Female Risk Aversion: Experimental Evidence from Myanmar

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Gender Differences in Risk Preferences

Problem/Motivation: Gender inequality and discrimination are persistent despite their illegality, e.g. pay gap, gender ratios in executive/managerial positions, military service, and political offices.

Scope: The problem is worse in developing countries. Gender inequality and poverty are very strongly correlated. (UN Human Development Report 2016.) To combat poverty, one must address gender inequality as well. This is a global issue since "To eradicate extreme poverty and hunger" is number one in the list of Millennium Development Goals endorsed by all 191 United Nations member countries.

Gender Differences: Literature shows that males and females behave very differently. Males are more competitive (Cassar et al, 2016; Fletchner et al, 2009; Gneezy and Rustichini, 2004). Females are more risk averse quantitatively (financially, personal discount rate) and qualitatively (smoking, career choice) (Harris et al, 2006; Charness and Gneezy, 2009; Croson and Gneezy (2012); Byrnes et al, 1999).

Causal Chain: How these gender differences give rise to disparity in the equality is not clear. But we know that economic risk aversion can be a barrier to escaping poverty (Dercon and Christiaensen, 2010).

Research Question: Does gender disparity for risk preference exist in Myanmar? Characteristics?

We find that females more risk averse than males in general. Females match males when reward is cash, but fall behind when rewards are gift cards and school supplies. Adult females are most risk averse and their risk attitude over time is most distinct from the rest of the groups. Our data suggests that risk preference may not be a constant, but oscillates which allows even the most risk averse individual to pursue a high risk course of action.

Measuring Risk Preference

	Student		Adults		Total
	Females	Males	Females	Males	
Site 1	48	23	-	-	**71**
Site 2	70	34	-	-	**104**
Site 3	33	28	54	25	**140**
Trial	1	1	9	1	**12**
Total	**152**	**86**	**63**	**26**	**327**

Table 1. Our subjects consist of 152 females and 86 males high school seniors. 63 adult females and 26 adults males.

How do we measure risk? We use a progressive lottery selection.

- We solicited our subjects with choices where amount they earn depends on the decision they make.
- There is no cost to the participants.
- Subjects chose one of the six choices (example below) and decide how much they earn by a coin flip.
- They chose again from any of the six choices again, and we flip. Subjects found out what earned.
- We repeated it five times so not only we observed what their risk preference is, we also saw how their risk tolerance changed over time and the effect of previous result on the next action. This simulates how past failure or success influenced the next decision and risk preference.

Increasing risk →

Choice 1	Choice 2	…	Choice 6
Head = $5	Head = $6	…	Head = $12
Tail = $5	Tail = $4		Tail = $0

Table 2. Risk choices. Choices 3, 4, and 5 are not shown here.

Our metric to measure risk. Choice 1 is the lowest risk level because it pays $5 whether the coin flip is head or tail, safest and least risky choice. Choice 6 is the riskiest because if the coin flip results in tail, earning would be zero. Amount progressively increases for head and decreases for tail. (Actual experiment was conducted with the local currency, kyats. Values were similar in purchasing power to this.)

Average Risk for Each Type of Reward

While females generally falls behind males in risk tolerance, difference is only significant for gift card and school supplies, enough to attest the literature in female risk aversion. (Adults did not participate in gift card rounds.)

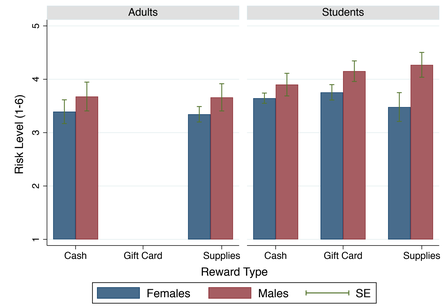

Figure 1. Average risk by gender for each type of reward.

Change in Risk Preference Over Time

This is no known lottery selection experiment where subjects played consecutive rounds where previous earning was allowed to effect the next decision.

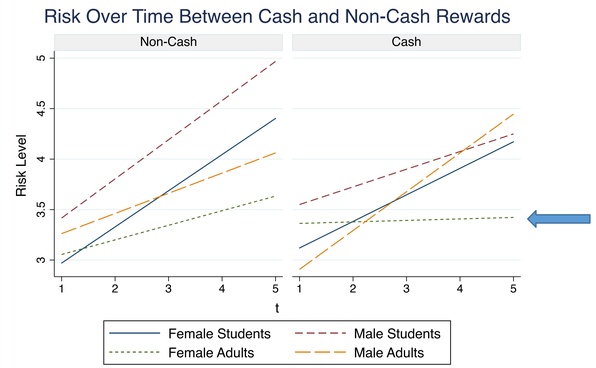

Figure 2. Shows linearly fitted line for the average risk of each round for all treatments. All groups shows increasing risk. In the long run, choice 6 would give the highest earning since it has the largest expected value in accordance with expected utility theory.

	Female Student	Female Adult	Male Student	Male Adult	
Female Student		**0.0478	0.4409	0.46733	Cash
Female Adult	*0.0767		0.2874	*0.0551	
Male Student	0.7733	**0.0496		0.2588	
Male Adult	0.3608	0.766	0.2842		
	Non-Cash				

Table 3. Shows p-values of the Wald test of the slopes of the fitted lines in Figure 2. Only adult females are statistically differently from others. The rest is statistically indistinguishable from each other.

Oscillating Risk Preference

Our contribution to literature is the oscillating nature in the following graphs.

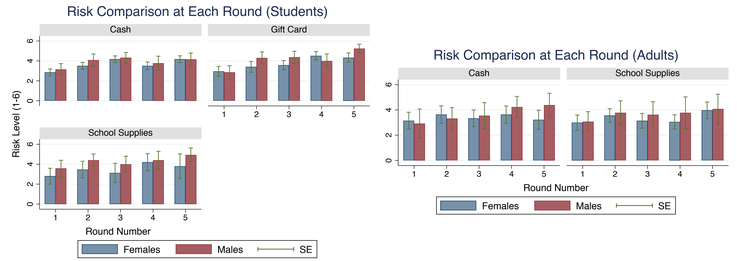

Figure 3. Analysis of risk level at each round shows inconsistency in risk levels and its cyclic nature.

Dohmen et al (2017) finds that risk preferences are cyclical over time. Our results shows cyclical nature of risk preference even during a very short period. Five rounds took about 30 minutes to conduct. In the long run the cyclical nature may be due to life phases or greater economic shocks, war, recessions, etc. In the short term, cyclical nature may be response to the previous result, whether it was heads or tails or how much was earned. The drop in risk level at 3rd or 4th round is peculiar. If subjects were responding the result of previous decision, there should not be consistent drops at 3rd or 4th rounds because they were all different sessions.

Conclusion and Further Research

Our results confirm the literature -

- females are more risk averse than males
- older females are even more risk averse
- younger people are more risk loving
- males and females have the matching risk level for cash, but both are suppressed due to high value of payouts (Hold and Laury, 2002). This is not due to females significantly decreasing risk aversion, but males suppressing their higher risk tolerance at a greater degree.

Limitations of our study: Our results are exclusive of effects from poverty or the cultural standards for risk. Lack of gender difference in risk when playing for cash for both adults and students may be from an entirely different reason than literature indicates, e.g. cultural affinity for cash. Our statistical power ranges from 20% to 70% which are less than 80%, therefore increases the chances for type I and type II errors.

We recommend further research in the dynamics of risk preference. Most behavioral economic experiments have been snap shots of the risk preference at a point in time. We should examine the evolution of risk over time more carefully. With more data, we can help build a foundation for more modern risk-utility theory. This is in line with Rabin and Thaler (2001) recommendation that the theory of risk aversion based on expected utility maximization theory is inadequate.

Influential Papers and Contact

Holt, Charles, A., and Susan K. Laury. "Risk Aversion and Incentive Effects ." *American Economic Review*, 92(5): 1644-1655, 2002.

Rachel Croson and Uri Gneezy, "Gender Differences in Risk Preferences," *Journal of Economic Literature,* 47(2): 448-474, 2009.

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