French savers in the current crisis
Preferences, financial expectations, and the demand for savings and life insurance

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CNRS-PSE

17e Meeting of the Geneva Association’s Annual Circle of Chief Economists
“Insurance prospects in a Changing Risk Environment”
SCOR, 24-25 March 2015
**Outline of the presentation**

  - Panel dimension => November 2014 wave (results coming)

1. Individual wealth **behaviors**: impact of the crisis
   - \( \Delta \text{behaviors} = g(\Delta \text{preferences}, \Delta \text{present resources}, \Delta \text{expectations}) \)

2. Changes in future income and asset price **expectations**

3. Changes in individual risk, time & other **preferences**
   - Usual measures: lottery choice, Likert scales

4. Measuring individual preferences: **scores**
   - Method of scoring
   - Preference scores: determinants, correlations, wealth effects

5. **Scores**: overall stability of risk & time preferences

- Conclusions
### Available surveys

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample size</strong></td>
<td>1,135</td>
<td>2,460</td>
<td>3,826</td>
<td>3,783</td>
<td>3,616</td>
</tr>
<tr>
<td><strong>Number of questions for the scores</strong></td>
<td>80</td>
<td>50</td>
<td>115</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td><strong>Risk lottery on income (Barsky et al., 1997)</strong></td>
<td>-</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Scales</strong></td>
<td>Yes</td>
<td>-</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Experimental measures</strong></td>
<td>-</td>
<td>-</td>
<td>400 subjects</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
1. Changes in behaviors
Behaviors, preferences & expectations

\[ \Delta \text{behaviors} = g[\Delta \text{preferences}, \Delta \text{present resources}, \Delta \text{expectations}] \]

- **Preferences towards risk, time & (family) transmission**
  - Inherited from the past (childhood, experience…)

- **Present available resources**
  - “Cash in hand” (income & wealth)
  - Present liquidity constraints, unemployment, perceived exposition to risk
  - Capitals: health, education…
  - Ability (may be improved by financial literacy?) & cognitive capacity

- **Expectations & beliefs about the future** (italics: in Pater survey)
  - Economic expectations: *future labor income, prob. of unemployment; risk & return of real estate & financial assets*, liquidity constraints
  - Self expectations: future tastes, health, survival probabilities
  - ‘Social’ expectations: future (of) retirement benefits & Welfare State
Example of decomposition of changes in behavior

- Investment choice between:
  - a risky asset: expected return $m$ & standard deviation $\sigma$
  - & a safe asset of return $r$

- **Expected utility**: share of risky asset $p \Rightarrow p = (m-r) / \sigma^2 \gamma$.
  Change in $p$ may depend on:
  - Changes in preferences: relative risk aversion $\gamma$
  - Changes in price expectations concerning the risky asset ($m, \sigma$) – or even the riskless asset ($r$)

- If **background risk** on labor income added: share $p$ **lower** if the saver is ‘temperant’ (substitution of risks)
  - Change in $p$ may also come from changes in labor income risk
  - If **present risk exposition** in labor income increases, the share $p$ decreases (if the saver is temperant: $4^{th}$ derivative of the felicity function)
Under the financial crisis, you have become...?

- More prudent: 48% in 2009, 54% in 2011
- Less prudent: 1% in 2009, 1% in 2011
- No change: 49% in 2009, 43% in 2011

**More farsighted:**
- 45% in 2009
- 51% in 2011

**Less farsighted:**
- 1% in 2009
- 1% in 2011

**No change:**
- 50% in 2009
- 44% in 2011

**More supportive of others:**
- 21% in 2009
- 22% in 2011

**More individualistic:**
- 11% in 2009
- 16% in 2011

**No change:**
- 64% in 2009
- 59% in 2011
"Do you think that, in the future, you will save more money, less money or the same amount than today, in the following assets? »

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>More money</th>
<th>Same money</th>
<th>Less money</th>
<th>Stop to save</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance savings</td>
<td>6%</td>
<td>51%</td>
<td>16%</td>
<td>16%</td>
<td>11%</td>
</tr>
<tr>
<td>Housing saving arrangements</td>
<td>7%</td>
<td>49%</td>
<td>18%</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>Liquid savings</td>
<td>11%</td>
<td>47%</td>
<td>25%</td>
<td>11%</td>
<td>6%</td>
</tr>
<tr>
<td>Mutual funds</td>
<td>3%</td>
<td>25%</td>
<td>19%</td>
<td>27%</td>
<td>26%</td>
</tr>
<tr>
<td>Stocks</td>
<td>4%</td>
<td>25%</td>
<td>19%</td>
<td>30%</td>
<td>22%</td>
</tr>
</tbody>
</table>

More money or same money vs. less money or stop to save on this asset (%):
- Insurance savings: +25
- Housing saving arrangements: +24
- Liquid savings: +22
- Mutual funds: -18
- Stocks: -20
"Do you think that, in the future, you will save more money, less money or the same amount than today, in the following assets? »

<table>
<thead>
<tr>
<th>Portfolio Type</th>
<th>More money</th>
<th>Same money</th>
<th>Less money</th>
<th>Stop to save</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing saving arrangements</td>
<td>4</td>
<td>41</td>
<td>11</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>Liquid saving</td>
<td>12</td>
<td>46</td>
<td>25</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Insurance savings</td>
<td>7</td>
<td>44</td>
<td>20</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Mutual funds</td>
<td>3</td>
<td>21</td>
<td>15</td>
<td>20</td>
<td>41</td>
</tr>
<tr>
<td>Stocks</td>
<td>2</td>
<td>22</td>
<td>16</td>
<td>24</td>
<td>36</td>
</tr>
</tbody>
</table>

More money or same money vs. less money or stop to save on this asset (%)

- Housing saving arrangements: +23
- Liquid saving: +22
- Insurance savings: +13
- Mutual funds: -11
- Stocks: -16
As regards financial investments, do you think that…

Pater 2007, 2009 & 2011 (panel) : in % (N = 1,087)

- The bulk of one’s savings should be invested in risky assets from the moment that there is a chance for very high potential gains.

- A large share of one’s savings may be invested in risky assets if the potential gains make it worthwhile.

- A small part of one’s savings may be invested in riskier assets.

- One should not take risks; all of one’s savings should be invested in safe assets.
2. Changes in expectations
### Expectations about your future professional situation

Between 2007 & 2009, the expected probability of unemployment has slightly risen.

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very important</strong></td>
<td>12.2</td>
<td>13.0</td>
</tr>
<tr>
<td><strong>Somewhat important</strong></td>
<td>20.2</td>
<td>24.9</td>
</tr>
<tr>
<td><strong>Little important</strong></td>
<td>37.8</td>
<td>35.8</td>
</tr>
<tr>
<td><strong>Not important at all</strong></td>
<td>10.9</td>
<td>9.6</td>
</tr>
<tr>
<td><strong>Irrelevant</strong></td>
<td>17.1</td>
<td>13.7</td>
</tr>
<tr>
<td><strong>Don't know</strong></td>
<td>1.8</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Do you think the crisis will have a significant negative impact on your job? (in %)
# Anticipated return on stock market within the next 5 years

The question: distribute 100 points

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will have increased by more than 25%</td>
<td>/_______/</td>
</tr>
<tr>
<td>Will have increased by 10 to 25%</td>
<td>/_______/</td>
</tr>
<tr>
<td>Will have increased by less than 10%</td>
<td>/_______/</td>
</tr>
<tr>
<td>Will be the same</td>
<td>/_______/</td>
</tr>
<tr>
<td>Will have decreased by less than 10%</td>
<td>/_______/</td>
</tr>
<tr>
<td>Will have decreased by 10 to 25%</td>
<td>/_______/</td>
</tr>
<tr>
<td>Will have decreased by more than 25%</td>
<td>/_______/</td>
</tr>
</tbody>
</table>

In your opinion, if you expect the stock market to increase within the next 5 years, which is the highest possible increase (as a percentage)?

In your opinion, if you expect the stock market to decrease within the next 5 years, which is the lowest possible decrease (as a percentage)?
Anticipated return on stock market within the next 5 years

Pater 2007, 2009 & 2011 (panel : ½ respondents = around 1,000 in each case)

Average anticipated return:
- 2007: 5.6%
- 2009: 3.6%
- 2011: 0.4%

Panel 2007-2009
Panel 2009-2011
Anticipated labor income within the next 5 years

Pater 2007, 2009 & 2011 (panel : ½ respondents, around 1,000 in each case)

Average anticipated increase

2007 : 3.7%
2009 : 1.9%
2011 : 0.0%

Expected variations are *a priori* net of inflation
Determinants of stock price expectations (Pater 2009)

- **Expected return**
  - Men are more optimistic than women (+1.1%)
  - The amount of wealth: positive effects
  - ‘Information’ increases expectations => expected return rises with:
    - Age
    - Economic & financial press reading
    - Level of financial education
  - ‘Good in mathematics’, ‘luck in life’: positive effects,
  - Executives are more optimistic, self-employed are more pessimistic
  - Past capital gains have a positive effect

- **Expected risk**
  - Lower among the elderly, those without a diploma, who do not read economic & financial press
  - Negative effect of past capital gains
3. Changes in preferences: usual measures
The hypothetical income lottery measure of risk aversion

Barsky, Juster, Kimball and Shapiro (1997)

- Suppose that you have a job which guarantees for life your household’s current income $R$. Other companies offer you various contracts which have one chance out of two (50%) to provide you with a higher income and one chance out of two (50%) to provide you with a lower income. Do you accept?

R: current (lifetime) income

Contract A

\[ \frac{1}{2} \rightarrow R \quad \frac{1}{2} \rightarrow R \quad \frac{2}{3} \rightarrow \frac{2}{3}R \]
The income lottery (continued)

Barsky, Juster, Kimball and Shapiro (1997)

**Contract A**

- **yes**
  - 1/2
  - R
  - 1/2
  - 0.5 R

- **no**
  - 1/2
  - R
  - 1/2
  - 4/5 R
The lottery measure of relative risk aversion

Panel PATER 2007, 2009 and 2011 (N=1,087)

- The rational consumer chooses the contract if
  \[ E u = u(2c) + \frac{1}{2} u(\lambda c) \geq u(c) \]
  Hypothesis: expected utility maximization, \( u \) is CRRA

<table>
<thead>
<tr>
<th>Relative risk aversion</th>
<th>Rejection of Contract A</th>
<th>Acceptance of Contract A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rejection of contract C</td>
<td>Acceptance of contract C</td>
</tr>
<tr>
<td>2007</td>
<td>50,8</td>
<td>22,3</td>
</tr>
<tr>
<td>2009</td>
<td>60,3</td>
<td>19,9</td>
</tr>
<tr>
<td>2011</td>
<td>62,4</td>
<td>20,1</td>
</tr>
</tbody>
</table>

Lottery measure: people are becoming more and more risk averse
Lottery measures are quite unstable over time

**Distribution across waves of the lottery measure**

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2011</th>
<th></th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ&gt;3.76</td>
<td>2≤γ&lt;3.76</td>
<td>1≤γ&lt;2</td>
<td>γ&lt;1</td>
</tr>
<tr>
<td>2007</td>
<td></td>
<td></td>
<td></td>
<td>Number of observations</td>
</tr>
<tr>
<td>γ&gt;3.76</td>
<td>73.4%</td>
<td>41.4%</td>
<td>37.0%</td>
<td>41.2%</td>
</tr>
<tr>
<td>2≤γ&lt;3.76</td>
<td>13.6%</td>
<td>38.1%</td>
<td>25.6%</td>
<td>12.8%</td>
</tr>
<tr>
<td>1≤γ&lt;2</td>
<td>10.2%</td>
<td>16.6%</td>
<td>29.8%</td>
<td>23.0%</td>
</tr>
<tr>
<td>γ&lt;1</td>
<td>2.8%</td>
<td>3.9%</td>
<td>7.6%</td>
<td>23.0%</td>
</tr>
</tbody>
</table>

Number of observations: 894, 488, 383, 148, 1913

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th></th>
<th></th>
<th>Number of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>γ&gt;3.76</td>
<td>74.2%</td>
<td>48.2%</td>
<td>37.4%</td>
<td>34.5%</td>
</tr>
<tr>
<td>2≤γ&lt;3.76</td>
<td>14.2%</td>
<td>34.6%</td>
<td>30.7%</td>
<td>21.2%</td>
</tr>
<tr>
<td>1≤γ&lt;2</td>
<td>8.9%</td>
<td>13.0%</td>
<td>24.0%</td>
<td>25.7%</td>
</tr>
<tr>
<td>γ&lt;1</td>
<td>2.8%</td>
<td>4.1%</td>
<td>7.9%</td>
<td>18.6%</td>
</tr>
</tbody>
</table>

Number of observations: 979, 338, 254, 113, 1684
Likert preference scales (self-assessed)

**Time preference** : On a scale of zero to ten, where would you place yourself between the following two "extreme" descriptions?

0 : persons who live day by day and take life as it comes, who don't think too much about tomorrow nor worry about the future

10 : persons who are preoccupied by their future (even their distant future) and whose mind is well set on what they want to be or do later in on life

【Live day by day  Preoccupied by the future】

【0 1 2 3 4 5 6 7 8 9 10】

**Impatience** : On a scale of zero to ten, where would you place yourself between the following two "extreme" descriptions?

0 : persons who are impulsive or impatient, who can't stand waiting, who are quick to react, and who want everything right away

10 : persons who are poised and thoughtful, who know how to grin and bear it, and who need time before forging an opinion or taking a decision

【Impatient  Patient】

【0 1 2 3 4 5 6 7 8 9 10】

**Risk** : As regards your attitude towards risk on the whole, where would you place yourself, using the same scale?

0 : corresponds to very prudent persons, who seek to limit the risks of life as much as possible, and who aspire to a well-organised life, without surprises

10 : corresponds to persons drawn by adventure, who seek novelty and challenges, and who like to take risk and have got a lot at stake in their lives

【Prudent  Adventurous】

【0 1 2 3 4 5 6 7 8 9 10】
Scales of preferences between 2007, 2009 and 2011

According to scales, people become...
  - a little more patient
  - as farsighted
  - less risk tolerant
  - overall
  - and in
  - any domain
  - of life

Panel PATER 2007, 2009 and 2011 (N=1,087)

- Short term patience
- Time preference
- Global Risk
- Family
- Portfolio
- Work
- Health
- Consumption, Leisure

Risk by domain

Less impatient

More farsighted

More risk tolerant

- 2007
- 2009
- 2011
Histogram of the preference scales

Risk

Time preference

Defects: - anchor points (value 5)
- irregular spikes from one year to the other
4. Measuring preferences: individual ordinal scores
No one single question is satisfactory in itself: focuses on one arbitrary domain of life and...

- Concerns a specific preference parameter but then too abstract
  - Lottery questions (see above)
- Cannot be related to a specific preference parameter
  - “Owing to the mad-cow disease, has your meat consumption changed?”
  - Self-assessed Likert scales (see above)
- Concerns as well risk & time
  - “Is it worth sacrificing today pleasures of life, in order to live longer?”
- Concerns everyday life, but then framing & other effects
  - “Do you ever park your car illegally”: risk vs. civic-mindedness
- Is (deliberately) too trivial to be considered in isolation
  - “When the weather is uncertain, do you take an umbrella or a raincoat?”
- Is relevant but suffers from obvious endogeneity biases
  - “Do you ever have difficulty ends meet”
Our alternative approach (1): scores

- Build in small touches the psychological profile of the saver
  - Multiply the number of simple questions: lotteries, opinions and intentions, real-life choices & actual behaviors, possible scenarios...
    - Since no one single question is satisfactory
  - …on different areas of life: consumption, leisure, health, investments, work, retirement, family...
  - considering different risks (big, small, gains, losses…) & time-horizons

- Individual **scores** for preferences towards risk, time and family
  - A priori attribution of questions to preference parameters
  - Coding the questions (-1, 0, 1): scores are the sum of the answers given
    - as “averages” of the responses given, on a purely ordinal basis
  - Validation of ordinal measures
    - Internal consistency: Cronbach alpha, correlation of “sub-scores” in different domains Principal component analysis, etc.
Our alternative approach (2): virtues of aggregation

Problem: no one question is fully satisfactory

- **Aggregation** in synthetic, relative scores could be the answer
  - If a common component exists, such ‘aggregation’ of questions reduces *ex ante* framing effects, noise & measurement error, endogeneity biases
  - Score = context-free measure
  - Score = summary measure (risk: large & small risks, gains & losses…)
  - Score = partly a collection of natural instruments
  - Score = significant explanatory power of wealth amount & composition

- **Data choose** the scores for each preference
  - Only **one** (internally consistent) risk score
  - **Two** preferences scores concerning the horizon
    - Short-term impatience
    - Time preference for the present over the life-cycle
  - **One** score for family altruism (children)

Risk aversion
Ambiguity aversion
Loss aversion, etc.
Top ten questions contributing to the risk score

<table>
<thead>
<tr>
<th>Items</th>
<th>Rank 2009</th>
<th>Rank 2007</th>
<th>Risk tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>high (%)</td>
</tr>
<tr>
<td>Takes precautions in case the weather turns out nasty</td>
<td>1</td>
<td>1</td>
<td>44.7</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
<td>45.8</td>
</tr>
<tr>
<td>Wears seatbelt, respects speed limit, respects traffic light</td>
<td>2</td>
<td>2</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td>14.9</td>
</tr>
<tr>
<td>Parks in forbidden zones</td>
<td>3</td>
<td>3</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>8.2</td>
</tr>
<tr>
<td>Sacrifice today pleasures of life in order to live longer</td>
<td>4</td>
<td>6</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td></td>
<td>7.6</td>
</tr>
<tr>
<td>Thinks that homogamy explains longevity of the couples (same income, social origin, political orientation, religion, tastes…)</td>
<td>5</td>
<td>7</td>
<td>23.5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td></td>
<td>26.3</td>
</tr>
<tr>
<td>&quot;Marriage is an insurance policy&quot;</td>
<td>6</td>
<td>8</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
<td>20.9</td>
</tr>
<tr>
<td>&quot;Home ownership ensures that you will always have a roof over your head&quot;</td>
<td>7</td>
<td>4</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td></td>
<td>14.8</td>
</tr>
<tr>
<td>Recommends to close to take risks in their career</td>
<td>8</td>
<td>12</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td></td>
<td>16.0</td>
</tr>
<tr>
<td>Has taken risks in their career, and/or sports and/or sexual activities</td>
<td>9</td>
<td>9</td>
<td>24.4</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td></td>
<td>22.2</td>
</tr>
<tr>
<td>Have practiced the following sports: off-piste skiing, parapenting, microlighting, parachuting, bungee jumping, mountaineering, rock-climbing, rafting or canyoning, diving…</td>
<td>5</td>
<td>5</td>
<td>18.3</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
<td>17.2</td>
</tr>
</tbody>
</table>

Similar ranks of the questions in the risk score (idem in 2011)
### Top ten questions contributing to the time preference score

<table>
<thead>
<tr>
<th>Items</th>
<th>Rank 2009</th>
<th>Rank 2007</th>
<th>foresight</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Retirement has to be prepared well in advance&quot;</td>
<td>1</td>
<td>2</td>
<td>21.3</td>
</tr>
<tr>
<td>1 21.3 21.7 57.0</td>
<td>2</td>
<td>24.4</td>
<td>21.2</td>
</tr>
<tr>
<td>Careful to keep in shape</td>
<td>2</td>
<td>4</td>
<td>15.5</td>
</tr>
<tr>
<td>2 15.5 21.0 63.5</td>
<td>3</td>
<td>13.8</td>
<td>43.4</td>
</tr>
<tr>
<td>We should teach children and teenagers how to save money</td>
<td>3</td>
<td>2</td>
<td>4.9</td>
</tr>
<tr>
<td>3 4.3 45.2 50.5</td>
<td>4</td>
<td>6</td>
<td>12.6</td>
</tr>
<tr>
<td>Plan his holidays well in advance</td>
<td>4</td>
<td>5</td>
<td>14.0</td>
</tr>
<tr>
<td>4 14.0 22.3 65.1</td>
<td>5</td>
<td>7</td>
<td>7.1</td>
</tr>
<tr>
<td>Sacrifice today pleasures of life in order to live longer</td>
<td>5</td>
<td>1</td>
<td>7.6</td>
</tr>
<tr>
<td>5 7.6 16.3 76.7</td>
<td>6</td>
<td>3</td>
<td>4.2</td>
</tr>
<tr>
<td>Your children refuse to give up their leisure activities, hobbies or friends for their studies. Do you agree?</td>
<td>6</td>
<td>5</td>
<td>4.8</td>
</tr>
<tr>
<td>6 4.8 35.0 60.2</td>
<td>7</td>
<td>11</td>
<td>31.6</td>
</tr>
<tr>
<td>I am someone who makes plans for the future</td>
<td>7</td>
<td>2</td>
<td>37.9</td>
</tr>
<tr>
<td>7 37.9 64.9 3.5</td>
<td>8</td>
<td>10</td>
<td>27.1</td>
</tr>
<tr>
<td>Would prefer early retirement against a lower pension after the age of 65</td>
<td>8</td>
<td>1</td>
<td>25.4</td>
</tr>
<tr>
<td>8 25.4 23.2 51.4</td>
<td>9</td>
<td>12</td>
<td>27.1</td>
</tr>
<tr>
<td>Does the possibility that you could end up your life in a nursing home preoccupy you?</td>
<td>9</td>
<td>4</td>
<td>42.9</td>
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<tr>
<td>9 42.9 57.1 55.8</td>
<td>10</td>
<td>14</td>
<td>8.8</td>
</tr>
<tr>
<td>Buys transport tickets well in advance</td>
<td>10</td>
<td>8</td>
<td>8.3</td>
</tr>
<tr>
<td>10 8.3 29.0 62.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Similar ranks of the questions in the time preference score (idem in 2011)**
### Cronbach’s alpha of scores in the 5 Pater surveys

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
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<td>0.51</td>
<td>0.68</td>
<td>0.67</td>
<td>0.66</td>
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<td>27/32</td>
<td>57/65</td>
<td>52/58</td>
<td>53/58</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time preference</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach's alpha</td>
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<td>0.40</td>
<td>0.56</td>
<td>0.54</td>
<td>0.54</td>
</tr>
<tr>
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<td>16/18</td>
<td>27/34</td>
<td>23/30</td>
<td>23/30</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Family altruism</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach's alpha</td>
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<td>0.37</td>
<td>0.45</td>
<td>0.40</td>
<td>0.44</td>
</tr>
<tr>
<td>Items retained/Total</td>
<td>8/9</td>
<td>7/8</td>
<td>13/14</td>
<td>13/14</td>
<td>13/14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Short-term impatience</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach's alpha</td>
<td>0.27</td>
<td>0.28</td>
<td>0.47</td>
<td>0.44</td>
<td>0.44</td>
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<tr>
<td>Items retained/Total</td>
<td>8/13</td>
<td>3/3</td>
<td>16/16</td>
<td>16/16</td>
<td>16/16</td>
</tr>
</tbody>
</table>
Principal components analysis: risk score
Scores much better than other measures on…

Scores correlated with all other survey & experimental measures

- Nicer histograms…

- Explaining risk measures by standard covariates (2009)
  - Pseudo R2: 7.4% score; 1.3% lottery; 0.9% general scale

- Homogamy in couples, (rank) correlation (2002)
  - Risk: 0.52 score; 0.19 general 0-10 scale; 0.26 lottery (Kimball: 0.41)
  - Time preference: 0.45 score; 0.25 for 0-10 scale

- Intergenerational (rank) correlation (2002)
  - Risk: 0.22 score; 0.08 n.s. lottery (Kimball: 0.20)
  - Time preference, altruism: 0.15 scores

- Stability over time (see below)

- Robustness of wealth effects & score correlations across dates
Histogram of the preference scores

Risk

Time preference
### Time correlations of preference measures across waves

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk scores</td>
<td>0.57</td>
<td>0.51</td>
<td>0.75</td>
<td>0.69</td>
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<td>Time preference scores</td>
<td>0.46</td>
<td>0.36</td>
<td>0.66</td>
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<td>0.67</td>
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<tr>
<td>Risk lottery</td>
<td>0.28</td>
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<td>0.30</td>
<td>0.30</td>
<td>0.31</td>
</tr>
<tr>
<td>Risk scales</td>
<td></td>
<td></td>
<td></td>
<td>0.32</td>
<td>0.29</td>
</tr>
<tr>
<td>Time preference scales</td>
<td></td>
<td></td>
<td></td>
<td>0.54</td>
<td>0.49</td>
</tr>
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<td>Number of observations</td>
<td>798</td>
<td>600</td>
<td>2234</td>
<td>1179</td>
<td>1970</td>
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</table>
## Risk score robustness: who is more risk averse?

( ) : significant at the 10% level

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<tbody>
<tr>
<td>Income</td>
<td>(-)</td>
<td>Non linear</td>
<td>Non linear</td>
<td>Non linear</td>
<td>Non linear</td>
</tr>
<tr>
<td>Age</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Gender: female</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Familial status</td>
<td>Married: +</td>
<td>Married: +</td>
<td>Married: +</td>
<td>Married: +</td>
<td>Married: +</td>
</tr>
<tr>
<td>Social origin</td>
<td>Self-employed: -</td>
<td>Self-employed: -</td>
<td>Self-employed: -</td>
<td>Self-employed: -</td>
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<tr>
<td>Education</td>
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<td>-</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Children at home</td>
<td>0</td>
<td>0</td>
<td>(-)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Children away from home</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>(-)</td>
<td>(-)</td>
</tr>
<tr>
<td>Numbers of observations</td>
<td>1 135</td>
<td>2 460</td>
<td>3 825</td>
<td>3 782</td>
<td>3 616</td>
</tr>
</tbody>
</table>
### Time preference score robustness: who is more short-sighted?

( ) : significant at the 10% level

<table>
<thead>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gender : female</td>
<td>0</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Familial status</td>
<td>Married: -</td>
<td>Married: -</td>
<td>Married: -</td>
<td>Married: -</td>
<td>Married: -</td>
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<tr>
<td>Social origin</td>
<td>0</td>
<td>(+)</td>
<td>(+)</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Education</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Children at home</td>
<td>0</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>0</td>
</tr>
<tr>
<td>Children away from home</td>
<td>(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Intergenerationnal transfers received</td>
<td>(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Numbers of observations</td>
<td>1 135</td>
<td>2 460</td>
<td>3 825</td>
<td>3 782</td>
<td>3 616</td>
</tr>
</tbody>
</table>
Correlations between preference scores

Very robust coefficients of correlation between scores of preference at different dates

<table>
<thead>
<tr>
<th>Scores 2007</th>
<th>Risk aversion</th>
<th>Preference for the present</th>
<th>Impatience</th>
<th>Familial altruism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk aversion</td>
<td>1.00</td>
<td>-0.44</td>
<td>-0.33</td>
<td>0.30</td>
</tr>
<tr>
<td>Preference for the present</td>
<td>1.00</td>
<td>0.26</td>
<td>-0.30</td>
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</tr>
<tr>
<td>Impatience</td>
<td>1.00</td>
<td></td>
<td>-0.11</td>
<td></td>
</tr>
<tr>
<td>Family altruism</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scores 2009</th>
<th>Risk aversion</th>
<th>Preference for the present</th>
<th>Impatience</th>
<th>Familial altruism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk aversion</td>
<td>1.00</td>
<td>-0.37</td>
<td>-0.34</td>
<td>0.33</td>
</tr>
<tr>
<td>Preference for the present</td>
<td>1.00</td>
<td>0.21</td>
<td>-0.25</td>
<td></td>
</tr>
<tr>
<td>Impatience</td>
<td>1.00</td>
<td></td>
<td>-0.16</td>
<td></td>
</tr>
<tr>
<td>Family altruism</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scores 2011</th>
<th>Risk aversion</th>
<th>Preference for the present</th>
<th>Impatience</th>
<th>Familial altruism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk aversion</td>
<td>1.00</td>
<td>-0.40</td>
<td>-0.36</td>
<td>0.29</td>
</tr>
<tr>
<td>Preference for the present</td>
<td>1.00</td>
<td>0.20</td>
<td>-0.29</td>
<td></td>
</tr>
<tr>
<td>Impatience</td>
<td>1.00</td>
<td></td>
<td>-0.12</td>
<td></td>
</tr>
<tr>
<td>Family altruism</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

Example
Risk aversion or ‘prudence’ goes rather with (corr.):
- Foresight (≈ +0.4)
- Patience (≈ +0.35)
- Family altruism (≈ +0.3)

Crossing preference scores ➔ Typology of savers
Time preference score and wealth accumulation (2007-2009-2011)

Time preference score between 1st and 4th quartiles (ceteris paribus)
Preferences and portfolio choice in 2007-2009-2011
(+: higher risk aversion or prudence; +: higher preference for the present; +/-: more altruistic)
BLUE
BLACK
GREY

Marginal effects of a variation of one standard deviation on the probability of ownership

Equities
Liquid saving
Main residence

Less far-sighted: − [2; 4]%
More risk averse: − ≈3%
More altruistic: ns

Less far-sighted: − [3; 4]%
More risk averse: + ≈1%
More altruistic: ns

Less far-sighted: − [2; 4]%
More risk averse: + ≈2%
More altruistic: ns

Control variables
- age, age², level of education,
- household total gross wealth (in brackets), household non capital income,
- presence of liquidity constraints
Preferences and portfolio choice in 2007-2009-2011
(+ : higher risk aversion or prudence; + : higher preference for the present; + : more altruistic)

Marginal effects of a variation of one standard deviation on the probability of ownership

**Annuities**

<table>
<thead>
<tr>
<th>Year</th>
<th>Less far-sighted</th>
<th>More risk averse</th>
<th>More altruistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$[-8; -0]$%</td>
<td>$[-5; -2]$%</td>
<td>ns</td>
</tr>
<tr>
<td>2009</td>
<td>$[-7; -4]$%</td>
<td>$[-3; 0]$%</td>
<td>ns</td>
</tr>
<tr>
<td>2011</td>
<td>$[-8; -4]$%</td>
<td>ns</td>
<td>$[1.5; 2]$%</td>
</tr>
</tbody>
</table>

**Life insurance**

<table>
<thead>
<tr>
<th>Year</th>
<th>Less far-sighted</th>
<th>More risk averse</th>
<th>More altruistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>ns</td>
<td>$[-1; 2]$%</td>
<td>ns</td>
</tr>
<tr>
<td>2009</td>
<td>ns</td>
<td>$[-5; 0]$%</td>
<td>ns</td>
</tr>
<tr>
<td>2011</td>
<td>ns</td>
<td>$[-5; 0]$%</td>
<td>$[1.5; 2]$%</td>
</tr>
</tbody>
</table>
Demand for insurance savings: control variables

- **Annuities**
  - Age effects: *concave (max: 75)*
  - Education: *positive*
  - Household wealth: *positive*
  - Household non property income: *positive*
  - Liquidity constraints: *ns*

- **Life insurance**
  - Age effects: *concave (max: 75)*
  - Education: *ns*
  - Household wealth: *ns*
  - Household non property income: *positive*
  - Liquidity constraints: *ns*
5. Scores: overall stability of risk & time preferences

Pater 2007-2009 (Panel) & 2009-2011 (Panel)

Source: Panel PATER **2007-2009** (N=2,234)

**2007**: mean=6.5  median=7

**2009**: mean=6.7  median=7

**2011**: mean=6.8  median=7

Source: Panel PATER **2009-2011** (N=1,970)
Risk score: histogram of variations in preference between 2007 and 2009

Pater 2007-2009 (Panel): ‘transitory’ variations of risk preferences over 2 years
Time preference score: histograms 2007-2009-2011

Pater 2007, 2009 & 2011, Panel

2007: average=-4.2, median=-4

2009: average=-4.2, median=-4

2011: average=-4.3, median=-4

Source: Panel PATER 2007-2009-2011 (N=1,087)
Distribution of family altruism and impatience scores between 2007 and 2009

Individus panelisés *Pater*

**Altruism**

- **2007:** Average: 4.6
- **2009:** Average: 5.0

More altruistic

**Impatience**

- **2007:** Average: 0.1
- **2009:** Average: -0.8

Less impatient (young)
Distribution of family altruism and impatience scores between 2009 and 2011

**Altruism average**
- 2009: 5.1
- 2011: 5.0

No significant change

**Impatience average**
- 2009: -1.0
- 2011: -1.3

No significant change
Changes in preferences: scores and other measures (2007-2009)

- Explaining “transitory” variations in preferences over 2 years
  - Risk score: no effect of standard covariates
    effect of “feel hit by the crisis” (less risk tolerant)
  - Time preference score: no effect
  - Impatience score: age effect (young have become more patient)
  - Score of family altruism: no significant effect
  - Variations in scores: almost random?

- What risk measures other than scores really measure?
  - Not pure risk preference but a combination of preferences with volatile risk perceptions & increased exposure to background risk
  - Explain that scores do not explain risky financial investments far better?
Since more than 4 years of crisis, overall stability of risk and time preferences of French households
- At least when evaluated by scores (a more robust measure)
- Preferences are heterogeneous between households & have a significant explanatory power of wealth & portfolio choices
- Preference formation: early in life
  - Environment: “depression babies”
  - Social origin, education, gender &
  - Especially parents’ own preferences (correlation = 0.2)

Lower willingness to take risks in saving & portfolio choices
- Due to higher exposure to (background) income risk (‘hit by the crisis’)
- Due to more pessimistic asset price expectations
  (see Arrondel & Masson, 2014)
### Propensity to take risk (in differences)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Linear model Coefficient</th>
<th>Robust t</th>
<th>Linear model Coefficient</th>
<th>Robust t</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expectations (differences)</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Labour income increasing rate</td>
<td>-0.196</td>
<td>-1.54</td>
<td>-0.170</td>
<td>-1.30</td>
</tr>
<tr>
<td>Labour income variance</td>
<td>0.190</td>
<td>0.21</td>
<td>0.271</td>
<td>0.29</td>
</tr>
<tr>
<td>Return on financial market</td>
<td><strong>0.222</strong></td>
<td><strong>2.43</strong></td>
<td><strong>0.234</strong></td>
<td><strong>2.57</strong></td>
</tr>
<tr>
<td><strong>Preferences (scores in differences)</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Risk aversion</td>
<td>-0.009</td>
<td>-2.72</td>
<td>-0.008</td>
<td>-2.53</td>
</tr>
<tr>
<td>Time preference</td>
<td>-0.002</td>
<td>-0.40</td>
<td>-0.002</td>
<td>-0.49</td>
</tr>
<tr>
<td>Altruism</td>
<td>0.003</td>
<td>0.50</td>
<td>0.003</td>
<td>0.46</td>
</tr>
<tr>
<td>Impatience</td>
<td>-0.004</td>
<td>-0.78</td>
<td>0.001</td>
<td>0.20</td>
</tr>
<tr>
<td>Affected by the crisis more than average</td>
<td>0.021</td>
<td>0.86</td>
<td><strong>-0.040</strong></td>
<td><strong>-1.96</strong></td>
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<td><strong>Age of head of household (ref: less than 30)</strong></td>
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<td></td>
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</tr>
<tr>
<td>30-40</td>
<td>-0.049</td>
<td>-1.16</td>
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<td>40-50</td>
<td>-0.060</td>
<td>-1.50</td>
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<td></td>
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<tr>
<td>50-60</td>
<td>-0.033</td>
<td>-0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-70</td>
<td>-0.025</td>
<td>-0.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 70</td>
<td>-0.049</td>
<td>-1.08</td>
<td></td>
<td></td>
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<tr>
<td><strong>Sex: man</strong></td>
<td>0.024</td>
<td>1.03</td>
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</tr>
<tr>
<td><strong>Married</strong></td>
<td>-0.006</td>
<td>-0.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of children at home</strong></td>
<td>-0.004</td>
<td>-0.29</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of adult children</strong></td>
<td>-0.010</td>
<td>-0.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education (ref: no diploma or less than bachelor)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor</td>
<td>-0.064</td>
<td>-1.90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College (one or two years)</td>
<td><strong>-0.067</strong></td>
<td><strong>-2.23</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College (more than two years)</td>
<td>-0.038</td>
<td>-1.09</td>
<td></td>
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</tr>
<tr>
<td><strong>Wave 2011</strong></td>
<td>0.051</td>
<td>1.82</td>
<td>-0.016</td>
<td>-0.80</td>
</tr>
<tr>
<td><strong>Number of observations</strong></td>
<td>1924</td>
<td>1924</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F(21,1522)</strong></td>
<td>2.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F(9,1522)</strong></td>
<td>2.72</td>
<td></td>
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</tr>
</tbody>
</table>

Significant effects of $\Delta$ risk score.................
- cancel in aggregate
- due to unobservables?

Overall stability of preferences only
Conclusions (2)

- How to generate more “enterprising” behaviors, i.e. more risky & long-term saving & investment?
  - Not easy to change preferences and abilities over the short-medium run
  - Improve financial education in order to change expectations & understanding: limited & often not lasting effect
  - Nudging & libertarian paternalism: debatable & customer bears the risk
  - “Create” a safer & more stable economic environment
    - Substitution of risks: temperance

- Preserve the Welfare State, especially for old days?
  - Or improve covering of life-cycle risks by private insurance?