Preferences, Disposition Effect and COVID-19

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Motivation

- Simultaneous measurements preferences, and disposition effect: losses are realized less than gains (Shefrin and Statman, 1985)
  - Allows testing disposition effect (DE) models, such as realization utility (Barberis and Xiong, 2012)
- Stability preferences and disposition effect
  - Preferences (and beliefs) change with financial crises:
    - Risk aversion increases (Cohn et al., 2015; Guiso et al., 2018)
  - Most papers assume that DE is constant, or cover only boom periods (Bernard et al., 2018)
- **Pension relevance:**
  - Preferences: policies (cuts, indexation, smoothing), choice architecture/communication, asset allocation
  - Disposition effect: understand investment decisions and, eventually, equilibrium prices

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

Key questions & 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 a strong DE, increasing in the volatility of returns
   - DE not constant, and hold rates increase during busts
3. What is the relation between trading behavior and preferences?
   - *Work in progress, forthcoming*

Sample decision screen CTB

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

	Euro's today (with certainty)	**Euro's that you receive 1 year later with certainty**
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
  $\Rightarrow$ Varying starting times, delays, interest rates and payment probabilities

Parameter estimation

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

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

- We estimate per individual

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

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

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

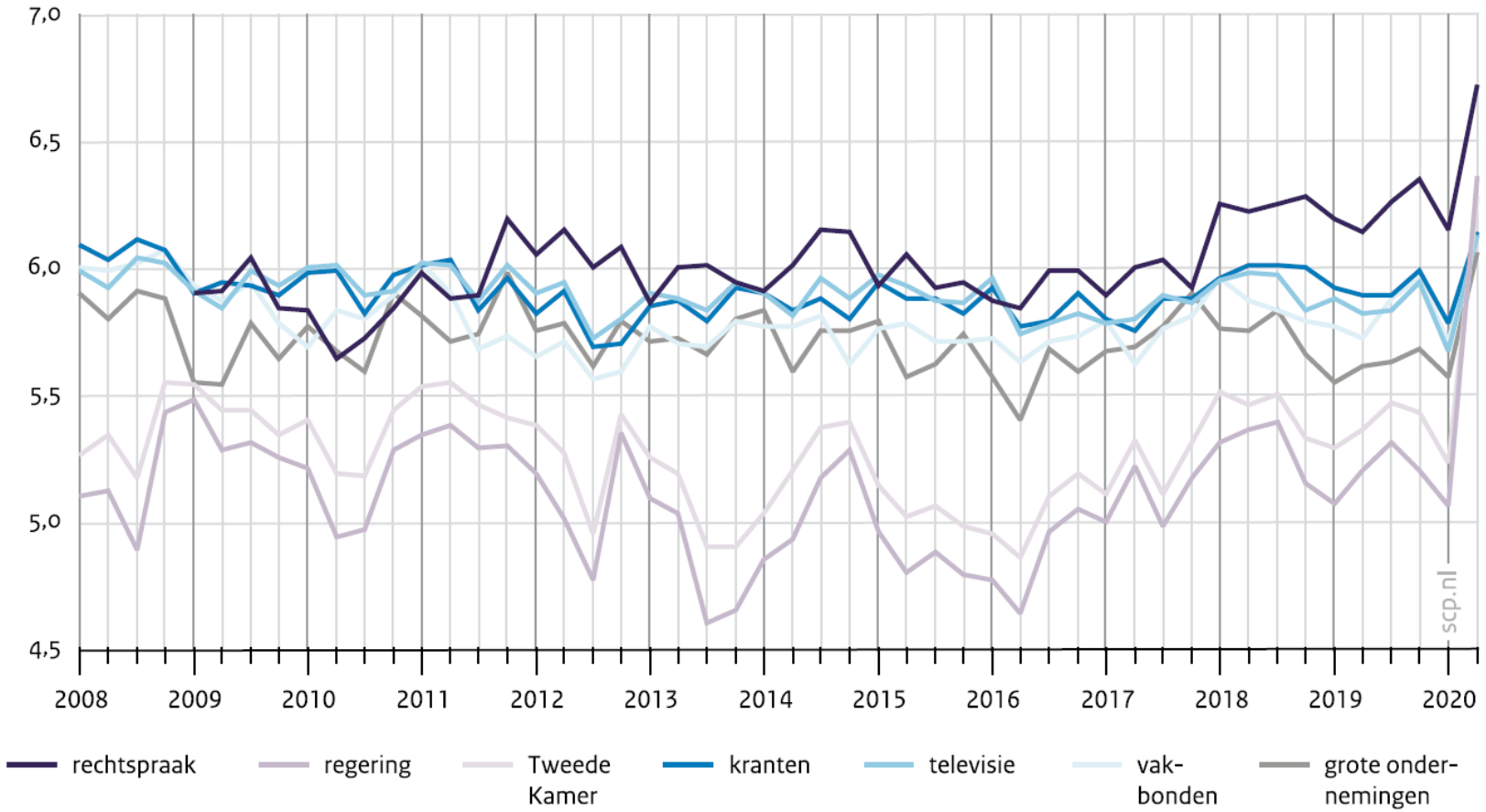
Trust during COVID-19: ordered probit

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

Trust in NL: Miltenburg and Schaper (2020)

Observations in line with each other

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



Design disposition effect

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

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

		Experimental Conditions				Hold rates		
Prospect	*N*	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

- Disposition effect (DE) = difference between hold rates after a loss (losers) and after a gain (winners)

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 × Loss			-0.77254
			-1.5916
Week 3 × Loss			-0.42295
			-0.81572
Week 4 × Loss			-0.89333
			-2.0845
Controls	YES	YES	YES

Conclusion

1. We find that present bias and impatience increase during the emergence of COVID-19

   Risk aversion decreases, in contrast with Cohn et al. (2015) and Guiso et al. (2018)

2. Trust in insurers increases, in line with Miltenburg and Schaper (2020)

3. We find a strong DE, which is not constant during COVID-19

   Hold rates increase during busts and decrease during booms, in line with Bernard et al. (2018)

Upcoming: Repeat survey during December

References I

- Andreoni, J. and C. Sprenger (2012). "Estimating Time Preferences from Convex Budgets". In: *American Economic Review* 102.7, pp. 3333–3356.
- Balakrishnan, U., J. Haushofer, and P. Jakiela (2017). "How Soon Is Now? Evidence of Present Bias from Convex Time Budget Experiments". In: *NBER Working Paper of Labour Economics*.
- Barberis, N. and W. Xiong (2012). "Realization utility". In: *Journal of Financial Economics* 104, pp. 251–271.
- Bernard, S., B. Loos, and M. Weber (2018). "The Disposition Effect in Boom and Bust Markets". In: *Working paper*.
- Cheung, S. L. (2020). "Eliciting utility curvature in time preference". In: *Experimental Economics* 23, pp. 493–525.
- Cohn, A., J. Engelmann, E. Fehr, and M.A. Maréchal (2015). "Evidence for Countercyclical Risk Aversion: An Experiment with Financial Professionals". In: *American Economic Review* 105.2, pp. 860–885.

References II

- Frederick, S., G. Loewenstein, and T. O'Donoghue (2002). "Time Discounting and Time Preference: A Critical Review". In: *Journal of Economic Literature* 40, pp. 351–401.
- Guiso, L., P. Sapienza, and L. Zingales (2018). "Time varying risk aversion". In: *Journal of Financial Economics* 128.3, pp. 403–421.
- Miltenburg, E. and J. Schaper (2020). "Maatschappelijke gevolgen van corona: Verwachte gevolgen van corona voor opvattingen en houdingen van Nederlands". In: *The Netherlands Institute for Social Research*.
- Ploner, M. (2017). "Hold on to it? An experimental analysis of the disposition effect". In: *Judgment and Decision Making* 12.2, pp. 118–127.
- Potters, J., A. Riedl, and P. Smeets (2016). "Towards a Practical and Scientifically Sound Tool for Measuring Time and Risk Preferences in Pension Savings Decisions". In: *Netspar Industry Paper* 59.

References III

- Shefrin, H. and M. Statman (1985). "The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence". In: *Journal of Finance* 40.3, pp. 777–790.
- Thaler, R. (1981). "Some empirical evidence on dynamic inconsistency". In: *Economics Letters* 8.3, pp. 201–207.
- Wang, H. (2017). "Robust asset pricing with stochastic hyperbolic discounting". In: *Finance Research Letters* 21, pp. 178–185.

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)