

# PREFERENCES, DISPOSITION EFFECT AND COVID-19

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14 December 2020

# MOTIVATION

- ▶ To understand and improve savings and investment decisions, we measure risk and time preferences and biases
  - ▶ Heterogeneity  $\Leftrightarrow$  choice architecture, communication & asset allocation
- ▶ **Key question:** Are preferences and investment behavior stable throughout time (and during COVID-19)?
  1. Risk aversion, patience, present bias, probability weighting and trust
    - ▶ Risk aversion decreases due to COVID-19 (Shachat et al., 2020)
  2. Disposition effect: losses are realized less than gains (Shefrin and Statman, 1985)
    - ▶ DE assumed to be constant in literature (Bernard et al., 2018)

# ILLUSTRATION: STABILITY OF RISK AVERSION

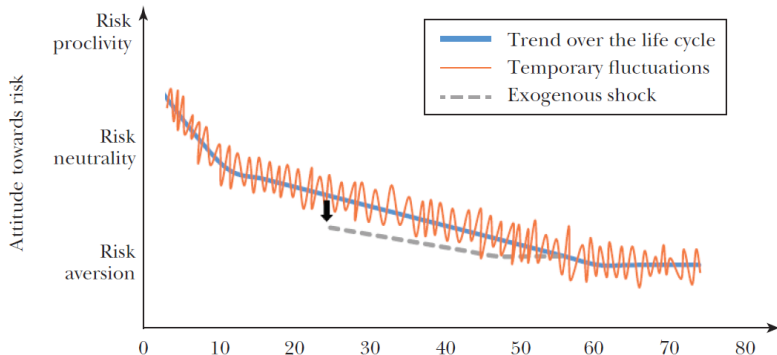


FIGURE: Schildberg-Hörisch (2018)

# EMPIRICAL: STABILITY OF TRUST

FIGUUR 1 Vertrouwen in zeven instituties, bevolking van 18+, 2008-2020/2 (in gemiddelde rapportcijfers)<sup>a</sup>

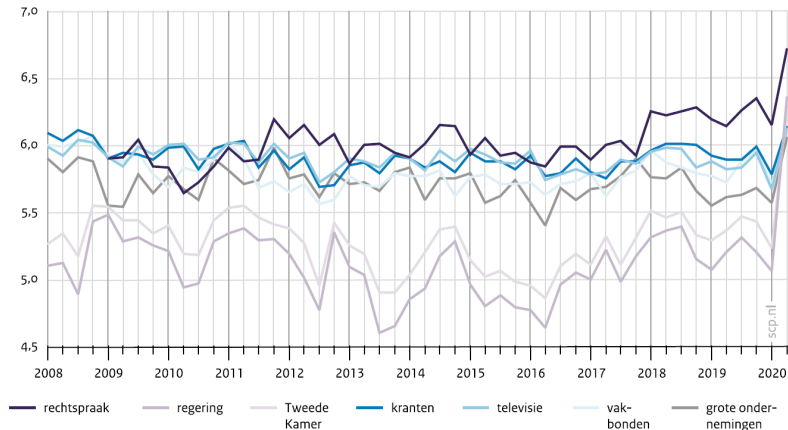
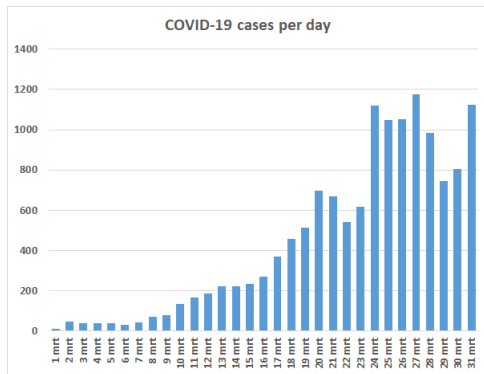


FIGURE: Miltenburg and Schaper (2020) (The Netherlands Institute for Social Research)

# KEY RESULTS

1. How stable are risk and time preferences during the emergence of COVID-19?
  - ▶ Present bias and impatience increase
  - ▶ Risk aversion decreases
  - ▶ Trust in insurers increases
2. How stable is the disposition effect during the emergence of COVID-19?
  - ▶ We observe cross-sectional DE, increasing in return volatility
  - ▶ DE not constant, and hold rates increase during busts
3. What is the relation between trading behavior and preferences?
  - ▶ *Work in progress, forthcoming*
  - ▶ *Follow-up survey December, forthcoming*

# COVID-19 IN THE NETHERLANDS



- ▶ March 6 first death, March 9 no hand-shaking
- ▶ March 15 abrupt national measures (closing bars, schools)
- ▶ March 22 NL-alert, March 23 Intelligent lockdown

# WHAT WE DO

1. We simultaneously measure risk (risk aversion and probability weighting) and time (present bias and discount rates) preferences during the emergence of the COVID-19 crisis
  - ▶ Convex Time Budget method (Andreoni and Sprenger, 2012)
2. We measure individual trading behavior (disposition effect) in a simple risky task
  - ▶ Four sequential investment decisions, similar to Ploner (2017)

**Data:** LISS sample, ages 40-70,  $N = 1961$  ( $N = 287$  for DE)

- ▶ 2 March '20 and 31 March '20

# SAMPLE DECISION SCREEN CTB

Each time below, allocate €10,000 between today and 1 year later.

|  | <b>Euro's today<br/>(with certainty)</b> | <b>Euro's that you<br/>receive 1 year later<br/>with certainty</b> |
|--|--|--|
| Suppose that per paid euro 1 year later you receive €0.00 additionally | €0                                       | €10,000  |
| Suppose that per paid euro 1 year later you receive €0.50 additionally | €0                                       | €15,000  |
| Suppose that per paid euro 1 year later you receive €1.50 additionally | €0                                       | €25,000  |
| Suppose that per paid euro 1 year later you receive €3.50 additionally | €0                                       | €45,000  |

- ▶ Total 20 CTB decisions: 5 sets with 4 decisions each  
⇒ Varying starting times, delays, interest rates and payment probabilities



# PARAMETER ESTIMATION

- ▶ The agent solves, with  $U(x) = \frac{x^{1-\gamma}}{1-\gamma}$ ,  $\pi(p) = p^\eta$

$$\begin{aligned} \max_{c_t, c_{t+k}} \delta^t & [\pi(p_t)U(c_t + w_1) + (1 - \pi(p_t))U(w_1)] \\ & + \beta\delta^{t+k} [\pi(p_{t+k})U(c_{t+k} + w_2) + (1 - \pi(p_{t+k}))U(w_2)] \end{aligned}$$

- ▶ We estimate per individual

$$\begin{aligned} \ln \left( \frac{c_t + w_1}{c_{t+k} + w_2} \right) &= \left( \frac{\ln \beta}{-\gamma} \right) \cdot \mathbb{1}_{t=0, p_{t+k}=1} + \left( \frac{\ln \delta}{-\gamma} \right) \cdot k \\ &+ \left( \frac{1}{-\gamma} \right) \cdot \ln(1 + r) + \left( \frac{\eta}{-\gamma} \right) \cdot \ln(p_{t+k}) \end{aligned}$$

# CROSS-SECTIONAL PREFERENCES

|                                    | Median | Standard Error | 25th Percentile | 75th Percentile |
|------------------------------------|--------|----------------|-----------------|-----------------|
| Present bias $\hat{\beta}$         | 1.000  | 0.048          | 0.819           | 1.471           |
| Discount factor $\hat{\delta}$     | 0.924  | 0.006          | 0.829           | 1.044           |
| Annual discount rate               | 0.082  | 0.006          | -0.043          | 0.207           |
| Risk aversion $\hat{\gamma}$       | 0.525  | 0.014          | 0.387           | 0.862           |
| Probability weighting $\hat{\eta}$ | 1.238  | 0.115          | -0.326          | 2.446           |

# DISTRIBUTION PREFERENCES

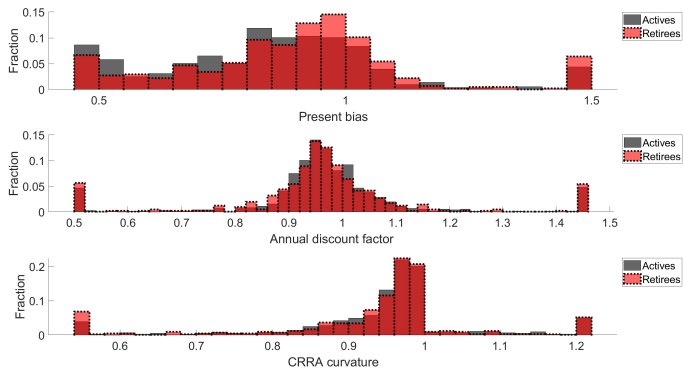


FIGURE: Goossens et al. (2020)

# PREFERENCES DURING COVID-19: OLS, ROBUST

| Dependent variable = | Present-bias factor $\hat{\beta}$ | Discount factor $\hat{\delta}$ | Risk aversion $\hat{\gamma}$ |
|----------------------|-----------------------------------|--------------------------------|------------------------------|
| Week 2               | -0.025                            | -0.017                         | -0.023                       |
|                      | -0.148                            | -0.017                         | -0.040                       |
| Week 3               | -0.300**                          | -0.031*                        | -0.099**                     |
|                      | -0.137                            | -0.017                         | -0.040                       |
| Week 4               | -0.265*                           | -0.036**                       | -0.019                       |
|                      | -0.155                            | -0.018                         | -0.046                       |
| Male                 | -0.014                            | 0.006                          | -0.022                       |
|                      | -0.111                            | -0.013                         | -0.032                       |
| Age                  | 0.022***                          | 0.002**                        | 0.010***                     |
|                      | -0.006                            | -0.001                         | -0.002                       |
| Partner              | 0.013                             | -0.029**                       | -0.074**                     |
|                      | -0.106                            | -0.013                         | -0.031                       |
| Education 1          | -0.203                            | -0.065***                      | -0.112**                     |
|                      | -0.166                            | -0.019                         | -0.047                       |
| Education 2          | -0.015                            | 0.001                          | -0.004                       |
|                      | -0.131                            | -0.016                         | -0.038                       |
| Education 3          | -0.201*                           | -0.042***                      | -0.105***                    |
|                      | -0.119                            | -0.015                         | -0.034                       |
| Income (/1000)       | -0.135***                         | -0.002                         | 0.044***                     |
|                      | -0.042                            | -0.005                         | -0.012                       |
| Controls             | YES                               | YES                            | YES                          |
| Observations         | 1,927                             | 1,927                          | 1,927                        |

# TRUST DURING COVID-19: ORDERED PROBIT

| Dependent variable = | Trust    |
|----------------------|----------|
| Week 2               | 0.015    |
|                      | -0.069   |
| Week 3               | 0.11     |
|                      | -0.073   |
| Week 4               | 0.166**  |
|                      | -0.076   |
| Male                 | -0.046   |
|                      | -0.055   |
| Age                  | -0.003   |
|                      | -0.003   |
| Partner              | 0.089*   |
|                      | -0.054   |
| Education 1          | -0.069   |
|                      | -0.085   |
| Education 2          | -0.078   |
|                      | -0.062   |
| Education 3          | -0.018   |
|                      | -0.061   |
| Income (/1000)       | 0.089*** |
|                      | -0.026   |
| Controls             | YES      |
| Observations         | 1,870    |

# SAMPLE DESIGN SCREEN DE

You are about to invest €10,000 in product A or B. Do you choose product A or B?

- Product A: **gain** if heads, **loss** if tails
- Product B: **loss** if heads, **gain** if tails

| <b>Your choice and your results</b>   | <b>Sell instantly</b> | <b>Toss next year<br/><u>Heads</u></b> | <b>Toss next year<br/><u>Tails</u></b> |
|---|-----------------------|--|--|
| Your choice: Product A<br><br>Your toss: Heads<br><br><b>Your gain: +€3,000</b> | Instantly:<br>€13,000 | Next year:<br>€16,000                  | Next year:<br>€9,000                   |
| Your choice: Product A<br><br>Your toss: Tails<br><br><b>Your loss: -€4,000</b> | Instantly:<br>€6,000  | Next year:<br>€9,000                   | Next year:<br>€2,000                   |

1. Sell your product A now and instantly get paid
2. Hold your product A for one more year, toss a second coin next year and get paid next year

# CROSS-SECTIONAL RESULTS DE

- ▶ Definition: losses are realized less than gains (Shefrin and Statman, 1985)
- ▶ DE = difference between hold rates after a loss (losers) and after a gain (winners) (Ploner, 2017)

| Prospect  | N   | Experimental Conditions |        |        |       | Hold rates |         |        |
|-----------|-----|-------------------------|--------|--------|-------|------------|---------|--------|
|           |     | Win                     | Lose   | EV     | STD   | Losers     | Winners | DE     |
| 1. A or B | 287 | +3,000                  | -4,000 | -500   | 4,950 | 0.393      | 0.210   | +0.183 |
| 2. C or D | 287 | +4,000                  | -4,000 | 0      | 5,657 | 0.507      | 0.221   | +0.286 |
| 3. E or F | 287 | +5,000                  | -4,000 | +500   | 6,364 | 0.589      | 0.225   | +0.363 |
| 4a. X     | 90  | +6,000                  | -5,000 | +500   | 7,778 | 0.569      | 0.231   | +0.338 |
| 4b. Y     | 193 | +4,000                  | -2,000 | +1,000 | 4,243 | 0.449      | 0.221   | +0.228 |

# DE DURING COVID-19 (FE, LOGIT)

**TABLE:** Dep. var. *Hold* captures the decision to hold (= 1) or sell (= 0) the investment. *Loss* is equal to 1 when the subject suffered a loss after the first coin toss, and 0 otherwise. Model 3,  $N = 197$ .  $t$ -statistics below estimated coefficients.

|                      | Model 1  | Model 2  | Model 3    |
|----------------------|----------|----------|------------|
| Loss                 | 1.292*** | 1.091*** | 1.8136***  |
|                      | 9.441    | 7.473    | 6.1077     |
| Return AEX           |          | -7.42*** | -6.3588**  |
|                      |          | -3.222   | -2.2202    |
| Week 2               | -0.07984 | -0.08868 | 0.26411    |
|                      | -0.403   | -0.421   | 0.68011    |
| Week 3               | -0.2338  | 0.02914  | 0.22879    |
|                      | -1.041   | 0.118    | 0.57144    |
| Week 4               | 0.105    | 0.325    | 0.7619**   |
|                      | 0.506    | 1.424    | 2.0407     |
| Week 2 $\times$ Loss |          |          | -0.77254   |
|                      |          |          | -1.5916    |
| Week 3 $\times$ Loss |          |          | -0.42295   |
|                      |          |          | -0.81572   |
| Week 4 $\times$ Loss |          |          | -0.89333** |
|                      |          |          | -2.0845    |
| Controls             | YES      | YES      | YES        |



# CONCLUSION

1. We find that risk aversion decreases and impatience increases during the emergence of COVID-19  
⇒ In line with Shachat et al. (2020), contrasting Cohn et al. (2015) and Guiso et al. (2018)
2. We find that trust in insurers increases  
⇒ In line with Miltenburg and Schaper (2020)
3. We find a strong cross-sectional DE, which is not constant throughout time  
⇒ Hold rates increase during busts and decrease during booms, in line with Bernard et al. (2018)

**Upcoming:** Follow-up survey during December






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## APPENDIX: DECISION SETS

| Decisions | Set | $t$ | $k$ | $p_{t+k}$ | Risk adj. $r$ (%) |
|-----------|-----|-----|-----|-----------|-------------------|
| 1-4       | 1   | 0   | 1   | 1         | 0-350             |
| 5-8       | 2   | 0   | 1   | 0.5       | 0-350             |
| 9-12      | 3   | 0   | 1   | 0.75      | 0-350             |
| 13-16     | 4   | 0   | 5   | 1         | 0-58.49           |
| 17-20     | 5   | 1   | 5   | 1         | 0-58.49           |

# CROSS-SECTIONAL PREFERENCES

- ▶ No evidence present bias, corroborated by question Wang (2017) and aggregate analysis
- ▶ Discount rate lower than most previous work
  - ▶ Annual discount rate 30%-100% not uncommon (Frederick et al., 2002; Andreoni and Sprenger, 2012; Cheung, 2020)
  - ▶ Potential reasons: long horizons, high stakes (Thaler, 1981), and correction risk
- ▶ Risk aversion in line with CTB of Balakrishnan et al., 2017
- ▶ Probabilities overweighted, in line with Potters et al. (2016)