

Gender-associated differences in risk attitudes and perceptions among farmers in Mali

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Presentation overview

- > Research question
- > Risk attitudes & gender – why it matters
- > Theory & risk perception in the literature
- > Farmer First data
 - Risk-related survey questions
- > Methods
- > Demographics & empirical results
- > Findings
- > Conclusions



Research questions

- > **Do risk perceptions differ systematically between male and female farmers in Mali across risk domains?**
- > **What factors other than gender are associated with differences in risk perceptions?**



Why might gender differences in risk perceptions matter?

- > Adoption rates of development interventions often fall short of expectations (Feder and Umali, 1993) and vary by gender (Doss and Morris, 2001)
- > An individual's perception of risk often affects the likelihood of new technology adoption (Mara, Pannell and Ghadim, 2002)

Therefore, the potential exists for gender-specific interventions to improve adoption rates



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Theory and Literature: Risk Preferences & Gender

- > Gender differences may be due to differences in activities and roles, unequal power, differing levels of trust (Flynn et al., 1995)
- > Gustafson (1998) characterizes gender by segregation & hierarchy, difference in perception less important than how genders attach meaning to risk
- > Women more averse re: financial risk (Charness and Gneezy, 2012; Gneezy et al., 2003; Gupta et al., 2005; Croson and Gneezy, 2009)
- > Women less likely to compete (Fletschner et al., 2010; Anderson et al., 2014; Booth, 2012)
- > Feelings or emotions associated with risk, importance of perceived benefit/cost (Lowenstein, 2001; Slovic, Fischhoff and Lichtenstein, 1979)



Risk Perception: Other Predictors

- > Wealth, Income stability, Occupation, Age, Health, Education, Personality Traits (Nicholson et al., 2005; Dohmen et al., 2011)
- > Qualitative Characteristics of Risk, e.g., Familiarity, Voluntariness (Slovic, Fischhoff, and Lichtenstein, 1979)
- > Networked-ness and Access to information (Weber and Hsee, 1998)
- > Worldview – hierarchical, egalitarian, fatalistic, and individualism (Wildavsky and Dake, 1990)
- > Distinct research gaps exist on particular cultural groups, ethnicity matters for risk perception (Marris, Langford, and O’Riordan, 1998)

Must control for multiple factors when exploring role of gender.



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Theory and Literature: Risk Domains & Gender

- > Men more risk taking except with respect to social domain (Weber, Blais and Betz, 2002)
- > Swedish women more often oriented toward home/family domain, men toward work domain (Jakobsen and Karlsson, 1996)
- > Women are more often caregivers thus worry about health/safety domain (Davidson and Freudenburg, 1996)
- > Women more frequently express concern about environment domain, men about health/safety (Fischer et al., 1991)



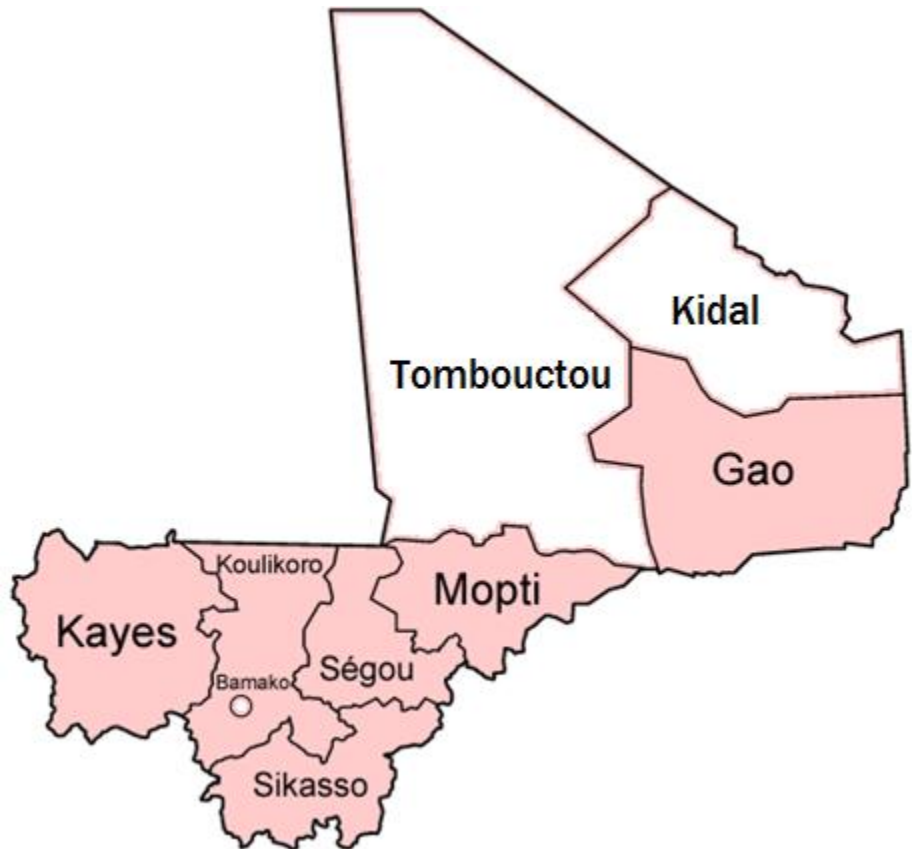
Farmer First Data

- > Smallholder farmers in Mali surveyed in October 2010 by TNS Research International, BMGF Funded
- > Household head answered all questions in the survey, spouses answered a subset of personal information, attitude and opinion questions



Mali Collection Regions

- > We focus on Malian households with single-headed or dual-headed opposite sex households
 - 2,703 total observations
 - 1,414 households
- > 6 Malian regions surveyed: Gao, Kayes, Koulikoro, Mopti, Segou, and Sikasso



Sample demographics

Household	Total (SD)	
Children under 15	2.43 (2.18)	
Number of large livestock	2.63 (1.96)	
Number of fowl & beehives	0.62 (0.76)	
Number of crops grown	3.52 (2.23)	
Individual	Men	Women
Age (years)	51.26 (13.87)	39.32 (12.40)
Health – (1 lowest, 5 highest)	3.90	3.92
Income secure (1=secure)	0.70	0.65
Time poverty (1=more time poor relative to income poor)	0.29	0.26
Observations	1,390	1,313

Perceived Risk Across Domains

Risk Perception Prompt: How frequently have you worried about the following risks in the past 12 months?

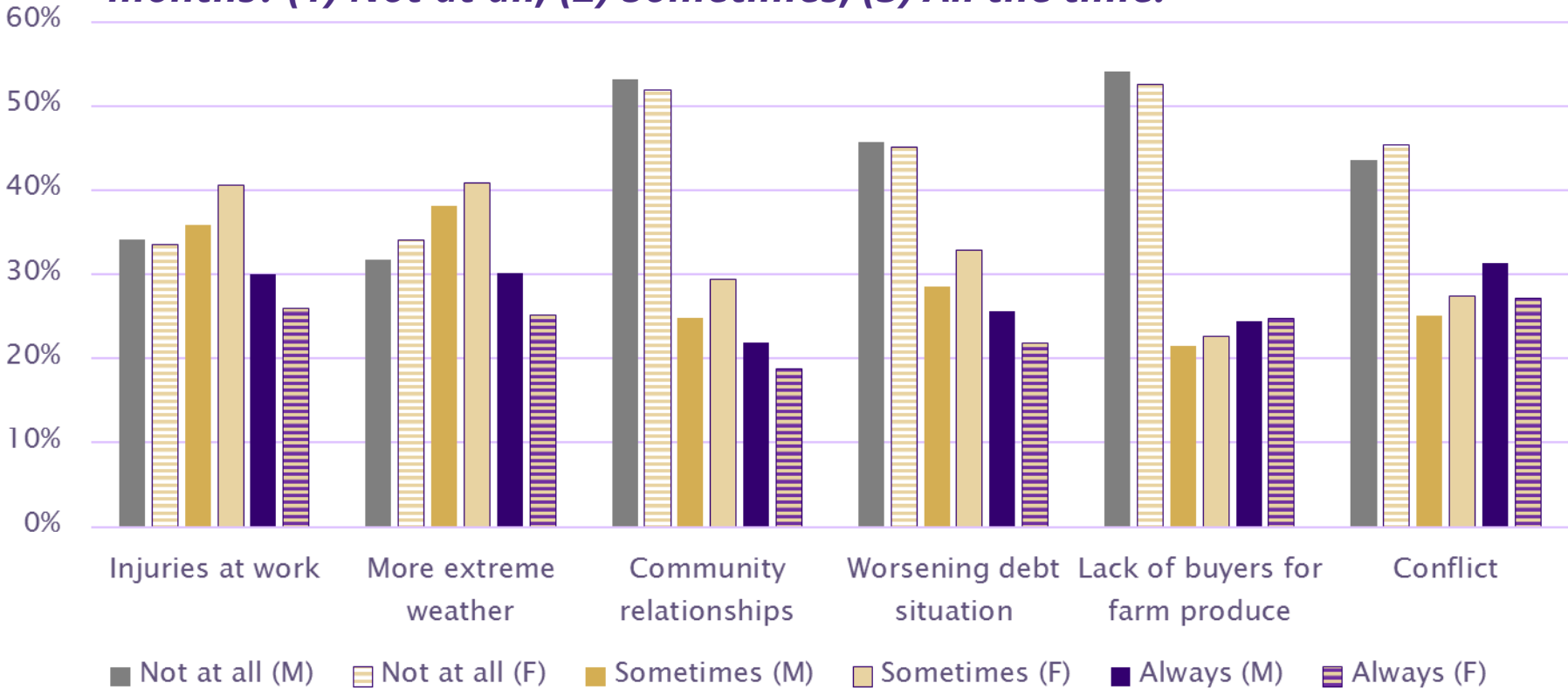
(1) Not at all; (2) Sometimes; (3) All the time?

Six Risk Domains	Potential Sources of Risk/Concern
Financial	Increasing Level of Debt
Health	Work Injury
Security	War/Conflict
Livelihood	Lack of Buyers at the Market
Environment	More Extreme Weather
Social	Weaker Community Relationships



Risk Responses by Gender

How frequently have you worried about the following risks in the past 12 months? (1) Not at all; (2) Sometimes; (3) All the time.



Methods

> Factor Analysis

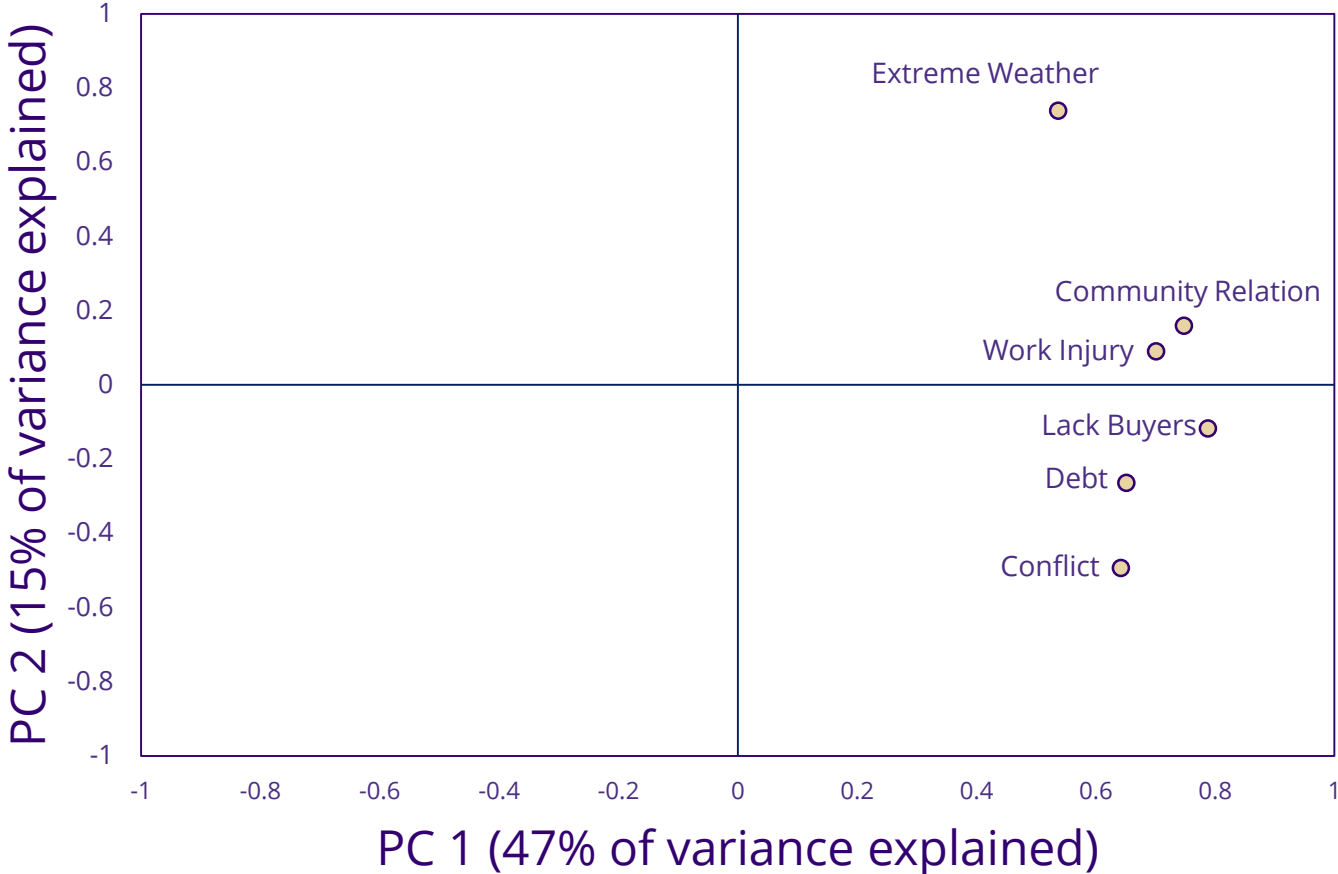
- Principal Component Analysis
- Distilled modes of worry about risk across six domains

> Regression Analysis

- Assessed the association between gender and categorical level of worry across risk domains
- Compared to binary OLS & logit results (combined categories of some worry and worry all the time)



Factor Analysis (PCA)



Factor Analysis (PCA) Results

- > PC1 domains tightly cluster, worriers v. non-worriers
 - > 47% variance explained
- > PC2 much more variable, accounts for domain similarities/differences
 - > 15% of variance explained
- > Community Relationships, Injury at Work cluster in PC2, suggests a similar response to emotional and physical risks
- > Lack of Buyers, Debt, i.e., risks related to economic health and the market, cluster in PC2, elicit a fairly similar response
- > Most distinct domains: Extreme Weather, Conflict
 - These sources of risk are largely out of the hands of individuals and elicit different risk perceptions and responses than domains which are more tied to individual choice and behavior.



Categorical OLS regression results – How often do you worry about X?

Individual	Work injury	Extreme weather	Community relations	Debt	Lack of Buyers	Conflict
Sex (1=female)	0.067*	-0.065*	0.070*	0.069*	0.160***	0.087*
Age (years)	0.001	-0.001	-0.002*	0.000	0.002	0.005***
Children under 15	-0.023**	-0.017*	-0.024**	0.011	-0.006	0.008
Income secure (1=adequate income)	-0.209***	-0.148***	0.002	0.082*	0.139***	-0.062*
Time poverty (1=time poor)	0.141***	0.154***	0.006	-0.190***	0.029	-0.014
Education level (1=at least one year of school, 0=none)	0.063*	0.009	0.082*	0.071*	0.094*	0.051
Self-health assessment (1-5; v. poor – v. good)	0.056**	0.024	0.034	-0.004	0.081***	0.060**
^Social Extroversion: Like to tell others about new farm methods	0.034*	0.005	0.050**	0.047*	0.056**	0.113***
^Fatalistic: Can't avoid misfortune	0.070***	0.030*	0.091***	0.039**	0.017	0.133***
^Individualistic: Doesn't want farm advice	0.041**	0.058***	0.110***	0.090***	0.104***	0.068***
Optimism (1=optimistic)	-0.125**	-0.120*	-0.160***	-0.133**	-0.234***	-0.066
Risk Preference (1=seeking)	-0.283***	-0.216***	-0.204***	-0.126*	-0.201***	-0.360***
Self-efficacy (1-3; not confident – confident)	0.094***	0.055*	0.065**	0.038	0.054*	0.033
^Social Orientation: discusses farm issues w/ others	0.084***	-0.054**	0.066***	0.050**	0.113***	0.118***
Network: # different info sources	0.145***	0.098***	0.227***	0.233***	0.216***	0.167***
# large livestock	-0.025**	-0.015*	-0.019*	-0.014	-0.014	0.001
# fowl & beehives	-0.086***	-0.074***	-0.097***	-0.030	-0.050*	-0.019
# diff crops sold/consumed	-0.009	-0.043***	-0.013*	0.011	-0.011	0.042***
Adjusted R2	0.125	0.084	0.147	0.102	0.124	0.166
Observations	2385	2372	2417	2395	2388	2404

^1=disagrees completely 2=somewhat disagrees 3=neither agree nor disagree 4=somewhat agrees 5=agrees completely

Findings – Categorical OLS Regression

- > Female: express more worry, except with respect to Extreme Weather
 - Significant at $p < 0.1$ for all Six Domains
- > Biggest effects for Networked/Informed, Optimist, Risk-Seeker
- > Fatalistic, Individualistic, Networked: higher worry all domains
- > Optimists and Risk-Seekers: lower worry
- > Socially Oriented: worry more overall, except for Extreme Weather
- > Income Secure (mixed picture), Time Poor (generally worry more)
- > Parents with Children Under 15 worry less for Work Injury, Extreme Weather, Community Relationships
- > Conflict and Extreme Weather exhibit distinct patterns and associations
 - Wealthier, Older, Diverse Crop Portfolio, Risk Seekers: more worry re: Conflict
 - Men, Childless, Time and Income Poor, Risk Averse: more worry re: Extreme Weather

Note: Results from alternative model specifications (Binary OLS and Logit) were similar – with an even stronger gender signal



Conclusions

- > Significant gender differences in risk perception, all domains
 - > Women select response “Worry Sometimes” more often
 - > Men select response “Worry all the Time” more often
- > Women express higher levels of worry except with respect to Extreme Weather, *when controlling for demographics, worldview, etc.*
- > Biggest effects – Networked/Informed, Optimists, Risk-Seekers
- > Level of perceived individual control over risk domain matters

Understanding that men’s and women’s risk perceptions differ lends insight into intrahousehold decision making, program uptake rates, and supports the design of effective interventions with improved levels of adoption for new technologies and programs.

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Thank you!
Questions?

Principal Components Analysis

Risk Domain	Principal Components			
	1	2	3	4
Conflict	.642	-.493	-.265	.506
Worsening Debt Situation	.651	-.264	.623	-.021
Community Relationships	.748	.160	.005	.028
More Extreme Weather	.537	.739	.125	.296
Injuries at Work	.701	.091	-.536	-.269
Lack of Buyers for Farm Produce	.788	-.117	.088	-.385



Risk-related Questions

How frequently have you worried about the following risks in the past 12 months? (1) Not at all; (2) Sometimes; (3) All the time:

