Will P2P insurance replace traditional insurance? An (in-the-lab) experimental study

Charles Davenne, EconomiX/Yakman

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About the speaker

Charles Davenne

• PhD student in behavioral economics at EconomiX (supervisor : Meglena Jeleva)
• Funded by Yakman (CIFRE) (supervisor : Christophe Neves)

EconomiX / Yakman

- EconomiX : Economics research laboratory of Paris Nanterre
- Yakman : Start up specialized in P2P insurance
Plan

- Introduction
- Experimental design
- Results
- Conclusion
Introduction

What about *P2P* and insurance?

- A commercial deadlock…
  - Commercial failures of most P2P model (B2C)

- …which has not yet said its last word:
  - Alibaba reinvents healthcare thanks to a P2P model (2019)
  - Real commercial success / Over 100 millions users.

- Pool consumers contributions without insurance carrier to reach self-insurance keeps showing its potential.

- Can consumers trust P2P model for damage coverage?

Introduction
P2P model : main characteristics (Yakman)

Coverage model based on common pot principle:
- Contributions stored in a common pot.
- Lump sum compensation payed in less than 72 hours
- Remaining funds are redistributed when coverage ends
- Claims management is provided by users

Main advantages :
- Agile response to new consumer’s needs (*time-to-market*)
- Reduction of go-to-market costs and claims management costs
- Transparent financial flow for the consumer

Main limitation :
- Limited financial capacity : risk of non-compensation if claims exceeds funds available in the common pot.
Introduction
Motivations

Through an experimental setting, we sought to answer the following questions:

- Are there individual or risk characteristics that explain common pot choice?
  - Social preferences / Risk aversion
  - Value of the good / Probability of loss

- What is the best way to deal with the risk of non-compensation?
  - Test of an informational nudge

- Is group identification essential for the common pot to be chosen?
  - Adding a group effect
Introduction
Methodology

■ Predictions from :
  ▪ Theoretical model (insurance microeconomics) :
    - Modelling insurance and common pot demand
  ▪ Related literature
    - Nudging, group effect and social preferences

■ Testing predictions in an experimental setting :
  ▪ Incentivized games (Main task and control tasks)
  ▪ Main task: participants exposed to damage risks with possibility to choose between different types of coverage (insurance, common pot) or no coverage
Introduction

Theoretical model

- Standard vNM Expected utility model:
  - Insurance demand modelization
  - Common pot demand modelization
  - Optimum comparison (simulation)

- Predictions:
  - Risk characteristics should not affect the probability to prefer common pot to insurance.
  - Common pot should be preferred by low risk adverse profiles while insurance should be preferred by high risk adverse profiles.
Introduction
Related literature

- Social preferences: Charness, Rabin (2002)
- Nudge experimentation: Banerjee et al. (2014)

Predictions:
- Individuals with pro-social preferences should prioritize common pot coverage
- Giving to participants a statistic for the risk of non-compensation should reduce disutility associated to this parameter
- Introducing a group effect should increase the probability for the common pot to be chosen
Introduction
Hypotheses to be tested

The probability to choose common pot rather than insurance:

- H1: increases with social preferences – *related literature*
- H2: increases when nudge is implemented – *related literature*
- H3: increases more when group effect is added – *related literature*
- H4: decreases with risk aversion – *theoretical model*
- H5: is independent of risk characteristics (value of the good and probability of loss) – *theoretical model*
Experimental design
Main task

Participants are exposed to 4 loss scenarios (2x2):
- Value of insured good: 500 E.C.U / 1500 E.C.U
- Probability of loss: 5% / 15%

For each scenario participants can either choose to:
- Not cover
- Cover with a traditional insurance
- Cover with a common pot

2 treatments:

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Treatment 1</th>
<th>Treatment 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistic about the risk of non compensation with the common pot</td>
<td>NO</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Group effect</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>
Experimental design
Main task (control)

<table>
<thead>
<tr>
<th>Situation</th>
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<tbody>
<tr>
<td>Value of the good :</td>
<td>750 E.C.U</td>
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<td>Probability of loss :</td>
<td>10 chances out of 100</td>
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<th>Options</th>
<th>No coverage</th>
<th>Insurance</th>
<th>Common pot</th>
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<tr>
<td>Premium :</td>
<td>0</td>
<td>75 E.C.U</td>
<td>75 E.C.U</td>
</tr>
<tr>
<td>Compensation :</td>
<td></td>
<td>525 E.C.U</td>
<td>525 E.C.U</td>
</tr>
<tr>
<td>Risk of non-compensation :</td>
<td></td>
<td>0%</td>
<td>No compensation if the common pot is empty</td>
</tr>
<tr>
<td>Expected redistribution :</td>
<td></td>
<td>0 E.C.U</td>
<td>19 E.C.U</td>
</tr>
<tr>
<td>Compensation delay :</td>
<td></td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Subscribe :</td>
<td>Choose</td>
<td>Choose</td>
<td>Choose</td>
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Experimental design
Main task - Treatment 1 (*nudge*)

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<td>19 E.C.U</td>
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<tr>
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Experimental design
Main task - Treatment 2 (*nudge + group effect*)

- Step 0: Artificially generate groups based on individual preferences (*Gioia (2017))*

- Group attribution based on individual choices:
  - For instance: You belong to « KANDINSKY » group
Experimental design
Main task - Treatment 2 (*nudge + group effect*)

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<td>Choose</td>
<td>Choose</td>
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Experimental design
Control tasks

- Risk aversion:
  - Holt & Laury (2002) in loss domain (incentivized)
    - 10 successive choices between loss lotteries (MPL)

- Social preferences:
  - One shot public good game (incentivized)
    - N=4
    - MPCR=0.3

- Time preferences:
  - Time preferences survey

- Sociodemographics:
  - Age, gender, academic level etc.

- Insurance background:
  - Insurance survey
Experimental design
General informations

- Run in LEEP (Laboratoire d’Economie Expérimentale de Paris)
- Duration of the experiment : 45’’
- Pay off procedure (RLI) :
  - One scenario randomly chosen at the end of the experiment
- Average payoff : 13.7 €
- Treatment setup : between subject.
- 163 participants (163x12=1956 choices) :
  - Control : 56 participants
  - Treatment 1 : 56 participants
  - Treatment 2 : 51 participants
- Software : Z-TREE
Results
Overview : treatments

- On average (all treatments combined) common pot is the most chosen option (36%) followed by insurance (32%) and no coverage (32%)

- Treatments 1 and 2 have a strong positive effect on common pot choices ($X^2$, $Pr=0.000$)

- Difference between treatment 1 and 2 is not significant ($X^2$, $Pr=0.536$)
Results
Overview: risk characteristics

- No coverage decreases with both value of the good and probability of loss.

- Both insurance and common pot increase with probability of loss regardless of the value of the good.

- Common pot captures all new coverage needs when value of the good increases for low frequency loss (scenario 1 to scenario 2).

Choices repartition through scenarios

- Common pot
- Insurance
- No coverage

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Value</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>500 E.C.U</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>1500 E.C.U</td>
<td>5%</td>
</tr>
<tr>
<td>3</td>
<td>500 E.C.U</td>
<td>15%</td>
</tr>
<tr>
<td>4</td>
<td>1500 E.C.U</td>
<td>15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>%</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 28 43</td>
<td>37 28 35</td>
<td>38 35 27</td>
<td>42 36 22</td>
<td></td>
</tr>
</tbody>
</table>

- Common pot decreases with both value of the good and probability of loss.

- Both insurance and common pot increase with probability of loss regardless of the value of the good.

- Common pot captures all new coverage needs when value of the good increases for low frequency loss (scenario 1 to scenario 2).
Results

Overview: risk aversion and social preferences

- For risk adverse participants (>5) coverage increases with risk aversion.

- No statistically significant correlation between risk aversion and preference for insurance.

- Strong positive correlation between social preferences and probability to choose common pot rather than insurance.
Results
Maximum Likelihood Estimation : Conditional logit (1)

<table>
<thead>
<tr>
<th>Alternative-specific variable</th>
<th>Coef.</th>
<th>Robust Std. Err.</th>
</tr>
</thead>
<tbody>
<tr>
<td>loading_rate</td>
<td>-1.219195***</td>
<td>.3017647</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>No coverage (NC)</th>
<th>Insurance (INS)</th>
<th>Common pot (CP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>value_of_good</td>
<td>-0.3993951***</td>
<td>0.1138507</td>
<td>-0.159626</td>
</tr>
<tr>
<td>loss_probability</td>
<td>-0.6942375***</td>
<td>0.1144731</td>
<td>0.018055</td>
</tr>
<tr>
<td>risk</td>
<td>-0.0448506**</td>
<td>0.0198931</td>
<td>0.0125612</td>
</tr>
<tr>
<td>social_preferences</td>
<td>-0.1256324***</td>
<td>0.0179774</td>
<td>-0.1125527***</td>
</tr>
<tr>
<td>time_preferences</td>
<td>-0.0160006</td>
<td>0.0220898</td>
<td>0.0009145</td>
</tr>
<tr>
<td>nudge</td>
<td>-0.482527***</td>
<td>0.1395941</td>
<td>-0.6751655***</td>
</tr>
<tr>
<td>nudge + group effect</td>
<td>-0.4207106***</td>
<td>0.1447528</td>
<td>-0.5565874***</td>
</tr>
<tr>
<td>const</td>
<td>1.122335***</td>
<td>0.2491507</td>
<td>0.823711***</td>
</tr>
</tbody>
</table>

Significance levels : *: 10% | **: 5% | ***: 1%
Results
Maximum Likelihood Estimation: Conditional logit (2)

The probability to choose common pot rather than insurance:

- H1: increases with social preferences ✓
  - (INS/CP: -0.1125527***)

- H2: increases when nudge is implemented ✓
  - (INS/CP: -0.6751655***)

- H3: increases more when group effect is implemented ✗
  - (Difference between nudge and nudge+group effect not significant)

- H4: decreases with risk aversion ✗
  - (INS/CP: 0.0125 (n.s))

- H5: is independent of risk characteristics ✓
  - (INS/CP (value_of_good): -0.159626 (n.s) and INS/CP (loss_probability): 0.018055 (n.s))
Conclusion

- Participants trust P2P model for damage coverage as much as they trust traditional insurance.

- Risk of non-compensation is not an issue especially if transparency is implemented.

- Group identification is not essential for common pot to be chosen.

- Experimental design improvement:
  - Control efficiency of the implementation of the group effect with (in-group/out-group) dictator games.
  - Control understanding on risk aversion task

- Upcoming experiments:
  - Common pot and fraud
  - Common pot and prevention

- For any questions, please feel free to contact me: charles.davenne@yakman.com
Thank you for your attention

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