

# My teammate, myself and I: Evidence on equity and equality norms in team-formation experiments in France, Japan and Spain

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## Abstract

We study team formation in three countries (France, Japan and Spain) and report data from real-effort experiments in which subjects bargain over a jointly produced outcome. Subjects decide between undertaking a task alone or with another subject, by releasing the minimum share of the future team outcome that they are willing to accept. Our findings stress the prevalence of the equality norm in a context in which merit could have played an important role in the allocation of joint profits. The inability of high-ability individuals to claim a large share of the team outcome makes it difficult to disband inefficient teams, and sustains unprofitable cooperation as a result. We argue that this inertia may threaten the ability of a large number of organizations to function well. We finally identify international differences in the patterns of team formation stressing that the equality norm is especially strong in the case of Japanese subjects.

Keywords: experiments, equity and equality norms, team formation

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# 1 Introduction

## Equity norms versus equality norms in bargaining

### A review of equity and equality norms

The issue of allocating a certain amount of money to individuals in a team is still a source of challenging research in social sciences. Research on distributional justice and social preferences have stressed the importance of two norms that guide individuals' decisions to share collective outcomes: equity and equality (Konow 2003, Konow, Saijo and Akai 2008). Since the Nichomachean Ethics in which Aristotle stressed that each individual should be rewarded according to his relative contribution to the collective effort, the norm of equity belongs to a long tradition of Western philosophers leading to the *proportionality principle*, according to which individuals' outcomes should be proportional to individuals' inputs, such as effort and ability. An alternative, although related, approach to the concept of equity is based on the *accountability principle* under which rewards should only be proportional to the contributions that individuals can control (Konow 2000). In this context, innate factors such as inherent abilities should not affect the distribution of wealth among people.

The norm of equality is based on the idea that individuals should receive the same share of the collective profits independently of their contribution to the joint endeavor. People exerting more effort or possessing higher levels of ability should not be rewarded more than others (Deutsh 1985, Nielsen 1985, Rawls 1971, Walzer 1983).

### Evidence on the equity and equality norms from bargaining experiments

Elements of equality norms have recently been introduced in models of social preferences, and become very popular in the experimental literature on bargaining, in which equal splitting rules are extensively used. For example, in the model by Fehr and Schmidt (1999) subjects suffered from inequality aversion.<sup>1</sup> This literature focuses on take-it-or-leave-it bargaining games and especially, on the ultimatum game (Güth, Schmittberger

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<sup>1</sup>Other models of social preferences introducing aversion to inequality are Bolton and Ockenfels (2000) and Charness and Rabin (2002).

and Schwarze 1982).<sup>2</sup> In these experiments subjects have to share an amount of money that is given to them by the experimenter at the beginning of the session and for which they do not exert a real effort. In this context, the concepts of equity and equality are both consistent with an equal split of the initial amount of money. Indeed, in a situation in which subjects do not generate the joint outcome, the partners' relative merit does not enter into the bargaining decision. In the ultimatum game experiments, almost half of the proposers offer an equal split of the team outcome. Also, responders often reject unequal divisions of the initial amount of money. These results are interpreted as evidence of a fairness norm in bargaining (Fehr and Schmidt 1999) where fairness coincides with both the equality and the equity norm. These results appear to be common to a large number of countries like Israel, Japan, the United States and Slovenia (Roth et al. 1991, Oosterbeek, Sloof and van de Kuilen 2004), and to a number of small scale societies (Henrich et al. 2004). Splitting the initial amount of money equally is a strong behavior pattern in the repeated ultimatum games (Güth and Tietz 1988), to large stakes (Roth et al. 1991, Hoffman, McCabe and Smith 1996, Slonim and Roth 1998) and to various levels of anonymity of the participants (Bolton and Zwick 1995). However, it is important to stress that in real life situations the amount of money that people have to share is usually the result of individual effort and is influenced by individual abilities. Therefore, merit may play a role in the final distribution of profits. Equality and equity are fundamentally different concepts if we take into consideration the dimensions of effort and merit. Given this distinction between equity and equality, we may wonder whether the equal split of the joint outcome is actually a fair allocation. Issues related to fairness have been introduced recently into bargaining experiments using tasks completed at the beginning of the experiment to convey entitlements.<sup>3</sup> Konow (2000) conducted dictator games including a preliminary stage in which subjects had to undertake a real effort task consisting in folding letters and sealing envelopes. The author found that dictators who knew subjects' individual performance on the task tended to keep a larger share of the

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<sup>2</sup>In the ultimatum game, a subject (the proposer) receives an amount of money from the experimenter that he has to share with an other player (the responder). The responder can reject the offer, in which case neither subject earns anything. If the responder accepts the proposed division of the initial amount of money, then it is implemented.

<sup>3</sup>In the dictator game, as opposed to the ultimatum game, the receiver cannot reject the sender's offer.

amount of money to be shared among individuals than they did in cases in which dictators were told that the difference in performance in the first task was totally arbitrary. As a result, the behavior of subjects in the role of dictators stresses that entitlements affect, although egocentrically, allocation choices. Schurter and Wilson (2007) considered the case of a dictator game in which subjects acquired the position of a sender depending on their performance in a quiz. The authors found that merit affected bargaining decisions as offers were significantly lower when senders earned their position. Also, Oxoby and Spraggon (2008) analyzed dictator games in which receivers are asked to exert a real effort. They found that receivers that were asked to complete a real task received larger offers than did receivers in the standard dictator game. Other experiments considered introducing equity concerns by conveying entitlements in negotiations (Gächter and Riedl 2005). The authors found that entitlements conveyed through quizzes gave a “moral property right” to subjects and shaped the duration of negotiation as well as determined the likelihood of agreements. Other studies found evidence both for equity and equality in dictator games in which entitlements were introduced (Frohlich, Oppenheimer and Kurki 2004, Cappelen et al. 2007). These authors stressed the heterogeneity in subjects’ social preferences.

### **The social context**

The social context is an important factor in understanding the norm that guides individuals’ behavior in bargaining experiments. For example, Dana, Cain and Dawes (2006), as well as Andreoni and Bernheim (2008), stressed that subjects liked to be perceived as fair implying that subjects’ preference for fair outcomes was magnified in a context in which they could be observed by others.<sup>4</sup> In particular, Dana, Cain and Dawes (2006) showed that subjects were ready to accept \$9 to silently exit a \$10 dictator game, and Andreoni and Bernheim (2008) found evidence that the proportion of dictators that split the initial amount of money equally was reduced when their behavior was more difficult to infer. In addition to varying the level of anonymity, Konow, Saijo and Akai (2008) distinguished

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<sup>4</sup>This behavior may be explained by the fact that in a number of situations, a concern for appearing fair is evolutionarily advantageous in that it fosters beneficial cooperation and helps avoid sanctions (Fehr and Gächter 2002, Gintis et al. 2003, Bowles and Gintis 2003).

the “spectator case” in which the person allocating the outcome was not affected by the splitting rule, from the “stakeholder case” in which the allocation was chosen by a person affected by the chosen allocation rule. The authors showed, with the help of a dictator game, that spectators displayed a preference for equity in their allocation of an amount of money that was generated by first completing an individual real-effort task. However, they stressed that lifting anonymity or making the dictator a stakeholder shifted preferences toward the equality norm. Then, the authors proposed to distinguish between “morals” which refer to the impersonal principles supported by impartial spectators (equity), and “mores” which are personalized moral norms that apply to stakeholders and that possibly shift preferences toward equality.

## **Team-formation experiments**

### **Teamwork and merit**

In this paper, we analyze the issue of allocating a joint outcome in a team context by developing real effort tasks performed by subjects working side-by-side. The focus on teams is motivated by the increasing popularity of team production in organizations resulting from both the rising complexity of tasks and the improvement in information technology (Lawler, Mohrman and Ledford 1995, Devine et al. 1999, Kozlowski et al. 1999). We explore the issue of team formation in an experimental setting in which teams are formed when partners are able to agree on a sharing rule for the team output. The decision to form a team is actually present in a wide range of contexts that include team formation inside, as well as outside, the existing organizations. An illustration of team formation inside an organization can be found in the analysis of workers’ decisions to move from individual work incentives to team incentives as in the case of the Koret Corporation described by Hamilton, Nickerson and Owan (2003). Another example is the situation of academics belonging to the same department and deciding whether to write single-authored or joint papers. Team formation is also present outside existing organizations. For example, when lawyers decide to form a partnership or when entrepreneurs decide to launch a start-up (Clarysse and Moray 2004, Forbes et al. 2006).

In our experiments, subjects had to complete a real team-task for which individuals' effort and abilities determined joint profits. This allowed us to introduce a dimension of merit in subjects' bargaining decisions over the joint outcome, and helped us disentangle the two norms that usually appear under the keyword of fairness: the equality and the equity norms. Our paper differs from standard bargaining experiments as subjects had to generate the initial outcome by undertaking a real task as a team.

In our experiment, teamwork was introduced by ensuring that the following unique characteristics of teams were present: task interdependence, reward interdependence and social identity (Colquitt, Zapta-Phelan and Roberson 2005). Task interdependence was present in our design since some level of cooperation among subjects was required, for example, to make sure that different team members did not end up finding the same numbers. Also, reward interdependence followed from the payment scheme under which payoffs depended directly on the performance of the team. Finally, social identity could also develop since we had subjects sit side-by-side and participate in a real-effort task in which communication between team members was allowed. In addition, subjects were assigned the same function in the team so that no status was created. Our approach could be seen as reward allocation between team members, partners or co-workers at the same layer of the hierarchy.

### **Cultural aspects and teamwork fashion**

We conducted our experiments in three countries: France, Japan, and Spain. This international comparison was motivated by the fact that in a context in which social elements rather than economic factors are at play country differences are likely to be relevant.<sup>5</sup> The choice of these three countries was not arbitrary. Japanese culture is usually associated with teamwork and cooperation (Abegglen 1958, Haitani 1990, Koike 1988) so that certain patterns of team formation may be specific to Japan. In this field, the increasing popularity of team production does not result only from the rising complexity of tasks and the improvement in information technology, but it is also a managerial trend. An

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<sup>5</sup>This is in line with Camerer (2003) stating that "cultural and structural variables have bigger effects, and are more helpful for building social preferences theories".

important part of teamwork does not result from any technology improvements or complicated tasks; teams are formed even for simple tasks because it is socially unthinkable to decide to split a team even if this team is inefficient. Moreover, the behavior related to work in a team may be influenced by the context in which the work is carried out (Oyserman et al. 2002, Shore, Coyle, and Jacquelin 2003, Triandis 1996). Cultural values affect the success of management initiatives to introduce work teams (Adler 1997). Thus, the culture of the organization where teams start out is of fundamental importance in predicting their effects on behavior, because individuals understand that “by promoting their self-interest they promote the interest of others” (Tjosvold 1998, p. 337). This is very familiar to students involved in new learning techniques, at least students in business schools in France.

### **Findings: the prevalence of the equality norm in team-formation experiments**

Our experimental results stress the prevalence of the equality norm in the process of team formation and team dissolution. We found that the large majority of subjects decided to split the jointly produced output equally, even in a context in which one of the partners appeared to contribute significantly more than the others. We infer that the equality norm is much more relevant in accounting for the allocation of team profits than are issues related to merit and equity. Interestingly, the equality norm is especially relevant in France and in Japan, which are societies characterized by a high level of egalitarianism.<sup>6</sup> The prevalence of the equality norm in subjects’ decisions to form teams implies that partners disregard team synergies as a relevant factor. As a result, we observe that almost 80% of the subjects were willing to form unprofitable teams in which there was no synergy. This result stresses how the equality norm while facilitating cooperation among individuals can lead to excessive and inefficient team formation. This inefficiency was especially striking in the Japanese sample.<sup>7</sup> As a consequence, we were also unable to identify the egocentric biases in teams reported in a number of studies in psychology

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<sup>6</sup>For example, income distribution in France and Japan tends to be less dispersed than in Spain. Refer, for example, to Oosterbeek, Sloof and van de Kuilen (2004) on page 18.

<sup>7</sup>We then identify a situation in which a social norm (here the *equality norm*) defined by Elster (2009) as a “*shared expectation that others will react to a given behavior in a way that is painful for oneself*” is actually painful for both the individual and the group.

that show that group members are inclined to overvalue their contribution to the joint outcome. There is evidence of egocentric biases, for example, in the case of spouses, coauthors or sportsmen (Zander 1971, Brawley 1984, Ross and Sicoly 1979, Forsyth and Schlenker 1977, Caruso, Epley and Bazerman 2006). In these studies, subjects were asked to assess their contribution to the joint outcome knowing that this would not affect the allocation of future joint profits and would not affect future collaboration. In our paper, we consider a context in which subjects' evaluations of their partner's contribution effectively determines whether they will continue to work as a team with the same partner in a second task and, if this is the case, this will determine the actual share of the collective outcome assigned to each partner. Our experimental design incorporates two novelties in the analysis of bargaining over a joint outcome. First, subjects participate in a team-production phase for which they exert a real effort, and second, their decision to allocate the group outcome will affect their future cooperation as well as their respective share of the joint output. The team-production phase used in our experiment is decisive in developing a team context in which subjects may decide not to behave as egocentrically as is reported in related studies. Our results actually support the early work of social psychologists (Mikula 1980, Deutsch 1985) that stress the prevalence of the principle of equality in a cooperative environment like teamwork compared to that in a competitive environment.

This paper is organized as follows. The next section introduces our experimental design, while section 3 details our main findings. Section 4 concludes. We address questions related to the robustness of our results in the appendix.

## **2 Experimental design**

### **Subject pool**

We invited subjects through campus-wide posters and e-mail advertisements to participate in our experimental sessions in three countries. We recruited subjects at the Universidad de Navarra in Spain (UNAV), at the Burgundy School of Business in France (BSB) and at Osaka University in Japan (OU). Subjects were informed that the experiment was

related to decision making and that it would last for approximately 60 minutes. They were also told that apart from a show-up fee of 5 euros (the equivalent of 7 euros in Japan) they would receive a certain amount of money depending on their performance in the laboratory. The majority of the subjects had either a Business or Economics major and were completing the third year of their degree at the time of the experiment. Table 1 shows a summary of our sessions.

Table 1: Session summary. Number of subjects and monetary gains.

Institution	Number of subjects (baseline treatment)	Average gain in the baseline treatment
UNAV (Spain)	62 (20)	19€
BSB (France)	196 (196)	18€
OU (Japan)	32 (16)	23€
Total	290 (232)	18.5€

## Experimental procedure

Our experiments were run in sessions with sixteen to twenty subjects paired randomly at their entrance to the laboratory. The experiment was divided into three stages. In order to study how people share the outcome of a real-effort team task, subjects first participated as a team in a production stage in which they had to find three- and four-digit numbers fulfilling certain criteria.<sup>8</sup> In the second stage, subjects were separated and were asked to, individually and without the possibility of communication, evaluate their own contribution to the team production in the previous stage. Subjects were also asked to reveal their willingness to stay in the same team by choosing the minimum acceptable share of the joint profit. At this stage, subjects finally had to complete an individual task. Then, depending on the answers in the second stage, teams were formed or dissolved in the third stage where subjects had to perform a task similar to the one completed in the first stage.

<sup>8</sup>The English translation of the instructions used in the baseline treatment are displayed in the appendix. The full set of instructions is available on-line for download at <http://www.unav.es/ecoprof/bcorgnet>.

Subjects were informed that their claimed minimal acceptable share of the joint profit would determine whether they took part in the last task of the experiment alone or in a team with their initial partner. In order to ensure that subjects revealed their true preferences about the set of allocations rules for the team outcome that they were willing to accept, we implemented a lottery mechanism.

The experimenter explained to the subjects that the allocation rule for the team outcome in the third stage would be determined by randomly drawing a piece of paper from a bowl that contained nine papers each of which showed one of the following numbers: 20%, 30%, 40%, 45%, 50%, 55%, 60%, 70%, 80%. The numbers indicated the share of profits that member 1 of the group would receive while member 2 would obtain the remaining amount.<sup>9</sup> Subjects were told that they would complete the third-stage task in a team with the same partner if their claim from the joint profits was consistent with the allocation rule randomly drawn from the bowl. Subjects' claims were considered consistent with an allocation rule if member 1's claim was not larger than the number that defined the allocation rule, and that member 2's was not larger than 100% minus that number.<sup>10</sup>

### 3 Experimental results

#### Equality versus equity

We start our analysis of the experimental results with the descriptive statistics of team performance in the first stage. Japanese teams performed significantly better than French and Spanish teams as they found on average 86.5% of the solutions whereas French and Spanish teams identified only 65.2% and 68.6% of correct answers, respectively (see table 2).<sup>11</sup> Table 3 shows the average and median answers to the second-stage questions concerning the perceived contribution to the team outcome and the claimed share of the joint

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<sup>9</sup>Subjects were randomly assigned the roles of member 1 and member 2 at the start of the experiment.

<sup>10</sup>Answers to the second question in the second stage allow us to elicit the set of possible bargaining agreements, that is the set of allocation rules for the team outcome that both partners would be ready to accept.

<sup>11</sup>The difference between the Japanese and the European samples has an important effect on our team synergy estimates presented later.

outcome. Given that each sample had a different size, we computed the overall average and the overall median over the three samples using both the sample weights and equal weights of  $\frac{1}{3}$ .<sup>12</sup>

Table 2: Team performance in the first stage.

institution	% of solutions found
UNAV (Spain)	68.6
BSB (France)	65.2
OU (Japan)	86.5

Table 3: Self-assessed contributions and minimum claims from joint profits. Answers to questions 1 and 2 in the second stage.

institution	perceived contribution (%)		minimum claim (%)	
	mean	median	mean	median
UNAV (Spain)	50.5	50	48.1	50
BSB (France)	48.9	50	50.6	50
OU (Japan)	49.9	50	46.8	50
total with sample weight	49.1	50	50.2	50
equal weight	49.7	50	48.5	50

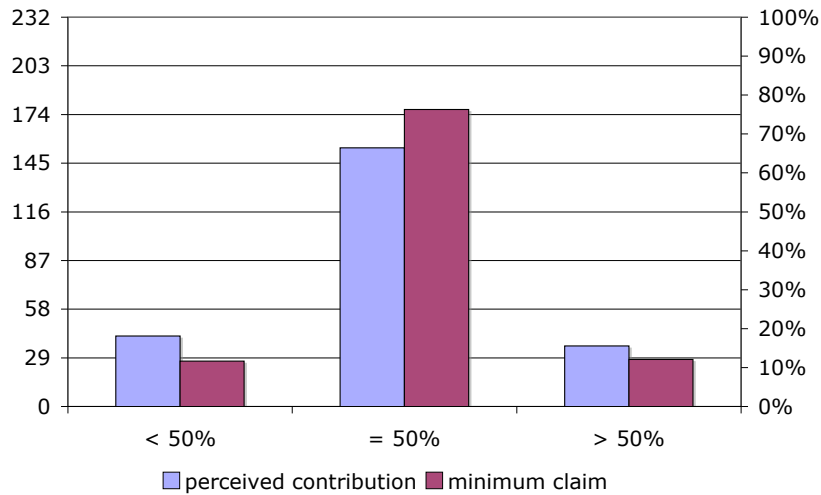
The median answer for stated contribution (labelled as question 1) and claimed profit share (labelled as question 2) was equal to 50% in all three samples. The average answer was not significantly different from 50% in any of the subsamples.<sup>13</sup> Figure 1 below shows the distribution of the answers.

The majority of answers to questions 1 and 2 were 50%. Interestingly this proportion was higher for the claimed share (76.3%) than for the stated minimum claim (66.4%). This suggests that subjects claimed 50% of the team outcome even in situations in which they perceive that one of the two team members contributed significantly more than the other. We actually found that 76% of the subjects who believed they had contributed more

<sup>12</sup>This second measure is particularly relevant in order to reduce the influence of the French data on our results, since the French sample accounts for 84.5% of the total number of observations.

<sup>13</sup>The 95% confidence interval of the whole sample for the mean answer to questions 1 and 2 are respectively [47.9%, 50.3%] and [49.1%, 51.2%]. We cannot reject at standard significant levels the two sided t-test that the average answer to question 1 or question 2 is equal to 50%.

Figure 1: Distribution of answers to questions 1 and 2



than their team partner claimed a share of the joint outcome that was lower than their considered contribution whereas 80% of the subjects who believed they had contributed less than their team partner claimed a share of the joint outcome that was greater than their perceived contribution. These decisions are consistent with the equality norm since subjects tend to choose allocations rules that are typically more egalitarian than sharing rules based on the relative contribution of the different team partners. This implies that equity is not the only driving force behind subjects' profit sharing decisions. Our comparison between the norms of equality and equity is based on the following definitions for equity-consistent and equality-consistent claims.

**Definition 1.** *Equality.* A claim (from the joint profits) is consistent with the equality norm if it is equal to 50%.

**Definition 2.** *Equity.* A claim (from the joint profits) is consistent with the equity norm if it is not higher (lower) than 50% when the corresponding self-assessed contribution is not higher (lower) than 50%. A claim (from the joint profits) is strictly consistent with the equity norm if it is higher than (lower than / equal to) 50% when the corresponding

*self-assessed contribution is higher than (lower than / equal to) 50%.*

These two definitions follow directly from our interpretation of the equity and the equality norms. We consider that a subject uses the equity norm when he decides to assign the future team outcome with respect to his knowledge of the relative contribution of the different team partners. In our experimental design subjects' perceived contributions depend both on the level of effort exerted by subjects as well as on subjects' ability levels. In this respect, our definition of the equity norm is weaker than the definition of equity that follows from the *accountability principle* under which fair rewards are in proportion to the contributions that individuals control (Konow, Saijo and Akai 2008). According to this principle, inherent abilities should not affect the fair allocation of the group outcome. We allow for a broader definition of the equity norm in line with the *proportionality principle* under which fair allocations should depend on subjects' inputs determined by both effort and ability. We argue that effort and ability tend to be highly correlated as subjects having a special talent will also try to exert a greater effort to take advantage of their inherent ability.<sup>14</sup>

A subject uses the equality norm when he decides to split the future joint outcome evenly independently of the relative contributions. The equality and the equity norms coincide when a subject perceives that both members of the team have contributed identically to the joint outcome. We establish in the next result that the norm of equality actually appears to be prevalent in our subject pool.

**Result 1.** *Equality norm versus equity norm. More subjects obeyed the equality norm than the equity norm when claiming their share of the joint outcome.*

In order to measure the relative importance of each norm we studied claims that were strictly consistent with the equity norm, and also report results based on the 78 observations (out of 232) where the subject reported more or less than 50% as his self-assessed contribution. The proportion of claims that were consistent with the two competing norms of equity and equality are shown in table 4.

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<sup>14</sup>In general, highly-talented individuals can be seen as having low marginal costs of effort. As a result, under the classical assumption of convex cost function highly-talented individuals will exert higher levels of effort.

Table 4: Proportion of claims that were consistent with the social norms of equality and equity in %. all: results based on all observations; contr.  $\neq$  50%: results based on observations with a self-assessed contribution different from 50%; strictly: results based on strictly consistent claims.

institution	equality-consistent claims		equity-consistent claims			
	all	contr. $\neq$ 50%	all	strictly	contr. $\neq$ 50%	strictly
UNAV (Spain)	50.0	33.3	95.0	55.0	50.0	50.0
BSB (France)	78.6	56.7	95.4	69.9	51.7	28.3
OU (Japan)	81.3	75.0	100.0	43.8	75.0	25.0
total with						
sample weight	76.3	57.7	95.7	66.8	55.1	29.5
equal weight	69.9	55.0	96.8	56.2	58.9	34.4

A large proportion of claims were consistent with either the equity or the equality norm in all three samples. Less than 5% of the claims in our database were inconsistent with both norms. A quick look at the statistically significant difference between numbers in columns 1 and 3 would give the impression that equality is less important than equity when forming a claim.<sup>15</sup> On one hand, the surprisingly explanatory power of the two norms and the low number of inconsistent claims might be due to our rather permissive definition given for equity-consistent claims. If we look at claims that were strictly consistent with the equity norm we can see that the power of the equity norm declined. Nevertheless, the two norms account for slightly more than three quarters of the claims with considerable differences between countries. Results on strictly consistent claims, and especially those that are derived from observations that exclude the 50% focal point as self-assessed contribution, show that on average significantly more claims were formed following the equality norm (57.7%) than the equity norm (29.5%). Our result is consistent with the recent analysis developed by Konow, Saijo and Akai (2008) in which the equality norm became prevalent in dictator games when subjects were non-anonymous stakeholders. The authors found that in this case almost half the subjects (49%) satisfied the equality norm.<sup>16</sup> In our environment not only were subjects non-anonymous stake-

<sup>15</sup>Our comparisons are based on two-sided parametric statistical tests. The reported differences are significant at the usual statistical levels if not stated otherwise in the text.

<sup>16</sup>Forty-five percent of the subjects complied with the equity norm in their experiment with non-

holders but they also faced each others as they worked side-by-side in a team task. The team context that characterizes our experiment may explain the strength of the equality norm as it tends to reduce social distance as does holding a stake in the outcome or being able to communicate with partners. Teamwork is actually an example of a cooperative environment in which, according to social psychologists Mikula (1980) and Deutsch (1985) the principle of equality is overwhelming. Mikula and Schwinger (1973) actually identified a prominent role of the equality norm when asking thirty six pairs of soldiers to allocate joint earnings. This early result was explained by the existence of a generosity bias among friends (Konow 2003). However, in this experiment we were able confirm the importance of the equality norm in a team context in which subjects were not friends. We cannot account for our result by a generosity bias since both subjects who believed they had contributed more than 50% to the total outcome and subjects who believed they had contributed less than 50% actually chose to split the joint outcome equally.

We observed substantial differences between the countries in the respective importance of equality and equity norms. In the Spanish subsample equality and equity seem to have the same importance, while the French and the Japanese observations clearly demonstrated that individual claims were more often derived by the equality norm rather than the equity norm.

**Result 2.** *International differences and the equality norm. The equality norm was more prevalent for Japanese and French subjects than for Spanish subjects.*

These findings are not surprising given the fact that patterns of redistribution, for example in public good games, have been found to be consistent with measures of income inequality in the three countries (Tachibanaki 2005, Uler 2007). Indeed, according to standard income inequality measures (e.g. Gini index), Spain shows higher levels of income inequality than does Japan or France (Brandolini and Smeeding 2007). These results are also in line with the fact that team incentives are extensively used in Japan, and especially in Japanese firms (Abegglen 1958, Haitani 1990, Koike 1988). It is remarkable that the self-assessed contributions are more disperse in the Japanese subsample. Only 25% of the Japanese subjects report a personal contribution exactly equal to 50% whereas around anonymous stakeholders and only six percent appeared to be driven by purely selfish motives.

70% of the Spanish and French subjects report a 50-50 contribution. In spite of their self-awareness and the high success rate, none of the Japanese subjects claimed more than 50% from the joint profits. We have to stress as well the possibility that the prevalence of the equality norm in the Japanese sample is enhanced by the strong compliance of Japanese subjects to a given norm as is found in public good games by Cason, Saijo and Yamato (2002). As a result, some Japanese subjects may also value the norm of equity as is the case for European subjects, but may decide to comply with the dominant equality norm.

Given the similarity of subjects' demographic characteristics, our three subsamples can be compared is possible. Our experimental subjects are mostly third-year undergraduate students with Business and Economics majors. However, we have to stress that on average Japanese subjects obtain better results in the tasks than did European subjects. They seem to have a stronger mathematical background that possibly gives them an advantage in solving number-related tasks. We used the translated (French, Japanese and Spanish) versions of the instructions in the lab to make sure that there was no selection bias according to subjects' ability to read English. Finally, the standard of living of students at the three locations was comparable, the magnitude of the incentives was therefore similar.<sup>17</sup>

## **Inefficient team formation**

The previous section stressed the relevance of equality and equity norms in subjects' decisions over allocating team outcomes. The majority of individual claims is consistent with either the equality norm or the equity norm, and in particular with the equality norm. However, one may still wonder to what extent economic factors can account for choices that are inconsistent with the equality norm.

**Result 3.** *Economic factors and excessive team formation. Subjects' claims are explained by the equality norm rather than by team-synergy related economic factors.*

We say that a subject's claim is driven by economic factors if it is the result of a

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<sup>17</sup>We used a show up fee of 7€ in Japan instead of 5€ in order to compensate for higher public transports prices. This is also the policy of the laboratory at Osaka University.

comparison between expected payoffs from performing the task in a team and expected payoffs from working alone on the task. The choice in this case is driven by the objective contribution to the team outcome and team synergies, rather than the perceived contribution.

Team synergy exists if the team profit is larger than the sum of individually achievable profits. However, our database contains only one observation for each task per subject, which makes it especially difficult to estimate team synergy.<sup>18</sup> Indeed, individuals would tend to perform better in task 2, given that they have been exposed to a similar task in the first stage. In what follows we concentrate on economic factors that result from differences between subjects' abilities. We used the success rate on the individually accomplished task 2 to create a proxy of personal abilities. It is an objective measure formally defined as follows.

**Definition 3.** *Relative contribution.* If subjects  $i$  and  $j$  achieve a success rate of  $x_i$  and  $x_j$  when performing the same task individually, we compute subject  $i$ 's relative performance or relative contribution to a team (formed by subjects  $i$  and  $j$ ) as  $\frac{x_i}{x_i+x_j}$ . Subject  $j$ 's relative contribution is  $\frac{x_j}{x_i+x_j}$ .

Intuitively a profit-seeking subject should seek to work in a team when he is less able than his partner. Similarly, he should prefer to work alone if his partner is less able than he is. Remember that presenting a smaller claim in our experiments made team formation easier. In order to ensure that the statistical analysis is simple and similar to the one previously presented, we used the following definition for economic-factor consistent claims.

**Definition 4.** *Economic factors.* A claim (from the joint profits) is consistent with economic factors if it is not higher (lower) than 50% when the corresponding relative contribution is not higher (lower) than 50%. A claim (from the joint profits) is strictly consistent with economic factors if it is higher than (lower than / equal to) 50% when the corresponding relative contribution is higher than (lower than / equal to) 50%.

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<sup>18</sup>The number of correct answers in task 1 was 53 whereas it was only 14 in the second task. Therefore not only possible learning effects, but also different difficulty levels render the comparison of the success rate across tasks difficult.

Table 5 is similar to table 4 and presents the results of the statistical analysis of the proxy of individual abilities, i.e. relative performance. The equality norm and the economic factors account for almost all observed claims in the laboratory. Again, the same caution as in the previous subsection is advised when comparing columns 1 and 3. Once we look at strictly consistent claims, and/or observations that are different from the 50% focal point (here, like for the relative contribution) we confirm the dominance of the equality norm over the economic factors. All but two of the differences between the proportions of claims that are consistent with the equality norm and economic factors reported in table 5 are statistically significant. The p-values associated with the two exceptions are around 25% and might be driven by the relatively small sample size since they correspond to the comparisons of the Spanish and Japanese samples.

Table 5: Proportion of claims that are consistent with economic factors and the social norm of equality in %. all: results based on all observations; contr.  $\neq$  50%: results based on observations with a relative contribution different from 50%; strictly: results based on strictly consistent claims.

institution	equality-consistent claims		economic factors-consistent claims			
	all	contr. $\neq$ 50%	all	strictly	contr. $\neq$ 50%	strictly
UNAV (Spain)	50.0	50.0	80.0	5.0	31.3	25.0
BSB (France)	78.6	80.3	91.8	13.3	53.5	8.5
OU (Japan)	81.3	87.5	100.0	12.5	62.5	12.5
total with						
sample weight	76.3	77.7	91.4	12.5	51.8	10.2
equal weight	69.9	72.6	90.6	10.3	49.1	15.3

We did not find significant international differences and suggest that economic factors have a limited role in accounting for subjects' decisions to share the future team outcome. Ignoring the economic factors leads directly to inefficient, i.e. excessive, team formation. It seems that on average roughly 10-12% of the subjects behaved rationally, in the classical economic sense, while more than 77% were guided by the norm of equality in spite of differing individual abilities.

## Team synergy

In spite of the previously outlined difficulties, we created a proxy of team synergies based on the ratio between the team performance on task 1 and the average individual performance for the two team members in task 2. Let  $\gamma_{ijk}$  denote the synergy factor for the team composed of subjects  $i$  and  $j$  in subsample  $k \in \{F, J, S\}$  where  $F$  stands for the French,  $J$  for the Japanese and  $S$  for the Spanish subsample. In order to adjust team synergies for possible learning effects and changing task difficulty levels, we gathered data from the individual performances on task 1 of Japanese and Spanish subjects without experience of similar tasks. From a sample of sixteen subjects in Japan, the average individual performance was 79% whereas it was 43% for the sample of twenty Spanish subjects. We did not estimate the individual performances of French subjects on task 1 as French and Spanish subjects obtained similar team performances in the baseline treatment and were expected to exhibit similar individual performances in task 1. The estimate of the average team synergies  $\Gamma_k$  for a given subsample  $k$  was then computed as the ratio of average team performance in task 1 and average individual performance on the same task. The estimate for the average team synergy was 0.79 in the French and Spanish subsamples, i.e.  $\Gamma_S = \Gamma_F = 0.79$ . In the Japanese subsample the estimate for the synergy factor  $\Gamma_J$  was 0.54. The average team synergy was lower for the Japanese sample given that subjects reached very high levels of performance when undertaking the task individually. Team performance in task 1 was on average only 9% greater than the individual performance on the same task. That is team synergy is practically absent. The presence of synergies would imply an average team synergy greater than one. Despite the absence of synergies the great majority of subjects were willing to form teams. Indeed, 78% of the teams in our sample were actually feasible, meaning that there was an allocation rule for the team outcome that both team members would be ready to accept in the second stage of the game.<sup>19</sup> As a result, subjects were ready to maintain inefficient teams as their claims from joint profits were determined by concerns of equality rather than efficiency. This result stresses the fact that fairness is unlikely to coincide with economic efficiency in a team

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<sup>19</sup>This occurred if the sum of team partners' claims in the second stage of the game were lower than or equal to one.

context.<sup>20</sup>

## 4 Conclusions

In this paper we developed an experimental setting to analyze team formation. Team formation was introduced as the result of a bargaining process over a jointly produced outcome. As a result, our analysis relates to standard bargaining experiments with the novelty that the amount of money to be distributed was collectively produced by completing a real effort team task. We confirmed the prevalence of the equality norm encountered in the bargaining experiments literature in a context in which an alternative norm could be used. Indeed, the fact that the joint outcome was obtained by completing a real team task possibly induced a dimension of merit in the allocation of the team output. This was the case since subjects exerted different levels of effort and had different levels of abilities in the team task. As a result, individuals could use the equity norm and emphasize the role of merit in allocating the joint outcome. However, we observed that the equity norm was less prevalent than the equality norm in explaining subjects' decisions to form and dissolve teams. It seems that the norm of equality also explained a much larger proportion of subjects' decisions than, did economic factors implying excessive team formation.

We have also identified international differences as the equality norm and then excessive team formation were more prevalent in the Japanese subsample than in the Spanish one. Also, French subjects exhibited a stronger equality norm than did their Spanish counterparts. These international differences are consistent with different measures of inequality in the three countries under study.

As an agenda for future research, we propose to conduct team-formation experiments with North American subjects with a focus on the role of the equality norm in the dynamics of entrepreneurial team formation.

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<sup>20</sup>These results contrast sharply with studies that put fairness and efficiency on equal footing (e.g. Posner 1981).

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# Appendix

## Team formation experiment (*Baseline treatment*)

### Instructions

The goal of this experiment is to study individual decision making. The instructions are simple and if you follow them carefully you will receive a considerable amount of money in cash by the end of the experiment. Payments will be made confidentially, so no one will receive information about the earnings of the other participants. You can ask a question at any time by raising your hand first. Apart from these questions it is strictly forbidden to talk to other participants. You are only allowed to talk with your teammate. Talking with another subject may result in immediate expulsion from the experiment.

This experiment consists of three tasks. In all of them you will have to work alone or in a group with another participant chosen randomly in this room. With these instructions you received a card labeled either “member 1” or “member 2”. The two members have the same role in the group. With your assigned partner you will have to undertake a common task for which you will be provided a pencil and a sheet of paper. All participants have received the same instructions as you.

For each task, you will be asked to find, in a limited amount of time, numbers that satisfy specific conditions.

*Example: Find as many numbers as you can, satisfying the following conditions:*

- It has 3 digits.
- If you sum its digits the result is equal to 7.
- If you multiply its digits the result is strictly larger than 10.
- The number 124 is not a solution, because although it has 3 digits and they sum up to 7 ( $1 + 2 + 4 = 7$ ), if you multiply its digits the result is 8 ( $1 \times 2 \times 4 = 8$ ) which is smaller than 10.
- The number 423 is not a solution either, because although it has 3 digits and if you multiply them the result is larger than 10 ( $4 \times 3 \times 2 = 24$ ), the sum of its digits is not 7, but 9 ( $4 + 2 + 3 = 9$ ).
- The number 322 is a solution, because  $3 + 2 + 2 = 7$  and  $3 \times 2 \times 2 = 12$ , which

is higher than 10.

For each number that you find you will be rewarded with 40 centimes of euros. As a result, if you and your partner find  $n$  numbers together, you earn  $n$  times 40 centimes of euro. Your individual earnings will be computed as the half of your group earnings, for this reason your payoff will be  $n$  times 40/2 centimes of euros.

Also, each wrong answer entails a penalty of 40 centimes of euro. If you get fewer correct answers than incorrect answers your benefits are zero.

Notice that by answering correctly you can earn a considerable amount of money in a short period of time!

**- Task 1 -**

You have 10 minutes to find as many numbers as you can, satisfying the following conditions:

- It has 3 or 4 digits.
- If you sum its digits the result is equal to 10.
- If you multiply its digits the result is strictly larger than 23.

*Example of a correct answer.*

• The number 262 is a solution, because  $2 + 6 + 2 = 10$  and  $2 \times 6 \times 2 = 24$ , which is higher than 23.

Good luck!

**- Questions -**

Please answer now the following questions. The answers to these questions are anonymous and will never be revealed along the experiment.

1. What has been your individual contribution, in percentage terms, to the performance of the group?
2. What is the percentage of the group profits that you would claim in order to undertake a similar task with the same person?

In the last task the allocation rule of your group's profits will be determined by a random device. A piece of paper will be taken from a bowl that has the following 9 pieces of paper:

*20%, 30%, 40%, 45%, 50%, 55%, 60%, 70%, 80%*

This number indicates the share of profits that “member 1” of your group will receive by the end of this task. You can figure out whether you are “member 1” or “member 2” by looking at the card that you were given at the start of the experiment.

You will undertake the following task in a group with the same partner as before if you and your partner were ready to accept the allocation rule as stated in the answer to question 2.

*Examples.*

- Suppose that “member 1” answered 30%, “member 2” answered 35% and the piece of paper with 40% was chosen. In this case the group will stay, since “member 1” will receive 40% of the final profits and he has claimed 30% only. “member 2” will get 60%, while he claimed 35% only.

- Suppose that “member 1” answered 60%, “member 2” answered 35% and the piece of paper with 40% was chosen. In this case the group will be dissolved, since “member 1” will receive only 40% of the final profits, while he has claimed 60%.

**- Task 2 -**

You have 5 minutes to undertake individually a similar task. Find as many numbers as you can satisfying the following conditions:

- It has 3 or 4 digits.
- If you sum its digits the result is equal to 9.
- If you multiply its digits the result is strictly larger than 19.

For each number that you find you will be rewarded with 40 centimes of euros.

Good luck!

**- Task 3 -**

You have 5 minutes to find as many numbers as you can, satisfying the following conditions:

- It has 3 digits.
- If you sum its digits the result is equal to 8.
- If you multiply its digits the result is strictly larger than 11.
- All the digits are different from each other.

For each number that you find you will be rewarded with 40 centimes of euros.

If you work alone this is your final earnings.

If you work in a group, as a result, if you and your partner find  $n$  numbers, together you earn  $n$  times 40 centimes of euros. Your individual earnings now will be computed according to the above specified allocation rule. That is, the group profits will be split as indicated by the number on the piece of paper drawn from the bowl.

Good luck!

## Robustness of our results

In this section, we assess questions related to the robustness of our results by considering the effects of a number of modifications of the baseline treatment. In particular, we consider order effects and the importance of team size.

### Anchor and order effects

First, we reversed the sequence of tasks completed by subjects in the experiments. We wished to check whether starting with a team task could lead teamwork to be the default, making it difficult for subjects to dissolve the initial partnership. We considered an alternative design in which subjects started working individually on task 1 and then answer the following question in stage 2. The answers determined whether subjects were going to form a team in stage 3 or not.

What is the percentage of the group profits that you claim in order to undertake a similar task with a person selected randomly in this room?

We ran this experiment with a pool of sixteen Japanese subjects. The findings presented in the previous section were robust to this change in the order of the tasks. In this reversed treatment, the median of individual claims was 50% and the mean was equal to 56.6%. The performance in task 1 was 79.6%. We saw again that Japanese subjects achieved very high levels of performance even when they were working individually on the task. The success rate of 79.6% was comparable to the previously reported success rate of 86.5% obtained by Japanese subjects when working in a team on the same task. The result confirms the absence of team synergy. In spite of the absence of team synergies and the reversed task order, subjects obeyed the equality norm extensively. Indeed, the median claim from the team outcome chosen by subjects was 50% similar to the case in which subjects started with teamwork.

## **Team size**

In order to assess the importance of team size in the allocation of a joint output we considered data from an experiment in which subjects had to perform a number task in teams of three subjects selected randomly at their entrance to the laboratory. Subjects were isolated and had to assign a share of the joint outcome to each team member. The allocation rule of the team output was computed as the average of each partner's allocation rule decision. We performed this peer evaluation experiment at the Universidad de Navarra with 24 participants. The importance of the equality norm was confirmed in this context too, since 10 subjects (42%) chose a strictly egalitarian rule giving one third of the joint output to each team member. Also, the large majority of subjects' allocation rules were weakly egalitarian: 19 subjects (79%) gave the same share of the joint output to their two team partners. These results stress that the use of the equality norm in the allocation of team outcomes is not restricted to the focal 50-50 split.