



WIND VALUE

An Opportunity for Climate Action and for Energy Communities

**End-of-Life Decisions for Wind Farms:
An Opportunity for Climate Action and Energy Communities**

**Report: Risk Attitudes Within Communities
Work Package 7.3**

Month 27/48

Authors: Qianhui Chen and Peter Deeney



Wind Value Funding Ref: IRC*21/PATH-A/9348 Peter Deeney SFI-IRC Pathway Prog
June 10, 2024

Contents

- Executive Summary** **2**

- 1 Introduction** **3**

- 2 Background** **3**

- 3 Method** **3**
 - 3.1 Example Question 4
 - 3.2 Statistical Testing 4

- 4 Results** **4**

- 5 Conclusions** **4**

The Wind Value project is based in the Environmental Research Institute of University College Cork (UCC), Ireland with assistance from Cork University Business School, UCC. The PI, Peter Deeney, may be found at the Cleaner Production Promotion Unit, G0.3, Environmental Research Institute, Ellen Hutchins Building, Lee Road, Cork T23 X10. The Research Team comprises: Luca Bernardi, Kevin Campbell, Qianhui Chen, Peter Deeney, Claire Ducourtieux, Niall Dunphy, Fabian Gogolin, Paul Leahy, Dorcas Allan Mikindani, John O'Brien and Rebecca Windemer.

The authors of this report are Qianhui Chen and Peter Deeney. The work here extends earlier work led principally by Kevin Campbell in [Baxter et al. \(2023\)](#). Qianhui Chen worked as an intern on the Wind Value project during 2023-2024, while studying as an undergraduate student in the BSc (Hons) Environmental Science with Environmental Management (Dual Degree), partner institution: MUC – Minzu University of China. Peter Deeney is the project's principal investigator.

Executive Summary

The Wind Value research project seeks to estimate a financial valuation for onshore wind farms in Ireland. It will develop decision support tools which will assist wind farm managers to decide between decommissioning, repowering and life-extension for the end-of-life of a wind farm. This research will also assist local communities who may be interested in buying part or all of their local wind farm.

Risk attitude questionnaires were distributed to an Irish and a Chinese community. In both cases risk aversion (dislike of risk) was stronger than risk loving attitudes, and there was no evidence of a difference in risk attitudes between men and women.

The DOI for this report is 10.5281/zenodo.11147757

1 Introduction

The purpose of Work Package 7 of the Wind Value project is to produce a decision support tool for communities who may consider investing in a wind farm. Part of this includes an analysis of the attitudes towards risk of possible investors, with consideration being given to any difference between genders in the risk aversion (dislike) or risk loving attitudes. In this report we present the findings of a risk attitude questionnaire given to two distinct communities, one in Ireland and one in China. The Irish community was addressed at the [Wave and Wind Energy Day](#) in summer 2023. This investigation, carried out by Kevin Campbell in [Baxter et al. \(2023\)](#), found no evidence to suggest a difference between women's and men's risk attitudes, and found that community financial risk aversion was stronger than risk loving attitudes.

A larger sample of people from China was assessed in autumn of 2023. The questionnaire was translated and administered to this larger sample of people by Qianhui Chen. There are two main findings from both investigations, firstly that risk aversion is much stronger than risk loving attitudes in both communities, and secondly that there is no evidence from these questionnaires to support the idea that there is a difference in risk attitudes between men and women.

2 Background

It has been proposed in the finance literature that men are more risk loving and less risk averse than women (Dwyer, Gilkeson and List¹, 2002; Watson and McNaughton², 2007; Halko, Kaustia and Alanko³, 2012). The size of such a difference is questioned by Filippin and Crosetto⁴ (2016). This is relevant to the decision support tool for use by potential community investors because the tool should acknowledge any difference in the risk tolerance of its audience. The topic of the role of gender in financial risk taking, is outside of the scope of the Wind Value project, however, the project will examine the data it generates for evidence of such a role.

3 Method

Participants were invited to complete an anonymous online questionnaire to assess their investment risk attitude. Part of the questionnaire included a space for participants to describe their gender. This was used to determine which participants were men or women. Irish participants were attendees at the [Wave and Wind Energy Day](#) held in summer 2023. The Chinese participants were invited using researcher networks. The information, consent and schedule documents for the focus groups, questionnaires and interviews covering the Irish and Chinese research activity can be found [here](#).

The financial risk questions and the analysis method to convert the answers into risk aversion and risk loving scores, were based on work by Colasante and Riccetti⁵. The questionnaires are available

¹Dwyer, P.D., Gilkeson, J.H. and List, J.A., 2002. Gender differences in revealed risk taking: evidence from mutual fund investors. *Economics Letters*, 76(2), pp.151-158.

²Watson, J. and McNaughton, M., 2007. Gender differences in risk aversion and expected retirement benefits. *Financial Analysts Journal*, 63(4), pp.52-62.

³Halko, M.L., Kaustia, M. and Alanko, E., 2012. The gender effect in risky asset holdings. *Journal of economic behavior & organization*, 83(1), pp.66-81.

⁴Filippin, A. and Crosetto, P., 2016. A reconsideration of gender differences in risk attitudes. *Management Science*, 62(11), pp.3138-3160.

⁵Colasante, A. and Riccetti, L. (2020) Risk Aversion. Prudence and Temperance: It is a Matter of Gap Between Moments, *Journal of Behavioral Finance*, 100262; Colasante, A. and Riccetti (2021) Financial and Non-Financial Risk Attitudes: What Does

from Zenodo at this link for [Ireland](#)⁶ and at this link for [China](#)⁷.

3.1 Example Question

An example of a question is, " Given the choice of winning €10 or else winning €5 or €15 with equal likelihood, what would you choose?" If the participant responds €10, then their score for risk aversion increases by 1, if they take the other choice, their score for risk loving attitude increases by 1. This question was repeated with different amounts of money but with the same objective. Other versions of the question were to choose between a parking fine of €10 or a fine of €5 or €15 with equal probability. In the second case we examine whether people decide differently between losses and wins.

The questions produced scores from 0 to 10 for each participant to measure their risk aversion and risk loving attitudes, in both cases a higher score means more intense attitude.

3.2 Statistical Testing

These scores for women and men from China, Ireland and both, were examined using a non-paired t-test with a null hypothesis of no difference in the means. This produced a cumulative distribution function (CDF) value to measure the significance of a difference in the means, see Section 4. A two tailed significance test was used so that if the CDF is above 95% or below 5%, the null hypothesis would be rejected.

4 Results

The means and standard deviations of the scores for risk aversion and risk loving attitudes, for men and women from Ireland and China are given in Table 1. Initial examination of the scores from the questionnaires in Table 1, indicates that the mean score for risk aversion is higher than for risk loving attitudes. This is true for both the Irish and Chinese communities. It is interesting to note a wider range of scores among the Irish community, as seen in the higher standard deviations. There was a slightly higher risk loving score for men in Ireland, and slightly lower risk loving score for men in China. It was found that there was no significant difference in either risk aversion or risk loving scores between women and men in either country or for both countries together, see Table 2. In all cases the CDF was not in a 5% upper or lower extreme range indicating insufficient evidence to reject the null hypothesis.

5 Conclusions

The results show that both communities are more risk averse than risk loving, and so any investment offered to such investors would need to carry a very low risk to be considered acceptable. Also, there is no evidence of a difference in risk attitudes between the men and women who responded to the questionnaires. There would therefore be no need to prepare different versions of the community decision support tool for women and men.

it Matter? Journal of Behavioral and Experimental Finance, 100494.

⁶<https://zenodo.org/records/11115740>

⁷<https://zenodo.org/records/11115766>

	Ireland Women	Ireland Men	China Women	China Men
N	6	10	24	38
Risk Aversion				
Mean	7.5	7.5	8.8	9.0
Standard Deviation	2.17	2.17	0.96	0.90
Risk Loving				
Mean	3.8	4.2	2.1	2.0
Standard Deviation	3.06	1.87	1.2	1.0

Table 1: Descriptive statistics for the risk aversion and risk loving scores for men and women, for the two communities

	Ireland	China	Both
N	16	62	78
Risk Aversion			
Difference (F - M)	0	-0.17	-0.12
t-Statistic	0	-0.68	-0.38
CDF	50%	25%	35%
Risk Loving			
Difference (F - M)	-0.17	0.10	0.03
t-Statistic	-0.12	0.35	0.08
CDF	45%	63%	53%

Table 2: t-Test results for differences between the risk attitudes of men and women in Ireland, China and both

Acknowledgments

The [Wind Value](#) project is funded by the [Irish Research Council](#) under the [Pathway Scheme](#) for early career academics, reference number IRC*21/PATH-A/9348 [Peter Deeney](#) SFI-IRC Pathway Prog.