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Facing a changing labour force in China: Determinants of trust and reciprocity in an experimental labour market

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Abstract

Due to economic and demographic changes highly educated women are increasingly important for the Chinese labour market. Gender is a well-studied determinant of behaviour in economic experiments, as are similarly academic major, age and income. We study determinants of trust and reciprocity for Chinese subjects in a labour market experiment using two variants of a gift exchange framework with employers and workers. We find that women are significantly less trusting and less reciprocal in one game variant while this relationship is only clear for reciprocity in the other variant.

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1. Introduction

Economic growth together with the one child policy are changing the labour market in China with growing demand for skilled labour, increasing the importance of women in the labour force (Zhang *et al.*, 2012). Furthermore, more educated women are entering the labour force, as education of children does not focus on boys any more – parental investments go to one child independent of its gender, while traditionally parents invested primarily in males. Understanding the role of gender on the market for skilled labour in China is hence increasingly important.

Many economic experiments have investigated gender differences in labour market decisions. Croson and Gneezy (2009) provide a comprehensive survey. However, most experiments were conducted in Western countries and less is known about applicability to China. As gender differences are based on genetic but also cultural factors, it is necessary to study them within culture. Furthermore, Song *et al.* (2012) argue that trust and reciprocity, which matter in labour relations, may be different in China due to *guanxi* (the importance of social connections). In this paper we use Chinese subjects, focussing on trust, reciprocity and risk-taking in an experimental labour market. We add to existing research that addresses gender differences in trust and reciprocity in China indicating that females are less trusting and potentially less reciprocal (Wang and Yamagishi, 2005; Song *et al.*, 2012; Shen and Qin, 2014).

We find that women are less trusting. Lower willingness to create social benefit and be reciprocal, rather than risk attitudes, drives this result, although both may have a joint effect. We also investigate other individual characteristics (age, academic major, employment status and income), connecting existing research on these variables to our results from China.

2. Literature and hypothesis

Gender is probably the best studied determinant of decisions in economic experiments. Eckel and Grossman (2008) and Croson and Gneezy (2009) summarise experimental evidence on gender differences in behaviour that involves risk attitudes and social preferences. They conclude that differences between decisions of men and women are observable in some cases while not in others. The picture is particularly mixed for social preferences, with no or vanishing differences based on gender, showing tendencies of lower trust and higher reciprocation by women. Croson and Gneezy (2009) also describe that women are often more risk averse than men. Due to these mixed results research on gender differences continues (see e.g. the special issue of *Journal of Economic Behavior and Organisation* 83(1) in 2012).

Also other determinants of experimental decisions have been studied, although not as extensively as gender. Age has been related to risk attitudes (e.g. Harbaugh *et al.*, 2002) and social preferences (e.g. Martinsson *et al.*, 2011; Sutter and Kocher, 2007; Charness and Villeval, 2009). Pro-social behaviour increases with age, but changes are gradual with differences between cohorts or generations. Also academic major has been linked to pro-social behaviour. Marwell and Ames (1981) observed that economists are often more selfish and their results have been confirmed by further studies (Carter and Irons, 1991; Frank *et al.*, 1993; Dasgupta and Menon, 2011). We study gender but include academic major and age as controls. We also consider other variables which may be important for experimental decisions and discuss these below.

We hypothesise similar effects of gender and other demographic controls in our experiment. However, decision patterns of students in China may differ from those found elsewhere. Bu and McKeen (2001) provide evidence that social behaviour may be different in China, especially in working environments. Wang and Yamagishi (2005) find that Chinese women are less trusting when engaging in social relationships requiring reciprocal counterparts. Also Shen and Qin (2014) find that women are less trusting in experiments across 4 regions in China, but find no significant differences in trustworthiness. We therefore hypothesise women to be less trusting than men, while recognising that gender differences might be context-dependent.

3. Experimental design

We used the gift exchange game (GEG, as introduced by Fehr *et al.*, 1993) and the wage promising game (WPG, a GEG variant introduced in Dulleck *et al.*, 2012). In both games participants are employers or workers. The employer first makes a wage offer (WO=[5,10,...,100]) to the worker who can accept or reject it. If the worker rejects, the game ends and both employer and worker receive 60 experimental dollars. If the worker accepts, he has to choose an effort (E=[1,2,...,10]). In the GEG the game ends at this point and both players get paid based on the payoff function (see below). In the WPG the employer observes the effort and determines the final wage (FW=[5,10,...,100]), which does not depend on the wage offer made previously. In both games the payoff functions are $\pi^{Employer}$=50–*wage*+20·E and π^{Worker}=50+*wage*–(6+4·E) experimental dollars, whereas the *wage* is the WO in the GEG and the FW in the WPG.

The games allow us to study trust and reciprocity. These games were used instead of the more general trust game (Berg *et al.*, 1995), as the GEG and WPG with the framing used here are more tailored to study labour market trust, which was the main interest of this study. In the GEG employers make high wage offers if they trust workers to return high effort and workers return high effort if they are reciprocal. In the WPG wage offers are non-binding; high efforts will only be chosen by workers who trust in employers to return high final wages; and final wages in reaction to effort imply that employers are reciprocal. If also wage offers play a significant role for final wages in the WPG, they are not pure cheap talk. Using the two games allows to observe what drives trust: Pro-social attitudes or expected reciprocation, as uncertainty about binding counterpart decisions is present for employers in the GEG, but not in the WPG, and for workers vice versa. Hence, comparing between the games allows to understand if risk or reciprocation explain behaviour.

The experiment was implemented in a computer laboratory using z-tree (Fischbacher, 2007) with 216 volunteer students (60% male, average age 20.63, 112 economics-related and 104 engineering-related students) at Southeast University in Nanjing in November 2010.[1] A labour market framing described the roles as employers and workers, and decisions as *wage offers*, *efforts* and *final wages*. Participants were randomly assigned the role of workers or employers at the beginning and remained in this role throughout the experiment. The experiment included 8 rounds of the GEG and 8 rounds of the WPG; the order of which game was played first was randomly changed between sessions to control for order effects. Participants received instructions for each game before the first round of each game (i.e., before rounds 1 and 9, respectively). Employer-worker pairs were rematched each round. 2 rounds of each game were randomly chosen for payment and experimental dollars were transformed to Chinese Yuan at a rate of 50:1 as announced at the beginning of the experiment; participants earned between 3 and 12 (on average around 8) Yuan for about one hour of participation. This compares to 7 to 8 Yuan paid per hour of student work opportunities on campus at the time of the experiment. The experiment was followed by a short experimental questionnaire, asking for gender, age, and other demographic information, job market experience, job attitudes, origin within China, income and expenditures, and trusting attitudes.

4. Experimental results

Participants played as employers or workers and in two different games, the GEG and the WPG. Decisions therefore depend on the role and the game. Wage offers, efforts and realised wages are significantly different between the games and therefore analysed separately.[2] We scrutinised results for game order effects (which we did not find) and further controls. We include controls if they were significant in any specification or if results in the literature indicated a potential relationship. Further robustness checks were made on the functional specification of the analysis (Tobit models instead of OLS).[3] We did not find any qualitative changes based on alternative specifications and report OLS results in the following. Regressions used standard errors clustered by individual (results are the same when clustering by session).

[1] Participants interacted in sessions with others that had similar majors than themselves but were not informed about this or other characteristics of their counterpart.

[2] Differences in *wage offers* and *realised wages* in the GEG come from the possibility of workers to decline wage offers.

[3] Structured models may reflect complex game dynamics, such as the rejection of offers.

Table 1: Determinants of decisions

	Wage offer (GEG) (1)	Wage offer (WPG) (2)	Final wage (WPG) (3)	Final wage (WPG) (4)	Effort (GEG) (5)	Effort (WPG) (6)
Female	-15.690**	-4.418	-10.374*	-8.754	-0.702**	-0.593
	(6.374)	(4.843)	(5.834)	(5.509)	(0.345)	(0.514)
Econ. student	-4.753	6.525	-4.604	-2.502	-0.511	0.154
	(6.640)	(5.365)	(6.436)	(5.766)	(0.381)	(0.502)
Age	-4.877**	-4.991**	-0.491	0.785	-0.010	-0.070
	(2.155)	(2.082)	(2.260)	(1.998)	(0.123)	(0.168)
Currently employed	17.885***	0.726	12.412*	13.093***	-0.340	-0.625
	(5.682)	(4.427)	(6.392)	(4.629)	(0.769)	(0.627)
Income	0.008**	-0.002	0.004	0.003	-0.000	-0.002**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.000)	(0.001)
Period	-1.600***	2.619***	0.602	-0.333	0.103***	-0.148***
	(0.554)	(0.404)	(0.473)	(0.535)	(0.032)	(0.046)
Wage offer				-0.035	0.072***	0.070***
				(0.098)	(0.004)	(0.005)
Effort				6.846***		
				(0.653)		
N	784	784	614	614	792	792
R^2	0.16	0.12	0.05	0.32	0.60	0.28

OLS regressions of employer (1)-(4) and worker (5)-(6) decisions. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level; standard errors are clustered by individual.

We start with describing employer decisions. Specifications (1)–(4) of Table 1 show determinants of binding wage offers in the GEG, non-binding wage offers in the WPG and final wages in the WPG. Potential determinants are gender, academic major, age, employment status, income and a time control (Period, to reflect developments over time). Our variable of interest is gender. Females are less trusting in the GEG, making significantly less generous wage offers to workers. Wage offers are lower by 27 percent ($\frac{16}{57}$, given the average wage offer of 57), an economically large difference. Female employers are hence less trusting. Comparing employer decisions across games indicates that risk attitudes might drive lower trust, as females' lower level of wage offers is mediated once the risky element is removed in the WPG and the wage can be determined after observing effort. Furthermore, females pay marginally lower wages in the WPG; however, the effect is not entirely robust as it becomes insignificant when controlling for efforts received.[4]

We also investigate other variables. There is no significant effect of academic major on decisions. Older employers are significantly less trusting in both games. Final wage decisions of the WPG are however not influenced by age. As age differences in our sample reflect relative age within a cohort, there is no straightforward interpretation and we refrain from speculation. Current employment has a significantly positive effect on binding wages, both for wage offers in the GEG and final wages in the WPG, but not for wage offers in the WPG. This indicates that job experience increases trust and reciprocity. We also control for income, which has a significantly positive effect on wage offers in the GEG, but not on other employer decisions. The size of the income coefficient (0.008) is noticeable (the standard deviation is 506). As parental transfers are the major source of income for most participants, this indicates that participants from higher-income families trust more. Wage offers decline over time in the GEG although it would be

[4]Insignificantly lower wage offers lead to lower efforts and insignificantly lower reciprocity to efforts jointly lead to lower final wages by females. Furthermore, when using a random-effects model for final wages corresponding to specifications (3) and (4) in order to account for individual heterogeneity, females pay significantly less in both cases. This supports the general notion that final wages by females are lower (though the gender effect is smaller than in the random-effects correspondent of specification (1)).

profitable for employers to increase their wage offers.[5] On the contrary, in the WPG wage offers increase over time, hence employers increasingly use (costless) wage offers to increase worker effort. For final wages in the WPG no time trend is observable. For this decision specification (4) describes two other factors, wage offers and received efforts, due to their potential importance. Wage offers were used as cheap talk, having no influence on final wages. However, employers positively reciprocate efforts and pay more than workers' extra cost of effort.[6]

We then analysed worker decisions. Columns (5) and (6) of Table 1 show potential determinants of efforts. Workers respond positively to wage offers and react to them in almost the same way in both games, although in the GEG wage offers are binding while they are not in the WPG. We considered the same determinants for workers as for employers. Females are less reciprocal in the GEG, while the difference is insignificant in the WPG.[7] This result indicates that female workers are significantly less reciprocal, but not significantly less trusting, which differs to findings for employers. We also investigate other potential determinants. There is no significant difference for academic major, age and employment status. Higher income is related to less trust in the WPG, while there is no significant difference in the GEG, the first of which is contrary to the finding in the analysis of employer choices. These results weaken the effects of other covariates observed for employer decisions, hence the role taken in the experiment may influence what drives trust and reciprocity. Finally, there is again a significant time trend. Workers are increasingly reciprocal in the GEG and decreasingly trusting in the WPG, which is consistent with time trends for employers.

Overall, and in line with the literature, we observe trust and reciprocity for both games and roles. We find significant gender differences in the GEG and a more mixed picture in the WPG. Our results suggest that females are both less trusting and less reciprocal: Comparisons across games for employers indicate that females are less trusting due to both risk attitudes and reciprocity: Gender differences in wage offers become smaller and insignificant when the risky element is removed, which highlights the role of risk attitudes. However, there is also some indication that females pay lower final wages in the WPG, which is due to gender differences in reciprocity. The importance of risk attitudes is, however, not further supported when looking at effort decisions, as introducing uncertainty for workers in the WPG does not increase gender differences. Also across the different decision variables gender differences are much less pronounced (mostly insignificant) in the WPG, indicating that the introduction of wage promises makes decisions of males and females more similar. Nevertheless, even in the WPG lower reciprocity of female employers (showing in overall lower final wages by employers) prevails. This result regarding gender differences in reciprocity is supported when looking at worker decisions. Female workers are less reciprocal, as they return significantly less in the GEG, but do not provide significantly different efforts when facing uncertainty in the WPG. This leaves a mixed picture, in which risk attitudes and reciprocity have a joint influence, and with lower reciprocity being a potentially greater driver of gender differences. Furthermore, the results indicate that the gender effect of risk attitudes and reciprocity may be influenced by the role taken in the experiment. While explaining this difference is speculative only with our data, our findings are in line with the general picture in the literature that women are more reactive to game-context and framing.

5. Conclusion

We find that some but not all findings of the experimental economic literature on gender differences are also visible in our Chinese sample. Females are less trusting than males in GEG decisions, with its direction and context-dependence being similar to findings in the West (Croson and Gneezy, 2009) and elsewhere in China (Wang and Yamagishi, 2005; Shen and Qin, 2014). However, we find only partial support that this lower trust is primarily driven by risk aversion. Rather reciprocity drives a good part of our results, as in both games females transfer less to their counterparts when making the last decision in a game.

[5]Increasing the wage offer by one unit (5) has an effect of $\Delta\pi^{Employer}$ = -5+0.07·5·20 = 2.2 given the coefficient of wage offers on effort (0.07) by workers (see columns (5) and (6) of Table 1).

[6]One extra unit of effort costs workers 4, but is reciprocated with 6.8 experimental dollars by employers.

[7]The effect is driven by the reaction of females to wage offers if using an interaction term together with the dummy variable for females or instead of the dummy variable.

Our results provide important insights about determinants of (labour market relevant) preferences in China. Understanding gender differences in labour relations is crucial, as China continues to grow, while its demographic structure is changing and likely to increasingly draw on an educated female workforce. Knowing about the behaviour of this workforce is therefore important. This paper is one step towards a better knowledge. For example, our results indicate that using more informal labour market relations may generally lead to more gift exchange and hence higher productivity. However, they also indicate that work environments in which gift exchange between employers and workers is central function less well with a predominantly female workforce, though gender differences are partly mediated when allowing for non-binding wage offers. This may require revised management styles for Western firms expanding to China and is informative for Chinese policy makers who consider to create labour markets in which (informal) gift exchange is substituted by more formal interaction.

References

Berg, J., J. Dickhaut and K. McCabe (1995) "Trust, Reciprocity, and Social History." *Games and Economic Behavior* **10**(1), 122–142.

Bu, N. and C. A. McKeen (2001) "Work goals among male and female business students in Canada and China: The effects of culture and gender." *International Journal of Human Resource Management* **12**(2), 166–183.

Carter, J. R. and M. D. Irons (1991) "Are economists different, and if so, why?" *Journal of Economic Perspectives* 171–177.

Charness, G. and M. C. Villeval (2009) "Cooperation and Competition in Intergenerational Experiments in the Field and the Laboratory." *American Economic Review* **99**(3), 956–978.

Croson, R. and U. Gneezy (2009) "Gender differences in preferences." *Journal of Economic Literature* **47**(2), 448–474.

Dasgupta, U. and A. Menon (2011) "Trust and trustworthiness among economics majors." *Economics Bulletin* **31**(4), 2799–2815.

Dulleck, U., J. Fooken and Y. He (2012) "Public Policy and Individual Labor Market Discrimination: An Artefactual Field Experiment in China." *QuBE Working Paper Series* .

Eckel, C. C. and P. J. Grossman (2008) "Differences in the economic decisions of men and women: Experimental evidence." *Handbook of experimental economics results* **1**, 509–519.

Fehr, E., G. Kirchsteiger and A. Riedl (1993) "Does Fairness Prevent Market Clearing? An Experimental Investigation." *Quarterly Journal of Economics* **108**(2), 437–459.

Fischbacher, U. (2007) "z-tree: Zurich toolbox for ready-made economic experiments." *Experimental Economics* **10**(2), 171–178.

Frank, R. H., T. Gilovich and D. T. Regan (1993) "Does studying economics inhibit cooperation?" *Journal of Economic Perspectives* 159–171.

Harbaugh, W. T., K. Krause and L. Vesterlund (2002) "Risk attitudes of children and adults: Choices over small and large probability gains and losses." *Experimental Economics* **5**(1), 53–84.

Martinsson, P., K. Nordblom, D. Rützler and M. Sutter (2011) "Social preferences during childhood and the role of gender and age – An experiment in austria and sweden." *Economics Letters* **110**(3), 248–251.

Marwell, G. and R. E. Ames (1981) "Economists free ride, does anyone else? experiments on the provision of public goods." *Journal of Public Economics* **15**(3), 295–310.

Shen, J. and X. Qin (2014) "Cooperation, Trust and Economic Development: An Experimental Study in China." *Pacific Economic Review* **19**(4), 423–438.

Song, F., C. B. Cadsby and Y. Bi (2012) "Trust, reciprocity, and guanxi in China: An experimental investigation." *Management and Organization Review* **8**(2), 397–421.

Sutter, M. and M. G. Kocher (2007) "Trust and trustworthiness across different age groups." *Games and Economic Behavior* **59**(2), 364–382.

Wang, F. and T. Yamagishi (2005) "Group-based trust and gender differences in china." *Asian Journal of Social Psychology* **8**(2), 199–210.

Zhang, J., X. Pang, L. Zhang, A. Medina and S. Rozelle (2012) "Gender Inequality in Education in China: A Meta–Regression Analysis." *Working Paper - Rural Education Action Project* .