent Variable	**Both Gained from Joint Production**		**Equal Profit Split**		**Equal Surplus Split**		**Chair Producer's Profit Share**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Case 3	-0.145***	-0.163***	-0.404***	-0.379***	-0.011	-0.021	-0.033	-0.022
	(0.033)	(0.031)	(0.042)	(0.040)	(0.028)	(0.029)	(0.028)	(0.027)
Employment Framing	0.033		-0.306***		0.033		-0.022	
	(0.021)		(0.044)		(0.030)		(0.033)	
Employment Framing	0.136***	0.146***	0.154***	0.137***	0.004	0.021	0.013	0.004
* Case 3	(0.038)	(0.036)	(0.051)	(0.049)	(0.042)	(0.042)	(0.029)	(0.030)
Accurately Calculated	0.133**	0.071	0.032	0.060	0.017	-0.021	-0.061	0.019
Optimal Production	(0.053)	(0.055)	(0.063)	(0.063)	(0.039)	(0.043)	(0.081)	(0.071)
Male	0.022		-0.039		-0.004		-0.010	
	(0.018)		(0.026)		(0.022)		(0.013)	
Economics or	0.045**		-0.018		0.037		-0.004	
Accounting Major	(0.018)		(0.031)		(0.029)		(0.011)	
Age	0.003		-0.010		-0.002		-0.001	
	(0.003)		(0.007)		(0.005)		(0.002)	
Year of Study	-0.007		0.017		-0.012		-0.004	
	(0.008)		(0.013)		(0.011)		(0.007)	
Prior Economics	0.028		-0.015		0.013		-0.013	
Experiment Experience	(0.022)		(0.030)		(0.024)		(0.019)	
Prior Psych	-0.012		-0.032		-0.017		0.006	
Experiment Experience	(0.018)		(0.027)		(0.022)		(0.013)	
Constant	0.734***	0.891***	0.745***	0.338***	0.150	0.135***	0.626***	0.498***
	(0.085)	(0.054)	(0.139)	(0.062)	(0.108)	(0.043)	(0.124)	(0.065)
Subject Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	904	904	904	904	904	904	904	904
R-squared	0.084	0.266	0.222	0.443	0.011	0.144	0.010	0.151
Mean dep var	0.918	0.918	0.254	0.254	0.111	0.111	0.506	0.506

Analysis performed at the individual level. Sample is restricted to individuals in pairs who entered into joint production. Both Gained from Joint Production is equal to one if both pair members' earnings from joint production is (weakly) higher than they would have earned in wages had they not produced jointly, and zero otherwise. Split Profit Equally is equal to one if the profits from joint production are evenly split between pair members, and zero otherwise. Split Surplus Equally is equal to one if a each pair member earns their own wage plus half of joint production profits minus both pair members' wages, and zero otherwise. Chair Producer's Profit Share is equal to the share of profits from joint production allocated to the chair producer (owner in employment frame). Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A4: Effect of Case Type and Employment Framing on Individual Level Outcomes

Dependent Variable	Profit-Wage		Percentage Gain from Joint Production		Indicated Disagreement	
	(1)	(2)	(3)	(4)	(5)	(6)
Case 2	20.798***		0.257***		0.009	
	(1.337)		(0.016)		(0.017)	
Case 3	17.845***	7.427***	0.346***	0.218***	0.072***	0.067***
	(1.755)	(1.890)	(0.034)	(0.035)	(0.021)	(0.019)
Employment Framing	-0.513		0.001		-0.032**	
	(0.494)		(0.010)		(0.013)	
Employment Framing *	3.403**		0.017		0.037*	
Case 2	(1.656)		(0.021)		(0.022)	
Employment Framing *	3.755*	2.086	0.040	0.031	-0.002	-0.020
Case 3	(2.155)	(2.336)	(0.047)	(0.048)	(0.027)	(0.025)
Accurately Calculated	4.985***	5.522***	0.082***	0.065**	0.002	0.003
Optimal Production	(1.453)	(1.859)	(0.025)	(0.032)	(0.019)	(0.020)
Male	0.878		0.011		-0.025**	
	(0.944)		(0.017)		(0.011)	
Economics/Accounting Major	-0.184		-0.004		-0.007	
	(1.054)		(0.022)		(0.014)	
Age	-0.184		-0.001		-0.003	
	(0.215)		(0.005)		(0.003)	
Year of Study	0.366		0.002		-0.004	
	(0.487)		(0.009)		(0.006)	
Prior Economics Experiment	-0.329		0.016		0.015	
Experience	(1.073)		(0.021)		(0.012)	
Prior Psych Experiment	1.538*		0.008		-0.013	
Experience	(0.926)		(0.018)		(0.011)	
Constant	-2.557	6.090***	-0.085	0.070**	0.113*	0.039**
	(4.398)	(1.740)	(0.093)	(0.030)	(0.059)	(0.019)
Subject Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	1,860	1,860	1,860	1,860	1,860	1,860
R-squared	0.218	0.106	0.156	0.136	0.025	0.119
Mean dep var	13.89	13.89	0.207	0.207	0.0602	0.0602

Analysis is run at the individual level of observation. Profit − Wage is equal to the difference between the individual's earnings from joint production and her outside option, and zero if her outside option is chosen. Percent Gain from Joint Production is equal to the percent difference between the individual's earning from joint production and her outside option wage, and zero if her outside option is chosen. Indicated Disagreement is equal to one if the individual indicates that they could not reach an agreement during the chat section of the period, and zero otherwise. Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A5: Effect of Case Type, Employment Framing, and Experience on Pair Outcomes

Dependent Variable	Joint Production	Optimal Production	Seconds Spent Chatting
	(1)	(2)	(3)
Case 2	0.740***	-0.205***	46.041***
	(0.028)	(0.028)	(3.510)
Case 3	0.645***	-0.305***	56.636***
	(0.029)	(0.030)	(3.259)
Employment Framing	0.082*	0.109**	-25.066***
	(0.045)	(0.045)	(5.223)
Periods 5-8	-0.026	-0.029	-6.752
	(0.052)	(0.053)	(5.048)
Periods 9-12	0.065	0.036	-10.007*
	(0.050)	(0.050)	(5.535)
Periods 13-15	0.078*	0.104**	-16.585***
	(0.046)	(0.046)	(5.617)
Employment Framing*	0.042	0.012	9.617
Periods 5-8	(0.070)	(0.071)	(7.255)
Employment Framing*	-0.025	-0.027	6.010
Periods 9-12	(0.065)	(0.065)	(7.209)
Employment Framing*	-0.017	-0.083	23.940***
Periods 13-15	(0.070)	(0.071)	(7.922)
Constant	-0.042	0.904***	69.051***
	(0.032)	(0.032)	(4.422)
Observations	930	930	927
R-squared	0.442	0.126	0.322
Mean dep var	0.486	0.799	87.63

Joint production is equal to one if a pair enters into joint production, and zero otherwise. Optimal Production is equal to one if the pair chooses to produce jointly if it is optimal to do so and also chooses the optimal production mode, or equal to one if the pair chooses to continue in wage work if joint production is not optimal, and zero otherwise. Seconds Spent Chatting is equal to the number of seconds a pair spends chatting during the undirect chat section of a period. Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table A6: Chat Characteristics, Employment Frame, & Joint Production

Dependent Variable	**Joint Production**		
	(1)	(2)	(3)
Case 3	-0.109***	-0.076**	-0.097***
	(0.039)	(0.036)	(0.037)
Employment Framing	0.100***	0.078**	0.107***
	(0.037)	(0.037)	(0.037)
Mention of Equality of Division	-0.070		
	(0.043)		
Mention of Outside Option		-0.177***	
		(0.042)	
Chair Producer/Employer Makes First Offer			0.077**
			(0.037)
Constant	0.753***	0.785***	0.679***
	(0.040)	(0.035)	(0.038)
Observations	581	580	581
R-squared	0.030	0.059	0.032
Mean dep var (baseline)	0.673	0.673	0.673
Mean dep var (full sample)	0.728	0.728	0.728

Joint production is equal to one if a pair enters into joint production, and zero otherwise. The baseline group is the sample in the partnership frame. Robust standard errors are in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Appendix B Proofs

Below we present the proofs for the propositions presented in Section 5 and a related lemma. Without loss of any generality, we assume throughout that $w_1 \geq w_2$.

Proposition 1. *We can characterize the outcomes under three different cases as following: i) When the size of pie is smaller than the sum of outside options then the players will always choose the outside options.*
ii) When $\pi > w_1 + w_2$ and $\frac{\pi}{2} > w_i$ for both $i \in \{1, 2\}$, then there is a Pareto improving division of π for any α, if either both players or neither player incorporate outside options in fairness consideration. However, if one player incorporates outside options in fairness consideration and the other player does not, then there is a Pareto improving division of π only if α is low enough.
iii) When $\pi > w_1 + w_2$ and $\frac{\pi}{2} < w_i$ for some $i \in \{1, 2\}$, then there is a Pareto improving division of π for any α, if both players incorporate outside options in fairness consideration. However, if at least one player does not incorporate outside options in fairness consideration, then there may not be a Pareto improving division of π if α is high enough.

Proof. First we consider case 1, where $\pi < w_1 + w_2$. Note that, for joint production, $u_i(x, w) \leq x_i$ independent of whether player i incorporates outside options to define fairness. As $x_1 + x_2 < w_1 + w_2$ for any allocation of the pie, both cannot be (weakly) better-off by sharing the pie. Hence, the players should choose the outside options in the bargaining game.

For case 2, where $\pi > w_1 + w_2$ and $\frac{\pi}{2} > w_i$ for both $i \in \{1, 2\}$, $u_i\left(\frac{\pi}{2}, \frac{\pi}{2}, w\right) = \frac{\pi}{2} > w_i$ if neither player incorporates outside options in fairness and $u_i\left(w_1 + \frac{\pi - w_1 - w_2}{2}, w_2 + \frac{\pi - w_1 - w_2}{2}, w\right) = w_i + \frac{\pi - w_1 - w_2}{2} > w_i$ if both players do. Thus, there is some allocation of the pie that makes both players better off when they both define fair allocation the same way. However, if the two players differ in how they define fair allocation, then it is possible that there is no division of π that makes both better off if α is large enough and $w_1 \neq w_2$.

Now consider case 3, where $\pi > w_1 + w_2$ and $w_1 > \frac{\pi}{2} > w_2$. If both players incorporate outside options in fairness, $u_i\left(\frac{\pi + w_1 - w_2}{2}, \frac{\pi - w_1 + w_2}{2}, w\right) = \frac{\pi + w_i - w_j}{2} > w_i$. Thus, there will be a Pareto improving division of the pie in that case. When at least one of the players does not incorporate outside options in fairness, then if α or $w_1 - w_2$ is large enough, there might not be any division of π that is Pareto improving, leading to bargaining failure. Note that even when both players believe that equal division is the fair allocation, when the outside options are very different, giving player

1 just w_1 would already make player 2 worse off than her outside options. □

Proposition 2. *Bargaining failure is more likely in case 3 than in case 2.*

Proof. Given the characterization of scenarios where bargaining failure may occur under cases 2 and 3 as discussed in Proposition 1, it will suffice to focus on the case where the two players differ in their definition of the fair outcome. Lemma 1 below shows that, in that scenario, fixing π and the sum of outside options, if the parameters (α, w) are such that there is a Pareto-improving allocation of π when $w_1 > \frac{\pi}{2} > w_2$, then there has to be a Pareto-improving allocation of π when w_1 is decreased and w_2 is increased by the same amount in a way that $\frac{\pi}{2} \geq w_{1,2}$. Hence, while bargaining failure can happen in both cases 2 and 3, it would happen more frequently under case 3. □

Lemma 1. *Suppose the two players differ in how they define fair allocation. If α is such that joint production is feasible for some outside option combination (w_1, w_2) where $w_1 > \frac{\pi}{2} > w_2$, for a given π, then joint production will be feasible for any outside option combination (w_1', w_2') such that $w_1' + w_2' = w_1 + w_2$ and $\frac{\pi}{2} \geq w_{1,2}'$.*

Proof. Suppose $w_1 > \frac{\pi}{2} > w_2$ with $\pi > w_1 + w_2$. First, we consider the case where $\mathbf{1}_{O_1} = 0$ and $\mathbf{1}_{O_2} = 1$ and joint production is feasible. Hence, there are x_1, x_2 such that $x_1 + x_2 = \pi$ and

$$u_1(x_1, x_2, w) = x_1 - \alpha(x_1 - x_2) \geq w_1 \text{ and } u_2(x_1, x_2, w) = x_2 - \alpha|x_1 - w_1 - (x_2 - w_2)| \geq w_2.$$

Now consider outside options $(w_1', w_2') = (w_1 - \epsilon, w_2 + \epsilon)$ where $\frac{\pi}{2} > w_1 - \epsilon$ and $\frac{\pi}{2} > w_2 + \epsilon$. As the utility functions are symmetric, we can restrict attention to $w_1 - \epsilon \geq w_2 + \epsilon$. This implies that, $x_1 - x_2 \geq x_1 - \epsilon - (x_2 + \epsilon)$. Then, if we offer the two players $x_1 - \epsilon$ and $x_2 + \epsilon$,

$$u_1(x_1 - \epsilon, x_2 + \epsilon, w) = x_1 - \epsilon - \alpha(x_1 - \epsilon - (x_2 + \epsilon)) \geq w_1 - \epsilon = w_1'.$$

Moreover,

$$\begin{aligned} u_2(x_1, x_2, w) &= x_2 + \epsilon - \alpha|x_1 - \epsilon - w_1 + \epsilon - (x_2 + \epsilon - w_2 - \epsilon)| \\ &= x_2 - \alpha|x_1 - w_1 - (x_2 - w_2)| + \epsilon \geq w_2 + \epsilon = w_2'. \end{aligned}$$

Hence, joint production will be feasible.

Similarly, when $\mathbf{1}_{O_1} = 1$ and $\mathbf{1}_{O_2} = 0$, bargaining success under case 3 implies,

$$u_1(x_1, x_2, w) = x_1 - \alpha|x_1 - w_1 - (x_2 - w_2)| \geq w_1 \text{ and } u_2(x_1, x_2, w) = x_2 - \alpha(x_1 - x_2) \geq w_2.$$

Using arguments similar to the ones above, we can show that for a different set of initial endowment (w_1', w_2') where $w_1' + w_2' = w_1 + w_2$ and $\frac{\pi}{2} > w_{1,2}'$, there will be a share of pie which makes both players better off. Thus, the existence of feasible bargaining solution in a case 3 scenario involving two players whose fairness definitions differ, would suggest that there will be feasible bargaining solution in any case 2 scenario involving those two players. □

Proposition 3. *Suppose more players believe that fair allocation is equal division of surplus under the employment frame, which makes the outside options more salient. The probability of optimal choice for both cases 2 and 3 increases under the employment frame.*

Proof. We will prove this result by considering different scenarios. First, consider case 2. When both players define fairness the same way, they will successfully bargain to produce jointly. If the two players define fairness differently, if α is small enough given (π, w_1, w_2) then the players will bargain successfully. Therefore, we need to compare bargaining success probability under the two frames when bargaining failure occurs if the two players define fairness differently. In that case, the probability of bargaining success is $p_i^2 + (1 - p_i)^2$ for $i \in p, e$. The difference between the employment and partnership frames is

$$2p_e^2 - 2p_e - 2p_p^2 + 2p_p = 2(p_e + p_p - 1)(p_e - p_p).$$

The difference is strictly positive if $p_e + p_p > 1$. Therefore, the probability of bargaining success in case 2 will be higher for employment frame. For case 3, first consider (π, w_1, w_2) combinations for which bargaining failure occurs only when the players differ in their definition of fairness. The above argument shows that the employment frame will increase probability of bargaining success when $p_e > p_p$ and $p_p + p_e > 1$. If (π, w_1, w_2) is such that bargaining success occurs only when both players define fairness with respect to outside options, then the employment frame will increase bargaining success as $p_e > p_p$. Therefore, the employment frame will lead to a higher likelihood of bargaining success or optimal choice for both cases 2 and 3. □

Appendix C Data Appendix

Displayed below are the experimental instructions and chat guidelines provided to subjects. Text only included in the partnership frame is in bold and text only included in the employment frame is italicized.

Experimental Instructions

General Rules

This session is part of an experiment about the economics of organization. **Specifically, we explore how people decide whether to join in a partnership and form a company together. We also explore how people make production decisions and divide revenues between the partners.** *Specifically, we explore how people decide whether to form a new company. We also explore how they jointly make production decisions and choose the salary of the employee.* If you follow the instructions carefully and make good decisions, you can earn a considerable amount of money.

All the participants in this session have been recruited in the same way as you and are reading the same instructions as you are. It is important that you do not communicate with any other participant outside of the chatting program we provide you with or discuss the details of the experiment with anyone during or after the session. The session will consist of 20 periods. The first five of them will be practice periods. They will help you to understand the structure of the game and will not be used in determining your earnings from this session. The following 15 periods, periods 6 to 20, will be used to determine your earnings from this session.

Description of a Period

In each period, you will randomly be assigned to be either a chair or a table maker who earns a fixed wage at your current job. You will be randomly matched with another participant, referred to as your partner hereafter, who makes the other product (e.g. if you are a chair maker, your partner will be a table maker and vice versa) earning a fixed wage at the current job. Suppose that the wages from the current jobs for the chair and table makers are given by the following table:

Wages From the Current Job for the Chair Maker	w_C points
Wages From the Current Job for the Table Maker	w_T points

Now suppose an opportunity outside of your current jobs arises in which a client wants to buy a set of matching chairs and tables from you and your partner. The client tells you how much she is willing to pay for each of the four options: (1) fancy chair and fancy table, (2) fancy chair and plain table, (3) plain chair and fancy table, and (4) plain chair and plain table. If you and your partner want to take this opportunity and produce chairs and tables jointly, we refer to that as joint production and the resulting revenue as joint revenue. If you and your partner produce jointly, then you two will have to leave your current jobs and form a company. *Now suppose an opportunity outside of your current jobs arises in which a client contacts the chair maker wanting to buy a set of matching chairs and tables. The chair maker cannot produce chairs and tables alone, but can create a company and hire the table maker she is matched with as an employee to jointly produce chairs and tables. If you and your partner want to take this opportunity and form a company, you two will have to leave your current jobs. The chair maker is considered the owner and the table maker is an employee who is paid a salary by the company. They can choose to produce one of the four options for the client: (1) fancy chair and fancy table, (2) fancy chair and plain table, (3) plain chair and fancy table, and (4) plain chair and plain table. The client pays the company a revenue and the company bears the production costs of chair and table based on the chosen option.* Suppose, for each of the 4 options, the revenue and the production costs for chairs and tables are given by the following table:

Revenue and Production Costs Based on the Type of Chairs and Tables

Options:	**1 – Fancy Chair, Fancy Table**	**2 – Fancy Chair, Plain Table**	**3 – Plain Chair, Fancy Table**	**4 – Plain Chair, Plain Table**
Revenue	*e* points	*f* points	*g* points	*h* points
Production Cost of Chair	c_F points	c_F points	c_P points	c_P points
Production Cost of Table	t_F points	t_P points	t_F points	t_P points

The company's net profit equals the revenue minus the production costs of table and chair. Thus, the net profit from option 1 is $e - c_F - t_F$ points, from option 2 is $f - c_F - t_P$ points, and so on.

If you produce jointly, each of you will bear your own production cost and will not receive a wage. Thus, your total earnings from the company will equal your share of the joint revenue minus the production cost for chair. Suppose, for example, you and your partner jointly choose option 1, receiving a joint revenue of *e* points. If you two decide that the share of revenue you will receive is *m* points then your partner will receive $e - m$ points (the most *m* can be is *e*) as her share of revenue. Your net earnings will be $m - c_F$ points and your partner's net earnings will be $e - m - t_F$ points. Note that, while the joint revenue depends on both the chair and table types, your own production cost depends only on the type for your own product (chairs in this example). If you and your partner do not to form a company together, you will continue to work in your current jobs at the fixed wages and will not bear any production cost (earning w_C and w_T points, respectively).

If you and your partner decide to produce jointly, neither will receive a wage from the current job and your earnings will depend on your production and salary decisions. Being the owner of the company, the chair maker will earn the revenue, bear production costs of chair and table, and pay a salary to the table maker. The table maker will earn the salary and bear no production cost. For example, if option 1 is produced and the table maker's salary is s points, then the net earnings of the chair and table makers are $e - s - c_F - t_F$ points and s points, respectively. Note that, you and your partner (the table and chair makers) jointly decide whether to form a company, which option to produce, and the table maker's salary. If you do not agree to form a company, you will continue to work in your current jobs at the fixed wages and earn w_C and w_T points, respectively.

Decision-making in Each Period

In each period, you will be informed of the current wages, revenue, and production costs for that period. First, you will be asked to report which option of joint production maximizes the company's net profit. This exercise gives you an opportunity to familiarize yourself with the problem which you two will face if you produce jointly.

Next, you will chat anonymously with your partner to discuss and decide whether you two want to leave your current jobs and form a company to produce jointly. In the first 5 periods, you will be given three minutes to chat with your partner. In periods 6 to 20, you will be given two and a half minutes. If you want, you can end the chat earlier than that. Once you have finished chatting, you will be asked to indicate whether you two want to stay at your current jobs, produce jointly, or did not reach an agreement. If you choose to stay at current jobs or do not reach an agreement, then you will not form a company and both will receive the fixed wages from your current jobs. If you choose joint production, you will be asked to enter your production decision. First, you will

have to choose one of the four options of joint production. **Next, you will be asked on the next screen to report how you want to divide the joint revenue. You will both be paid according to the company's production and revenue sharing decisions, as described above.** *Next, you will be asked to report the salary of the table maker from the company. The table maker will be paid the salary and the owner (the chair maker) will earn the joint revenue minus the table maker's salary and the costs of tables and chair, as described above.* If you and your partner agree to joint production, but the subsequent choices of options or table maker's salary do not match, then there is miscommunication between the two of you about what the agreement is and you will stay with your current jobs.

Differences between Periods

Recall that there will be 20 periods in this experiment and you will be randomly matched with another participant in each period. Whether you are a chair or table maker will also be randomly chosen and can differ across periods. In all periods, the chair maker is considered the owner in case of joint production. Thus, you will be the owner in some periods and the participant you are matched with will be the owner in others. You will participate in the decision process described above in every period. The current wages, revenues, and production costs will be different in every period to represent differences in opportunities, clients' preferences, and production processes.

Ending the Session

At the end of the session, you will see a screen displaying your point earnings from each period. You will earn an amount based on your point earnings from two randomly chosen periods between periods 6 and 20. Your earning in points will be converted into money at the rate of $1 for 10 points. That is, if you earn y points in total in these two periods, your total income from the experiment will be $\$y/10$. You will be paid this amount in cash at the end of the session.

Guidelines for the Chat Sessions

Please adhere to the following guidelines regarding appropriate ways of communication during the chat session in each period. Failure to comply with these guidelines may result in your removal from this experiment without any payment.

- Please do not disclose your identity, or ask your partner to disclose his or her identity.
- Please do not make any comments that may be perceived as threatening by your partner.
- Please do not discuss topics with your partner that do not relate to the experiment in the given period.
- Please do not use any swear words or slang and please keep the chat at a professional level.
- If at any point during the chat your partner has made you uncomfortable, please inform Prof. Hossain or the lab manager on duty.
- To use the chat time as efficiently as possible, we recommend the following sequence for your conversation with your partner:
    - Begin the chat by proposing whether or not to produce jointly. You can make the first proposal no matter whether you are a chair maker (owner) or table maker (employee).
    - If you propose to produce jointly, suggest the option (among the four options of joint production) that you think is optimal and what the salary for the table maker should be.
    - If you receive a proposal, either accept the proposal or propose a counter proposal.
    - If you and your partner have chosen an option for joint production of chair and table and the table maker's salary, ensure that both of you are completely aware of what you have agreed upon. Write those down on the sheet provided.
    - Once you and your partner come to an agreement or you realize that you cannot come to an agreement, you can end the chat.

The Table below presents the full set of parameters subjects faced in the partnership and employment frames.

	Joint Revenue				Cost				Wages	
Period	F, F	F, P	P, F	P, P	FancyC	PlainC	FancyT	PlainT	W_C	W_T
1	450	150	225	50	130	65	160	75	65	55
2	350	150	150	50	125	75	175	75	30	45
3	500	455	300	50	150	140	150	75	75	125
4	450	150	225	50	130	65	160	75	95	25
5	400	300	300	300	150	70	150	50	75	75
6	700	700	700	500	200	80	200	110	135	225
7	500	250	450	250	200	80	170	90	85	60
8	470	465	370	170	160	75	200	75	130	65
9	400	300	300	220	200	70	200	110	30	30
10	400	350	300	300	190	70	190	70	25	85
11	500	455	300	50	150	140	150	75	100	95
12	600	500	480	420	200	110	200	70	130	130
13	500	380	480	320	190	90	190	90	30	115
14	700	700	700	500	200	80	200	110	200	160
15	700	700	700	500	200	80	200	110	240	240
16	390	225	150	50	100	75	210	75	50	50
17	500	320	320	320	200	80	200	80	45	65
18	500	150	225	50	100	75	100	75	95	115
19	600	500	500	400	170	100	130	80	165	45
20	400	250	350	150	175	70	220	90	45	25