EMPIRICAL ESSAYS ON JOBS, WOMEN, AND TRUST

by

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ABSTRACT OF THE DISSERTATION

Essays on Jobs, Women and Trust

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This dissertation is concerned with how social norms contribute to gender inequality. In particular, I examine how attitudes toward gender roles affect women's labor outcomes and what factors determine these roles. I also investigate if there are pecuniary motives behind "bride kidnaping marriages", a contentious "traditional" practice in Kyrgyzstan that often restricts women's ability to choose mates. Lastly, I conduct an experiment designed to elicit information about how individuals make investment decisions without binding contacts in a modified "trust (or investment) game". The experiment is designed to simulate life situations, like potential moral hazard problems related to intergenerational transfers.

In chapter 2, I focus on measuring the effect of conservative attitudes on female labor force outcomes. The literature measures the effects of gender role attitudes using indices that do not reveal whether a woman is conservative or liberal with respect to attitudes toward gender roles by local norms. I conjecture that local norms matter. Accordingly, I employ a novel approach to determining if a woman is conservative or not, which incorporates both her attitudes toward gender roles and the perception by men in her community of what women's roles should be. I estimate and compare results from bivariate and switching probit models which assume that being a conservative woman is endogenous

with respect to female labor market decisions. I also use a semiparametric approach to circumvent the necessity of relying on strong distributional assumptions when using comparable baseline parametric models. Using a rich data set from a country in Central Asia, semiparametric methods predict conservative females will reduce labor force attachment by 8.8 percentage points, a significantly lower effect in magnitude than the one yielded by parametric models. From a policy perspective, my analysis reveals that university level education is 50 percent more effective in terms of increasing the labor force participation of conservative women when compared to secondary technical education. I also find that mothers with university degrees, but not technical degrees, pass egalitarian gender attitudes to their daughters, fostering wider acceptance of women's employment and promoting convergence of gender gaps in labor force participation.

In Chapter 3, I investigate if there are pecuniary motives associated with a 'traditional' way of getting married in Kyrgyzstan, called 'Ala Kachuu' and translated as 'catch and run' or 'bride kidnapping'? I examine if bride kidnapping marriages (BKMs) are associated with the level of wedding costs in Kyrgyzstan. Despite evidence that a wedding's cost may be twice per capita GDP, the current literature does not consider the costs associated with wedding festivities as a major factor explaining bride kidnapping. Using a rich data set from Kyrgyzstan, I find that BKMs lead to a 42 percent reduction in wedding costs compared to conventional marriages. A falsification test, addressing potential endogeneity concerns, confirms the results are not driven by omitted variable bias or selection issues.

In Chapter 4, I conduct an experiment designed to elicit information about how individuals choose amounts to invest and pay back in the presence of the investor's ability

to reward the counterpart at no cost to the investor in the final stage of the experiment. The experiment is an extension of a conventional "trust (or investment) game". It involves sequential exchanges of money without the ability of making enforceable agreements between participants, which suggests that the Subgame Perfect Nash Equilibrium is to send zero amount of investment. I find that the higher the investor's ability to "reward" the recipient in the final stage, which acts as a treatment, the greater is the level of investment in the first stage. In addition, higher values of treatment also lead to: i) more efficient outcomes in terms of total surplus generated and ii) greater return on investment. Lastly, I provide evidence that the investor may be driven both by self- and other-regarding (equity-based) preferences. However, the investors' behavior is not consistent with altruistic motives. The experiment bears resemblance to real life situations such as intergenerational transfers characterized by an exchange motive and labor migrant's transfers of remittances explained by investment motives.

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Dedication

This dissertation is dedicated to my parents, Galina Kolchina and Yuri Kolchin. I am especially grateful to my mom for her unconditional love and support.

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Chapter 1

Introduction

Reducing gender inequality in different outcomes is socially desirable goal across the nations. Gender gaps in labor market outcomes draws attention of both public and policy makers due to its effects on social welfare. As a result, researchers devoted considerable efforts to understanding what stifles the women from entering labor markets on par with men. One the factors explaining gender gaps in labor markets is attributed to norms of behavior. In a similar manner, norms of behavior affect the way marriage markets operate in many developing countries, leading to "traditional" ways of getting married when men have considerably more discretion of choosing a mate.

In the second chapter, I measure the effect of conservative attitudes on female labor force outcomes in a novel way. More specifically, I focus at understanding how being a conservative woman with respect to gender roles attitudes by community norms affects labor market outcomes. I estimate if a woman is conservative or not incorporating both her attitudes toward gender roles and the perception by men in her community of what women's roles should be. I use a switching probit, in addition to the widely used bivariate probit, as factors affecting female labor force participation are likely be different for the women with conservative and liberal attitudes toward gender roles. In addition, I employ semiparametric methods to produce more robust estimation given that the distributional assumptions required to yield consistent results for parametric models are likely to be violated.

In the third chapter, I explore the relationship between 'traditional bride kidnapping' marriages observed in Kyrgyzstan and wedding costs focusing on wedding

festivity expenditure. The wedding is the most costly privately arranged ceremony in many countries. In Kyrgyzstan, the expenditure on wedding festivities averages more than twice per capita GNI. Such wedding costs are a significant burden for a large fraction of Kyrgyz households. The objective of this chapter is to rigorously estimate a hypothesis that that bride kidnapping marriages lead to the reduction of the wedding costs.

Interactions among individuals involve trust and trustworthiness on daily basis. Indeed, people manage to carry out many economic transactions without relying on contracts. In the last chapter, I design and run an experiment to understand how individuals make investment decisions without binding contacts in the presence of the investor's ability to reward the counterpart at no cost to the investor in the final stage of the experiment. The experiment is an extension of a conventional "trust (or investment) game" introduced by Berg et al (1995). The experiment is designed to model a number of life situations. For example, the decision to migrate and sending remittances are also based on informal family agreements. They often are based on informal intergenerational financing of the initial costs associated with migration of a family member.

For the first two chapters, I use the data collected in 2010-2013 for the Life in Kyrgyzstan survey (Brück et. al., 2014). In addition to conventional household survey modules, this survey includes data about: i) attitudes toward gender roles (available only for 2012 and 2013) of both male and female respondents; ii) how the marriage was originated according to female respondents and iii) detailed data on the largest festivity in last 12 month.

Chapter 2

The Effect of Conservative Norms of Behavior on Female Labor Force Participation

2.1 Introduction

Gender inequality in numerous economic and social outcomes remains a persistent issue in many countries, hindering their social welfare. For example, Clark et. al. (1991) find that the economic development of a nation has a strong association with women's labor force share. With respect to labor market outcomes, gender inequality is generally attributed to three distinct factors: discrimination, preferences and productivity. A very detailed theoretical and empirical overview on the outcome differentials by gender and race are provided in the renowned Altonji and Blank's (1999) chapter of the Handbook of Labor Economics. Discrimination is a product of sexist prejudices, while preferences relate to the difference in choices made by men and women. Despite pronounced differences between them, properly measuring these components is difficult. Yet, identifying and estimating the magnitude and significance of the sources of gender differences remains of great interest for economists. Indeed, understanding the obstacles preventing women from entering labor markets on par with men can allow tailoring more effective policies.

Disentangling gender inequality into distinct components is an extremely challenging task. While researchers focus usually on analyzing the effect of one factor at a time, results based on observational data are as a rule treated with caution due to difficulties associated with rigorously controlling other components affecting gender inequality (Altonji and Blank, 1999). In certain instances, experimental approaches could be successfully applied to isolate the effects of interest. For example, Gino et. al. (2015) argue

that preference differences between men and women affect their outcomes in achieving job promotions. Women, in contrast to men, view high-level positions attainable but less desirable due to associating more negative outcomes with promotions.

In this paper, I am concerned with understanding how being a conservative woman by community norms affects labor market outcomes. It is necessary to factor in local perceptions of "female" identity and social norms as by themselves gender role attitudes appear imprecisely revealing of whether a woman is considered conservative or not. In this work, comparing a woman's gender roles attitudes with behavioral prescriptions for women by men in the community she resides enables us to ascertain whether she is considered to hold liberal and conservative views on gender roles.

Typically, I do not observe this in the literature which focusses instead on the effect of gender role attitudes (see, for example, Fortin, 2005; Miyata and Yamada, 2016; Vella, 1994). I argue that understanding the effect of gender role attitudes has limited policy use falling into the category of cases when the data determines the questions that can be asked, according to Duflo (2006). This effect could have been useful on its own if it were associated with a particular factor driving gender disparities mentioned above. It appears to be not the case.

It remains an open question to what extent gender role attitudes are molded by preferences and gender discrimination. In other words, I do not know if strongly agreeing to conventional statements used to capture attitudes such as "a man's job is to earn money; a woman's job is to look after the home and family" and "important decisions should be made by the husband rather than the wife" reflect the unadulterated preferences of women without the effect of gender discrimination. In practice, I expect that discrimination from

men significantly influences women's responses. Therefore, the effect of gender roles attitudes on female labor market outcomes does not help us understand whether it is attributable to differences in preferences or gender discrimination. Otherwise, its use would be invaluable in models explaining gender gaps.

I also think that estimated effects of gender role attitudes on labor market outcomes are less relevant for devising policy recommendations. Specifically, drawing a line between conservative and liberal attitudes given the degree of agreement of disagreement with a statement "important decisions should be made by the husband rather than the wife" is quite subjective. For some people, only a respondent who expresses strong disagreement with it should be considered a proponent of liberal attitudes toward gender roles. Whereas others could suggest treating a woman who neither agree nor disagree with the statement as liberal, especially if her response contrasts most other women supporting the statement. As such, what could be perceived liberal behavior in some Middle East states, where traditional society norms prevail, may not necessarily be treated similarly in New York area or other countries. The same applies to geographic variations of social norms within a country. Indeed, I observe remarkably high variation in gender role attitudes across different areas of Kyrgyzstan. Therefore, again, what is more interesting from my perspective is unveiling how being a conservative woman by community norms affect labor market outcomes.

In terms of econometric models, I start by showing preliminary results of the effect of a gender attitude index on labor force participation using univariate probit and a system of equations where the variable of interest is modeled in a separate equation. As a robustness check, I also estimate models using community fixed effects to control for

community unobserved characteristics. This approach alleviates concerns over omitted variable bias due to unobserved community level variables, and also justifies controlling for regional fixed effects in my models. Next, I examine the determinants of female labor force participation using parametric bivariate and switching probit models. I also estimate the models using a semiparametric approach to check if strong assumptions regarding the structure of error terms in parametric models affect the consistency of results. The semiparametric methods appear to yield remarkably different inferences making them a better substitute for their parametric counterparts.

I use a recent household survey data form Kyrgyzstan. Rich survey data allows us to construct an index capturing attitudes toward gender roles of both male and female respondents and, using geographic residence of respondents, determine whether a woman's views are conservative or not. Similar to other work, the index that I use to derive my variable of interest is based on conventional statements gauging the perceived role of women in household decision making, household production, the labor market and the education sector relative to the men's role.

I contribute to the literature analyzing the effects of attitudes toward gender roles on female labor supply decisions. First, new to this literature, I employ a novel approach to differentiate between a conservative and liberal woman not only based on her responses to gender attitude statements but also by taking into account the behavior men in her community expect to see by women. This contribution may also apply to a wider range of literature that analyzes the impact of gender discrimination on different outcomes. For example, in their recent paper, Ruyssen and Salomone (2018) argue that a major driver of the desire by women to migrate abroad is related to the perceived level of domestic gender

discrimination, which is based on the question if a respondent agrees or not that women are treated with respect and dignity in her country. However, this model does not explain well the situation in Kyrgyzstan since, according to the data, the perceived level of gender discrimination is quite low, but the intentions to migrate of Kyrgyz women are very high compared to other countries. I could apply my model since the perception of discrimination is subjective and heavily depends on the perception of women's role specific to different geographic areas. Then perceived gender discrimination along with the outcome variable could be likely better explained by such underlining factors as whether women share conservative or liberal norms.

Second, I use a switching probit in addition to the widely used bivariate probit model finding that the marginal effects of some key factors explaining female labor market attachment are markedly different for conservative and liberal women. Third, I employ semiparametric estimation to provide with more robust estimation of results given that the assumptions required to yield consistent results for parametric models are likely not to hold. In fact, economic theory has little to say about the distribution of error terms, which are assumed to follow the normality assumption historically for tractability reasons. Lastly, this is the only study attempting, to the best of my knowledge, to assess the effect of women adhering to conservative norms of behavior on their labor force attachment in Kyrgyzstan or any other state in Central Asia.

The paper is organized as follows. In the next section, I describe the conceptual framework that is based on the identity model introduced by Akerlof and Kranton (2000). As opposed to the standard neoclassical labor-leisure model, it allows one to predict different equilibrium outcomes given different types of agents, as conservative and liberal

women in my case. Next, I provide a literature review focusing on empirical works that explore the relationship between attitudes toward gender roles and female labor market outcomes.

I proceed with a description of the data I use for statistical analysis. It comes from two waves of a recent household survey conducted in Kyrgyzstan. The subsequent section is concerned with the discussion of my results on the effects of the gender role attitudes on female LFP. At this point I perform this in a similar manner as in the previous literature. Then I proceed with describing and addressing potential threats to internal validity, including endogeneity due to omitted variable bias and resorting to strong parametric assumptions concerning distribution of error terms. The former is partly addressed by estimating a community based fixed effects model. With respect to the latter concern, I rerun the model with the gender role attitudes semiparametrically and find that the marginal effects of interest decreases in magnitude and becomes weakly significant. This leads us to the exposition of the model I propose.

In subsequent sections, I illustrate in more detail why the effects of gender role attitudes may be heterogeneous depending on whether a woman is conservative or liberal. Failure to account for heterogeneity may render the results inconsistent. This line of reasoning leads us to introduce bivariate and switching probit models for estimation of the effects of conservative norms of behavior on female LFP. I estimate first the parametric models and then their comparable semiparametric counterparts. I also provide an overview about the advantages of and requirements needed for using semiparametric methods, and lay out all steps one needs to replicate the estimation.

The last two sections are dedicated to a discussion of the results and the conclusion. I end with several comments on potential shortcomings of my study that may suggest further areas of work.

2.2 Conceptual framework

The theoretical foundation of my work arises from a model of identity proposed by Akerlof and Kranton (2000), where identity is defined as one's sense of belonging to a social category. In their article, they draw on psychodynamic personality theory to explain how an individual's identity maps to his/her behavior, and augment the standard neoclassical utility maximizing framework by integrating identity as an argument in the utility function.

When the identity model is applied to the concept of gender identity, we deal with such social categories as "men" and "women", which are related to a set of distinct behavioral prescriptions. Divergence from expected behavioral prescriptions diminishes one's utility level. Using a simple game theoretical model that assumes interactions of individuals with opposite identities allows observing different equilibrium outcomes. As such, a gender identity model can account for many different social phenomena concerning gender inequality, including gender discrimination, social exclusion and the household division in labor. With respect to labor force participation rates, it can explain the difference in rates between men and women if the prevailing behavioral prescriptions limit women's role to being homemaker and view men as the main breadwinners.

I use the degree of agreement with a set of statements describing attitudes toward gender roles to learn about the expectations men in a local community have with regard to the proper behavior of women and if a woman is in compliance with the prescriptions or

not by comparing her responses, summarized by the gender attitude index, with that of men residing in her community. Complying is interpreted as conservative (or traditional) behavior; while not complying is treated as liberal. It is worth noting that such delineation is novel in the empirical literature; in other papers whether a woman adheres to traditional or liberal views is not clearly defined. It is based solely on a woman's individual responses that capture their attitudes toward gender roles without taking into consideration men's expectations in specific geographic areas. Contrary, my approach enables me to capture more precisely the threshold between conservative and liberal women at the community level. According to Akerlof and Kranton (2000), "if women's identity is enhanced by work inside the home, they will have lower labor attachment then man". Since conservative women view their primary responsibility in working inside home – as opposed of what they think about the men's role – it is expected that it will negatively affect the outcome variable, when a conservative indicator variable is included in the female labor force participation equation.

2.3 Literature review

Early human capital models emphasized the importance of the expected duration of labor force participation. Women are expected to have more changes in labor market status over the life cycle due to pregnancy, which makes their optimal investment in education less than that of men (Polachek, 1978). This contributes to explaining gender gaps in labor market outcomes. However, many other factors influence labor market outcomes. A number of studies find a negative relationship between conservative attitudes[1] toward

[1] In many studies traditional and non-egalitarian attitudes are used instead of conservative although the measurement of attitudes is based on a similar set of questions.

gender roles and female labor market attachment. I review first the studies that use data from developed countries.

Attitudes toward gender roles were extensively examined in labor economics and were found to be strongly significant in influencing various labor market outcomes and investment in human capital. Vella (1994) finds that gender roles attitude has an impact on female labor supply and human capital accumulation. While explaining the formation of the gender attitudes with parental education and religious affiliation, he does not find the existence of reverse causality between the level of female education and these attitudes, as a result, claiming that attitudes toward gender roles are formed in the childhood.

Levine (1993) finds that female attitudes towards a woman's role is an important determinant of female labor force participation based on the General Social Survey data from US. Using three waves of data spanning more than 10 years from the World Values Surveys, Fortin (2005) examines the relationship between gender role attitudes (of women) and female labor force participation in the OECD. She concludes that anti-egalitarian gender views have a significant negative association with female employment rates and the gender pay gap. More specifically, Fortin (2005) uses responses to the statements "when jobs are scarce, men should have more rights to a job than women" and "being a housewife is just as fulfilling as working for pay" to distinguish if a respondent shares the traditional social norm of women as housewives, and employ them for constructing a separate binary variable to examine labor market outcomes. She also makes the interesting observation that positive responses to the former statement decrease over time and as cohorts get younger. This allows the author to conclude that this represents a gradual decline in gender discrimination in labor markets. At the same time, the share of positive responses to the

latter statement ("being a housewife is just as fulfilling as working for pay") remains remarkably stable over time and different cohorts.

A separate strand of literature examines the formation of gender role attitudes. Farre and Vella (2007) shows that mothers' attitudes have a statistically significant effect on those of their sons. They also report a strong association between the attitudes of sons in their youth and their wives' labor supply in adulthood. For daughters, the association between their own attitudes and adult labor outcomes is weak and appears largely to operate through the educational channel.

In a similar vein, Fernandez et al. (2004) provides evidence that liberal gender role attitudes exhibited by men also have a significant effect on increasing female labor force participation rates and reducing gender gaps. In particular, the authors argue that men who had working mothers have statistically greater chances to have working spouses. To address the endogeneity of mothers' labor force status, Fernandez et al. (2004) use variation in men's military draft in the USA as a source of exogenous variation in mothers' labor force supply.

The studies that use data from developing countries report overall similar findings. For example, Dildar (2015) argues that conservative attitudes toward gender roles, along with religiosity, have a negative impact on female LFP in Turkey. Miyata and Yamada (2016) assess the impact of gender role attitudes on labor market participation in Egypt. However, contrary to the above studies, they find that the attitudes do not affect labor market outcomes among young women. The authors instrument the variable of interest with mother's attitudes toward gender roles to address the endogeneity of gender role attitudes.

2.4 Data

The data comes from the Life in Kyrgyzstan (LIK) survey (Brück et. al., 2014) that was conducted annually 4 times starting 2010. The survey is based on stratified, two-stage sampling and is representative at national, regional and urban/rural levels. While 3,000 households with 20,142 individuals were interviewed in the first waive, some attrition is observed in every subsequent wave. My sample contains 4,976 females with complete information for all variables present in the econometric model.

The outcome of interest is female labor force participation and is captured by the *LFP* indicator variable which equals one if a woman participates in the labor market and zero otherwise. I treat respondents who are searching for a job as labor markets participants, which is consistent with the LFP definition. The major regressand of interest is an index capturing attitudes toward gender roles. I produce it using individual responses to the following statements:

1. Important decisions should be made by the husband rather than the wife.
2. A man's job is to earn money; a woman's job is to look after the home and family.
3. A husband's career should be more important to the wife than her own.
4. A university education is more important for a boy than for a girl.

The statements aim at gauging the perceived role of women in decision making, household production, labor market and education sector relative to the role of men. The responses are provided by both men and women. Individual responses are limited to five categorical answers including: strongly disagree (1), disagree (2), don't know (3), agree (4) and strongly agree (5). The numbers in brackets correspond to respondents' answers. Thus, a greater number is associated with more conservative attitudes toward gender roles.

A number of options are available for mapping the responses from the above statements to an index. The least preferred way is creating indicator variables for each statement reflecting traditional vs. non-traditional attitudes. The inefficiency of this approach stems from losing ordered nature of responses and including a set of highly correlated variables in a model. Another way, is summing up the responses and obtaining an index variable ranging from 4 to 20, with the latter value representing extremely traditional attitudes[2]. I employ another alternative – polychoric principal component analysis developed by Kolenikov and Angeles (2009). When used with ordered categorical variables, this approach is more efficient than a conventional PCA (see Appendix A for more details). The advantage of the polychoric PCA results in a higher proportion for the total variance explained by the first principal component. In my case, the first principal component explains 62% of the total variance of the original four variables related to the statements. The first component ranges from -4.23 to 0.53. I transform it to have a range between 0 and 1, where the latter number indicates extremely conservative attitudes and 0 – most liberal attitudes toward gender roles. The reason for this is that sharing the most traditional attitudes is captured by the choice "strongly agree" that is coded as 5, whereas the opposite alternative to it, "strongly disagree", is coded as 1. I name this variable *gender attitude index* and use it as a right hand side variable in the LFP equation. The descriptive statistics related to the *gender attitude index* are provided in Table 2.1 and Appendix E.

Table 2.1 reports summary statistics for all variables used in analysis. I provide statistics for the full sample of women along with two sub-samples based on whether they participate in the labor force or not. I notice that women who participate in the labor force

[2] I use traditional and conservative interchangeably in this paper.

are more liberal in terms of attitudes toward gender roles compared with those who are out the labor force – the gender attitude index is less for the latter category by approximately 10 percentage points.

Human capital is regarded as a most significant and important determinant of labor market outcomes. The education system in Kyrgyzstan is comprised of pre-school, general and professional education. General (or secondary) education consists of three levels: primary, basic and high. Kyrgyz legislation requires all children to attend school from 7 years old, and complete at least primary and basic level, which corresponds to 1 to 4 and 5 to 9 grades, respectively. Two more years of studies grant a student high school education. The majority of the population completes high school. Due to a relatively low number of secondary school dropouts – less than 2.5 of the respondents' report completing less than 9 grades – I do not create a separate indicator variable for them. I observe that 80 percent of women who are out of labor force have high school education or lower, compared with that of 58 percent for women participating in labor market activities.

Technical education is formally divided into two distinct categories – primary and secondary. It takes 1-2 years to obtain a degree for the former and 3-4 for the latter. The number of years a student spends in a technical school may depend whether s/he has basic or high school education. Around 2 percent of woman report having primary technical education, while this figure is 11 percent for secondary technical education. With respect to higher levels of education, almost 18 percent of female respondents have college or university level degrees. As expected, those who report being out of the labor force are less likely to have professional or higher level education degrees than those who participate in the labor force. The difference is particularly high for higher level degrees – roughly a

quarter of employed female respondents have college level education while among women who are not part of the labor force the percentage is 10.4.

Income is an important factor that explains labor market decisions. Unfortunately, deriving household and individual income is problematic, as almost two third of the population resides in rural areas with limited formal job opportunities and lives off agricultural activities. As a result, I create a proxy for household income. Employing the PCA, I construct a *wealth index* based on the availability of selected household assets and amenities (see Appendix A for details). The first component captures 63 percent of the variance of the variables used for constructing the index. According to Table 2.1, the *wealth index* is higher for employed females than for those who are not.

It became a standard practice to account for migration in studying labor force decisions in countries where the prevalence of intra and inter migration is substantial. There is evidence showing both positive (Hadi, 2001) and negative (Rodriguez and Tiongson, 2001) effects of migration on the LFP decisions of those who stayed behind. I create a migration variable, *migrant household*, which equals one when a respondent has a household member who lives abroad during the survey time. This variable is considered endogenous in the literature, and, since the impact of migration on LFP is not my focus in this study, it would be better to replace it with an exogenous measure of migration. I could rely a practice of calculating the share of households with a migrant at community level and naming this variable migrants network (McKenzie and Rapoport, 2010). However, there is a downside of using this community level variable - its inclusion would create perfect multicollinearity problem when I employ community fixed effect models as robustness check. Since Kyrgyzstan is known for a high level of international labor

migration I resort to having the *migrant household* variable in my regression models rather than omitting it.

One of the challenges in my study is to make sure that the *gender attitudes index* I construct, and the binary variable *conservative* that is produced based on it, measure the extent to which a respondent shares conservative social norms concerning women versus other effects with which it is likely correlated. These factors may include other personal characteristics, such as acceptance or denial of liberal ideas in other domains than gender attitudes. Since they also are likely to explain individual labor market decisions, controlling for them is crucial. Therefore, I create a *progressiveness index* using CPA based on whether a women expresses willingness to accept as a son in law or daughter in law with: a) different education, b) different social status, c) different ethnic background and d) different religious beliefs. A high value of the index is related to having progressive ideas and lacking bias toward individuals of other religions, races and social backgrounds. Table 2.1 suggests that there is no statistical difference in the *progressiveness index* among women having different labor force statuses.

I also control for other social and demographic characteristics, including age, marital status, level of education, and health status. For the latter, I generate a binary variable *illness*, which equals one if a person responds positively to having suffered from at least one illness according the question: "Have you suffered from any of the following illnesses in the last 12 months?" The list of illnesses includes: Myocardial infarction, High blood pressure, Stroke, Anemia, Tuberculosis, Kidney disease, Flu, Gastrointestinal, Liver disease and Gynecological illness. Good health is known to be associated on average with high individual productivity. While the data contains subjective assessment of individual

health conditions, I prefer using the information from the above questions given that they can be treated as exogenous. Table 2.1 reveals that the *illness* variable is not different among women with different labor market participation statuses.

Labor supply in the households with married couples is closely related to reproductive decisions. Since rearing of children, especially before they start high school, is costly in terms of both time and financial resources, it is likely to affect labor market decisions of their parents. Therefore, I include a variable, *children under 7*, which reports the number of children under 7 years old in a household. Generally, having children is considered to be a normal good. Since the cost of rearing children determines of the number of children in families, it explains why usually rural households have more children compared with urban ones (Rosenzweig, 1977). As expected, less children are observed in the households where a woman is attached the labor market. I also construct the variable *farm* that equals one if the members of the respondent's household own a plot of land that is used for farming and zero otherwise. According to Table 2.1, female LFP is higher by 3.6 percentage points in households with agricultural farms.

2.5 Estimation results

Table 2.2 compares estimated marginal effect of the *gender attitude index* on female LFP for a range of regression models starting with a naïve OLS and concluding with a community fixed effects model. The first column of Table 2.2 shows that a change from most liberal attitudes toward gender role to most extreme traditional attitudes (i.e. *gender attitude index* change from 0 to 1) is associated with a 28.6 percent reduction in female LFP if no other controls are added to the model. The coefficient estimate is statistically significant at the 1 percent level.

Table 2.1. Descriptive Statistics Based on Female Labor Force Participation Status

	Full sample			LFP = 0		LFP = 1	
VARIABLES	mean	min	max	mean	se	mean	se
Gender attitude index	0.495	0	1	0.543	0.006	0.447	0.006
Wealth index	0.148	0	1	0.135	0.004	0.161	0.004
Progressiveness index	0.377	0	1	0.380	0.007	0.375	0.007
Risk taking	3.438	0	10	3.279	0.045	3.598	0.050
Illness	0.610	0	1	0.613	0.010	0.607	0.010
Education Level:							
High school or below	0.691	0	1	0.802	0.008	0.580	0.010
Primary Technical	0.020	0	1	0.015	0.002	0.025	0.003
Secondary Technical	0.111	0	1	0.079	0.005	0.143	0.007
Higher School	0.178	0	1	0.104	0.006	0.253	0.008
Age	39.44	18	65	39.00	0.295	39.88	0.234
Married	0.715	0	1	0.757	0.008	0.672	0.009
Kyrgyz	0.678	0	1	0.644	0.010	0.712	0.009
Migrants household	0.135	0	1	0.144	0.007	0.125	0.007
Adults in HH	3.990	0	11	4.197	0.037	3.784	0.034
Children under 7	0.944	0	6	1.185	0.024	0.703	0.019
Farm	0.314	0	1	0.296	0.009	0.332	0.009
Exogenous restrictions:							
Communist parent	0.025	0	1	0.020	0.003	0.029	0.003
Time for religious practice (hours)	0.507	0	12	0.713	0.038	0.300	0.024
High school or below, mother	0.745	0	1	0.779	0.008	0.711	0.009
Professional school, mother	0.148	0	1	0.129	0.007	0.168	0.007
Higher School, mother	0.107	0	1	0.092	0.006	0.121	0.007
High school or below, father	0.766	0	1	0.798	0.008	0.734	0.009
Professional school, father	0.142	0	1	0.129	0.007	0.154	0.007
Higher School, father	0.092	0	1	0.073	0.005	0.111	0.006
N				2,488		2,488	

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).

In the second column, I add a number of variables related to personal and household characteristics, but without year or geographic fixed effects. The marginal effect of the variable of interest decreases in magnitude to -16.5 percentage points and remains statistically significant at the one percent level. The rest of results are consistent with the literature. As expected, female LFP monotonically increases with education: the likelihood of a female participation in the labor market rises by 18.9, 19.6 and 26.3 percentage points

when she holds a primary technical, secondary technical and higher education degree, respectively. Risk taking is positively associated with the LFP as well. Having a farm increases the probability of female LFP by 9.1 percentage points. Married women are 5.9 percentage points less likely to participate in the labor market, while women that reported experiencing illness are 3.1 percentage points less likely to do so. The probability of labor market participation decreases with an additional child under the age of 7 by 8.4 percentage points. Contrary to my expectations, the *wealth index* is not significant.

Year and regional fixed effects are added to the model in the third column of Table 2.2. The marginal effect of gender role attitudes' decreases to 14 percentage points compared to the previous specification, but still remains significant at the one percent level. Overall, the magnitude and significance of the marginal effects remain at the same level with the following exception. Risk taking becomes statistically insignificant. The marginal effect pertaining to having a farm decreases to 6.5 percentage points.

2.5.1 Addressing threats to endogeneity

One of the main goals of this study is to address the potential endogeneity of the variable that captures an individual's attitude toward gender roles and estimate its effect on female labor market outcomes. I address it using by estimating a two-step control function presented in Table 2.4. For the control function, I adopt Rivers and Vuong (1988). It is based on obtaining the estimates of the first stage equation error terms. These estimated residuals then are used as a regressor to obtain unbiased and consistent parameter estimates in the structural equation.

The identification strategy relies on having at least one exclusion restriction in the structural equation that explains the potentially endogenous *gender attitude index* and is

not correlated with the structural equation's error term. Vella (1994) uses parents' education and religion to instrument gender attitudes index in a human capital accumulation model. I follow broadly the same approach adding another exogenous restriction. In addition to the parents' education level, the respondents also provide information whether their parents were Communist party members. Thus, I create an indicator variable *communist parent* which equals one if one of the parents is reported to be affiliated with the Communist party. In twentieth century, communist ideology was very much progressive toward women's rights, gender equity and the empowerment of women. Thus, it is likely that children of the communist party members can inherit gender egalitarian views from their parents. In Kyrgyzstan, which was a republic of the Soviet Union until 1991, the Communist party enjoyed a political monopoly until the late 90s.

Table 2.2. Marginal Effects from Female LFP equation, Univariate Probit

	Model 1	Model 2	Model 3	Model 4
Gender attitude index	-0.286	-0.165	-0.140	-0.162
	(0.023)***	(0.023)***	(0.024)***	(0.027)***
Education:				
Primary technical		0.189	0.173	0.151
		(0.047)***	(0.047)***	(0.046)***
Secondary technical		0.196	0.183	0.202
		(0.021)***	(0.022)***	(0.021)***
Higher		0.263	0.263	0.268
		(0.019)***	(0.019)***	(0.019)***
Wealth index		-0.008	0.024	0.022
		(0.033)	(0.035)	(0.038)
Progressiveness index		-0.046	-0.059	-0.078
		(0.020)**	(0.020)***	(0.026)***
Risk taking		0.009	0.001	0.002
		(0.003)***	(0.003)	(0.003)
Illness		-0.031	-0.039	-0.050
		(0.014)**	(0.014)***	(0.015)***
Migrant household		0.005	0.014	-0.005
		(0.020)	(0.020)	(0.020)
Farm		0.091	0.065	0.004
		(0.015)***	(0.016)***	(0.019)
Kyrgyz		0.029	0.008	0.018
		(0.015)**	(0.015)	(0.021)
Married		-0.059	-0.062	-0.058
		(0.015)***	(0.015)***	(0.015)***
Children under 7		-0.084	-0.080	-0.066
		(0.007)***	(0.007)***	(0.007)***
Number of adults		-0.004	-0.005	-0.002
		(0.004)	(0.004)	(0.004)
Time FE	-	-	YES	YES
Regional FE	-	-	YES	-
Community FE	-	-	-	YES
N	4,976	4,976	4,976	4,976

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Individual religiosity is likely to explain some gender attitudes. While Vella (1994) uses religious affiliation as an exclusion restriction, I employ instead the variable *religiosity* that is based on how much time a respondent devoted to religious activities a day before the interview[3]. The reason for this is twofold. First, I do not have a question about religious affiliation in the LIT survey. Another reason is that the absolute majority of the Kyrgyzstani population is Muslim. Therefore, using a *religiosity* variable appears to be better suited in the context of Kyrgyzstan. Indeed, the degree of religiosity may vary substantially from person to person despite having identical religious affiliation. The *religiosity* variable appears to have a significant effect on the LFP it through the *gender attitude index*, while is highly insignificant if added as a covariate in the female LFP equation[4]. Although there could be other transmission channels, religiosity is unlikely to be correlated with the error term in the LFP equation as I control for a rich set of individual and household characteristics, including the *progressiveness index*.

Table 2.3 presents the regression results based on the above mentioned methods. I find that the marginal effect related to the *gender attitude index* is -21.5. It appears slightly greater in magnitude compared to -14 in the univariate probit from column 3 of Table 2.3. Marginal effects of other covariates are broadly the same as previously discussed probit estimates from the Table 2.2.

[3] I did not find a statistical difference between means of the *religiosity* variable of those who respond during business days versus on weekends.
[4] These results are not reported here.

Table 2.3. Marginal Effects from the Female LFP equation

	Two-step control function
Gender attitude index	-0.215***
	(0.054)
Education:	
Primary technical	0.031**
	(0.013)
Secondary technical	0.042***
	(0.006)
Higher	0.061***
	(0.005)
Wealth index	0.014
	(0.010)
Progressiveness index	-0.010
	(0.006)
Risk taking	0.000
	(0.001)
Illness	-0.015***
	(0.004)
Migrant household	0.004
	(0.006)
Farm	0.035***
	(0.006)
Kyrgyz	-0.003
	(0.005)
Married	-0.051***
	(0.005)
Children under 7	-0.021***
	(0.002)
Number of adults	0.002*
	(0.001)
ρho	0.866***
	(0.027)
Time FE	YES
Regional FE	YES
N	4,976

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$;
ρho is obtained from the estimated coefficient of 1.73;
marginal effects for *age* are not provided as age^2 is included in the regression model

The results of the first stage equation that estimates the *gender attitude index* are presented in Appendix B. In this equation, parents' education level is captured separately for mother and father by technical and higher education degree indictor variables. While they are jointly significant, only mother's college degree and father's professional degree are negatively statistically significant at the one percent level. They are associated with 4.5 and 3.5 percentage point reductions in the *gender attitude index*, respectively. This suggests that a woman whose parents' education level is above high school is on average more liberal with respect to gender role attitudes. It is necessary to note that parental education is expected to affect the female respondent's labor market status through her education level and wealth. However, since I control for both effects in the LFP equation, the exogeneity requirement is highly likely to be satisfied.

The effect of religiosity is statistically significant at 1 percent level. According to Appendix B, an extra hour spent on religious activities is associated with a 2 percentage point increase in the *gender attitude index*, suggesting that more religious women have less liberal views. The F-test of join significance of all the exogenous restrictions (*religiosity*, *parent's education* and *communist parent*) yields F-stastistic of greater than 10, suggesting that the identification is not prone to weak instruments problem.

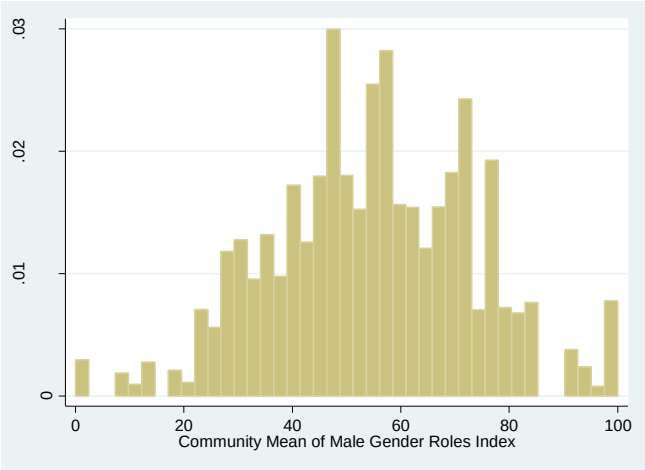
A number of control variables from the LFP equation are not included in the gender role attitudes equation due to their potential endogeneity. These variables include marital status, number of children under 7 years old, number of household members because of likely mutual causality. Vella (1994) also excludes *age* given that the omitted variables that affect the *gender attitude index* are likely to be correlated with the individual's age.

2.5.2 Heterogeneity

It is reasonable to expect that the effect of individual gender role attitudes may be heterogeneous. In particular, I conjecture that a woman with the same level of attitudes toward gender roles may have different labor market outcomes depending on whether she resides in a location with very conservative population or not. As described in the conceptual framework section, a practical approach is to compare a woman's attitudes with that men in her local community have toward gender roles. After all, if men's attitudes toward gender roles is a proxy for the female discrimination, then communities where the *gender attitude index* is high may reveal the existence of constraints toward female labor market participation decisions. For example, gender based discrimination assumes that men are less likely to choose a woman for a vacancy if a male candidate of similar characteristics is available. On the other hand, in very conservative wards, where women are expected to serve a traditional housewife role, it may be the case that a young woman may limit herself in professional and social life to meet conservative men expectations in order to increase her probability of marriage. This is an instance of a self-imposed constraint stemming from the difference in preferences between men and woman with respect to labor market decisions.

I show the density of the community mean of males' *gender attitude index* in the Figure 2.1. Interestingly, there are communities where the mean value takes extreme values of the index, revealing how different the perception of gender roles by men is within a country.

Figure 2.1. Density of the Community Mean of Males' Gender Attitude Index



Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).

Consistent with my story of the existence of constraints facing female labor market participation decisions, I split my data in two samples based on whether women exhibit more conservative views in terms of their gender role attitudes than the community level of men's attitudes. If they do, I assign a value of one to a variable *conservative* and zero otherwise. I provide the summary statistics for all the variables for the subsamples of women when conservative equals one and zero in Appendix E. As I can see, the difference is 13.5 percentage points in outcome variable, *LFP*, between conservative and liberal women, and is statistically significant at the 1 percent difference. Other significant differences are observed in education, religiosity, reported health status, parents' education. To see if my concerns about heterogeneity are justified, I replicate my estimation using these samples separately and report the findings for the marginal effects of interest in Table 2.4.

Table 2.4 reveals that *gender attitude index* is not significant for females who are more liberal than the men in the community they reside based on both two-step and

univariate probit estimation[5]. At the same time, women with more conservative views are 2 percentage points less likely to participate in labor market activities given an increase of 10 percentage points in the *gender attitude index* according the former specification. The results are significant at the 1 percent level for both specifications. This implies that the effect of the *gender attitude index* is not the same for different types of women. However, the robustness of the estimates may be questionable because the selection in the two samples is not addressed here.

Table 2.4. Marginal Effects of the Female LFP Equation

	univariate probit		Two-step control function	
	conservative = 1	conservative = 0	conservative = 1	conservative = 0
Gender attitude index	-0.168***	-0.001	-0.201***	0.019
	(0.047)	(0.058)	(0.056)	(0.057)
Regional FE	YES	YES	YES	YES
N	2,334	2,642	2,334	2,642

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

I can model selection by treating *conservative* as a dependent variable and using the explanatory variables from the first stage equation presented in Appendix B. In this case, I am concerned with estimating the effect of a dichotomous variable on labor force participation. The literature concerning the choice of estimators for models with a binary outcome and an endogenous binary treatment suggest two opposing approaches. Angrist (2001) advocates for the use of the simpler linear IV estimator as according to him it is quite robust to misspecifications in distribution of the error terms. However, Bhattacharya et al. (2006) argue that nonlinear estimators are marginally more robust than the linear IV

[5] A specification with a quadratic term of the gender attitude index shows that it is not statistically significant in both samples.

to the non-normality of the error terms. Among nonlinear estimators, bivariate probit is popular among economist. A less common approach includes switching probit. While it is similar to bivariate probit, it relaxes the assumption of the coefficients' equality in the structural equation imposed in bivariate probit by estimating separate equations for each regime. Both approaches employ maximum-likelihood estimation and assume that the outcome and treatment variables are determined by linear index models with jointly normal error terms. I discuss this in the next section. However, before proceeding to it, I show that the above results are robust to omitted variable bias associated with missing community level variables.

I run a regression specification with community fixed effects to find out if the significance of coefficients is attributable to omitted variable bias. This approach allows us to compare labor market outcomes of women residing in the same communities and, therefore, controlling any unobserved differences in community characteristics that could be correlated with female LFP and gender roles attitudes. For example, attitudes toward gender roles may be positively correlated with depressed local labor markets that could explain the overall low LFP rates. Fixed effects significantly buttress the credibility of the obtained inference if the coefficients of interest remain significant. In fact, Bayanpourtehrani and Sylwester (2013) demonstrate that the effect of cultural norms on LFP diminishes greatly in magnitude and significance after controlling for geographic fixed effects in a sample containing data from 174 countries. Such findings show that failure to control for geographic differences often leads to omitted variable bias and increases the likelihood of reporting significant results which arise solely due to endogeneity issues.

The specification with community fixed effects is reported in the fourth column of Table 2.2. Controlling for the community fixed effects, I observe that the average marginal effect of conservative attitudes toward gender roles is estimated at 16.2 percentage points and significant at the 1 percent level. Since this is a very close result to the previous specification, this reassures us that its significance is not driven by the omitted variable bias associated with unobservable community characteristics. Therefore, I can safely use specifications with regional effects. This finding is particularly useful when I employ semiparametric estimation later as this approach works better with parsimonious models requiring fewer parameters to be estimated. The rest of coefficients do not have significant changes in both magnitude and significance as well, with a couple of exceptions. Having a farm becomes insignificant.

In Table 2.5, I show the results related a community fixed effect specification instead of using regional fixed effects in Table 2.4. The results between community and regional fixed effects specifications are similar. Specifically, the average marginal effect of conservative attitudes toward gender roles is estimated at 19 percentage points and significant at the 1 percent level.

2.5.3 Model specification

I estimate a model consisting of two equations that explain labor market decisions and whether a woman is conservative or not. The latter is treated as two distinct regimes and is described by the below indicator function:

$$C_i = 1[y_{1i} \geq 0] \; = \; 1[Z_i\gamma + \mu_i \geq 0], \qquad (1)$$

Table 2.5. Marginal Effects of the Female LFP Equation

	univariate probit		Two-step control function	
	conservative = 1	conservative = 0	conservative = 1	conservative = 0
Gender attitude index	-0.289***	-0.026	-0.191***	0.014
	(0.078)	(0.078)	(0.087)	(0.088)
Community FE	YES	YES	YES	YES
N	2,334	2,642	2,334	2,642

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

where y_{1i} is a measure that captures to what extent a woman i is conservative (in terms of gender role attitudes relative to men's attitudes in the community she resides); i denotes the respondent; γ is a parameters' vector; Z_i is a vector of personal and household characteristics that are correlated with the outcome variable; and μ_i is an error term. C_i is the above described *conservative* variable and is reduced here to one letter for the sake of brevity. It equals one if a woman adopt more conservative attitudes toward gender roles relative to men's attitudes in the community she resides.

LFP_{ij} is the observed LFP status of woman i. It is described by the following indicator function:

$$LFP_{ij} = 1[y_{2ij} \geq 0] \;=\; 1[X_i\beta_j \;+\; v_{ij} \geq 0], \quad j = 0,1, \tag{2}$$

where y_{2ij} are the latent variables associated with binary variable LFP_{ij}; β_j is a j regime vector of parameters; Z_i is a vector of personal and household characteristics that explain the outcome variable; v_{ij} are j regime error terms. I assume that error terms μ_i, v_{i0} and v_{i1} from equations (1) and (2) follow a joint normal distribution with zero expectations vector and the below correlation matrix:

$$\Omega = \begin{pmatrix} 1 & \rho_{\mu 0} & \rho_{\mu 1} \\ & 1 & \rho_{01} \\ & & 1 \end{pmatrix} \quad (3)$$

where the $\rho_{\mu 0}$ and $\rho_{\mu 1}$ are the correlation coefficients between μ and v_0 and v_1, respectively, while ρ_{01} is the correlation coefficient between v_0 and v_1. The latter coefficient is not estimated given that only one regime j is observed for any female i but not both. Given the distribution of the error terms, I can formulate the log-likelihood function:

$$\text{Ln}(\psi) = \sum_{C_i=1, LFP_i=1} \ln[\Phi_2 (X_i\beta_1, Z_i\gamma, \rho_{\mu 1})] + \sum_{C_i=1, LFP_i=0} \ln[\Phi_2(-X_i\beta_1, Z_i\gamma, -\rho_{\mu 1})] + \sum_{C_i=0, LFP_i=1} \ln[\Phi_2(X_i\beta_0, -Z_i\gamma, -\rho_{\mu 0})] + \sum_{C_i=0, LFP_i=0} \ln[\Phi_2(-X_i\beta_0, -Z_i\gamma, -\rho_{\mu 0})], \quad (4)$$

where Φ_2 represents a bivariate normal cumulative distribution function.

The log-likelihood function (4) is based on the switching probit model. The absence of the *conservative* dummy variable is the distinct difference from the bivariate probit model. However, the former can be applied to generate the counterfactual probabilities for women who are conservative or liberal and the relevant labor market participation status. This allows one to estimate average treatment effect (ATE) and average treatment effects (ATE). These effects are quite intuitive to interpret and help us answering the questions: What is the overall effect of being a more conservative woman than the surrounding males expect on labor market participation rates?

The effect of having move conservative attitudes toward gender roles on the probability of the female labor market participation for a random female with x characteristics is captured by the TE:

$$\text{TE}(x) = \Pr[LFP_1 = 1 | \text{X} = x] - \Pr[LFP_0 = 1 | \text{X} = x] = \text{F}(\text{X}\beta_1) - \text{F}(\text{X}\beta_0) \qquad (5)$$

The ATE is obtained by taking a sample average of the TE(x) using the full sample:

$$\text{ATE} = \frac{1}{N} \sum_{i=1}^{N} \text{TE}(x_i). \qquad (6)$$

The identical effect for a female of x characteristics *among more conservative women* is described by the TT:

$$\text{TT}(x) = \Pr[LFP_1 = 1 | \text{C} = 1, \text{X} = x] - \Pr[LFP_0 = 1 | \text{C} = 1, \text{X} = x]$$

$$= \frac{\Phi_2(\text{X}\beta_1, \text{Z}\gamma, \rho_{\mu 1}) - \Phi_2(\text{X}\beta_0, \text{Z}\gamma, \rho_{\mu 0})}{F(\text{Z}\gamma)}, \qquad (7)$$

where F is the univariate normal cumulative distribution function. Basically, the TT is the difference between predicted probability of the labor market participation for a woman with conservative views and the probability had that women have more liberal views. The ATT is derived from the below equation by averaging the TT over the sample of conservative women:

$$\text{ATT} = \frac{1}{N_{C=1}} \sum_{C=1} \text{TT}(x_i). \qquad (8)$$

2.5.4 Parametric Results

I present marginal effects for the LFP equation from the joint estimation of equations (1) and (2) in Table 2.6. The corresponding estimated regression coefficients are provided in Appendix C.

I find heterogeneous responses in estimated marginal effects comparing bivariate and switching probit models – something that is not apparent when the analysis is

performed without employing the latter model. First, I notice that primary technical education is not statistically significant in determining the level of LFP of conservative women, while it is statistically significant at 5 percent level for liberal women. The marginal effect of secondary technical degree appears to be more that than twice as important in explain the LFP rates for conservative women than for liberal ones. At the same time, no significant differences are found between effects of higher education of conservative and liberal women. With regard to other personal characteristics, I can see that poor health status lowers down the probability of engagement in labor activity of conservative females, which is significant at the 5 percent level. For liberal women, health status appears not to be related to the outcome variable. Similarly, risk taking and progressiveness index decrease the LFP rate for conservative women but it has not statistically significant effect for liberal women. The probability of labor market participation increases with age at diminishing rate for both types of females according to Appendix C. The curvature of age predicted line is more pronounced for liberal women. Since age marginal effects are not constant, I do not report them in the Table 2.6.

Concluding my examination of the impact of observed characteristics on the LFP rate, I report that the correlation coefficients between residuals of the LFP equation and the reduced form conservative equation are both positive and statistically significant at the 1 percent level according to Appendix C. This suggests the existence of unobserved characteristics in the equations that are positively correlated, indicative of a positive selection bias and the need to use the structural approach to modeling female labor market participation. In other words, unobserved factors that lead women to become conservative

also increase the probability of their labor force participation. The same, but slightly less in magnitude, effect of unobserved characteristics is found for liberal women.

Table 2.6. Marginal Effects from the Female LFP Equation

	Bivariate probit	Switching probit, conservative=1	Switching probit, conservative=0
Conservative (dummy)	-0.354***		
	(0.042)		
Education:			
Primary technical	0.084**	0.050	0.119**
	(0.037)	(0.046)	(0.053)
Secondary technical	0.119***	0.070***	0.157***
	(0.020)	(0.024)	(0.028)
Higher	0.177***	0.151***	0.188***
	(0.022)	(0.030)	(0.029)
Wealth index	0.025	0.008	0.046
	(0.027)	(0.034)	(0.040)
Progressiveness index	-0.020	-0.040**	0.000
	(0.015)	(0.019)	(0.022)
Risk taking	-0.002	-0.007**	0.004
	(0.003)	(0.003)	(0.004)
Illness	-0.044***	-0.059***	-0.019
	(0.011)	(0.015)	(0.016)
Migrant household	0.011	0.032*	-0.011
	(0.016)	(0.018)	(0.025)
Farm	0.072***	0.087***	0.049***
	(0.013)	(0.016)	(0.019)
Kyrgyz	-0.009	-0.007	-0.012
	(0.012)	(0.015)	(0.019)
Married	-0.136***	-0.119***	-0.144***
	(0.017)	(0.023)	(0.023)
Children under 7	-0.053***	-0.052***	-0.052***
	(0.007)	(0.008)	(0.010)
Number of adults	0.005*	0.008*	0.002
	(0.003)	(0.004)	(0.005)
Time FE	YES	YES	YES
Region FE	YES	YES	YES
N	4,976	2,334	2,642

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Using equations (5) and (6), I find that conservative women are 30.6 or 29.2 percentage points less likely to participate in the labor markets based on parametric bivariate and switching probit models, respectively. The ATT are significant at the 1 percent level with standard errors of 4.1 and 3.9. For a randomly selected woman, the effect of being more conservative on labor market engagement is negative 35.4 or 42.3 percentage points according to parametric bivariate and switching probit models, respectively. This estimate The ATE are significant at the 1 percent level with standard errors of 4.2 and 4.3. Therefore, both bivariate and switching probit models yield similar results. The above ATE implies that if all women in the sample become conservative, the average drop in labor market participation is about 40 percentage points. The converse interpretation also means that if all women become liberal, the LFP is expected to increase by roughly 40 percentage points. Such an effect seems to be extremely large in magnitude, especially when compared with the raw difference in LFP of conservative and liberal women that is provided in Appendix E.

The unconditional difference in labor market participation is -13.5 with a standard error of 1.4 and it is markedly lower in magnitude than the mentioned estimates. First, it may suggest that women are not randomly chosen to adopt conservative or liberal norms of behavior. However, another reason may be possible failure in the assumption that the error terms distribution in parametric models is jointly normal and homoscedastic. Since this assumption is considered to be very strong and not related to econometric theory, it makes sense to check if estimates do not change in models where no structure of the error terms is imposed. For this reason, I present below the results from estimating both bivariate and switching probit models semiparametrically.

2.5.5 Semiparametric models

The key advantage of the semiparametric approach is that it allows a researcher to relax distributional assumptions related to error terms. Generally, semiparametric methods use the Bayes rule and a kernel density estimator to obtain the conditional density of Y given X by estimating the marginal density of Y multiplied by the conditional density of X given Y and divided by the marginal density of X. I employ semiparametric estimation of bivariate and switching probit models using the general results of Klein and Spady (1993).

To produce estimates in moderately sized samples, semiparametric estimators rely on index restrictions. It is easily explained if I consider first a bivariate probit model. According to the model, the expected probability of observing a conservative woman who is attached to labor market is given by:

$$\Pr(LFP_i = 1, C_i = 1 | X_i, Z_i) = \Pr(X_i\beta + \nu_i > 0, Z_i\gamma + \mu_i > 0)$$
$$= \Pr(X_i\beta > -\nu_i, Z_i\gamma > -\mu_i) = \Phi_2(X_i\beta, Z_i\gamma, \rho), \quad (9)$$

where Φ_2 represents cumulative distribution function for jointly standard normal errors ν_i and μ_i. The rest of variables and parameters are defined in equations (1) and (2). Semiparametric estimation does not need to assume any distributional assumptions of the error terms. However, it requires the following parametric indices: $V_L = X_i\theta_L$ and $V_C = Z_i\theta_C$. As shown in equation (10), the first variable in both indices have a coefficient of one. This assumption yields the following double index form of the conditional expectation of the outcome variable LFP_i:

$$E(LFP_i = 1 \mid X_i, V_C) = \Pr(X_i\beta + \nu_i > 0 | V_{Ci})$$
$$= \Pr(X_{1i}\beta_1 + \ldots + X_{ki}\beta_k + \nu_i > 0 | V_{Ci})$$

$$= \Pr(\beta_1[X_{1i} + \ldots + X_{ki}\theta_{Lk} + \nu_i] > 0 | V_{Ci})$$

$$= \Pr(X_{1i} + \ldots + X_{ki}\theta_{Lk} + \nu_i > 0 | V_{Ci})$$

$$= \Pr(X_i\theta_L > -\nu_i | V_{Ci}) = \Pr(V_{Li} > -\nu_i | V_{Ci}) = F(V_{Li}, V_{Ci}), \quad (10)$$

where β and γ are vectors of k and g true coefficients of the *LFP* and *Conservative* equations, respectively, θ_L and θ_C are ratios of the mentioned coefficients to β_1 and γ_1, respectively, and F is a cumulative density function of an unknown distribution. Since true parameters are not known, I employ semiparametric estimators to obtain estimated conditional expectation of the LFP conditioned on estimates of indices $\hat{V}_L$ and $\hat{V}_C$. Therefore, I denote the conditional expectation as $\hat{E}(LFP \mid \hat{V}_L, \hat{V}_C)$.

In addition to the index restriction, parameters' identification in semiparametric estimation requires that X_1 and Z_1 – the variables with respect to which the rest of parameters are normalized to – are continuous, statistically significant and different for each index. From in appendices (C) and (D) I know that both *age* and *religiosity* meet these criteria.

Equation (10) represents a semiparametric binary response model with a binary endogenous explanatory variable. It is estimated with the following log likelihood function:

$$\ln L = \sum_{j \neq i} \sum_{j \neq i} g_{i,Xi}\, g_{i,Zi} \ln(F(\hat{V}_{Li}, \hat{V}_{Ci})),$$

where $g_{i,Xi}$ and $g_{i,Zi}$ are trimming functions based on all continuous variables present in both indices. Standard in semiparametric literature, they serve the purpose of excluding observations with extreme values that lead to estimating undefined probabilities based on $F(\hat{V}_{Li}, \hat{V}_{Ci})$ in equation (11).

Estimating the function $F(V_{Li}, V_{Ci})$ hinges on kernel density estimator:

$$\hat{E}(LFP \mid \hat{V}_{Li}, \hat{V}_{Ci}) = \mathrm{F}(\hat{V}_{Li}, \hat{V}_{Ci}) = \frac{\sum_{j \neq i} LFP_i \, K\left(\frac{\hat{V}_{Li} - \hat{V}_{Li}}{h_L}\right) K\left(\frac{\hat{V}_{Ci} - \hat{V}_{Ci}}{h_C}\right) / ((N-1) h_L h_C)}{\sum_{j \neq i} K\left(\frac{\hat{V}_{Li} - \hat{V}_{Li}}{h_L}\right) K\left(\frac{\hat{V}_{Ci} - \hat{V}_{Ci}}{h_C}\right) / ((N-1) h_L h_C)}, \qquad (11)$$

where *K(.)* is a kernel density estimator and h_L and h_L is the bandwidth parameter for the LFP and conservative equations, respectively. Following Silverman (1986), I apply optimal bandwidth of $h_L = \sigma_{\hat{V}_L} N^{-1/5}$ and $h_L = \sigma_{\hat{V}_C} N^{-1/5}$, where $\sigma_{\hat{V}_L}$ and $\sigma_{\hat{V}_C}$ are standard deviations of the respective indices.

2.5.6 Semiparametric results

I examine first the difference between parametric and semiparametric results comparing average marginal effects reported in Tables 2.6 and 2.7. The average marginal effects related to higher education degrees are 6 percentage points lower according to the parametric switching probit for conservative women when compared with the semiparametric counterpart. Four percentage points difference is also observed for the same marginal effects when parametric and semiparametric bivariate probit models are compared. Another interesting finding is that marginal effects related to risk taking gain statistical significance at the 1 percent level in the semiparametric switching probit. Specifically, a unit increase in self-reported risky behavior in the scale of 1 to 10 is associated with an expected reduction of 1.6 percentage points in LFP rate by 1.6 for conservative women. For liberal women, this effect is identical but has a negative sign. At the same time, these marginal effects are not significant in the semiparametric bivariate probit. With respect to the number of adults in the household, parametric models report only one weakly significant coefficient. In semiparametric switching equations, the coefficients are highly statistically significant and have different signs.

Another interesting finding is related to the effect of having a migrant in the household. It has no statistically significant effect on liberal females while it increases the probability of being in labor market for conservative women almost by 5 percentage points. However, this result should be treated with caution since I do not address potential endogeneity of the *migrant household* variable in my model. Overall, I observe that the switching probit is a model of preferred choice as it accounts for heterogeneity in coefficients for different types of women. This occurs as the underlying assumption of the bivariate probit model that all factors have a similar effect on the outcome variable is appear not to be true. As shown in Table 2.7, a number of variables that are not significant in bivariate probit appear significant and often change their magnitude in the switching probit model. Note that other works examining the effects of gender role attitudes generally do not consider that factors explaining labor market outcomes may have different impact depending on values of the variable capturing gender role attitudes.

Using the coefficients from Table 2.7, I obtain ATT and ATE for the semiparametric models. They appear to be smaller roughly by a factor of 4 compared with the parametric effects. Specifically, conservative women are 8 or 6.1 percentage points less likely to participate in the labor markets based on semiparametric bivariate and switching probit models, respectively. In both the ATT are significant at the 1 percent level. For a randomly selected female, the effect of being conservative on female labor force participation (ATE) is negative 12.2 or 8.8 percentage points according to the semiparametric bivariate and switching probit models, respectively. The effects are statistically significant from each other as the respective standard errors are 0.85 and 0.71.

Unfortunately, a direct comparison of the results does not appear feasible as my variable of interest – whether a woman is conservative or not – is new to the literature. Negative association between conservative gender attitudes and labor market outcomes are reported by a number of studies based on data covering European countries and the United States, as summarized earlier. The only exception is Miyata and Yamada (2016) who find no significant causation between the gender role attitudes and female labor market decisions using Egypt data. This is the only study I am aware of that focuses on developing countries.

In some studies, a separate variable for each of the questions that gauge gender role attitudes are used, rather than creating an index capturing it – a common approach in the literature. For example, Fortin (2005) reports quite large effects related to the attitude variables. The marginal effects of the binary variables based on the questions "Scarce jobs should go to men first" and "Being a housewife is fulfilling" are -7.5 and -8.8 percentage points, respectively. "Working mother is warm with children" variable yields a 13.8 percentage point marginal effect. As a conservative woman is likely to positively agree to the first two statements and negatively to the last one, I expected joint marginal effect of would amount to -30.1 percentage points. Such a marginal effect is very close to my results obtained from the parametric models. Since, Fortin (2005), along with others, employs parametric models only, they may benefit from employing semiparametric methods as robustness check.

Table 2.7. Estimated Coefficients and Average Marginal Effects from the Female LFP Equation Using Semiparametric Approach

	Bivariate probit		Switching probit, conservative=1		Switching probit, conservative=0	
	Coeff.	ME	Coeff.	ME	Coeff.	ME
Conservative (dummy)	-17.751***	-0.122***				
	(1.221)					
Education:						
Primary technical	1.480	0.071	2.127	0.072	2.133*	0.152*
	(0.808)		(1.797)		(1.110)	
Secondary technical	2.722***	0.124***	1.764***	0.060***	2.715***	0.192***
	(0.406)		(0.624)		(0.618)	
Higher	3.065***	0.138***	2.623***	0.089***	2.954***	0.207***
	(0.371)		(0.603)		(0.539)	
Wealth index	0.458	0.021	-0.392	-0.013	1.095	0.074
	(0.536)		(1.21)		(0.750)	
Progressiveness index	-0.097	-0.004	-2.114***	-0.071***	0.761*	0.052*
	(0.306)		(0.664)		(0.448)	
Risk taking	0.066	0.003	-0.494***	-0.016***	0.238***	0.016***
	(0.054)		(0.119)		(0.087)	
Illness	-0.798***	-0.036***	-2.300***	-0.077***	-0.274	-0.018
	(0.231)		(0.491)		(0.311)	
Migrant household	0.328	0.014	1.459***	0.048***	0.06	0.004
	(0.334)		(0.530)		(0.432)	
Farm	1.342***	0.061***	2.222***	0.074***	2.019***	0.136***
	(0.322)		(0.615)		(0.511)	
Kyrgyz	-0.076	-0.003	-1.946***	-0.065***	-0.117	-0.008
	(0.256)		(0.578)		(0.414)	
Married	-2.315***	-0.101***	-3.687***	-0.125***	-1.486***	-0.101***
	(0.250)		(0.500)		(0.322)	
Children under 7	-1.169***	-0.053***	-1.975***	-0.066	-0.778***	-0.053***
	(0.150)		(0.336)		(0.16)	
Number of adults	0.068	0.003	-0.545***	-0.018***	0.329***	0.022***
	(0.077)		(0.145)		(0.100)	
Age squared	-0.012***		-0.014***		-0.012***	
	(0.000)		(0.000)		(0.000)	
Time FE	YES		YES		YES	
Regional FE	YES		YES		YES	
N	4,976		2,334		2,642	

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$

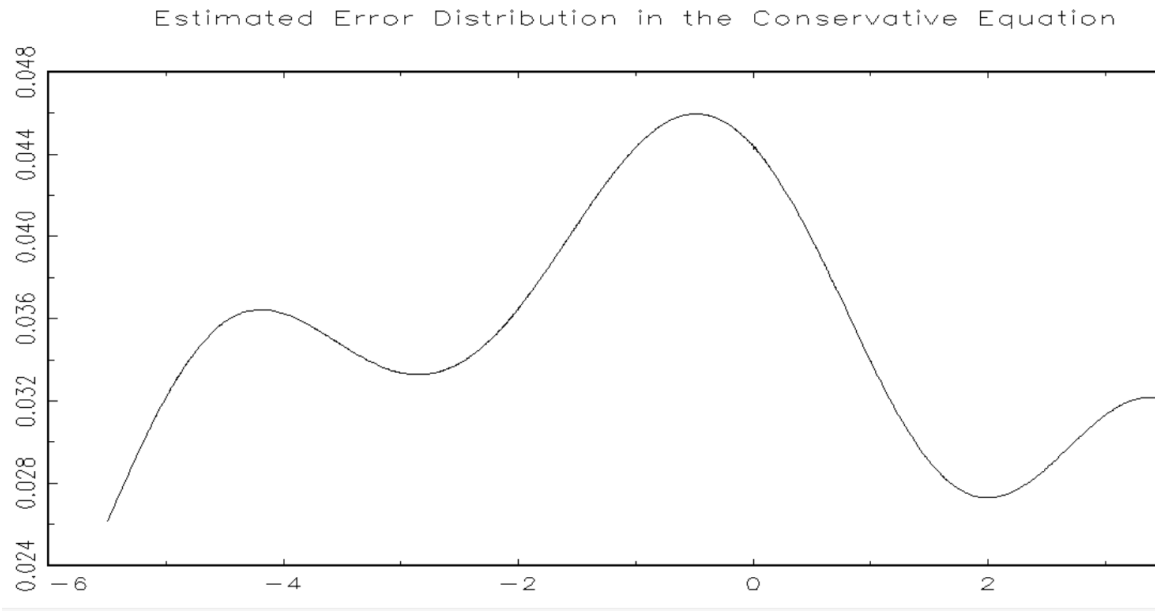
With respect to developing countries, the only similar study of I am aware of (Miyata and Yamada, 2016) finds no significant causation between the gender role attitudes and female labor market decisions in Egypt. This study, along with others, also only employs parametric models, which imply that gender roles attitudes is very likely to have a bias.

The results from the conservative equation estimated with semiparametric switching probit are presented in Appendix D. The semiparametric approach suggests that the probability that a woman is conservative reduces by 10.3 percentage points if her mother has a university degree. At the same time, father's education and mother's technical school education appear not to affect the conservativeness level of a woman. This a very interesting result from a policy perspective. It suggests that women's university level education is expected to trigger long term benefits in terms of passing more egalitarian gender role attitudes to their daughters, which, in turn, is expected to increases female labor force participation.

To uncover the reason for a substantial difference between semiparametric and parametric results of the labor force equation, I check if the normality assumption of error terms distribution holds in the conservative equation. I do this by constructing the density of error terms semiparametrically. First, I estimate semiparametrically the expected value of the conservative binary variable conditioning on the relevant index. This represents an estimate of the distribution function of the error term in the class of threshold-crossing models. Density is obtained then by means of taking a numerical derivative of the distribution function, and it is shown in Figure 2.2. It reveals that the error terms density in the conservative equation is extremely nonnormal. Consistent estimation of the labor

market participation equation hinges on obtaining unbiased and consistent estimates of the conservative equation. As a result, joint modeling that relies on a parametric assumption regarding error terms is expected to produce inconsistent parameters' estimates and, correspondingly, the marginal effects of interest.

Figure 2.2. Estimated Error Distribution in the Conservative Equation



Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).

2.6 Conclusion

This chapter studies the effect of conservative attitudes on female labor market attachment. The literature examines only the effect on LFP of gender role attitudes, a measure that does not reveal if a woman is considered conservative or not by local perception. As a better alternative, I construct a binary variable gauging if a woman is considered conservative or liberal in her community. This is done by comparing a woman's own gender roles attitudes with the perception by men in the community where she resides of what women's roles

should be. Accounting for men's attitudes at the community level is quite natural since men can affect female labor market outcomes through gender discrimination or by contributing to the formation of a woman's preferences with respect to labor market decisions. From a theoretical standpoint, I draw on the concept of gender identify incorporated in the standard neoclassical utility function. This enables us to account for interaction between individuals with different identities resulting in predicting different possible equilibrium outcomes. I analyze a system of simultaneous equations using bivariate and switching probit models separately to find out if there is heterogeneity in the marginal effects of conservatism and liberalism. In addition to conventional parametric estimation, I employ a semiparametric estimation technique. Its significant advantage over the former is that the semiparametric approach does not impose any parametric assumptions on the error terms distribution. Since the assumptions appear not to hold in my case, parametric and semiparametric methods produce quite different results.

I find that being a conservative woman leads to a lower probability of labor market participation compared to a liberal woman. However, parametric models predict that this effect is approximately negative 40 percentage points, while semiparametric estimation yields much smaller figures of -8.8 to -12.2 based on switching and bivariate probit models, respectively. Therefore, due to incorrect parametric assumptions, the parametrically estimated effect of interest appear to have an upward bias on the order of more than 300 percent, when is compared with that of the semiparametric models.

There are also other interesting results revealed by estimating a semiparametric switching probit. Education – the one of the major factors in human capital accumulation models – appears to play a different role in determining female labor market participation

rates for conservative and liberal women. In short, any educational degree has at least twice the effect on labor market attachment for liberal women compared to conservative ones.

From a policy perspective, understanding the relative importance of factors influencing labor market participation of conservative women is of great importance to Kyrgyzstan and many other developing countries where female LFP lags behind that of males. My analysis shows that university level education is 50 percent more effective in terms of increasing the employment of conservative women when compared with secondary technical education. At the same time, the effect of having secondary technical degrees appears to have a similar effect as higher level education for liberal women. Therefore, making higher level education more accessible for conservative women is a more effective policy choice to spur their LFP. Furthermore, I find that university level education is expected to trigger long term benefits in terms of passing more egalitarian gender role attitudes to their daughters. This, in turn, should result wider acceptance women's employment and fostering convergence of gender gaps in labor force participation.

As is common in empirical work, the reported results should not be treated as conclusive. Therefore, I would like to highlight some limitations and directions for my further research. First, the equation explaining if women are conservative could certainly benefit from having more variables capturing the intergenerational transmission of gender role attitudes. I only use the variables on education level of a woman's parents and if they were members of the Communist party. However, a growing literature on the drivers of gender identity suggests that other factors may be at play. For example, as described above, the probability of female labor force attachment increases if a woman's spouse had a

working mother. Second, the proposed model does not address the existence of possible direction of causality from labor force status to a woman's level of conservativeness. This could happen if an employed woman exhibits more liberal views developed at a workplace. A natural way to deal with possible reverse causality issues is to add the *LFP* variable to the right hand side of the conservative equation. However, in this case the identification of the *LFP* coefficient requires an exogenous restriction variable that explains a woman's labor market decisions and is not correlated with error terms of the conservative equation. If such a variable exists, it is not available in the data set I use.

Chapter 3

Economic Incentives behind 'Bride Kidnapping' Marriages: Relative Price and Bad Behavior

3.1 Introduction

The wedding is the most costly privately arranged ceremony in many countries. In Kyrgyzstan, a small Central Asian country with a population of 5.5 million and a gross national income (GNI) per capita of 1,190 US dollars[6], the expenditure on wedding festivities averages more than twice per capita GNI. In addition, a groom's family frequently has to follow a widely accepted regional practice of paying a *bride price*[7]. Such exorbitant wedding costs are a significant burden for the large fraction of Kyrgyz households who live in poverty or in near-poverty. In some Central Asian countries these cost concerns have policymakers issuing decrees curbing wedding expenditure and other traditions. For example, in Kyrgyzstan, the authorities of Nookat district issued a decree curbing wedding expenditure and the pride price (Beshov, 2012). It limits the bride price to maximum of 50,000 Soms (approximately 1,100 US dollars) and restricts the number of cars in wedding cortege to 4 vehicles. In neighboring Tajikistan, the government introduced legislation to limit lavish weddings, funerals and other private ceremonies by

[6] 2013 estimates using the World Bank Atlas method are used to match the year of the last waive of the survey data used in the analysis. Instead of using current exchange rates the Atlas conversion factor reduces exchange rate fluctuation impacts in cross country national income comparisons. It uses the average of a country's exchange rate for a given year and the two preceding years, adjusted for the difference between the rate of inflation in the country and international inflation (World Bank Atlas method - detailed methodology (accessed April 18, 2019): https://datahelpdesk.worldbank.org/knowledgebase/articles/378832-what-is-the-world-bank-atlas-method.

[7] Bride price is in-kind or money payment from the groom's family to the bride's family.

restricting the maximum number of guests, the duration of the event, and the length of the wedding procession (Najibullah, 2007). While the marriage market literature pays significant attention to dowries and bride prices, academic discourse omits a discussion of costly wedding celebrations.

My research on wedding expenditure is based on a quite unique household survey that allows a researcher to differentiate between three forms of marriage. This is what makes the marriage market in Kyrgyzstan peculiar – conventional marriage by mutual consent coexists with *arranged* and *bride kidnapping marriages (BKMs)*. The latter form of marriage is observed in Kyrgyzstan on a relatively large scale, and has been documented in a number of works (see, for example, Amsler and Kleinbach, 1999; Kleinbach, Ablezova, and Aitieva, 2005; Nedoluzhko and Agadjanian, 2015; Becker, Mirkasimov, and Steiner, 2017). Recent UNFPA (2016) estimates suggest that 22% of marriages in the country happened through bride kidnapping, with two-thirds of cases taking place in rural areas. In simple terms, bride kidnapping describes a situation where a man abducts a woman and brings her to his house for the purpose of marrying her. The bride kidnapping literature has examined the extent to which it is non-consensual and why grooms or the groom and the bride collectively resort to it. However, most literature on bride kidnapping is from an anthropological or ethnographic point of view. The appearance of large and representative household surveys recently enable the academic community to employ statistical analysis to explore the relationship between bride kidnapping and different outcomes of interest.

This paper explores the relationship between bride kidnapping and wedding costs focusing on wedding festivity expenditure. The *conspicuous consumption* role of weddings

is observed in many countries and related to maintaining relative status position within a community. Brown, Bulte and Zhang (2011) claim that Chinese households' sponsor splendid wedding to attract better brides for their sons. Funerals are another life event that often serve as an example of conspicuous consumption. Case, Garrib, Menendez and Olgiati (2013) report that South African households spend approximately one annual income for a funeral often driving themselves into debt, with higher spending observed for a senior family member's funeral.

The empirical analysis is challenging due to the non-randomness of BKMs. Thus, the endogeneity of the variable of interest has to be addressed. My analysis is done using ordinary least squares (OLS) with community fixed effects to control for potential omitted variable bias stemming from unobserved variation in community cultural traditions, poverty profile, economic opportunities, etc. Since Kyrgyzstan has a diverse and highly immobile population, perhaps partly due to its mountainous terrain, I consider employing community fixed effects to be an essential part of the estimation. In addition, I perform a falsification test by rerunning the model with alternative outcomes that are not expected to be influenced by BKMs to make sure that the findings are not driven by some selection issues or unobserved household characteristics.

The results of the analysis show that BKM households spend on wedding festivities 42.4 percent less on average than households having conventional marriages. This represents a quite significant difference given the overall high costs of wedding festivities. This finding is quite interesting from two perspectives. First, the monetary cost of bride kidnapping has been discussed almost exclusively in terms of potentially reducing bride price and yet there are no estimates of the relationship between BKMs and expenditures on

wedding festivities, to the best of my knowledge. Second, the current literature does not include economic reasons among the list of most significant factors contributing to bride kidnapping.

The paper is organized as follows. In the next section, I provide the background information and literature review on the forms of marriages in traditional societies, focusing on bride kidnapping in Kyrgyzstan. Next, I proceed with data description and the econometric model I use for the analysis. In subsequent sections, I discuss the results obtained from two competing approaches: fixed effects OLS and Two Stage Least Squares (2SLS), followed by a robustness check based on a falsification test. The last section is dedicated to the conclusion.

3.2 Background

Contemporary marriage in developed countries is based on the idea of consent expressed by both bride and groom (Becker 1973, 1991). In individualistic societies – as opposed to traditional ones – mate selection happens through the experience of romantic relationship and companionship prior to marriage, which are considered vital elements (Dion and Dion, 1996). Individual consent in marriage formation plays crucial role as it is closely related to individual bargaining power. It is the grooms' and brides' discretion to make the decision whether to continue search for a potential mate or marry an available mate that underpins the economic analysis of marriage formation according to Becker (1973, 1991). On the other hand, bride kidnapping and arranged marriages, which are typical of traditional societies, may imply less degree of consent to marry a particular candidate. For example, Qureshi (1991) describes three forms of arranged marriages that are characterized by different degree of involvement of parents and children in mate selection process. In one

of the forms, parents control the entire process without consulting with their children. Here, the individual interests are subjugated to the interests of the family and community to fulfill religious and social obligations (Ahmed, 1986). In addition, as love marriage implies a romantic relationship prior to marriage, it presents a threat to family honor and make arranged marriages a socially acceptable form (Dion and Dion, 1996).

Arranged marriages are widespread in Central Asia, and typically involve the bride's and groom's parents or relatives who have an important role in the search process for their children's future spouse. In the Kyrgyz context, arranged marriages assume significant participation of children (Werner, 2009). For example, a young man could inform his parents about the woman he would like to marry, while she may or may not be aware of his intentions. The next step for his parents would be to visit the woman's parents and discuss if their proposal is acceptable. Granted acceptance, negations start about terms of marriage, including the size of the bride price, the content of the daughter's portion, timing of wedding ceremonies and the number of guests from each side. In any case, if a mate finds the parents' choice unattractive, generally, he/she generally may opt to decline it and ask for carrying on the search for a new candidate. Since this form of marriage is different from conventional marriages and is likely to be intertwined with some traditional, cultural and economic factors, I control for it in the statistical analysis.

Bride kidnapping is mainly analyzed from utilitarian and human rights perspectives (Borbieva, 2012). It was mainly viewed through the prism of utility maximization in the twentieth century. For example, according to Ayres (1974) bride kidnapping allows individuals with scarce resources to meet their needs, while Stoss (1974) highlights the function of the kidnapping to enable young men to bypass difficulties associated with

alternative forms of marriage that are more time consuming and/or expensive. Young people may resort to bride kidnapping in societies where premarital contacts between young people are discouraged or castigated (Kiefer, 1974). At the same time, recent scholarship tends to interpret bride kidnapping as an act of violence contributing to gender inequality and protracting violation of human rights. For example, Werner (2009) argues that bride kidnapping often brings about gender-based violence and is used by men to "to assert and maintain power over women". Specific to Kyrgyzstan, Amsler and Kleinbach (1999) argue that bride kidnapping enables men to maintain a dominant position over woman. It is worth noting that in addition to bride kidnapping other works use such terms as *marriage by capture, bride abduction* or *bride theft* (Ayres, 1977; Barnes, 1999; Kiefer, 1977; UNFPA, 2006). Bride kidnapping and bride abduction appear to be most frequently used in the recent works related to forced marriages.

Bride kidnapping in the Kyrgyz context is referred by a specific term *Ala Kachuu*, which is literally translated as 'to take and run away' (Aisarakunova, 2010). Borbieva (2012) highlights the role of bride kidnapping as a social institution, given its wide acceptance by both man and women. According to her, several factors contribute to it, including: strong social discouragement or forbiddance of premarital relationships, expectation for women to have children, and symbolism of marriage for women as an act in transitioning to adult status. In similar vein, Handran (2004) argues that bride kidnapping is perpetuated by men in Kyrgyzstan to assert ethnic identity and male power. According to the survey analyzed by Kleinbach et al (2005), a sizable share of respondents of both gender, when asked why they had married through bide kidnapping, responded that 'It is a good traditional way to get a bride'. Table 3.1, taken from Kleinbach et al (2005), provides

eight choices to the question why this woman was kidnapped. The above response was the most popular (38%), followed by "Woman might refuse marriage proposal" (29%), 'To prevent woman from marring another (male)' (28%). Interestingly, the answer 'Man was unable to pay *kalym* (a term for bride price used in Cental Asia to) was chosen only by 4 percent of the respondents, suggesting that economic factors do not play significant role in choosing the type of marriage. Unfortunately, this statistics is based on the survey conducted in a village that has a high incidence of bride kidnapping and, therefore, the results cannot be generalized to the whole country.

Table 3.1. Why Was This Woman Kidnapped?

	Women (%)
It is a good traditional way to get a bride	38
Woman might refuse marriage proposal	29
To prevent woman from marrying another	28
Woman had refused a marriage proposal	12
Parents of woman might not agree to marriage	7
Man was unable to pay kalym (bride price)	3
The woman was pregnant	2
Parents of man might not agree to the marriage	1

Source: Table 3 from Kleinbach et al (2005)

The most extreme cases of BKM are non-consensual. Nedoluzhko and Agadjnian (2015) estimate that the proportion of consent and non-consent BKMs are approximately equal. They call kidnapping by consent as *mock kidnapping* and argue that it is an intermediate marriage form that combines elements of traditional marriage practice (*Ala Kachuu*) with those of choice marriage. According to the UNFPA study (2016) a quarter of bride kidnappings in Kyrgyzstan were committed without consent. Kleinbach et al (2005) report the responses on the degree of mutual consent by men and women involved in bride kidnapping. According to the survey analysis conducted by them, when asked

about the degree of mutual consent, two responses that capture the prevalence of 'staged' and non-consensual bride kidnappings are 'Woman kidnapped with her own consent' (34%) and 'Woman kidnapped by physical force' (18%). Another response "Woman kidnapped through deception" is reported by 46% of the respondents, and it may be perceived as non-consensual. However, Werner (2003) argues that, in local context, bride kidnapping often involves elements of deceit and yet is viewed as consensual.

Perhaps, a simple question a reader might have is why kidnapped females do not refuse marriage to her abductor if the kidnapping occurred against her will. Kleinbach et al (2005) estimate that only 8% of the bride kidnapping attempts were rejected. One of the popular explanations of why women act complacently and are very likely to accept the bride kidnapping 'proposal' is high social, and sometimes family pressure, in the event if they escape the groom's house or decline the proposal. If a kidnapped woman leaves the groom's house unmarried, the community is likely to stigmatize her as the woman who disgraced herself, her family and the kidnapping family (Werner, 2009). The prospect of getting married for her in this case may diminish substantially. Unfortunately, the data limitations preclude me from differentiating between consensual and non-consensual BKMs.

While the economic side of bride kidnapping had not gotten much attention, a few researchers acknowledge that bride kidnapping reduces the cost of marriage in the societies where it is higher for the groom's family (Conant, 1974; Lockwood, 1974; Kiefer, 1974). However, no significant association between bride kidnapping and bride price was found by Aryes (1974). In addition, in some cultures the converse relationship is observed (Barnes, 1999). In Central Asia, only a limited number of works mention that bride

kidnapping lowers the cost of marriage, focusing instead on the bride price size. Werner (2004) and Kuehnast (1997) provide narrative description of why, according to the rural Kyrgyzstan and Kazakhstan residents, bride kidnapping leads to lower marriage cost. According to them, bride kidnapping entails less time (for courtship), negotiations and money. Paying a bride price and organizing the wedding festivity remains the responsibility of the groom's family, but they are able to dictate the amounts to the bride's family if bride kidnapping transpires. In similar vein, Lom, the producer of a documentary about the bride kidnapping phenomenon in Kyrgyzstan, commented: "If you kidnap a girl, you still have to pay, but the bride price is usually around a third lower" (Sadiq, 2004). However, as bride kidnapping is a vanishing practice worldwide, quantitative research touching economic aspects is practically absent.

My study is close to the literature that focuses on the economics of arranged marriages and dowry. Dowry is an essential part of arranged marriages in many Asian countries and its size is determined by bargaining power of bride's and groom's households. The size of the dowry, which is in-kind or money payment from the bride's to the groom's family, and the bride price, which is a payment from the groom's to the bride's family, receives a lot of attention. The study of Block, Rao, and Desai (2004) establishes a causal relationship between how much households spend on weddings with the size of a dowry. More specifically, Block et al (2004) develop a simple theoretical framework and provides statistical evidence that the high cost of weddings in rural Indian serves the purposes of signaling improved household status. This happens if the household manages to attract a high quality groom outside of the community, which implies that his status is not observed by the community. The role of the dowry is to attract a better groom, while

expensive wedding festivity is in line with adhering to traditions and demonstrating improved status. Another work by Brown, Bulte and Zhang (2011) argues that Chinese households sponsor splendid weddings to attract better brides for their sons.

3.3 Data

The Life in Kyrgyzstan (LIK) survey (Bruck et. al., 2014) was conducted annually four times starting 2010. The survey uses stratified, two-stage sampling and is representative at national, regional and urban/rural levels. While 3,000 households with 20,142 individuals were interviewed in the first waive, some attrition is observed in every subsequent wave.

Table 3.2 reports summary statistics of variables for the sample of households who reported son's wedding as the largest festivity in the last 12 months[8]. The raw number of households reporting son's wedding as a largest festivity in the last 12 month is 243, missing data in variables *event's expenditure* and *household income satisfaction* reduces the sample by one household to 242, which is now referred to as the full sample. I provide statistics for the full sample along with sub-samples of households that have different histories in terms of the way marriages originated – through match (meaning conventional

[8] The selection of households is based on the responses to the question in the Expenses on Customs and Traditions module: "Which festive event was the largest in terms of guests and expenditures?" The rest of the questions of the module are related to the chosen largest festivity. No information is available on other festivities. Thus, it is possible that the households that had a male wedding festivity in past year could spend more on some other festivity. In this case, these households would not report information on male wedding festivities. If these households are different from other households then the survey data on male wedding expenditure would be not representative of the all Kyrgyzstani households. However, given that the average expenditure of the most expensive festivities is substantially lower than that of wedding expenditure, I argue that wedding expenditure on male's weddings are very unlikely to suffer from selection issue. For instance, compared to 104.8 thousands Soms spent on a typical male's wedding, Kyrgyzstani households spend on average 43.6, 38.6 and 36.4 thousands Soms on other, new house celebration, and remembrance day, respectively.

marriage when both groom's and brides' expressed mutual consent to wed), arranged or bride kidnapping.

The information related to the type of marriage is retrieved from the Women's Background and Fertility module of the data survey. It is based on the following set of questions. First, female respondents of age starting 18 were asked if they have ever been married. Positive responses were followed by a question about the type of marriage: *How did this marriage come about?,* accompanied by three possible answers: a) *love marriage*, b) *arranged marriage* and c) *bride kidnapping*. Based on this information, an indicator variable *bride kidnapping marriage (BKM) household* is created which equal one if at least one female in the household reports that she married through bride kidnapping, and zero otherwise. These households comprise 21.5 percent of the sample. The *love marriage household* indicator variable equals one if all of the reported marriages in a household were conventional 'love' marriages. *Love marriage households* account only for 38.8 percent. The rest of households fall into the category of arranged marriages, captured by the indictor variable *arranged marriage households*.

The *event's expenditure* variable is related to eight distinct festivities, which are obtained from the following question in the household module: 'What type of festive event(s) did your household host in the last 12 months?' The answers are categorized into the following nine choices:

Table 3.2. Summary Statistics for the Sub-sample of Households that Reported Son's (Male's) Wedding as a Largest Festivity

VARIABLES	All	'Love' (match) marriage households	Arranged marriage households	Bride Kidnapping households
Event's expenditure (in thousands Soms)	104.8 (6.18)	128.1 (13.03)	92.24 (6.37)	86.03 (10.38)
Household income satisfaction[9]	5.978 (0.12)	6.286 (0.22)	5.899 (0.18)	5.552 (0.23)
Household head is female	0.174	0.191	0.156	0.173
Household head education:				
High school	0.736	0.628	0.823	0.769
Professional school	0.149	0.181	0.104	0.173
Higher School	0.112	0.181	0.073	0.058
Kyrgyz	0.694	0.766	0.469	0.962
Observations:	242	94	96	52

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).

1. Son's (any male) wedding/marriage
2. Daughter's (any female) wedding/marriage
3. Birth of a baby
4. Jubilees/anniversary
5. Birthday
6. New housing celebration
7. Funeral

8 Remembrance day

9. Other

[9] Based on the question: "How satisfied are you today with your personal income? Please rate it from 0 (completely dissatisfied) to 10 (completely satisfied)".

Next, the respondent is asked which festive event was the largest in terms of guests and expenditures, along with a number of follow up questions pertaining to the mentioned event. Using the information provided regarding the total amount of monetary and non-monetary expenses spent on the event (including livestock slaughtered, food originated form own production, etc.), I construct the variable *event's expenses*. Son's (male's) marriage was reported as the largest event by 243 households whereas the daughter's marriage scored 133 responses (I lose one observation due to non-response in other variables). This implies that son's marriage is of greater importance in Kyrgyzstan compared with that of daughter's one. Since my focus is on wedding expenditure, I select the wedding events and create a variable *expenditure on male's wedding*.

To control for the household income, I opt to use the mean value of household adult members' response to the question: *'How satisfied are you today with your personal income? Please rate it from 0 (completely dissatisfied) to 10 (completely satisfied)'*. I consider that this subjective measure of income better captures household welfare as measuring income becomes imprecise given that a substantial share of population in Kyrgyzstan rely on non-wage agricultural activities. I observe that BKM households report the lowest household income satisfaction score. It is statistically different from match marriage households but not different from arranged marriage households.

The education system in Kyrgyzstan is comprised of pre-school, general and professional education. General education consists of three levels: primary, basic and secondary. Kyrgyz legislation requires all children to attend school from 7 years old, and complete at least basic level, which corresponds to 9 years of studies.

Professional education is broadly divided by technical and higher levels. At the same time, technical education is formally comprised of two distinct categories – primary and secondary. It takes 1-2 years to obtain a degree for the former and 3-4 for the latter. Due to the small sample, I create one indicator variable accounting for technical degrees. Higher education is related to college or university degrees that requires at least 4 year of studies and completing of secondary school.

The level of education highlights the important disparities among the heads of different types of households. While 18 percent of 'love' marriage household heads have a university degree, only 7.3 and 5.8 percent of heads of arranged and BKM households have the this level of academic achievement. In addition, the percentage of the latter category with a professional school degree is on par with that of the heads of the 'love' marriage households (17.3 and 18.1 percent, respectively), while only 10.4 percent of arranged marriage household heads have professional degrees.

3.4 Econometric Model

The econometric model I am interested in expenditure on male's wedding and BKM are dependent and independent variables, respectively:

$$\ln Y_i = B_i \beta_1 + A_i \beta_2 + X_i \psi + u_i, \quad (1)$$

where Y_i represents expenditure on male's wedding in the household i; B_i equals one if wedding in the household i is associated with BKM and zero otherwise; A_i equals one if wedding is associated with the arranged marriage and zero otherwise; β_1 and β_2 are parameters related to B_i and A_i, respectively; X_i is a vector of the i^{th} household characteristics explaining male wedding expenditure; ψ is a vector of parameters; and u_i is

an error term. It is unfortunate that estimating equation (1) is not feasible as linking expenditure on male's wedding, reported in the household module, to the *BKM* variable obtained from the individual female questionnaire is problematic, as discussed below.

The information about the year the marriage is not directly observable as married and divorced female respondents report how many years ago they married. If these responses are used to assign marriages to calendar years, the sample of married woman who had marriage in the year of survey is substantially smaller than the number of reported male weddings. One explanation of such discrepancy is the difference in time reference. Specifically, the question about major festivities is related to the past 12 months, which does not overlap with a calendar year since the survey was conducted around middle of a calendar year. Therefore, attributing a major festivity to a specific calendar year is not possible. Another explanation is that after the marriage some sons separate from the household. As such, no information is obtained on these types of marriages as both spouses do not reside in the survey household. The sample is further reduced as some married/divorced women do not report on the way their marriage came about. In addition, in cases when there is more than two marriages reported by some households in the survey years, there is no way to distinguish which one is related to the reported son's wedding being a major festivity within the past 12 months.

While the variable of interest is not directly observable there is a proxy variable, the indicator variable *bride kidnapping marriage (BKM) household.* As noted above, it is equal to one if at least one woman in the household reports that she married through bride kidnapping, and zero otherwise. I argue that the history of BKMs in a household predicts well BKMs during the survey years. The process of bride kidnapping is relatively short

time wise and carried out as a rule by the groom and his friends. At the same time, persuading the kidnapped woman to provide her consent to marry the groom may take a longer time. Moreover, it is the female part of the groom's family who plays the major role in convincing the kidnapped bride to agree to marry the groom (Borbieva, 2012). According to Borbieva (2012), a large share of women (who married through bride kidnapping) she interviewed admitted "they believed the success of a marriage has little to do with how it begins" even though they were not willing to be kidnapped. Therefore, I argue that bride kidnapping is more likely to occur in the household that has a history of BKMs. Bride kidnapping stories on the internet corroborate this line of reasoning. Some of them reveal the cases where the female part of household advises the groom on which woman to capture for marriage. Lom's (2004) documentary illustrates a case where several mothers pressure their sons to kidnap brides. When the kidnapped female is brought to the house, the married women vehemently persuade her not to leave the house. Some of these women tell that they were kidnapped as well and they do not regret it. This information gives a rise to the idea that bride kidnapping event can be treated as an outcome of a household decision-making rather than a groom's unilateral action, and, it is reasonable to expect that the degree of support BKM increases with the number of previous BKMs in the household. Hence, I estimate the following equation:

$$\ln Y_i = B_{2i}\,\alpha_1 + A_{2i}\,\alpha_2 + X_i\,\theta + \varepsilon_i, \qquad (2)$$

where B_{2i} is equal one if at least one female in the i^{th} household reports that she married through bride kidnapping, and zero otherwise; A_{2i} is equal one if at least one female in the i^{th} household reports that she had an arranged marriage, and zero otherwise; α_1 and α_2 are parameters related to B_{2i} and A_{2i}, respectively; X_i is a vector of the i^{th} household

characteristics explaining male wedding expenditure; θ is a vector of parameters; and ε_i is an error term. X_i also includes indicator variables for communities in the equation (2), allowing me to compare wedding expenditure and types of marriage within each community, thus controlling unobserved fixed community characteristics. I employ community fixed effects to alleviate endogeneity concerns given Kyrgyzstan's diverse and highly immobile population, that lead to significant variation in customs, poverty level, economic opportunities among different localities. However, despite controlling for community fixed effects in equation (2), α_1 may be estimated inconsistently due to unobserved household or individual effects. One of the conventional approaches addressing endogeneity issues is to apply IV estimation or employ household fixed effects estimation taking advantage of the panel structure of the data. The latter appears to be not feasible as the dataset does not have multiple observations on male wedding expenditure per each of the households. After all, the data set consists of three consecutive years of observations.

Becker et al (2017) use the same data set to estimate the impact of bride kidnapping on birth weight of children and instrument the bride kidnapping variable with the percentage of marriages within a community that resulted from bride kidnapping. Their 2SLS estimate increases roughly by factor two in magnitude compared with an OLS estimate. However, specific to the regression model I use, it is likely that this instrument, which is based on community level variation, is not exogenous since it may be correlated with some unobserved community characteristics captured by the error term in the structural equation. These characteristics could include cultural and social norms that also explain expenditure on festivities. The use of community fixed effects and 2SLS based on

community variation are mutually exclusive[10]. Accordingly, I provide estimates based on both approaches, being cautious about potential validity problem of the instrument.

To confirm the existence of causal relationship between BKM and male wedding expenditure, i.e. address the possible endogeneity problem due to omitted variables or selection issues, I rely on two approaches. The first one is related to setting up a falsification test, hinging on the ideas of Karl Popper (1959). It is based on examining an alternative outcome that is not affected by the *BKM household* variable but would be affected by potential confounders that might be correlated with it. If the *BKM household* variable has no significant estimated effect on the alternative outcome, then the statistical relationship between this variable and male wedding expenditure is not rejected.

The second approach calls for gauging the sensitivity of the coefficient of interest to omitted variables based on Altonji, Elder, and Taber (2005) and Bellows and Miguel (2009). The technique calls for estimating a potential influence of omitted variable bias by observing how the coefficient of interest changes as additional explanatory variables are included. As the inclusion of additional controls may decrease the absolute value of the coefficient related to the *BKM household* variable, adding more explanatory variables could further attenuate its effect to the extent it might become zero. However, if adding observable explanatory variables has no or little impact on the value of the bride kidnapping coefficient then one can reject the hypothesis of omitted variables explaining the difference in wedding expenditure.

[10] This happens due to perfect multicollinearity if both community fixed effects and a community level variable are included in the model

3.5 Estimation Results

Table 3.3 compares the estimates of BKM households' expenditure on male weddings in a range of regression models starting with a naïve OLS and concluding with community fixed effects model. The first column of Table 3.3 shows that the households with at least one case of reported BKM spend on average 33 log points (or 30 percent) less than the household with the history of conventional 'love' marriages. The coefficient estimate is statistically significant at 5 percent level. Expenditure on male wedding by BKM households estimate would be unbiased if the sample of these household is not different on all characteristics from the households in Kyrgyzstan, which is tantamount to random assignment of males to BKMs. If the BKM households are different from the rest of households and the differences are not controlled for then it is very likely that the coefficient of interest is biased. As I add more variables that are likely to be associated with the household wedding expenditure in every subsequent regression model, I can observe whether the coefficient of interest is sensitive to inclusion of new controls.

Model (2) in Table 3.3 provides additional controls related to a number of socio-economic characteristics of the households, while model (3) adds time fixed effects. Their result are very similar. The *BKM households* coefficient decreases in magnitude and lose significance, whereas the coefficients related to *female headed households* and *fifth income quintile households* demonstrate significant negative and positive association, respectively, with expenditure on male wedding. The inclusion of regional fixed effects in model (4) restores the significance of the coefficient of interest, while having almost no effect on the other previously significant coefficients. High sensitivity of the *BKM household* variable suggests that it is likely to be endogenous.

Table 3.3. OLS Estimates of Expenditure on Male's Wedding

VARIABLES	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
BKM household	-0.330**	-0.235	-0.254	-0.268*	-0.551***
	(0.141)	(0.156)	(0.156)	(0.161)	(0.196)
Arranged marriage household	-0.181	-0.121	-0.0839	-0.170	-0.109
	(0.110)	(0.113)	(0.111)	(0.120)	(0.168)
Female household head		-0.459***	-0.435***	-0.350**	-0.209
		(0.143)	(0.139)	(0.144)	(0.181)
Household head education:					
Professional school		-0.018	-0.008	0.047	-0.004
		(0.133)	(0.135)	(0.135)	(0.169)
Higher School		0.316*	0.319*	0.457**	0.137
		(0.167)	(0.170)	(0.203)	(0.277)
Kyrgyz household head:		0.008	0.023	0.021	-0.007
		(0.123)	(0.123)	(0.142)	(0.293)
2 hh income quintile		0.038	0.0302	0.0589	0.058
		(0.141)	(0.143)	(0.145)	(0.231)
3 hh income quintile		0.134	0.113	0.091	0.0176
		(0.159)	(0.165)	(0.174)	(0.269)
4 hh income quintile		0.0716	0.058	0.007	0.0728
		(0.158)	(0.160)	(0.165)	(0.267)
5 hh income quintile		0.433**	0.395**	0.388**	0.564**
		(0.167)	(0.170)	(0.164)	(0.285)
2012 year			0.176	0.237*	0.224
			(0.127)	(0.126)	(0.156)
2013 year			0.213*	0.203*	0.138
			(0.118)	(0.120)	(0.147)
Constant	11.38***	11.24***	11.10***	11.07***	11.76***
	(0.0920)	(0.125)	(0.140)	(0.225)	(0.460)
Observations	242	242	242	242	242
R-squared	0.029	0.124	0.137	0.194	0.556
Time FE	NO	NO	YES	YES	YES
Region FE	NO	NO	NO	YES	NO
Community FE	NO	NO	NO	NO	YES

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

The fifth column replaces regional with community fixed effects, which leads to the increase in the magnitude of the coefficient of interest to minus 55 log points.

Translating the coefficient into marginal effects, I find that BKM households spent 42.1 percent less for male wedding celebration compared with conventional 'love' marriage households[11].

On the other hand, the difference between households with arranged and 'love' marriages shrinks to minus .08 log points and becomes statistically insignificant. The top household income quintile is significant at one percent and suggests that rich household spend 41 percent more than poor ones. Interestingly, the difference between fourth and fifth quintiles is also very substantial (39%). The coefficients related to females headed households and household heads with higher school level of education lose their significance. I also observe a substantial increase in R squared from 0.19 to 0.56 once the community effects are accounted for, implying that more than one third of variation in males' wedding expenditure is explained by community characteristics.

The increase in magnitude of the coefficient of interest is indicative of negative correlation between some omitted community characteristics and BKMs households. Local cultural and income differences could be an instance of omitted variables. In this case, it would be reasonable to assume that households in affluent localities are likely to spend more on festivities, including weddings. If bride kidnapping is more widespread in poor communities then it explains why the coefficient of interest increased in magnitude. In this situation, festivity expenditure and residuals, are positively correlated, while *BKM household* indicator variable and residuals are negatively correlated leading to downward bias in the coefficient of interest in the models without accounting for community effects.

[11] Technically, -0.55 log points from the model (5) is not statistically different from -0.27 log points from model (4). The small sample size results in relatively large standard errors.

Table 3.4. Two Stage Least Squares Estimation of Expenditure on Male's Wedding

VARIABLES	(1) 2SLS, Male Wedding	(2) 2SLS, 1st Stage	(3) 2SLS, Other Festivities	(4) 2SLS, 1st Stage
BKM household	-0.146		0.534***	
	(0.352)		(0.177)	
Arranged marriage household	-0.187	-0.029	0.011	-0.127***
	(0.121)	(0.051)	(0.068)	(0.019)
Female household head	-0.304**	-0.041	-0.125**	0.097***
	(0.146)	(0.067)	(0.061)	(0.022)
Household head education:				
Professional school	-0.008	0.010	-0.0003	0.002
	(0.151)	(0.065)	(0.064)	(0.024)
Higher School	0.399*	-0.112	0.136**	-0.094***
	(0.219)	(0.068)	(0.067)	(0.023)
Kyrgyz household head:	-0.015	0.040	0.069	0.047***
	(0.150)	(0.044)	(0.069)	(0.018)
2 hh income quintile	0.0150	0.035	0.0469	-0.002
	(0.173)	(0.094)	(0.079)	(0.028)
3 hh income quintile	0.111	-0.007	0.137*	-0.004
	(0.178)	(0.099)	(0.080)	(0.029)
4 hh income quintile	0.175	0.004	0.256***	-0.011
	(0.186)	(0.102)	(0.08)	(0.028)
5 hh income quintile	0.488***	-0.087	0.510***	-0.030
	(0.185)	(0.110)	(0.081)	(0.028)
Type of festivity: (reference: birth of child)				
Female wedding			1.299***	-0.022
			(0.086)	(0.037)
Jubilees/anniversary			0.332**	-0.011
			(0.141)	(0.048)
Birthday			-1.067***	0.001
			(0.067)	(0.025)
New housing celebration			0.293**	0.001
			(0.127)	(0.055)
Funeral			-0.443***	-0.014
			(0.108)	(0.037)
Remembrance day			0.048	0.019
			(0.107)	(0.033)
Other festivity			0.308***	0.006
			(0.113)	(0.034)
community ratio of bride kidnapping before 1991		1.104***		0.803***
		(0.164)		(0.057)
Observations	242	242	1,805	1,805
R-squared	0.189	0.426	0.376	0.312
Time FE	YES	YES	YES	YES
Region FE	YES	YES	YES	YES

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

I also provide 2SLS results employing the identical identification strategy proposed by Becker et al (2017). They argue that the risk of being kidnapped and conceding to marriage for an unmarried woman of reproductive age is greater in the locations where the prevalence of past bride kidnapping was high. Becker et all (2017) estimate the share of bride kidnapping before 1991 by community to use it as an exogenous restriction for two stage least squares, assuming it represents a source of exogenous variation in the marriage equation for an unmarried woman to be kidnapped since 1991. With the structural equation estimating birthweight, Becker et al (2017) make an assumption that the past *community ratio of bride kidnapping* explains birthweight only through BKMs. However, as I discussed earlier, it may be possible that past *community ratio of bride kidnapping* is correlated with unobserved economic and cultural characteristics at community and household level that are correlated with expenditure on male's festivity.

Table 3.4 shows 2SLS results for both expenditure for male's festivity and other major festivities[12]. I start by highlighting the first stage results presented in column (2): a 10 percentage points increase in community ratio of BKMs before 1991 is associated with a 20 percent increase in the probability of observing a BKM household in this community. This coefficient is significant at the 1 percent level. Looking at the second stage equation in column (1), I find that BKM households do not spend significantly different amounts on male weddings compared with 'love' marriage households. This presents a sharp contrast from earlier reported negative 42.4 percent difference obtained from the community fixed effects model. As discussed, both approaches may provide inconsistent results – the exclusion restriction in 2SLS could be correlated with the second stage equation's

[12] Column (3) and (4) are related to the falsification test described in the next section - it replaces the dependent variable in column (3) with expenditure for other types of major festivities

residuals, while the community fixed effect may not account from some other sources of endogeneity.

3.6 Robustness checks

I provided evidence that BKM households spend on average less on male weddings. However, without additional analysis I cannot claim that lower male wedding expenditure is an outcome of BKMs. In fact, one could argue that the primary reason why the BKM households spend less on male marriages is because they are different from other households on unobservable characteristics. For example, BKM households could be less affluent than other households – questioning if household income effects are properly controlled in my models – or due to other omitted controls. If true, this would imply that subjective household income employed in my model is not a good proxy for the true unobserved level of household income. It would also mean that BKM household expenditure on male wedding is significant due to omitted variable bias, whereas the true effect of the BKM would not be different regardless the way the marriage formed – via bride and groom discretion, parents' arrangement or bride kidnapping. Hence, I proceed with conducting a falsification test to verify if the coefficient of interest in model (5) is consistently estimated.

A falsification test requires confirming that the *BKM household* variable has no significant estimated effect on alternative outcomes. The expenditure for other types of major festivities serves perfectly a role of alternative outcomes, and apparently BKMs in a household should not explain variation in it. Therefore, if I find that the level of the BKM households' expenditure on festivities related other than male wedding is not different from those incurred by other types of households, than it would buttress the original findings,

i.e., I would fail to reject the causal relationship between BKM and male wedding expenditure. On the other hand, the validity of the claim that BKMs are associated with lower male wedding expenditure would be undermined if there is evidence that these households spend on average less on other type of festivities as well. This would mean that other unobserved factors that are correlated with the *BKM household* variable lead to lower wedding expenditure.

The results of this falsification test suggest that the causal relationship between BKM and expenditure on male's wedding is not rejected. Regression models (2) to (5) in Table 3.5 presents regression outcomes for expenditure related to 8 different types of major festivities reported by households as dependent variable. These festivities include female wedding, jubilees/anniversary, birthday, new housing celebration, funeral, remembrance day, any other type of festivity, with birth of baby being a reference category. The coefficient related to the *BKM household* variable is not statistically significant in the community fixed effects model (5), rejecting the hypothesis that omitted variables make it significant in explaining male wedding expenditure. With respect to other regression results, I observe that festivity expenditure is positively associated with households headed by individuals with a higher education degree and negatively associated with female headed households. The type of festivities, Kyrgyz household head, along with time fixed effects, as are statistically different as well.

Table 3.5. OLS Estimates of Expenditure on Other Major Festivities

VARIABLES	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
BKM household	0.053	0.033	0.032	-0.004	-0.029
	(0.069)	(0.059)	(0.059)	(0.062)	(0.062)
Arranged marriage household	0.107	-0.117**	-0.116**	-0.072	0.009
	(0.067)	(0.058)	(0.058)	(0.063)	(0.062)
Female household head		-0.114**	-0.114**	-0.077	-0.116**
		(0.058)	(0.056)	(0.057)	(0.054)
Household head education:					
Professional school		-0.053	-0.045	0.007	0.053
		(0.064)	(0.064)	(0.063)	(0.061)
Higher School		0.010	0.013	0.082	0.042
		(0.064)	(0.063)	(0.064)	(0.065)
Kyrgyz household head:		0.185***	0.178***	0.152**	0.110
		(0.061)	(0.061)	(0.064)	(0.095)
2 hh income quintile		0.023	0.029	0.046	-0.010
		(0.077)	(0.078)	(0.077)	(0.071)
3 hh income quintile		0.135*	0.141*	0.126	0.069
		(0.081)	(0.081)	(0.079)	(0.076)
4 hh income quintile		0.271***	0.283***	0.234***	0.102
		(0.079)	(0.079)	(0.078)	(0.077)
5 hh income quintile		0.391***	0.400***	0.473***	0.378***
		(0.080)	(0.080)	(0.079)	(0.084)
Type of festivity:					
(reference: birth of child)					
Female wedding		1.268***	1.265***	1.294***	1.214***
		(0.086)	(0.085)	(0.086)	(0.092)
Jubilees/anniversary		0.375***	0.380***	0.337**	0.276**
		(0.139)	(0.138)	(0.135)	(0.121)
Birthday		-1.071***	-1.053***	-1.059***	-0.976***
		(0.067)	(0.067)	(0.068)	(0.068)
New housing celebration		0.340**	0.340**	0.277**	0.310**
		(0.135)	(0.135)	(0.127)	(0.135)
Funeral		-0.446***	-0.437***	-0.440***	-0.328***
		(0.110)	(0.111)	(0.106)	(0.010)
Remembrance day		0.062	0.058	0.065	0.143
		(0.107)	(0.108)	(0.106)	(0.106)
Other festivity		0.274**	0.290**	0.314***	0.345***
		(0.111)	(0.113)	(0.113)	(0.110)
Observations	1,805	1,805	1,805	1,805	1,805
R-squared	0.002	0.358	0.360	0.402	0.566
Time FE	NO	NO	YES	YES	YES
Region FE	NO	NO	NO	YES	NO
Community FE	NO	NO	NO	NO	YES

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

I resort to the above falsification test to determine if 2SLS model, the results of which are shown in Table 3.4, delivers consistent results. While a falsification test is not generally applied to the models that account for endogeneity like 2SLS, its intuitive interpretation may provide one with important corroborating evidence on whether the underlying assumptions of the model are valid or not. To recapitulate, in absence of endogeneity issues, we expect to observe in the falsification test that expenditure on major festivities of BKM households should not be statistically different or greater than that of 'love' marriage households. It would be also fair to expect somewhat less spending on festivities by BKM households as they report being less content with the household income when compared with the rest of household types. According to column (3) in Table 3.4, 2SLS suggests that BKM households spend on average 70.6 percent more on major festivities, excluding male weddings, than the reference category. Such an inference seems to be unrealistic for two reasons. First, as mentioned above, BKM households appear to be more financially deprived. Second, the literature on forced marriages informs us that BKMs are more popular among the poor households since they often find it difficult to pay high bride prices. Therefore, using 2SLS model based on *community ratio of bride kidnapping* variable as an exclusion restriction appears to produce inconsistent results.

Additional evidence about the robustness of the estimates of the coefficient of interest to endogeneity is presented using an approach based on Altonji, Elder, and Taber (2005) and Bellows and Miguel (2009) and is reported in Table 3.6. According to Table 3.6, I observe the estimated coefficient of interest in model (1) without control variables does not change much in all subsequent models when more controls are included. Relative change in coefficients allows gauging how strong the omitted variable effect should be

relative to the observed controls to make the effect of bride kidnapping zero. The last specification (4) does not diminish the coefficient of interest. Estimating the model without insignificant time fixed effects (3) or all other insignificant controls (2), I can use the estimated coefficients to calculate that the amount of influence unobserved variables have on the *BKM household* variable is 9.2 to 15.2 stronger than that of the available observable variables to produce a zero value of the bride kidnapping coefficient. These numbers are based on the ratio of observed and unobserved covariances with the *BKM household* variable derived based on equation (6) in Appendix F. Therefore, I conclude that the coefficient of interest is robust to the omitted variable bias.

3.7 Conclusion

This paper contributes to the literature on economics of marriage by examining if there is a relationship between male weddings costs and bride kidnapping form of marriage. Studying this is of interest since the literature on the economic incentives of bride kidnaping contains qualitative assessments of the relationship, but little in the way of quantitative analysis. The major empirical challenge to is to address endogeneity concerns that stem from the fact that bride kidnapping does not happen randomly across households. Its effect on expenditure of male's wedding could be confounded with the effect of unobserved covariates.

Table 3.6. OLS Estimates of Male Wedding Expenditure with Fixed Effects

VARIABLES	Model (1)	Model (2)	Model (3)	Model (4)
BKM household	-0.550**	-0.496**	-0.516**	-0.551***
	(0.216)	(0.204)	(0.198)	(0.196)
Arranged marriage household	-0.207	-0.227	-0.198	-0.109
	(0.191)	(0.190)	(0.176)	(0.168)
Female household head			-0.200	-0.209
			(0.170)	(0.181)
Household head education:				
Professional school			0.0151	-0.004
			(0.191)	(0.169)
Higher School			-0.134	0.137
			(0.311)	(0.277)
Kyrgyz household head:			0.308	-0.007
			(0.302)	(0.293)
1 hh income quintile		-0.086	-0.0329	0.0581
		(0.243)	(0.249)	(0.231)
2 hh income quintile		-0.010	0.0198	0.0176
		(0.172)	(0.178)	(0.269)
4 hh income quintile		0.158	0.174	0.073
		(0.191)	(0.200)	(0.267)
5 hh income quintile		0.532**	0.555**	0.564**
		(0.262)	(0.266)	(0.285)
2012 year				0.224
				(0.156)
2013 year				0.138
				(0.147)
Constant	11.89***	11.85***	11.58***	11.76***
	(0.272)	(0.327)	(0.485)	(0.460)
Observations	242	242	242	242
R-squared	0.510	0.535	0.546	0.556
Time FE	NO	NO	NO	YES
Community FE	YES	YES	YES	YES

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

To overcome this potential problem, I employ two competing models, community fixed effects OLS and 2SLS with a community level exclusion restriction suggested in literature. Given that bride kidnapping marriages (BKM)s do not happen randomly across the households, addressing endogeneity is critical. According to the former approach,

BKMs lead to the reduction in wedding costs by 42 percent compared with conventional marriages. OLS underestimates the coefficient of interest. Yet, it may not alleviate completely the endogeneity stemming from other possible omitted variables. On the other hand, when estimated using 2SLS the coefficient of interest is not statistically significant. Moreover, 2SLS relies on a strong validity assumption – it is valid only if one can completely rule out the lack of the correlation between the community level exclusion variable (the historical community bride kidnapping ratio) and omitted variables, such as community labor market conditions or cultural and social norms that explain the outcome variable.

To reveal which model produces consistent results, I use a falsification test. It is based on rerunning the regression models with an alternative outcome variable (expenses on other different types of major festivities) for which BKM households are not assumed to spend more than the reference households. Given that the falsification test based on the OLS fixed effects model results in a non-significant coefficient for the *BKM household* variable, I conclude that it is not driven by omitted variable bias. On the other hand, the test run on the 2SLS suggests that BKM households spend on average 71 percent more than the reference households for different types of festive events. I find it implausible considering that BKM households report lower satisfaction with income. I argue that the 2SLS results are inconsistent as the instrument is not valid. Therefore, I conclude that bride kidnapping marriages lead to the reduction in wedding costs by 42 percent compared with conventional marriages.

Chapter 4

Reciprocity Enhancement in a Modified Trust Game

4.1 Introduction

Decisions involving trust and trustworthiness permeate everyday social life. In fact, people do not rely on contracts most of the time when concerning economic transactions. There is a wide body of literature providing evidence that trust and trustworthiness improve economic outcomes. For instance, at the micro-level Dirk and Ferrin (2002) argue that trust is associated with employees' positive behavior in organizations. At macro-level, according to Fukuyama (1995) trust and willingness to reciprocate have a positive influence on economic growth and other economic activities. The decisions to migrate and send remittances back to the country of origin are also based on informal family agreements, often involving the intergenerational financing of the migration process of a family member (Rapoport and Docquier, 2006).

One of the puzzling aspects identified by scholars studying trust is that the agents' behavior cannot be explained by conventional models based solely on self-regarding preferences. The failure of conventional models gave rise to alternative models based on other-regarding preferences, leading to the appearance of the experimental literature on the economics of trust, altruism and reciprocity**.** One of the most commonly used experiment to measure trust was designed by Berg, Dickhaut and McCabe (1995). In this laboratory experiment, subjects, who are randomly assigned to two different roles, exchange positive amounts of experimental currency despite the absence of binding contracts and the existence of Subgame Perfect Nash Equilibria (SPNE) predicting the exchange of zero amounts. Specifically, a Sender (or investor) chooses to transfer any feasible amount from

his/her endowment to an anonymous Receiver in the first stage. This amount gets tripled, and the Receiver may return any amount back at his/her disposal in the second stage. The amount sent in the first stage is often considered a measure of trust, while the one returned in the second stage is related to reciprocity. More details of the trust game are provided in the next section.

Here I extend the trust game by Berg et al (1995) by adding a stage, in which a Sender (S) has the discretionary power of providing a Bonus (B) to a Receiver (R) at no cost to himself. I conjecture that the higher the level of B, the more likely S will attempt to use his power over granting B to achieve a higher return on investment. On the other hand, if R predicts that S will transfer B when he is satisfied with the return on investment, then R may also be better off by transferring back a portion of his current earning anticipating an increase in his income resulting from the bonus transfer in the last stage of the game. Therefore, I hypothesize that higher values of B can lead to greater amounts of total surplus. The proposed refinement of the trust game bears much resemblance with the 'gift exchange' literature, which is covered in substantial details in the next section.

My experiment bears resemblance to a number of real-life situations. For example, parents could use their bequest strategically to address potential moral hazard problems related to intergenerational transfers. These transfers are explained by two competing motives – the altruistic and exchange motives. The latter, according to Cox (1987), suggests that parents send money to their children in return for expected services from them in the future. This 'exchange' does not depend on binding contracts, and, accordingly, parents may rely on other means to elicit reciprocity from their children such as strategically distributing their bequest among their children. In a similar manner, exchange

or investment motives also may explain labor migration and the level of remittances (Rapoport and Docquier, 2006). Specifically, the investment motive may play role, among other motives, in influencing labor migration decisions with parents making an 'investment' to coverthe migration costs of their sons and daughters. Under this scenario, parents may use the bequest as an enforcement mechanism again. In line with this prediction, Hoddinott (1994) also suggests that inheritance procedures could be very effective in preventing the migrants from refusing to send remittances back to their families home. In other words, the amount of remittances sent back to household members may be correlated with the size of the potential inheritance to be distributed in the future among those (labor migrants) who send remittances home. In my model, B could be conceptualized as the parents' bequest. Therefore, it should not decrease the payoff of the senders in the last stage of the proposed game.[13] I am not aware, to the best of my knowledge, of any laboratory experiments based on a model that has a stage where transferring money does not have an impact on the payoff of the sender.

This paper proceeds as following. In the next section, I review the literature concerning extensions of trust games and remittances. Section three is devoted to theoretical predictions and hypotheses. Section four describes the experimental design. Lastly, section five provides an extensive discussion of the experimental results and section six concludes.

[13] In my game, the value of B does not affect the value of initial endowment of Senders (parents) that they could send in the first stage of the game to Receives (children). This assumption is justified if we assume that B is related to intangible assets.

4.2 Related Literature

This section is divided into two sections providing a brief literature review on the causal factors driving migration and remittances, followed by a more detailed overview of trust games.

4.2.1 Related literature on migration and remittances motives

The investment motive hinges on the assumption that the household's collective decision on the migration of a member is driven by the wish to increase the total household income. Indeed, Todaro (1969) proposed a seminal model in which migration is explained by individual and household utility maximization. Frequently, in countries without well-developed credit markets, the household pools resources, perhaps including borrowing from the extended family, to finance the education or the cost of travel of the migrating household member. In this case, remittances could be treated as repayments of the costs incurred by the household, provided the existence of a working enforcement mechanism. While Cox and Jimenez (1992) provided a theoretical modeling of the investment motive, the work of Ilahi and Jafarey (1999) is one of the examples, where the investment motive is investigated. It also illustrates the challenges in identifying the micro-level processes behind the transfer of remittances. The authors show that a significant proportion of migrants in Pakistan tend to rely on loans from extended family given the financial constraints of the parents. Data limitations, however, preclude testing the investment motive, as data on remittances to other people different from close family members is usually not available. Even though the indirect measurement of remittances' flows leads

to less robust findings, Ilahi and Jafarey (1999) find that borrowing from outside the family reduces the remittances to migrant's immediate family members.

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4.2.2 Related literature on trust games and gift change

There have been many studies that employed laboratory experiments to understand better what drives human behavior exhibiting trust without binding contracts, contradicting theoretical predictions based on self-interest and rationality. Here, I describe in more details the trust game introduced by Berg et al (1995). Subjects are granted with $10 and randomly assigned to pairs. There are two stages in the game, in which the player who is randomly assigned to be Sender (S) has to choose any amount X, between zero and $10, to transfer it to an anonymous Recipient (R). The amount sent (X) gets tripled, and it may be perceived as "investment". In the succeeding stage, R has to choose to send back Y, a feasible amount at his/her disposal ($10 + [0 \leq Y \leq 3] * X$). Y may be interpreted as the return on S's "investment", or, as described earlier, Y also may be treated as reciprocity.

The rest of remaining money after returning Y constitutes R's payoff: $(10 + 3X - Y)$, while S's payoff is what is left after sending X plus Y: $(10 - X + Y)$.

The unique SPNE prediction in the original Berg's game is to send zero money, which leaves the players in a pair with a payoff of $20. This prediction is based on the assumption that the players are rational and self-interested, which makes S certain that R does not transfer back any money. Apparently, the equilibrium of the Berg's game is Pareto-inferior to a number of other feasible allocations as the payoff for a pair of players could amount to $50, if S transfers the full endowment of $10.

Berg et al (1995) attribute the results of their experiment to trust and reciprocity. In fact, 30 out of 32 senders transferred $5.16 on average, with only two senders sending zero amounts. They were paid back $4.66 on average, and almost half of the receivers returned more than the sender transferred them. Given that the game is played once, it involves a double-blind protocol with reputation and punishment treats controlled in the lab setting. Therefore, the authors attribute the statistically significant difference from the standard prediction to the reciprocal behavior of the players. Moreover, to test if potential misunderstandings of the experiment instructions led to the deviation from the prediction, they strengthen their claim by running a follow-up "social history" experiment. This experiment differs from the first one in that the individuals were presented with the summary results of the original "no history" experiment. The outcome of the second experiment was overall similar to the first one.

There were numerous efforts to understand whether the "trust game's" outcomes of sending positive amounts to senders (S) should be attributed to the expectations of reciprocation, or there are "other-regarding preferences" at play. In the latter case, S may

care about the payoffs of R as well as his/her own welfare. Gneezy et. al. (2000) came up with a modification of Bergs' game, the results of which do not support the existence of other-regarding preferences. They introduce an upper bound to what S can be repaid afterwards, and conclude that players send more when large repayments are allowed. When the repayment was limited to $2, S transferred on average $2, an amount that is 3 times less than when the repayment limits were higher. Along the same lines, Chaudhuri and Gangadharan (2007) observe a significant reciprocity effect in a modified trust game. They find that the amount of money expected back from the receiver plays a major role in determining the amount that is sent to R. S transfers on average $2.14 if they expect to get back less than the amount they transfer to the receiver. However, if they expect to receive back more than they transfer to R, the average amount transferred increases to $6.05.

Cox (2001) employs a triadic design to decompose Berg's trust game in a rigorous way. Triadic design, employing the original trust game and two modified dictator games as different treatments, allows disentangling altruistic or other-regarding preferences from trusting and reciprocating behavior. The results of Cox's experiment suggest that Ss are motivated both by altruism and expected reciprocity. Similarly, he finds that Rs exhibit both altruistic and reciprocal behavior.

Fehr and Rockenbach (2003) examine if the threat of punishment crowds out trustworthiness in Berg's trust game. They modify the original trust game by adding a treatment where S has discretion of imposing a fine before transferring money to R. The latter suffers a loss of 4 points if he/she transfers less than the amount S indicated. As a result, sanctions negatively affect trustworthiness. The authors hypothesize that the

attempts to use sanctions to enforce an unfair distribution of income may be perceived as hostile acts, inducing Rs to reduce the level of cooperation.

Previous work under the gift exchange rubric demonstrates that there exist substantial efficiency gains that are generated contrary to the predictions of the self-regarding preferences models (Ferh, Kirchsteiger and Rield, 1993; Ferh, Gatcher and Kirchsteiger, 1997; Ferh and Schmidt, 2004). The outcomes in these studies are generally attributed to the influence of other-regarding preferences like fairness and reciprocity. A distinct feature of gift exchange games is the existence of a third stage, which allows the substantial magnifying of the impact of the other-regarding preferences on incentives. Generally, the third stage represents either an ex-post reward and/or punishment options by principals.

A good example of a gift exchange game is presented in Fehr and Schmidt (2004). In their work, a simple labor market is simulated where principals are supposed to interact randomly with ten agents ten times. Every time an agent is randomly matched with a principal, he is supposed to choose effort levels e_1 and e_2 for two distinct tasks. The agent's effort cost is an increasing and convex function of the total effort, while the principal's revenue is obtained from the function $10*e_1*e_2$. In addition, only first task effort can be contracted and verified by the principal. Principals can offer two types of contracts: piece rate contract where a base rate is fixed per unit of effort for the task one, and a bonus contract. The bonus contract also specifies a piece rate per unit of effort, however, in addition, the principal can also pay a bonus after observing his profits, which is equivalent to observing the agent's effort level for both tasks. Naturally, the principal has full discretion over the amount of bonus to be paid.

Under the assumption of self-regarding preferences, one should predict that the bonus contact should not be better in term of generating profits for both players. After all, a selfish principal is not supposed to transfer any bonus in any one-shot interaction with other agents. Such an outcome should preclude agents from putting in any effort above minimal. Despite these theoretical predictions, the experiment illustrates that a large fraction of principals pay substantial bonuses, which are strongly correlated with the total effort. Such results are explained by reciprocal behavior, which induces the principal to pay the bonus if the agent's performance is of satisfaction to him. On the other hand, the existence of a potential bonus pay provides incentives for the agents to choose higher effort levels, compared with the piece rate contracts, and also allocate effort levels efficiently across the tasks. As a result, bonus contracts lead to a more efficient effort allocation and greater payoffs to principals and agents. It is worth noting that both actions, paying bonus and increasing the level of efforts, are costly to both parties. For example, given the random nature of matching of players the principal is clearly better off paying zero bonus regardless of the agent's level of efforts he observes.

It would be of interest to learn how the principal – who is named Sender in my experimental game – reacts to conditions when transferring a bonus in the last stage has no effect on his/her payoff. What makes this assumption interesting is that there is no unique SPNE in such a set up as opposed to the existence of unique equilibria in all gift exchange games described above. As I explain later, the existence of a range of SPNE is related to the indifference of Senders (or the principals in other gift exchange games) to transferring a bonus in the last stage.

4.3 Experimental Design and Procedures

I extend the trust (investment) game by Berg et. al. (1995) by adding a stage, in which a Sender (S) has discretion of providing a bonus (B) to a Receiver (R) at no cost to himself. B could be interpreted as S's choice whether to grant a "bequest" to R or not. More specifically, the amount of B is public information – it is specified to both subjects in the beginning of each game and represents a treatment. To avoid any interfering framing effects during the experiment, I do not tell participants that B could be treated as a bequest. Note that the game essentially collapses to the original investment game if the value of B is zero.

The idea of adding an extra stage that allows S to grant B is likely to trigger an opposite effect on R's behavior when compared with Fehr and Rockenbach's (2003) treatment of imposing a fine to penalize the likely opportunistic behavior of Rs. Therefore, I hypothesize that Rs send back more with increasing amounts of B. Since such behavior is likely to be anticipated by Ss, I expect that B is positively correlated with more efficient outcomes when compared to the ones observed in the original Berg's game. This means that Ss are expected to transfer greater amounts with increasing amounts of B. I provide more details on this in the prediction and hypotheses section.

Except the additional stage, my experimental design is similar to the original investment game. One of the differences between Berg's et. al. (1995) and my game is that Ss and Rs have asymmetric endowments, which are 10 and 0 of Experimental Currency Units (ECU), respectively. Fifty-two subjects participated in the experiment in three different sessions. Each participant played 30 rounds of the game. Subjects were recruited among Rutgers University undergraduate students. The experiment was conducted in the

experimental laboratory of the Economics Department using the z-Tree program (Fisschbacker, 2007) in April 2014, using experimental instructions provided in Appendix G. Subjects are randomly assigned to the roles of S and R. Each participant is given $5 as a show up reward for the experiment. Each S is endowed with 10 ECUs in the beginning of each round of the game. S has to choose to transfer 0, 2.5, 5, 7.5 or 10 ECU of his/her endowment to an anonymous R. The amount chosen by S is tripled and transferred to R. In the second stage, R, after observing how much money was transferred to him/her, is able to send back any feasible amount to S. In the final stage of every round, S has to choose to transfer none or the full amount of B to R. As previously mentioned, the value of B is revealed to both players in the first stage of each round. Naturally, R learns if s/he is gets B or not at the end of the third stage of the experiment.

In the first stage of each game, the amount of B is randomly assigned to the pairs of the player from the following values: 0, 5 and 20 ECU. At the end of the experiment, the amount of ECU accumulated by each participant is converted to US dollars at the rate $4.5 for 100 ECU, and paid to each subject after he/she concludes playing 30 games. As previously highlighted, the decision to transfer B or not to do so does not alter the payoff of S. Accordingly, the payoff of each subject is defined by the following formula in each round:

$$P_S = 10 - X + Y \tag{1}$$

$$P_R = \begin{cases} 3X - Y, \text{if } F = 0 \\ 3X - Y + B, \text{if } F = 1 \end{cases} \tag{2}$$

where P_S and P_R are the payoff functions of S and R, respectively; X is the amount S transfers in the first stage and is limited to [0,10]; Y is the amount R transfers back and is limited to [0, 3X]; B is the amount of bonus defined by nature between 0, 5 and 20 ECU.

While playing 30 rounds of the experiment, the subjects adhere to the roles that they are randomly assigned in the first round for all the subsequent rounds of the experiment, given that Burk et. al. (2003) provided evidence that playing both roles by the same individuals reduces both trust and reciprocity in repeated trust games. In addition, Ss and Rs are randomly reassigned to new pairs each round, with a purpose of avoiding building reputation effect. The subjects are informed about the above rules prior to the start of the experiment. As mentioned earlier, in the first stage of each round, the amount of B is randomly assigned to the Ss from the following values: 0, 5 and 20 ECU. However, the number of Baseline and two Treatments of 5 and 20 ECU is imposed to be equal for each S during the session(i.e. each S plays the Baseline and two treatment games ten times each). Since Rs are randomly paired up with Ss each round, Rs play an equal number of Baseline and two treatment games *in expectation only*.

4.4 Predictions and Hypotheses

Contrary to the original investment game (Berg et al, 1995), the proposed experiment has multiple SPNE. This is due to adding the last stage in which the payoff of S does not change regardless of his/her decision to transfer B or not. This enables subjects to employ different strategies in equilibrium.

I provide an example of an SPNE based on threshold strategies for each player. I make the following assumptions with respect to the function F that describes if S transfers B or not: S transfer B only if he/she get back an amount denoted as $\underline{X}$. This amount is a

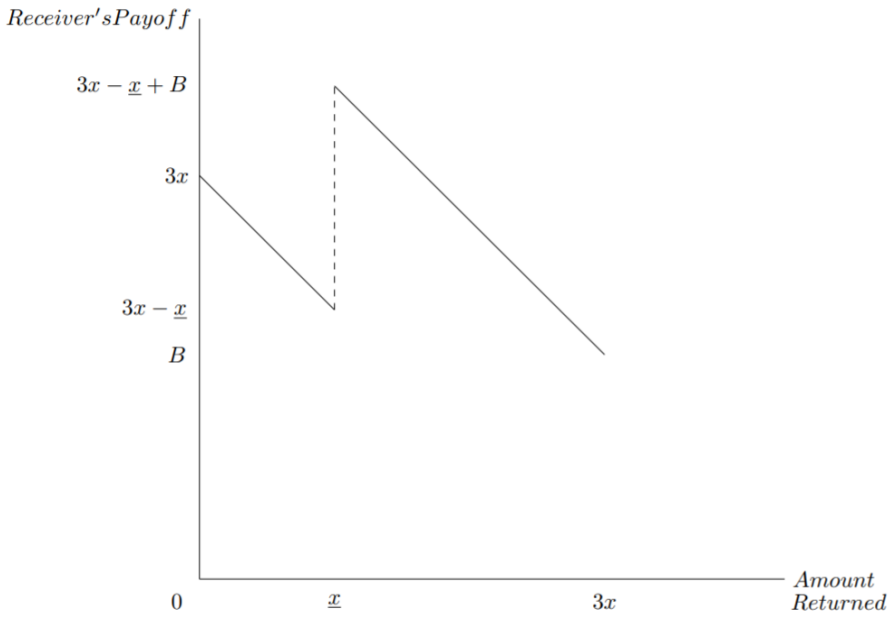
function of B and X. Rational S expect $\underline{X}$ to be equal to X, plus some minimal positive amount ε. Since I restrict the amount R can return to 0.5 increments, ε should be equal to 0.5 ECU[14].

$$F(X,Y,B)= \begin{cases} 0, \text{if } Y < \underline{X}(X,B) \\ 1, \text{if } Y \geq \underline{X}(X,B) \end{cases} \quad (3)$$

where $\underline{X}$ is the lowest amount that makes S transferring B. Rational R will send a minimal amount of Y that makes S transfer B, and, therefore, Y should be equal accordingly to $\underline{X}$. Returning a greater amount than $\underline{X}$ decreases the payoff of R that is presented in Figure 4.1, so R returns only $\underline{X}$. Naturally, R returns $\underline{X}$ only if it is less than the size of B. Putting all this information together, it is apparent that X and B is transferred by S only if the following inequality holds $B > Y \geq \underline{X} > X$, where $Y = \underline{X} = X + 0.5$ ECU in equilibrium. As a result, there is an SPNE *based on this form of game* when the amount of B is 5 ECU: i) S transfers 2.5 ECU; ii) this makes R to return 3 ECU (as R anticipates getting 5 ECU from B in the last stage); iii) S transfers B.

[14] Technically, there is also an SPNE when ε is equal to zero since none of the subjects have an incentive to deviate.

Figure 4.1. Receiver's Payoff Function when B > $\underline{X}$



In sum, I vary the value of B in the experiment, conjecturing that it should lead to different outcomes in terms of the amounts sent and returned. My expectation is that B leads to producing more efficient outcomes (total surplus in the game) compared to the ones observed in the original Berg's game. In fact, any strategies that S and R may use should be consistent with the derived earlier inequality B > Y $\geq$ $\underline{X}$ > X. This translates to a testable hypothesis that S transfer statistically greater amounts of X for increasing amounts of B. At the same time, R is expected to return Y that is greater or equal to X.

4.5 Experimental Results

Table 4.1 presents summary statistics on the amounts sent, amounts returned, along with the earnings of Ss and Rs. As expected, the summary statistics related to the baseline is relatively close to the outcomes of the trust games in which Rs lack the initial endowment. For instance, Schotter and Sopher (2006) report the average amount sent of 2.59 and the

average amount returned of 1.73 as the outcome of a one-shot game. One can also observe in Table 4.1 that the increase in B leads to monotonic increases in X, Y and the earnings of S and R.

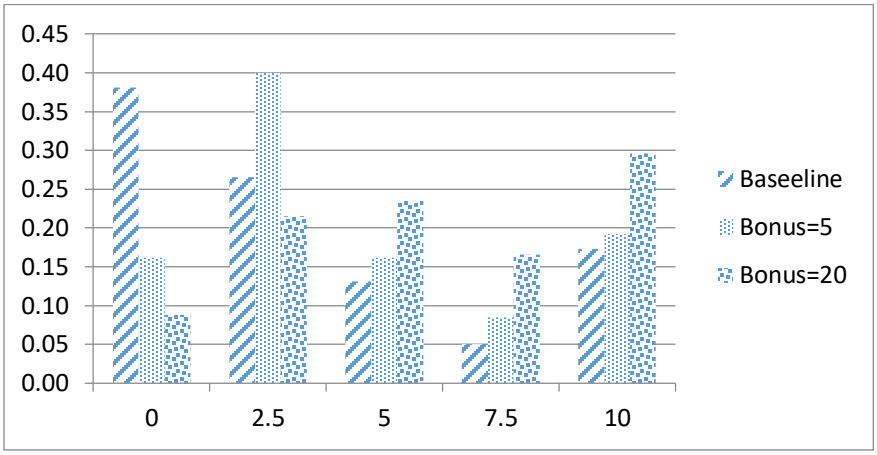
Table 4.1. Summary Statistics by Treatment

	Baseline		Bonus = 5		Bonus = 20		Overall	
	Mean	s.e.	Mean	s.e.	Mean	s.e.	Mean	s.e.
Amount sent (X)	3.42	0.23	4.37	0.21	5.91	0.21	4.57	0.13
Amount returned (Y)	1.79	0.25	3.54	0.28	8.02	0.38	4.45	0.20
Sender's earnings	8.37	0.24	9.18	0.24	12.11	0.32	9.88	0.17
Receiver's earnings	8.47	0.59	12.28	0.50	20.41	0.68	13.72	0.39
Receiver's earnings from bonus transferred only	.	.	2.73	0.15	10.69	0.66	6.71	0.30

4.5.1 The effect of treatment on amount sent

The relationship between the treatment and X is captured in Figure 4.2, which presents a histogram of the average amount sent for each treatment. Note that the distribution of X exhibits bimodal behavior with 0 and 10, 2.5 and 10, 5 and 10 for the Baseline and two treatments, respectively. Note that the most frequent choices of X given different values of B $-$ 0, 2.5 and 10 ECU $-$ are in line with the earlier theoretical predictions, i.e. X is less (or equal) the value of B. The average amount of X increases by 37 and 51 percent when B equals 5 and 20 ECU, respectively, if compared with the Baseline scenario.

Figure 4.2. Histogram of the Amount Sent (X) by Treatment



To demonstrate the treatment effect on X, I run a linear regression model controlling for individual fixed effects given the panel structure of the data. According to the regression results in Table 4.2, S transfers on average 0.94 ECU and 2.49 ECU more when B is 5 and 20 ECU, respectively. This is consistent with the predictions.

Table 4.2. Relationship between Amount Sent (X) and treatment

Dependent Variable: X	Coef.	*t*	Prob. > |*t*|
Bonus = 5	0.94	4.32	0.00
Bonus = 20	2.49	11.41	0.00
Constant	3.42	22.18	0.00
N	780		
individual fixed effects are not reported, but jointly highly statistically significant (Prob > F = 0.000)			

4.5.2 The effect of treatment on amount returned

According to Table 4.1 Y is positively correlated with B. However, this is largely related to the fact that S transfers greater X as the value of B increases. Table 4.3 provides an insight into how much is returned on average for each of the five different values of X in

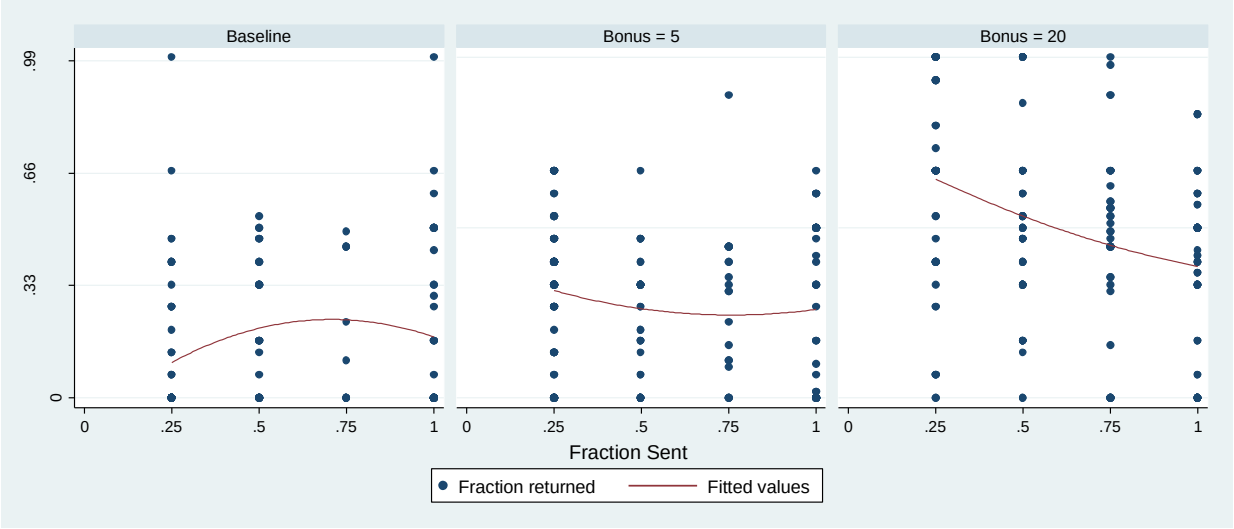
each treatment. As X increases, I observe an increasing pattern in Y across all treatments. Besides, for any level of X, Y also increases as the amount of B changes from 0 to 5 and from 5 to 20 ECU. While overall, this behavior is in line with the predictions as well. However, contrary to the predictions, roughly one third of subjects send X that is greater than 5 when B equals 5. For these cases, the average amount returned is also above 5, although somewhat less than the respective amounts of X (7.5 or 10 ECU).

Table 4.3. Average Amount Returned (Y) for Different Amount Sent (X)

	Baseline	Bonus = 5	Bonus = 20
Amount sent	Amount returned (# of obs)	Amount returned (# of obs)	Amount returned (# of obs)
0	0	0	0
	(99)	(42)	(23)
2.5	0.77	2.39	4.84
	(69)	(104)	(56)
5	3.24	3.57	7.93
	(34)	(42)	(61)
7.5	4.50	6.50	10.27
	(13)	(22)	(43)
10	5.44	7.59	11.55
	(45)	(50)	(77)

To better understand the effect of the treatment on the relation between X and Y, I plot the amount sent as a fraction of S's initial endowment against Y as a fraction of what is received by R in Figure 4.3. For example, if S transfers 2.5 and R returns 2.5, it corresponds to 0.25 fraction sent (2.5/10) and 0.33 fraction returned (2.5/7.5), respectively. I observe the concave relationship between the fraction returned and fraction sent in the Baseline case, while this relationship is linear when B equals 5 and 20.

Figure 4.3. Fitted and Actual Receiver's Fraction Returned and Sender's Fraction Sent by Treatment



4.5.3 The effect of treatments on total surplus

In the predictions and hypotheses section, I hypothesized that the greater the value of B, the more efficient the outcome in terms of the total surplus could be achieved. The total surplus is maximized when S transfers 100 percent of his initial endowment and grants B to R. Thus, the maximal possible value of the total surplus is equal to 30, 35 and 50 ECU for the baseline, Bonus 5 and 20 treatments, respectively. If I add up the average Ss' and Rs' earnings for each treatment and divide them by the relevant values of maximal possible total surplus, I come up with the finding that the participants get the joint payoff corresponding to 56, 61 and 65 percent of the maximum possible total surplus for the baseline, Bonus 5 and 20 treatments, respectively. As the values are statistically different at 1 percent level (see Table 4.4), these findings support the hypothesis that the maximum total surplus is achieved when the value of B is 20. If I exclude the value of B from the calculations of the maximum possible total surplus, then I find that the participants

received the joint payoff that corresponds to 56, 62 and 73 percent of the adjusted maximum possible total surplus of 30 ECU in the baseline, Bonus 5 and 20 treatments, respectively.

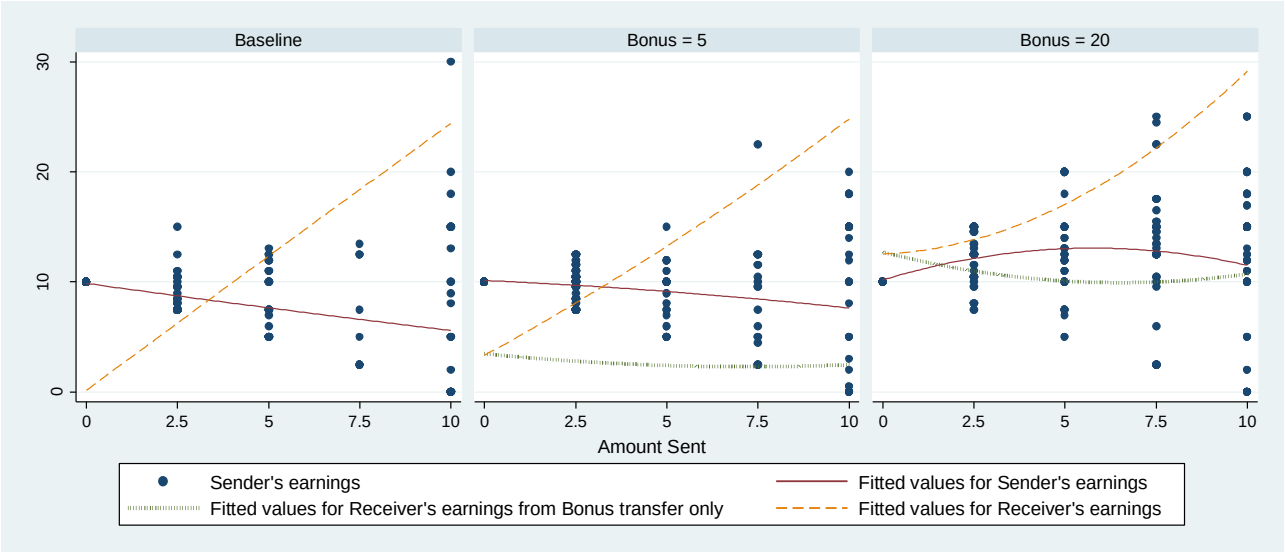
Table 4.4. Relationship between Actual Joint Participants' Earnings as Share of the Maximum Possible Total Surplus and Treatment

Dependent Variable: actual joint participants' earnings as a share of the maximum possible total surplus	Coef.	*t*	Prob. > |t|
Bonus = 5	0.052	3.29	0.00
Bonus = 20	0.089	5.66	0.00
Constant	0.562	50.59	0.00
N	780		
individual fixed effects are not reported, but jointly highly statistically significant (Prob > F = 0.000)			

4.5.4 The effect of the treatment on Sender's and Receiver's earnings and its relative distribution

Figure 4.4 provides an insight about the relationship between S's and Rs' earnings and X for each treatment. In addition, it contains a separate variable that captures the expected value of R's earnings from B only. As one can see in Figure 4.4, the higher the X is the less earnings S is expected to end up with in the baseline and Bonus 5 treatments. On opposite, sending positive X leads to an increase in expected S's payoff in Bonus 20 treatment. However, the relationship between X and the S's earnings in this case is not linear given that sending the full endowment of 10 ECU brings less return vs. sending any other positive amount.

Figure 4.4. Actual Sender's earnings, fitted Sender's and Receiver's Earnings, and Fitted Values of Receiver's Earnings from Bonus Transfer only vs. Amount Sent by Treatment



The relationship between X and S's earnings is formalized using the linear regression results presented in Table 4.5[15]. The coefficient related to X suggests that one additional ECU in X is associated with the decrease in S's earnings by 0.47 ECU in the Baseline game. The coefficient related to Bonus 5 treatment predicts that every additional ECU transferred to R diminishes the S's earnings by 0.25 ECU. The concave relationship between X and S's earnings in case of Bonus 20 treatment is statistically significant. According to the regression coefficients, S maximizes his/her earnings when s/he sends 5 ECU. At the same time, transferring 2.5 and 7.5 ECU also predicts to yield S's earnings that are very close to the maximum value of earnings when 5 ECU is sent.

Figure 4.4 also reveals that an increase in X lead to an accumulation of the expected R's earnings in every treatment. An estimated slope of the dashed line, which shows the relationship between X and R's earnings, is 2.47 ECU in the Baseline game, and it is 2.19

[15] The regression results for other model specifications are not provided here. Main treatments effects and quadratic terms for the Baseline and Bonus 5 treatments are not statistically significant in those regression models.

ECU when B is 5. The former means that for every additional ECU that S transfers, R keeps 2.47 and returns 0.53 ECU to S. When the B is 20, the relationship between X and S's earnings exhibits strictly convex behavior. For instance, while the slope is only 0.55 when X equals 2.5 ECU, it is 1.64 when X is 10 ECU. As a result, the difference between the expected R's and S's earnings significantly widens in absolute terms as X increases across all treatments. Therefore, looking at the participants' joint earnings in relative terms could be of interest.

Table 4.5. Relationship between Sender's Earnings and Amount Sent (X) and Treatment

Dependent Variable: Sender's earnings	Coef.	*t*	Prob. > |t|
Amount sent (X)	-0.47	-8.08	0.00
(Bonus = 5) x (X)	0.22	3.42	0.00
(Bonus = 20) x (X)	1.58	9.33	0.00
(Bonus = 20) x (X^2)	-0.10	-5.36	0.00
Constant	10.12	42.23	0.00
N	780		
individual fixed effects are not reported, but jointly statistically significant at ten percent level (Prob > F = 0.000)			

Table 4.6 shows the relationship between the expected share of joint earnings of S and R and X. In the Baseline case, as S increases X from 0 to 10 ECU his/her expected share of the joint earnings (or total surplus) monotonically shrinks from 100 percent to 18 percent. From an equity perspective, the most equal division of the expected total surplus is achieved when X is 2.5 ECU across all treatments. If we consider Bonus 5 treatment, S's expected share of the joint earnings (or total surplus) monotonically decreases from 75 percent to 23 percent as X raises from 0 to 10 ECU. The distribution of the total surplus becomes more favorable for S when B is 20 compared with the other treatments and X is greater or equal to 5 ECU.

Since the value B is included in the total surplus, it is of interest to investigate what determines transferring of B. From Figure 4.4, one can notice that the expected R's earnings from B, which are represented by the thick solid line, do not appear to change much across different levels of X. Yet, it is exactly the treatment effect leads to the differences in X, Y and the total surplus.

Table 4.6. Average Share of Joint Earnings of Sender (S) and Receiver (R) Conditional on Amount Sent (X)

	Baseline			Bonus = 5			Bonus = 20		
Amount sent (X)	Joint earnings (ECU)	Average share of joint earnings of: S	R	Joint earnings (ECU)	Average share of joint earnings of: S	R	Joint earnings (ECU)	Average share of joint earnings of: S	R
0	10	100%	0%	13.3	75%	25%	22.2	45%	55%
2.5	15	55%	45%	17.9	55%	45%	26.4	47%	53%
5	20	41%	59%	22.5	38%	62%	30.2	43%	57%
7.5	25	28%	72%	26.6	34%	66%	34.3	37%	63%
10	30	18%	82%	32.6	23%	77%	40.9	28%	72%

4.5.5 What determines transferring the bonus

Recalling from Table 4.1, the S's average earnings from transferring B is 2.73 and 10.69 ECU when Bonus is 5 and 20, respectively. This implies that S grants B 56 and 53 percent of times in Bonus 5 and 20 treatments, respectively. As highlighted earlier, the decision of transferring B or not does not have any bearing on the payoff of S. Therefore, I hypothesized earlier that rational and self-regarding utility maximizers could form a prediction that, when S decides to transfer a non-zero amount of X to R, S expects to grant B to R if his/her earnings are not less than the earnings without sending X, i.e. not less than 10 ECU. The rejection of this hypothesis could be an indication that S either is driven by other-regarding preferences, or s/he just opts to transfer B randomly, without taking into

account R's behavior. At the same time, if the hypothesis is not rejected, it is also possible that S is driven both by self- and some other-regarding preferences. If S is driven by altruistic motives, s/he should transfer B as it increases the payoff of R at no cost to S.

Table 4.7. Relationship between Transfer of Bonus and Treatment and Fraction of Receiver's Earnings from Reciprocity Perspective

	Model (1)	Model (2)	Model (3)	Model (4)
Dependent Variable: Bonus Transferred	Coef. (Prob. > |*t*|)	Coef. (Prob. > |*t*|)	Coef. (Prob. > |*t*|)	Coef. (Prob. > |*t*|)
Dummy for S's earnings greater or equal than 10 (SE>=10)	0.51 (0.00)	0.60 (0.00)		
(SE>=10) x (Bonus = 20)		-0.10 (0.22)		
Bonus = 20		-0.07 (0.29)	-0.04 (0.52)	0.02 (0.96)
Fraction of R's earnings sent back (FR)			1.40 (0.00)	7.05 (0.00)
(Bonus = 20) x (FR)			-0.53 (0.00)	-2.9 (0.00)
constant	0.17 (0.00)	0.19 (0.00)	0.13 (0.00)	-2.37 (0.00)
N	455	455	455	455
individual fixed effects significance (Prob. > F)	(0.000)	(0.000)	(0.000)	(0.000)

4.5.5.1 Transferring bonus and self-regarding preferences

The linear regression results provided in the first column of Table 4.7 demonstrate how S's earnings affect the decision of transferring B. The latter is captured by the dummy variable that equals one when S's earnings are greater or equal 10 ECU, and zero otherwise. This relationship is positive and highly statistically significant, controlling for Ss' individual

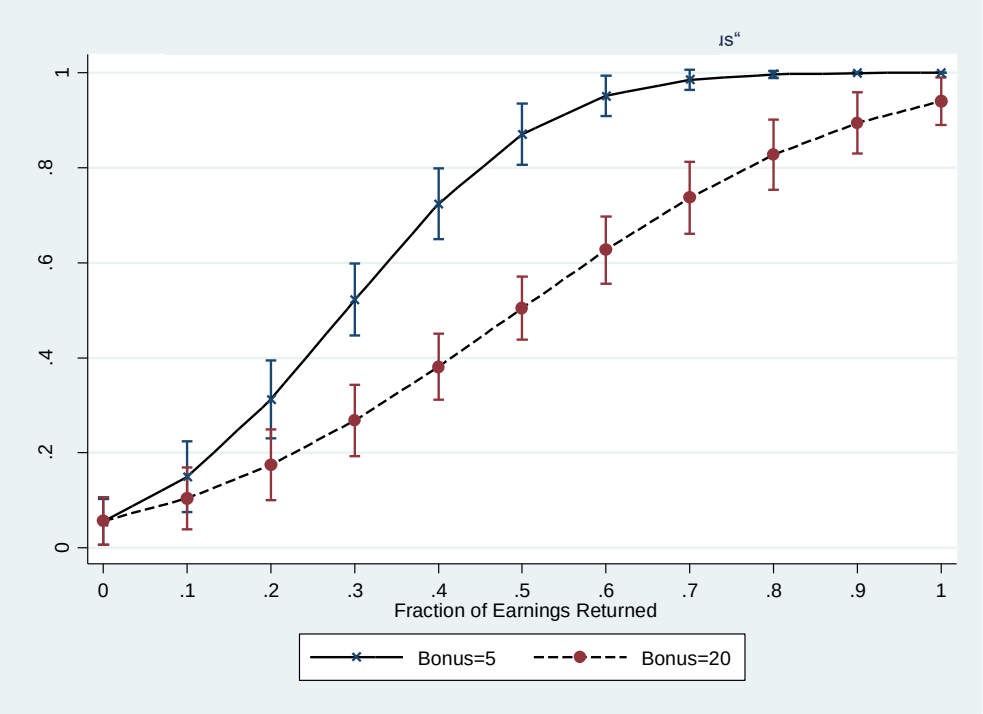
effects[16]. I use the linear regression model with robust standard errors rather than probit model, given that linear probability models produce very similar results to probit in absence of endogenous variables. According to it, S is 51 percentage points more likely to transfer B if the earnings of S are greater or equal than 10 ECU, i.e. S recovers or get positive return on sending X. Since one could expect that S's decision on transferring B may differ between two Treatments, I also run a model to account for it. As a result, according to model (2) in Table 4.7, the probability of S transferring B of 5 ECU increases by 60 percentage points if his/her earnings are not less than 10 ECU, whereas the probability of transferring B of 20 ECU increases by 43 percentage points. While this difference suggests that S expects to get a higher return when B is 20 ECU, the coefficients related to Bonus 20 binary variable and its interaction are not significant.

Another way to explain why S transfers B is to assume that the higher the proportion of the current earnings (3X) R returns to S, the higher the probability of S transferring him/her B. Accordingly, I employ the proportion of R's earnings s/he transfers back to S (Y/3X), which is typically considered in the trust literature as a measure of R's trustworthiness, as a regressor. The results from the model (3) in Table 4.7 indicate that 1 percentage point increase in the fraction of ECU transferred back by R leads on average to 1.44 percentage point increase in probability of getting B of 5 ECU and to 0.83 percentage points point increase in the probability of getting B of 20 ECU. Specifically, this model predicts that the probability that B of 5 ECU is transferred by S is 58 percent vs. 42 percent when B is 20 ECU when R returns to S exactly one third of his earning, thereby making

[16] The sample excludes observations when S transfers 0 ECU to R.

S's earning 10 ECU. As opposed to the model (2), the interaction between Bonus 20 binary variable and the fraction of R's earnings sent back is highly statistically significant.

Figure 4.5. Predicted Probability and Sender Transfers Bonus given a Fraction of Receiver's Earnings Returned



One of the shortcomings of the linear probability model is observed when R returns a high share of his/her earnings – in such a case the estimated probability of transferring B largely exceeds 100%. For instance, when R returns two thirds of his/her earnings, S is expected to transfer B with the estimated probability of 106%. As a result, I run the same regression specification using probit, the results of which are shown in model (4) of Table 4.7. Based on this model, I present in Figure 4.5 the predicted probabilities for different fractions of R's earnings returned. I do this as probit coefficients are difficult to interpret and reporting marginal effects for interactions is not feasible. According to Figure 4.5, returning exactly the same amount that was sent in the first stage, i.e. fraction of R's

earnings returned is 0.333, makes S to transfer B with a probability of 59% and 30% when B equals 5 and 20 ECU, respectively. Such a behavior of S is not in line with altruistic motives. As highlighted before, altruistically driven S is expected to transfer B as it increases the payoff of R without affecting S's payoff.

Table 4.8. Determinants of Transferring Bonus

Dependent Variable: Bonus Paid	Coef.	*t*	Prob. > |t|
Bonus (B):			
20	0.57	1.04	0.30
Amount Sent (X):			
5	-0.32	-0.53	0.60
7.5	-5.89	-1.44	0.15
10	0.69	1.59	0.11
(B) x (X):			
(20) x (5)	-0.48	-0.54	0.59
(20) x (7.5)	4.45	1.06	0.29
(20) x (10)	-0.90	-1.3	0.19
Fraction of Receiver's Earnings Returned	5.50	5.92	0.00
(B) x (Fraction of Receiver's Earnings Returned):	-3.79	-3.38	0.00
20			
(X) x (Fraction of Receiver's Earnings Returned):			
5	2.08	0.99	0.32
7.5	12.73	1.29	0.19
10	-1.97	-1.52	0.13
(X) x (B) x (Fraction of Receiver's Earnings Returned):			
(20) x (5)	-0.38	-0.16	0.88
(20) x (7.5)	-9.69	-0.97	0.33
(20) x (10)	3.59	2.21	0.03
N	455		

I also consider a model that adds the Amount Sent (X) in the model (4) of Table 4.7, conjecturing that it is likely to expect heterogeneous effects on the outcome variable depending on the value of X. Since X is constrained to 2.5, 5, 7.5 and 10 ECU, I estimate

a saturated probit model by calculating a separate parameter for 3 latter values[17] and also interact them with Bonus 20 binary variable, and a continuous variable Fraction of Receivers Earnings Returned. This model is presented in Table 4.8. It shows that most interaction terms, along with the coefficients related to different levels of X, are not significant individually. However, the coefficient related to different levels of X are jointly significant at the 10% significance level. Using the saturated model, I estimate an expected implicit return in absolute and relative terms from sending X that generates an expected probability of transferring B of 80% and provide the results in Table 4.9. One can notice that S expects different returns depending on the treatment level and X. For instance, when B equals 20 ECU, the expected rate of return rate, indicated in the last two columns in Table 4.9 declines as X increases. By contrast, the expected rate of return is positively associated with X when B equals 5 ECU.

Table 4.9. Expected Rate of Return on "Investment" (X) that Generates 80% Probability of Getting Bonus Transferred Given Different Amounts Sent (X) and Treatment:

Amount Sent (X)	Difference between Amounts Received and Sent		Fraction of Receiver's Earnings Returned		Implicit Rate of Return on X	
	Bonus = 5	Bonus = 20	Bonus = 5	Bonus = 20	Bonus = 5	Bonus = 20
2.5	0.9	5.4	1.36	3.16	36%	216%
5	0.8	6.6	1.16	2.32	16%	132%
7.5	5.8	9.3	1.77	2.24	77%	124%
10	7.8	10	1.78	2.00	78%	100%

Rather than concentrating on the implicit rate of return, it is worthwhile to calculate subjects' relevant expected payoff based on Table 4.9 and translate them into subjects' relevant shares of the total surplus. Using the payoff functions (1) and (2), I calculate the

[17] 2.5 ECU is a reference group.

total surplus shares when R returns Y such that it makes the probability of having B transferred 80% and present them in Table 4.10[18]. It is interesting to observe that the expected shares of the total surplus are very close to being equal when X is 7.5 and 10 ECU. Such a fair distribution of the total surplus can signal about the existence of other-regarding preferences such as equity based fairness.

Table 4.10. Expected Shares of Total Surplus when R Returns Y Such That It Makes the Probability of Getting Bonus Transferred 80%:

Amount Sent (X)	Bonus = 5		Bonus = 20	
2.5	30%	70%	34%	66%
5	31%	69%	37%	63%
7.5	50%	50%	44%	56%
10	52%	48%	43%	57%

4.5.5.2 The Bonus transfer and equity based fairness

I apply the fairness theory introduced by Ferh and Schmidt (1999) to the modified trust game with B, assuming that S may transfer B trying to achieve more equal distribution of the payoffs between him/her and R. This implies that there are subjects whose utility will diminish if they observe inequitable outcomes. In such a case, I conjecture that S transfers B if it makes the players' payoffs more equal than if B is not transferred. In other words, S uses the discretion over transferring B to minimize the difference in payoffs in the following model:

$$G_i = \alpha \max |P_{Ri} - P_{Sj}, 0| + \beta \max |P_{Sj} - P_{Ri}, 0|, \quad (4)$$

[18] Since B is transferred with 80% probability, an expected value of B is added the payoff of R.

where P_S and P_R denote payoffs of S and R, respectively, *before the last stage of the game starts when S chooses transferring B or not*; and G_i is a dichotomous variable that equals one if i^{th} S transfers B, and zero otherwise. Accordingly, I use the difference between the earnings of R and S that does not include B in equation (4). When the difference is positive it means that the R's second stage earnings are greater than those of S, and transferring B would further increase the differential. Naturally, in such a case, S, driven by equity-based fairness, does not transfer B since doing so would exacerbate the difference in the payoffs. This idea has weak preliminary support from Figure 4.2, where one can observe that B of 5 ECU is transferred most frequently (67 percent of times) when the amount sent (X) is zero, which leads to the reduction of the difference between S's and R's payoffs from 10 to 5 ECU. The results from equation (4) are provided in Table 4.11, which shows that the positive difference between R's and S's current earnings of 1 ECU reduces the probability that S transfers B by 1.7 percentage points, while the negative difference between R's and S's earnings of 1 ECU increases the probability of S transferring B by 2.5 percentage points.

When the difference between R's and S' earnings is negative, it also is justified to factor in a situation when equity-driven S transfers B to R only if the R's earnings after the last stage of the game, i.e. including the value of B, generates the difference with S's earnings of less magnitude in absolute terms than it is without B. Therefore, I break down "Negative difference between 2nd stage R's and S's earnings (NEG)" into two categories: i) when the negative difference between the 2nd stage R's and S's earnings , measured by β_1 in equation (5), remains negative after B is added to 2nd stage, and ii) when the negative

difference between 2nd stage R's and S's earnings, measured by β_2 in model (5), is positive after B is added to the 2nd stage R's earnings:

$$G_i = \alpha_1 \max |P_R - P_S, 0| + \beta_1 \max |P_S - P_R, 0| * D_1 + \beta_2 \max |P_S - P_R, 0| * (1-D_1), \quad (5)$$

where D_1 is a dummy variable which equals one when the negative difference between the second stage R's and S's earnings remains negative if B is added to it, and zero otherwise. The results presented in the second column of Table 4.11 and based on model (5) and show that the difference between coefficients β_1 and β_2 is nine percentage points, which is statistically significant. It suggests that S does differentiate if transferring B makes R's earnings greater than S's earnings or not.

Table 4.11. Relationship between Transfer of Bonus and Treatment from Fairness Perspective

	Model (1)	Model (2)
Dependent Variable: Bonus Transferred	Coef. (Prob. > |t|)	Coef. (Prob. > |t|)
Positive difference between 2nd stage R's and S's earnings (POS)	-0.017 (0.00)	-0.020 (0.00)
Negative difference between 2nd stage R's and S's earnings (NEG) [19]	0.025 (0.00)	
Negative difference between 2nd stage R's and S's earnings remains negative if B is added to 2nd stage Receiver's earnings (β_1)		0.025 (0.00)
Negative difference between 2nd stage R's and S's earnings is positive if B is added to 2nd stage R's earnings (β_2)		0.016 (0.01)
Constant	0.49 (0.00)	0.54 (0.00)
N	520	520
individual fixed effects significance (Prob. > F)	(0.000)	(0.000)

[19] An absolute value of the "Negative difference between 2nd stage Receiver's and Sender's earnings (NEG)" is used in the regression

Having shown that both self and other-regarding preferences may play role in influencing Ss' decision with respect to transferring B, I do not attempt to estimate both in one model given the structure of the experiment.

4.5.6 Adjustments in participant's behavior

It is very likely to expect that players adjust their behavior based on the outcomes of previously played rounds of the experiment. Indeed, Schotter and Sopher (2006) showed that subjects react to "intergenerational" advice with respect to amount sent and received in conventional trust games. Figure 4.6 contains the plot of fitted and actual mean earnings of Ss and Rs and the amounts sent by the experiment's period (or game number). One can see that while the Ss' expected earnings decline over time very mildly, the Rs' expected payoff drops quite significantly.

The adjustment in subjects' behavior over time is more pronounced in the Baseline games according to Figure 4.7, which shows mean period earnings of Ss and Rs vs. the experiment's period for each Treatment. It is known from the existing literature on one-shot trust games that Ss transfer statistically positive amounts, although it leads on average to negative returns for them, i.e. their payoff becomes less than the original endowment. Figure 4.7 provides evidence that in the long run, Ss adjust their behavior such that their expected earnings are greater than those of Rs in the Baseline games. In other words, self-regarding preferences become more dominant among Ss in the long run.

Figure 4.6. Average Amount Sent, Earnings of Senders and Receivers by Period of the Experiment

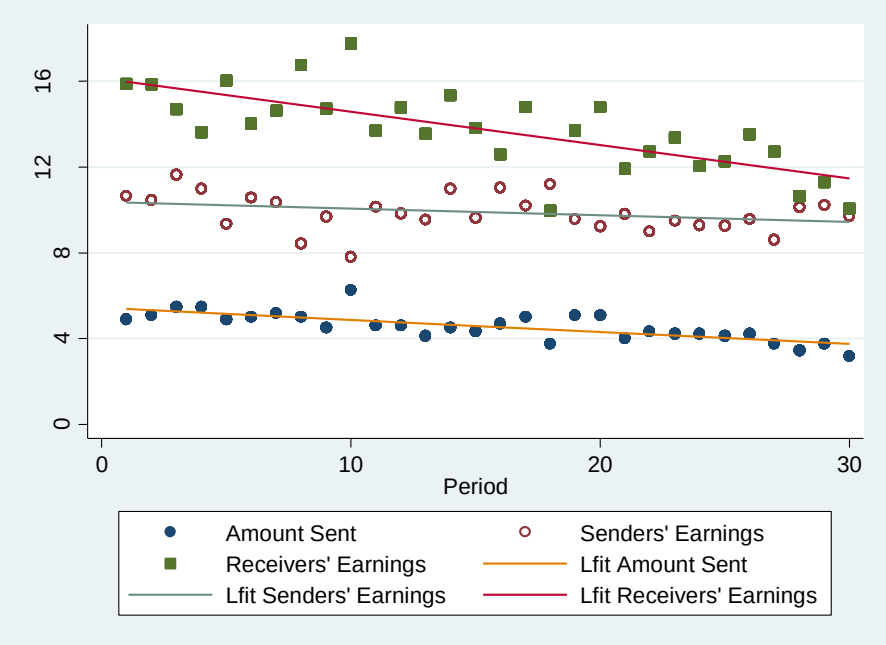
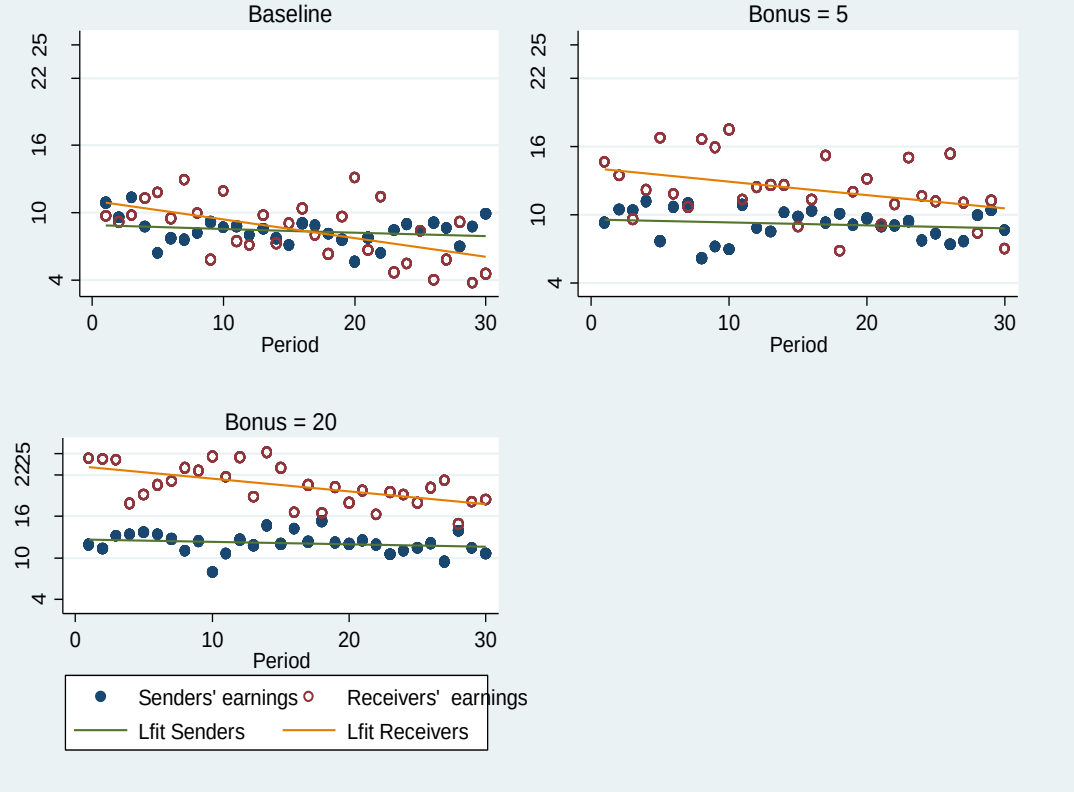


Figure 4.7. Average Earnings of Senders and Receivers by Period of the Experiment



4.6 Conclusion

I refine the "trust (or investment) game" by Berg et al (1995) by adding a stage, in which a Sender (S) has the ability of transferring a bonus (B) to a Receiver (R) at no cost to himself. Theoretical predictions suggest that different amounts of B should affect the behavior of S and R in terms of amount sent (X) and returned (Y). However, given that the SPNE is characterized by a wide range of X and Y, it is difficult to predict the outcomes of the experiment. Therefore, collecting and analyzing experimental evidence can provide interesting insights.

I discover that increasing the value of B leads to more efficient outcomes in terms of the total surplus. The experiment provides evidence that S sends greater amounts of X when B increases. It implies that S predicts that R forms a prediction that B is transferred upon return of some amount back greater than X. B is also positively associated with the fraction of the R's earnings, given a fixed amount of X, thereby providing greater return on sending X. At the same time, I also find evidence of the existence of Ss' other-regarding preferences in terms of equity-based fairness. Unfortunately, disentangling self- and other-regarding preferences appears to be rather challenging given the structure of the experiment, and is, therefore, is not performed.

Appendix A: Polychoric Principal Component Analysis

Principal component analysis was extensively used by empirical economists for constructing proxies for household welfare. For instance, Hammer (1998), Filmer and Pritchett (2001), Vyas and Kumaranayake (2006) constructed an asset index using this approach. The index is derived from a linear combination of different types of assets multiplied by estimated weights. The weights are derived from the standardized first principal component of the variance-covariance matrix of the household assets. The reason for devising an alternative to household income and consumption expenditure is related to the difficulties of obtaining their measurement in developing countries. With respect to the household assets, they are more easily directly observable by enumerators and less likely misreported by the survey respondents. Thus, asset-based indices may be considered a viable alternative or complement to the traditional metrics of household welfare.

The same approach is often followed for handing variables with multiple categories describing different socioeconomic individual or household characteristics, by generating a set of indicator variables. In this case, the use of the conventional CPS is questionable since it assumes operating with variables with multivariate normal distribution. Kolenikov and Angeles (2009) address this issue by assuming unobserved normally distributed continuous variables underlying observed discrete variable, estimating the correlation matrix of the unobserved variables and applying the PCA to the matrix.

There are several advantages from employing the polychoric PCA. First, there are efficiency gains associated with accounting the ordinal nature of the data. In addition, it allows avoiding possible spurious correlation stemming from negative correlation of the indicator variables obtained from a categorical variable. Third, using maximum likelihood

estimation to estimate variable weights is more efficient than the conventional PCA approach of averaging contributions of categorical variables to principal components. As a result, these polychoric PCA improvements lead to explaining higher proportion of the variance in the first principal component when compared with the conventional PCA.

Wealth index

The measure of the wealth index is derived from the reported availability of household assets. The computation is carried out by employing polychoric principal component analysis. The selection of variable for the PCA is dictated by two factors. Preference is given to the variables with a greater number of observations and contributing the most variation to the first principal component compared to variables that add less or no new information to the variation. For the wealth index, the following types of assets lead to attainment of 63 percent of variance explained by the first components:

car,

air conditioner,

washing machine,

personal computer

access to internet.

The raw wealth index ranges from -0.875 to 2.985. I rescale it to range from 0 to 1 and report the descriptive statistics in Table 4.1 and Appendix E. A higher value of the index is indicative of greater household wealth.

Appendix B: Estimated Marginal Effects of the Gender Attitude Index Equation

	Two-step control function
Communist parent	-0.040*
	(0.021)
Religiosity	0.022***
	(0.002)
Professional education, mother	-0.022
	(0.013)
Higher level education, mother	-0.045***
	(0.016)
Professional education, father	-0.035***
	(0.013)
Higher level education, father	0.002
	(0.017)
Risk taking	-0.004*
	(0.002)
Farm	0.011
	(0.010)
Kyrgyz	-0.001
	(0.024)
ρ	0.866***
	(0.027)
Time FE	YES
Region FE	YES
N	4,976

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$;
robust standard errors are reported; intercept, year and community fixed effects are not reported.

Appendix C: Estimated Coefficients from the Female LFP Equation

	Bivariate probit	Switching probit, conservative=1	Switching probit, conservative=0
Conservative (dummy)	-1.205		
	(0.175)***		
Education:			
Primary technical	0.285	0.179	0.388
	(0.123)**	(0.163)	(0.172)**
Secondary technical	0.404	0.250	0.511
	(0.063)***	(0.082)***	(0.086)***
Higher	0.602	0.539	0.612
	(0.065)***	(0.094)***	(0.085)***
Wealth index	0.084	0.029	0.151
	(0.093)	(0.122)	(0.129)
Progressiveness index	-0.068	-0.144	0.001
	(0.051)	(0.066)**	(0.073)
Risk taking	-0.006	-0.025	0.012
	(0.009)	(0.011)**	(0.012)
Illness	-0.149	-0.212	-0.061
	(0.037)***	(0.051)***	(0.053)
Migrant household	0.039	0.113	-0.035
	(0.054)	(0.065)*	(0.081)
Farm	0.246	0.313	0.159
	(0.043)***	(0.056)***	(0.062)***
Kyrgyz	-0.032	-0.025	-0.040
	(0.042)	(0.053)	(0.061)
Married	-0.464	-0.424	-0.470
	(0.051)***	(0.074)***	(0.068)***
Children under 7	-0.182	-0.186	-0.169
	(0.021)***	(0.026)***	(0.030)***
Number of adults	0.019	0.028	0.008
	(0.011)*	(0.015)*	(0.016)
Age	0.192	0.141	0.229
	(0.015)***	(0.018)***	(0.023)***
Age squared/100	-0.236	-0.173	-0.281
	(0.)***	(0.023)***	(0.028)***
ρ	0.632	0.825	0.541
	(0.121)***	(0.103)***	(0.188)***
Time FE	YES	YES	YES
Region FE	YES	YES	YES
N	4,976	2,334	2,642

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.0$. Robust standard errors are reported; intercept, year and community fixed effects are not reported.

Appendix D: Estimated Coefficients and Marginal Effects from the Conservative Equation, Semiparametric Switching Probit

	Coeff.	ME
Religiosity		
Communist parent	-0.241	-0.015
	(0.391)	
Professional education, mother	-0.186	-0.012
	(0.242)	
Higher level education, mother	-2.113***	-0.103***
	(0.386)	
Professional education, father	-0.395	-0.024
	(0.31)	
Higher level education, father	0.204	0.013
	(0.332)	
Risk taking	-0.359***	-0.022***
	(0.061)	
Farm	2.868***	0.227***
	(0.295)	
Kyrgyz	-1.388***	-0.099***
	(0.228)	
Time FE	YES	YES
Region FE	YES	YES
N	4,976	4,976

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).
Notes: * $p<0.1$; ** $p<0.05$; *** $p<0.01$;

Appendix E: Descriptive Statistics with Subsamples Divided by *conservative* Variable

	Full sample			conservative = 0		conservative = 1	
VARIABLES	mean	min	max	mean	se	mean	se
LFP	0.500	0	1	0.564	0.010	0.428	0.010
Gender attitude index	0.495	0	1	0.316	0.004	0.697	0.005
Wealth index	0.148	0	1	0.163	0.004	0.132	0.004
Progressiveness index	0.377	0	1	0.376	0.007	0.379	0.007
Risk taking	3.438	0	10	3.599	0.049	3.256	0.046
Illness	0.610	0	1	0.630	0.009	0.586	0.010
Education Level:							
High school or below	0.691	0	1	0.631	0.009	0.758	0.009
Primary Technical	0.020	0	1	0.023	0.003	0.016	0.003
Secondary Technical	0.111	0	1	0.131	0.007	0.089	0.006
Higher School	0.178	0	1	0.215	0.008	0.137	0.007
Age	39.44	18	65	39.16	0.257	39.76	0.276
Married	0.715	0	1	0.673	0.009	0.762	0.009
Kyrgyz	0.678	0	1	0.696	0.009	0.657	0.010
Migrants household	0.135	0	1	0.125	0.006	0.146	0.007
Adults in HH	3.990	0	11	3.905	0.035	4.087	0.037
Children under 7	0.944	0	6	0.903	0.022	0.990	0.023
Farm	0.314	0	1	0.298	0.008	0.332	0.010
Exogenous restrictions:							
Communist parent	0.025	0	1	0.028	0.003	0.020	0.003
Time for religious practice (hours)	0.507	0	12	0.305	0.023	0.735	0.040
High school or below, mother	0.745	0	1	0.710	0.008	0.784	0.009
Professional school, mother	0.148	0	1	0.161	0.007	0.134	0.007
Higher School, mother	0.107	0	1	0.129	0.007	0.081	0.006
High school or below, father	0.766	0	1	0.735	0.009	0.802	0.008
Professional school, father	0.142	0	1	0.158	0.007	0.123	0.007
Higher School, father	0.092	0	1	0.107	0.006	0.075	0.005
N				2,642		2,334	

Source: Author's calculation from Kyrgyzstan data (Brück et. al., 2014).

Appendix F: Accounting for Bias due to Unobserved Variables

Suppose that the model is estimated as:

$$Y_i = \alpha_1 K_i + \alpha_2 Z_i + \varepsilon_i, \quad (3)$$

where Y_i represents male wedding expenditure, K_i equals one if the household has at least one household member reporting of bride kidnapping as a way of her marriage formation and Z_i is a vector of household and individual (groom) characteristics. The coefficient of interest, α_1, is reported in model (1), Table 4.5. However, it suffers from omitted variable bias when some or all variables pertaining to Z_i are not observed. In the latter case, the estimated coefficient of interest can be broken down into two parts:

$$\text{plim } \alpha_{1,\widehat{OLS,NC}} = \alpha_1 + \alpha_2 \frac{\text{cov}(K,Z)}{\text{var}(K)}, \quad (4)$$

where plim $\alpha_{1,\widehat{OLS,NC}}$ is the OLS estimate of α_1 without controls. In case, when Z_i is captured by variables X_i that are observed and unobserved variables q_i, then equation (4) can be written as:

$$Y_i = \alpha_1 K_i + \alpha_2 X_i + \alpha_2 q_i + \varepsilon_i,$$

where variables related to q_i are not observed. As a result, α_1 is estimated as:

$$\text{plim } \alpha_{1,\widehat{OLS,C}} = \alpha_1 + \alpha_2 \frac{\text{cov}(K,q)}{\text{var}(K)}, \quad (5)$$

where plim $\alpha_{1,\widehat{OLS,C}}$ is the OLS estimate of α_1 when estimated regression model includes X_i. Taking the difference between α_1 without and with controls results in the following:

$$\alpha_{1,\widehat{OLS,NC}} - \alpha_{1,\widehat{OLS,C}} = \alpha_2 \frac{\text{cov}(K,X)}{\text{var}(K)}. \quad (6)$$

This allows obtaining the ratio of covariances, normalizing α_1 to zero:

$$\frac{\alpha_{1,\widehat{OLS,C}}}{\alpha_{1,\widehat{OLS,NC}} - \alpha_{1,\widehat{OLS,C}}} = \frac{\text{cov}(K,q)}{\text{cov}(K,X)}.$$

Appendix G: Experimental Instructions[20]

Introduction

You are about to participate in an experiment in the economics of decision making. Various research foundations have provided the funding for this research. The research is designed to study how people make decisions when facing uncertainty. At the end of the experiment you will be paid for your participation, as outlined below.

Instruction for the participants of the experiment:

In this economic experiment, you will play **30 rounds (games)**. In the first round, you will be randomly assigned one of two roles: **Sender or Receiver**. You will keep the assigned role till the end of the experiment.

Each round, you will be randomly paired with a player that has a different role than yours. For instance, if you are Receiver, each round you will be randomly paired with a Sender. You will not be told the identity of other participants neither during nor after the experiment. There is also no opportunity of communication between the participants. The Sender starts with 10 Units of Experimental Currency (ECU) each round (game), which can be used during the game according to the below instructions. Also, each Sender will be able to grant a **Bonus** to the Receiver at the end of each round

[20] The experimental instructions are primarily based on Butler (2008).

(game). The value of the Bonus will vary from round to round . The **Receiver** does not have an endowment. The following are **sequential stages of each round/game**:

A. Stage 1: Sender

The Sender may choose to transfer 0, 2.5, 5, 7.5 or 10 ECU of his money to the Receiver. The amount chosen by the Sender will **be tripled** and given to the Receiver. For example, if the Sender decides to send 5 ECU, then the Receiver gets 15 ECU. Naturally, the amount the Sender decides to transfer to the Receiver is deducted from his initial endowment of 10 ECU.

At the same time, the Sender learns the amount of **Bonus**, denoted here as Z, which the Sender will have to decide to transfer to the Receiver or not in the last stage of each round. Note that the decision to transfer the bonus or not to do so **does not change the earnings of the Sender**. In other words, if the Sender decides not to transfer the Bonus to the Receiver, the value of the Bonus does not increase the earnings of the Sender. Note that in some rounds the value of Bonus may be just zero.

To better understand the instruction, **you may find it helpful to review the attachment to the instruction, which contains an example with the screenshots of each stage of the game with additional explanations**.

B. Stage 2: Receiver

The Receiver, will be able to send back to the Sender an amount not greater than his/her current wealth after observing:

i) how much money was transferred to him or her from the Sender;

ii) how much is his current wealth, and;

iii) the amount of Bonus, that the Sender will have to decide to transfer to the Receiver or not in the last stage of the current round/game.

C. Stage 3: Sender

This is the final stage of the round. The Sender learns the amount the Receiver sent back to him and has to **decide whether to transfer the Bonus to the Receiver or not.**

D. Earnings:

At the end of each round, every participant is informed about his **current earnings** and the current earnings of the participant paired with him. The current earnings will be calculated each round according to the following formula:

The Sender earns: 10 ECU - (ECU sent to Receiver) + (ECU sent back by Receiver);

The Receiver earns: 3*(ECU sent by Sender) - (ECU sent back to Sender) + (0 or Z ECU)

At the end of the experiment, the amount of ECU accumulated by each participant will be converted to US dollars at the rate $4.5 for 100 ECU, and paid to each participant.

Note that each round Sender and Receiver and start with initial endowments of 10 ECU and 0 ECU, and they are not allowed to use accumulated earnings from previous rounds

Summary:

In the experiment you will be randomly paired with other participants to play 30 rounds of the game. You will be randomly designated as either Sender or Receiver. You will make decisions in terms of transferring money to an anonymous and randomly picked participant, which may increase or decrease your earnings. Whether you are successful in increasing earning will depend both upon the decisions that you and the person you are paired with make.

After you finished reading the instruction and the attachment to it, and you have a question, please raise your hand.

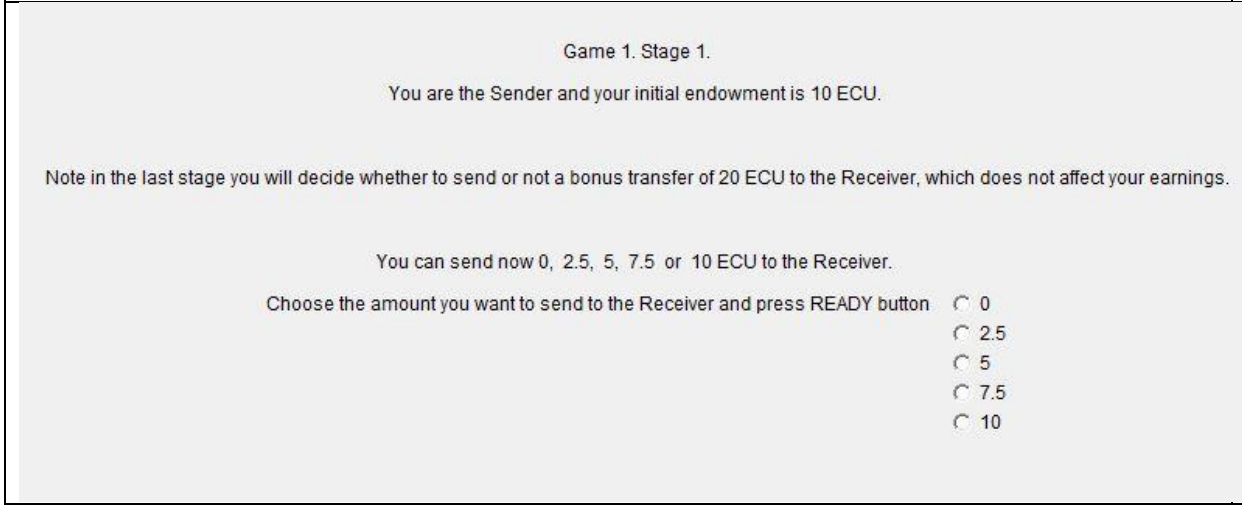
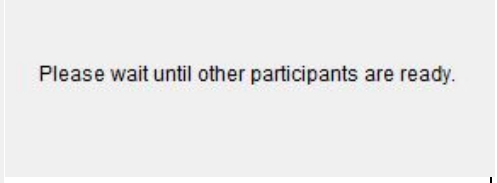
Attachment to the experimental instruction:

Let us consider an example, when the size of the Bonus is 20 ECU in first round (game) and

1. During the **First stage**, the Sender decides to send 5 ECU to the Receiver;
2. During the **Second stage**, the Receiver decides to return 4 ECU to the Sender;
3. During the **Third stage**, the Sender decides not to transfer the Bonus of 20 ECU to the Receiver;

Below you can see the screenshots of each stage for both **Sender (see left hand side)** and **Receiver (see right hand side):**

FIRST STAGE SCREENSHOTS

In the **first stage**, the **Sender** observes the following information on the screen:	Note that during **the first stage**, all the **Receivers** observe the following screen, while all the Senders are making decisions about how much ECU to send:
	

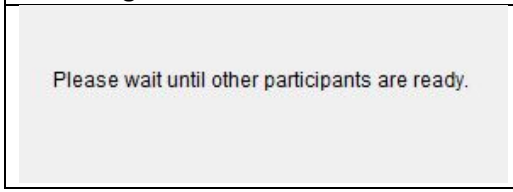
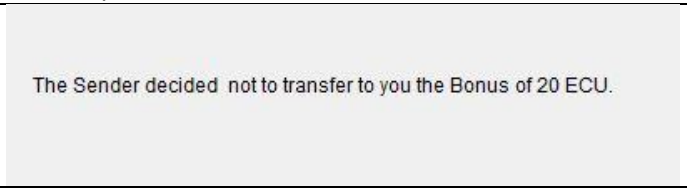
SECOND STAGE SCREENSHOTS (assuming that Sender transferred 5 ECU in the 1st stage)

Note that during **the second stage**, all the **Senders** observe the following screen, while all the Receivers are making decisions about how much ECU to send back:	In the **second stage**, the **Receiver**, who is randomly paired with the Sender, observes the following information on the screen:
Please wait until other participants are ready.	Game 1. Stage 2. You are the Receiver. The Sender transfered to you 5.0 ECU, so that you received 15.0 ECU. As a result, your current wealth is 15.0 ECU. while the Sender's current wealth is 5.0 ECU. Note that in the last stage the Sender will decide whether to send or not a bonus of 20 ECU to you, which does not affect his earnings. Choose any amount not exceeding 15.0 ECU that you would like to send back to the Sender and press READY (if your current wealth is 0, please enter 0):

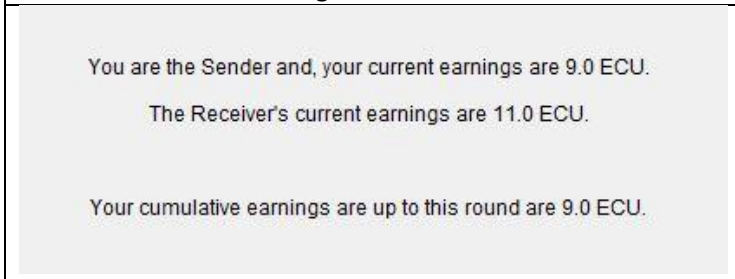
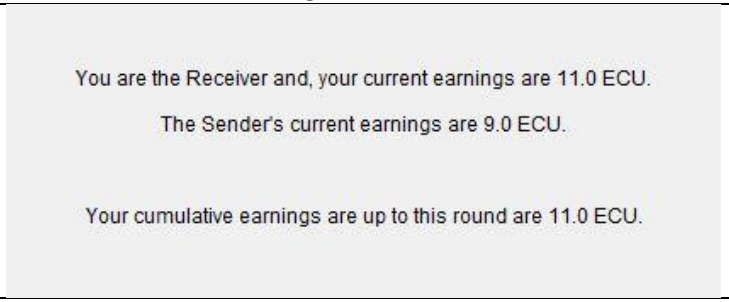
THIRD STAGE SCREENSHOTS (assuming that Receiver sent back 4 ECU in the 2st stage)

In the **third stage**, the **Sender** observes on the screen the following information: - the amount he transferred to the Receiver, - the amount the Receiver transferred back to him; - his current wealth and the current wealth of the Receiver	Note that during **the 3d stage**, all the **Receivers** observe the following screen, while all the Senders are making decisions to transfer the Bonus or not:
Game 1. Stage 3. You transfered 5.0 ECU to the Receiver. As a result, the Receiver ended up getting 15.0 ECU. The Receiver sent back to you 4.0 ECU. As a result, your current wealth is 9.0 ECU. while the Receiver's current wealth is 11.0 ECU. Would you like to transfer a bonus of 20 ECU to the Receiver? YES NO	Please wait until other participants are ready.

OUTCOME OF THE THIRD STAGE SCREENSHOTS (assuming that the Sender decided not to transfer the Bonus to the Receiver)

The **Sender** observes the following screen while the Receiver is observing information about the Sender's decision:	The **Receiver** observes the outcome of the decision of the Sender in the current pair:
	

OUTCOME OF THE CURRENT GAME SCREENSHOTS

At the end of each round (game), the **Sender** is updated about the outcomes of the current game:	At the end of each round (game), the **Receiver** is updated about the outcomes of the current game:
	

Note in the above example, as the participants played only once, the cumulative earnings of each participant are equal to the current earnings. As the experiment proceeds, the cumulative earnings will sum up all previous earnings. For instance, at the end of the second game, cumulative earnings will represent the sum of the earnings of the first and second games.

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