Flexible Work Arrangements and Precautionary Behavior: Theory and Experimental Evidence

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Basel, Oct 09, 2018

Research Question

- Well known fact that labor supply can be transformed into consumption/saving <u>intra</u>temporally
- But are saving and labor supply substitutes <u>inter</u>temporally?

  → Could solve (part of) precautionary saving puzzle

  → Could explain negative Frisch elasticity

  → Saving behavior has strong effects on economic growth

  → Practical importance: How should firms or governments regulate work arrangements?

How should firms or governments regulate work arrangements?

BBC Is it the end of the 9 to 5 working day?

HUFFPOST **Working 9 'Til 5? Only 6% Of Us Now Have A Traditional Working Day**

The Atlantic **Walmart's Future Workforce: Robots and Freelancers**

Forbes The Future Of Work: Flexible Work Arrangements

CNBC Uber will require US drivers to take six-hour breaks between long shifts

Precautionary Saving Puzzle

- Evidence for precautionary behavior is mixed

Jump to Literature

- There is evidence for precautionary **labor supply**

Definition

Precautionary Labor Supply. Difference between hours supplied in the presence of risk and hours under certainty (Flodén, 2006).

- 4.5% of weekly work hours of self-employed are precautionary (e.g. Jessen, Rostam-Afschar, and Schmitz, 2017)
- Precautionary labor supply should show up in savings

Reduction in Hours if Risk becomes Minimal

"I sleep in my office"

Étienne Gillig, 64, is a freelance artist and earns only 100 euros, but sometimes more than 6,000 euros a month. What's left, goesto the tax office.

By Felicitas Wilke, December 10, 2017, 15:55 / 208 comments

"If things get really tight, there are four times 50 cents on my window sill, four times one euro and four times two euros, which I can then use," says Étienne Gillig. © Simon Koy for TIME ONLINE

Precautionary Saving Puzzle

- But, no evidence for precautionary **savings** with survey data (e.g. Fossen and Rostam-Afschar, 2013; Lusardi, 1998, 1997)

- $\log(\text{Savings})_{it} =$
  $\beta_0 + \beta_1 \text{Risk}_{it} + \beta_2 \log(\text{Income in absence of shocks})_{it} + Z_{it}\beta_3 + \varepsilon_{it}$
  Why do regressions of this type not work?

- If intertemporal substitution not via savings, paradox is resolved

  → We formulate a model that allows income **shifting** by time allocation

Why an experimental study with students may be useful

- Drawbacks
  - only qualitative results (but no point looking at quantities if qualitatives wrong)
  - external validity (like in natural experiments)

- Usual problem in labor economics:
  Is it preferences, frictions or measurement error?

  In the lab
  - Control preferences, wage risk, frictions
  - No measurement error:
    wage risk and effort observed without error
  - Direct test of theory:
    see which part of theory fails under ideal conditions
- Falk and Heckman (2009):

  "many recent objections against lab experiments are misguided and [] even more lab experiments should be conducted."

Definition: Labor Supply

- **Definition**

  Supply of Effort. Effort is total cost incurred during given duration.

  Definition

  Supply of Work-Shift Time. A work-shift is calendar time spent working with continuous effort.
  Work-shift ends with valuation of total work net of total effort costs accumulated during work-shift.

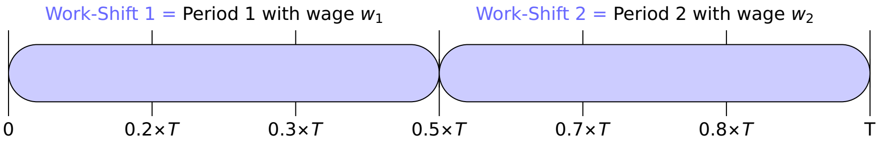
  - We show why work-shift choice (shifting) is equivalent to saving choice (consumption/leisure cuts, extra effort)

Findings of Our Experiment

- On the aggregate level, the model describes subjects' behavior well
- Extended model with shifting can predict behavior better
- Some who follow the intertemporal model and others who follow the static model coexist
- Combination of extended model and static model works best
- Precautionary saving exists for 82% to 94% of subjects
- Precautionary shifting exists for 40% to 66% of subjects
- Shifting and saving are **substitutes**, though not perfect substitutes

If governments or labor unions decide to promote variable work arrangements (flexible hours or days) as an alternative to the traditional fixed, 40-hour work week, saving and thus economic growth may be reduced.

The Standard Model

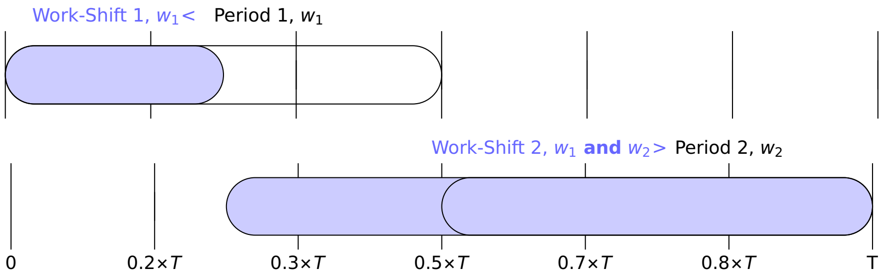


- Wage (piece rate) in period 1 certain, uncertain in period 2
- Effort translates into quantity via $q(e_i)$, costs of effort $v(e_i)$ are deducted
- After-tax consumption in each shift $c(y_i)$
- All decisions taken before uncertainty is resolved
- Two scenarios: Hand-to-mouth and Precautionary Saving
- Savings allow to smooth consumption

Our Extension to the Standard Model

We now distinguish between:

- period: time for which a (certain or uncertain) wage is paid,
- work-shift: time of uninterrupted work, income enters $c(y_i)$,
- round: a round consists of two periods and two shifts.

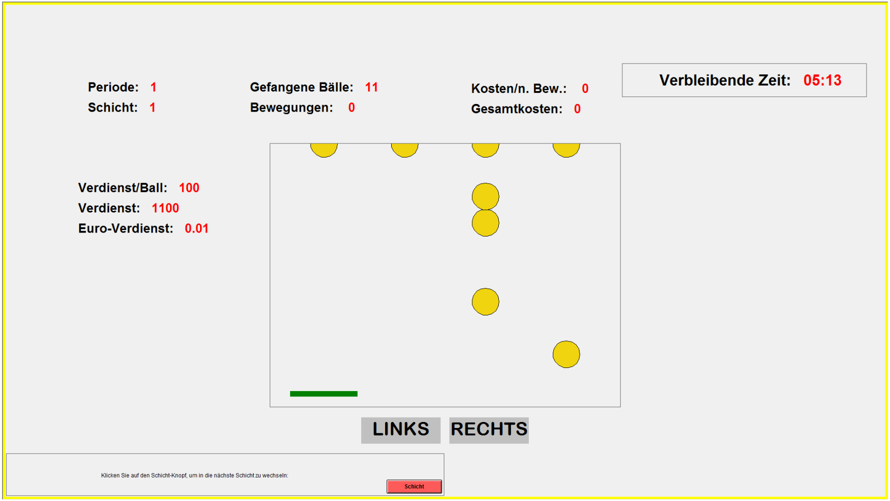


- Now the worker can (also) adjust the time spent in the work-shifts (total time fixed at T)
- Again, two scenarios: Precautionary Labor Supply and Precautionary Labor Supply and Saving
- Labor supply can also be used to smooth consumption
- Labor supply and saving are perfect substitutes

Definition of Treatments and Decision Variables

	Treatments			
	Standard Model		Extended Model	
	I Hand-to-Mouth	II Saving	III Shifting	IV Saving & Shifting
Effort	Allowed	Allowed	Allowed	Allowed
Saving	Not Allowed	Allowed	Not Allowed	Allowed
Time Allocation	Not Allowed	Not Allowed	Allowed	Allowed
	Choices			
Effort	e_1, e_2	e_1, e_2	e_1, e_2	e_1, e_2
Saving		s		s
Time Allocation			t	t

Real Effort Task
(Gächter, Huang, and Sefton, 2016)



A Two-Period Dynamic Stochastic Optimization Model

- Induced shift-separable CRRA payoff function:

$$c(y_i) = 4\log(y_i) - 4 \times 7.$$

- Coefficient of relative risk aversion (Pratt, 1964)

$$-y_i \frac{c''}{c'} = \tau = 1$$

- Coefficient of relative prudence (Kimball, 1990) is

$$-y_i \frac{c'''}{c''} = \tau + 1 = 2$$

Payoff Maximization Problem

- $$\max_{y_1, y_2} C = c(y_1) + E_{\varepsilon}[c(y_2)]. \tag{1}$$

- Budget in shift 1 with share of **time spent in first work-shift** t

$$y_1 = \begin{cases} y_1(t, w_1, e_1, s) & \text{if } t < 0.5 \\ y_1(0.5, w_1, e_1, s) & \text{if } t = 0.5 \\ y_1(t, w_1, e_1, w_2, e_2, s) & \text{if } t > 0.5 \end{cases} \tag{2}$$

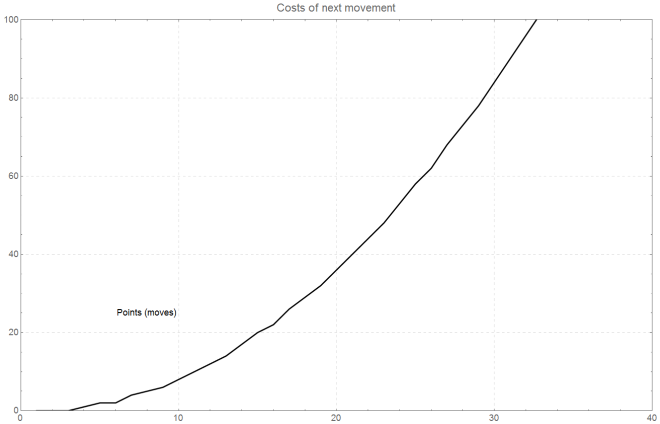
- Budget in shift 2

$$y_2 = \begin{cases} y_2(t, w_1, e_1, w_2, e_2, s) & \text{if } t < 0.5 \\ y_2(0.5, w_2, e_2, s) & \text{if } t = 0.5 \\ y_2(t, w_2, e_2, s) & \text{if } t > 0.5. \end{cases} \tag{3}$$

- **First period wage** $w_1 = 100$
- **Second period wage** stochastic i.i.d. $w_2 = w_1 + \varepsilon$ with $\varepsilon = \pm 80$ 20 or 180 with equal probability in second period
- e_1 and e_2 denote **effort** in shifts 1 and 2, s **savings**

How is y_i Determined?

- Costly production: induced quadratic effort costs



- Ability function estimated from real effort task:

$$\text{balls}(\text{moves}) = \beta_0 + \beta_1 \times \sqrt{\text{moves}} + \beta_2 \times \text{moves}^2$$

Lagrangians in the Standard Model

Treatment I (Hand-to-Mouth):

$$\mathcal{L}_i^I = E_\varepsilon[c(y_i, e_i)] + \mu^I(E_\varepsilon[w_i \times q(e_i) - v(e_i) - y_i]) \tag{4}$$

Treatment II (Precautionary Saving):

$$\begin{aligned}\mathcal{L}^{II} &= c(y_1, e_1) + E_\varepsilon[c(y_2, e_2)] \\ &+ \mu^{II}(E_\varepsilon[w_1 \times q(e_2) + w_2 \times q(e_2) - v(e_1) - v(e_2) - y_1 - y_2])\end{aligned} \tag{5}$$

Lagrangians in the Extended Model

Treatment III (Precautionary Labor Supply) + Treatment IV (both):

$$
\begin{aligned}
\mathcal{L}^{III/IV} &= c(y_1,e_1)+E_\varepsilon[c(y_2,e_2)]+\mu^{III/IV}\Bigg\{ \\
+\mathbb{1}_{\{t=0.5\}} &\times \Big[2\times t[w_1\times q(e_1)-v(e_1)]-y_1 \\
&+ 2\times(1-t)E_\varepsilon[w_2\times q(e_2)-v(e_2)]-y_2\Big] \\
+\Big(1-\mathbb{1}_{\{t=0.5\}}\Big)\mathbb{1}_{\{t<0.5\}} &\times \Big[2\times t[w_1\times q(e_1)-v(e_1)]-y_1 \\
&+ 2\times(0.5-t)[w_1\times q(e_1)-v(e_1)] \\
&+ 2\times 0.5E_\varepsilon[w_2\times q(e_2)-v(e_2)]-y_2\Big] \\
+\Big(1-\mathbb{1}_{\{t=0.5\}}\Big)\Big(1-\mathbb{1}_{\{t<0.5\}}\Big) &\times \Big[2\times 0.5[w_1\times q(e_1)-v(e_1)] \\
&+ 2\times(t-0.5)E_\varepsilon[w_2\times q(e_2)-v(e_2)]-y_1 \\
&+ 2\times(1-t)E_\varepsilon[w_2\times q(e_2)-v(e_2)]-y_2\Big]\Bigg\}
\end{aligned} \tag{6}
$$

Optimality Conditions

Treatment I:

$$c_{y_1}(w_1 q_{e_1} - v_{e_1}) = -c_{e_1}, \tag{7}$$

$$E_\varepsilon[c_{y_2}(w_2 q_{e_2} - v_{e_2})] = -E_\varepsilon[c_{e_2}]. \tag{8}$$

Income and effort can be traded at a rate equal to the difference between valued marginal production and marginal costs.

Treatment II/III/IV:

$$c_{y_1}(w_1 q_{e_1} - v_{e_1}) = -c_{e_1}, \tag{9}$$

$$E_\varepsilon[c_{y_2}(w_2 q_{e_2} - v_{e_2})] = -E_\varepsilon[c_{e_2}], \tag{10}$$

$$c_{y_1} = E_\varepsilon[c_{y_2}]. \tag{11}$$

Standard consumption Euler equation

Experimental Design

- Within-subject design (with 192 subjects)
- No interest, no discounting
- 3 trial periods and 4 treatment rounds with 2 periods for each subject
- In each of the 7 periods/rounds subjects complete real effort task
- In treatment round 2, 3, 4 subjects additionally make choices
  - Round 2: savings choice
  - Round 3: work-shift allocation
  - Round 4: both
- Elicitation of risk aversion: 12 binary choices between lotteries
- Subjects were invited using ORSEE (Greiner, 2015)
- Experiments were run on z-Tree (Fischbacher, 2007) at PLEx (Uni Potsdam) in November and December 2017
- Subjects were paid according to result of
  - one randomly chosen trial period,
  - one of the four treatment rounds,
  - with 5% chance of the risk aversion questions.
- Payoffs revealed only at the very end of the experiment
- Average duration 90 minutes, average 15 Euro, min 0, max 66

Ball Catching Task for Treatment III

(Gächter, Huang, and Sefton, 2016)

Saving Screen

In Schicht 1 haben Sie 3727 Punkte verdient. Jetzt haben Sie die Möglichkeit zu sparen.

Jeder Punkt, den Sie sparen, wird vor der Umrechnung in Euro von Ihrem Verdienst in Schicht 1 abgezogen. Der Sparbetrag wird zu Ihrem Verdienst aus der Aufgabe in Schicht 2 (vor der Umrechnung in Euro) addiert.

Bitte nutzen Sie den Schieber in der Box, um die hypothetischen Konsequenzen von unterschiedlichen Sparbeträgen auf Ihre Auszahlungen zu ermitteln.

Geben Sie dann Ihren Sparbetrag in dem Feld in der zweiten Box ein und bestätigen Sie Ihre Eingabe mit dem OK-Button.

0 500 1000 1500 2000 2500

Ersparnis in Punkten:	2021
Verdienst - Ersparnis in Schicht 1:	1706
Neuer Euro-Verdienst für Schicht 1:	1.88

Bitte geben Sie hier Ihren Sparbetrag in Punkten ein!

Ihre Ersparnis: 1500

OK

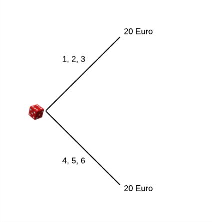
Elicitation of Risk Preferences

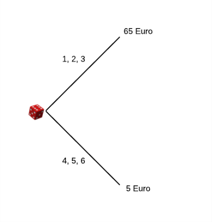
(Noussair, Trautmann, and Van de Kuilen, 2014)

Jump to characteristics

Dies ist die erste Entscheidung. Wählen Sie die Option, die Sie besser finden. Bitte entscheiden Sie sich zwischen "Option L" und "Option R"! (Nach dem Klick auf Ihre Wahl geht es direkt weiter zur nächsten Entscheidung.)

Option L:	**Option R:**





Von den beiden Optionen bevorzuge ich:

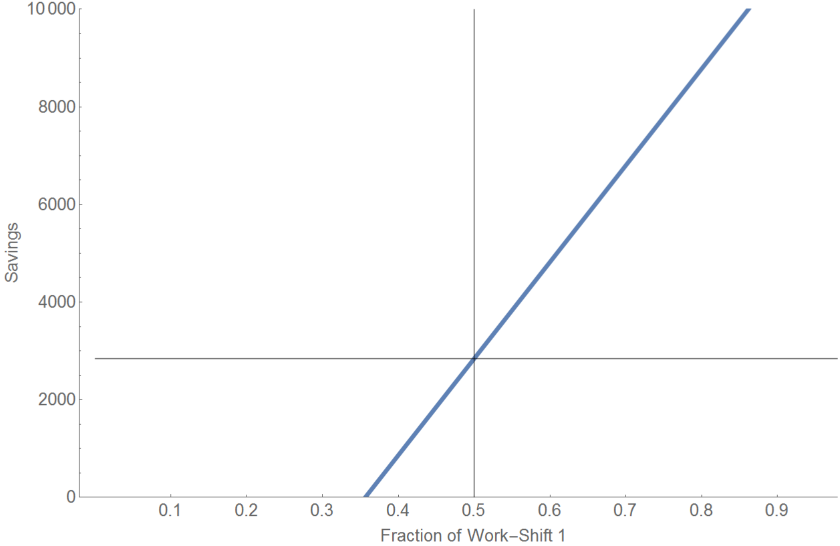
Option L

Option R

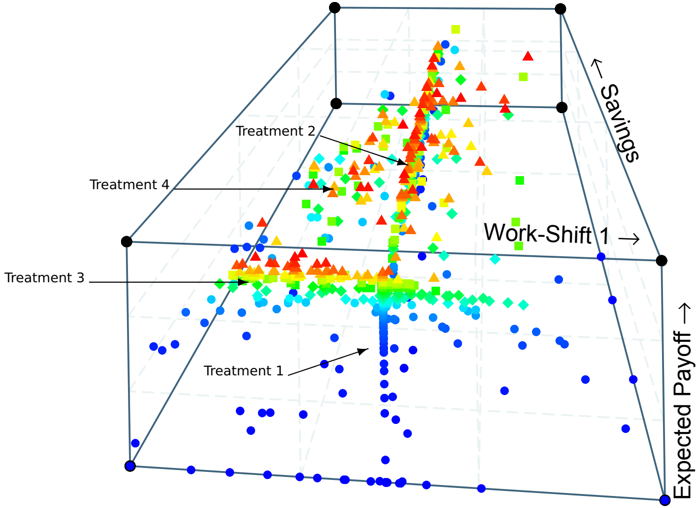
Hypotheses 1 to 4

- Hypothesis 1 (Direct reduction of effort by risk).
- Hypothesis 2 (Precautionary saving and effort):
  - i (Existence of precautionary motive).
  - ii (Absence of precautionary effort).
- Hypothesis 3 (Precautionary shifting):
  - i (Existence of precautionary shifting).
- Hypothesis 4 (Equivalence of saving and shifting).

Theoretically, Work-Shift Choice and Saving Choice Substitutes



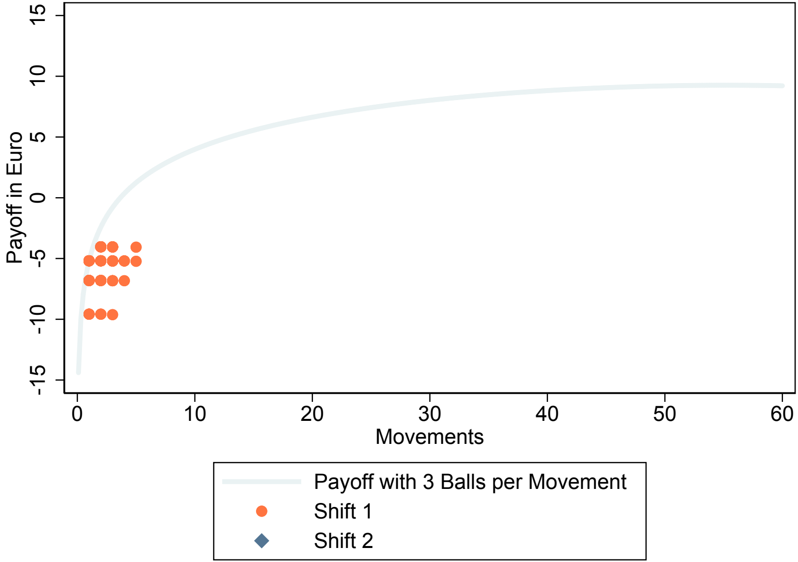
The Work-Shift-Savings-Payoff Space in GRAPH3D for Stata



The Work-Shift-Savings-Payoff Space in GRAPH3D for Stata

Behavior in T4 After 10 Seconds

Skip Data



Behavior in T4 After 20 Seconds

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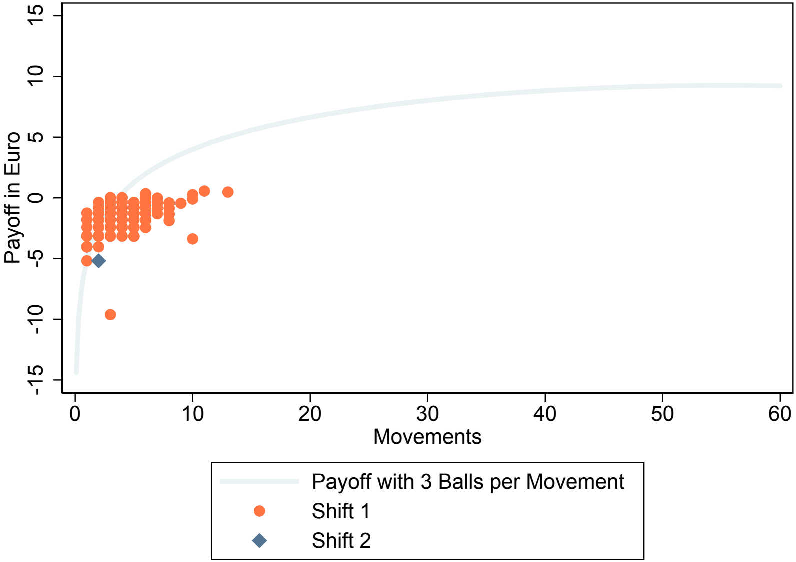

Behavior in T4 After 30 Seconds

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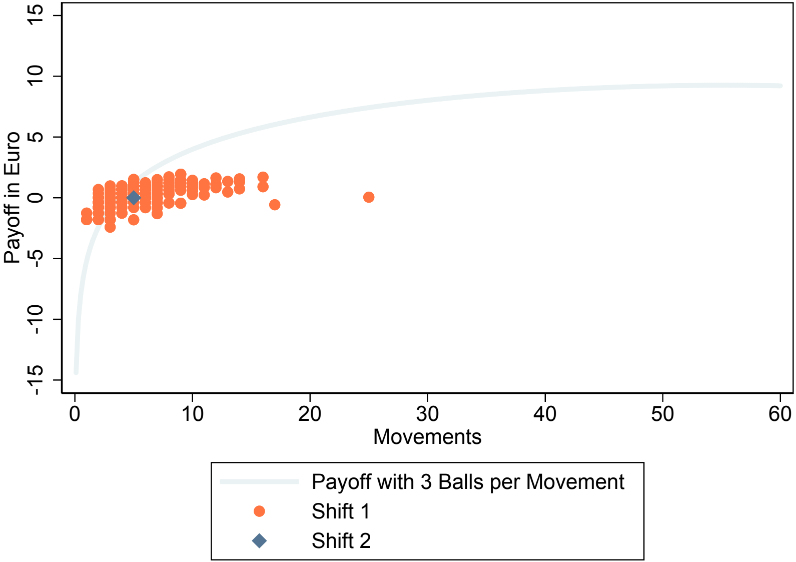
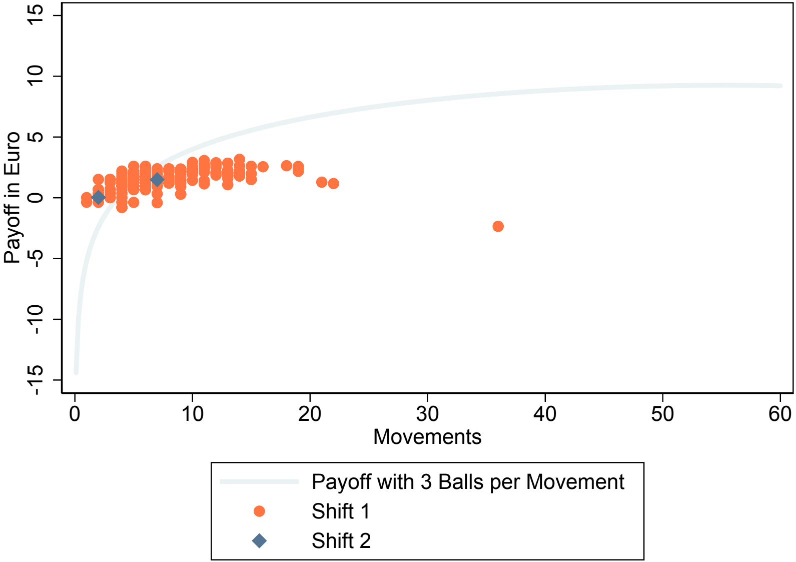


Behavior in T4 After 40 Seconds

Skip Data



Behavior in T4 After 50 Seconds

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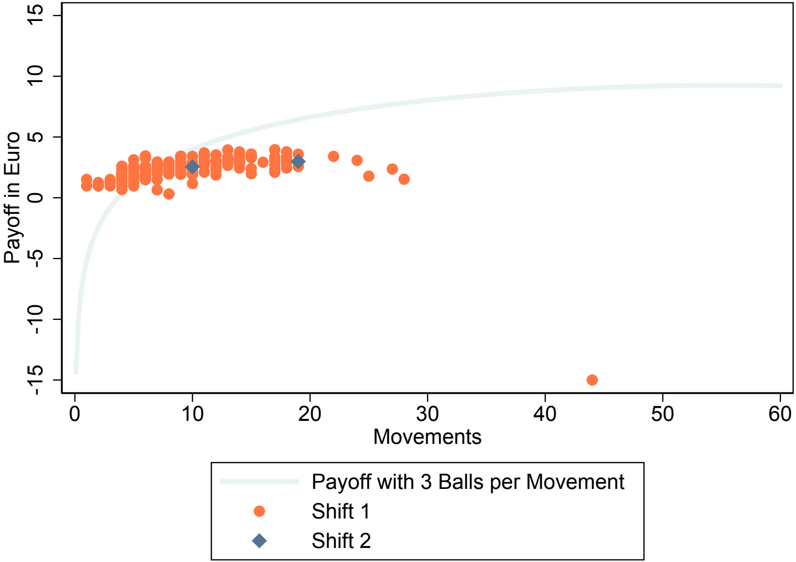

Behavior in T4 After 60 Seconds

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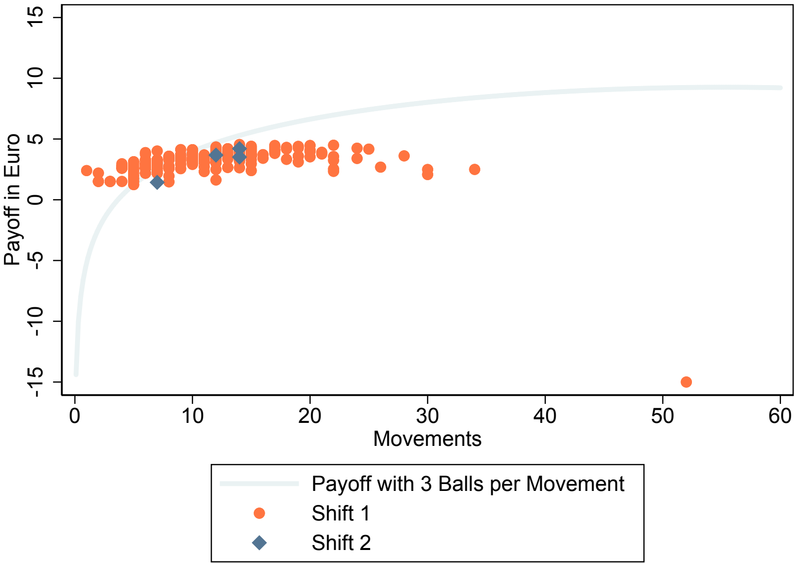
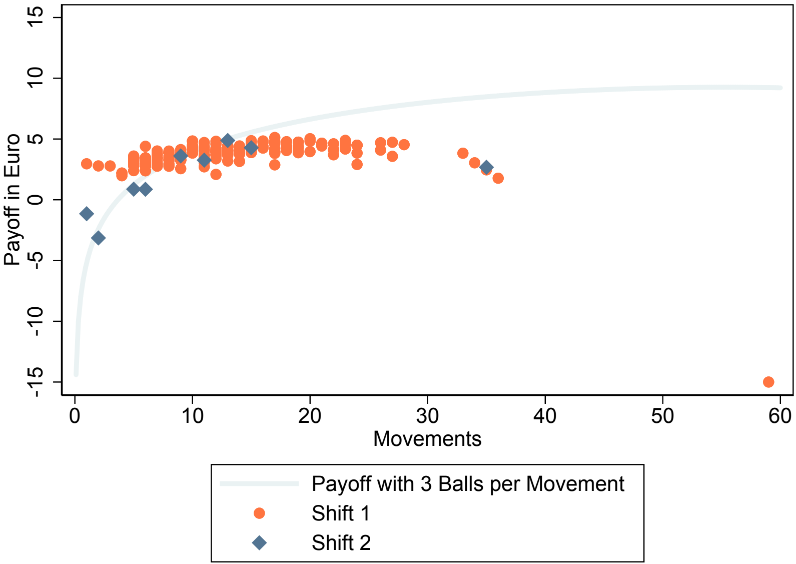


Behavior in T4 After 70 Seconds

Skip Data



Behavior in T4 After 80 Seconds

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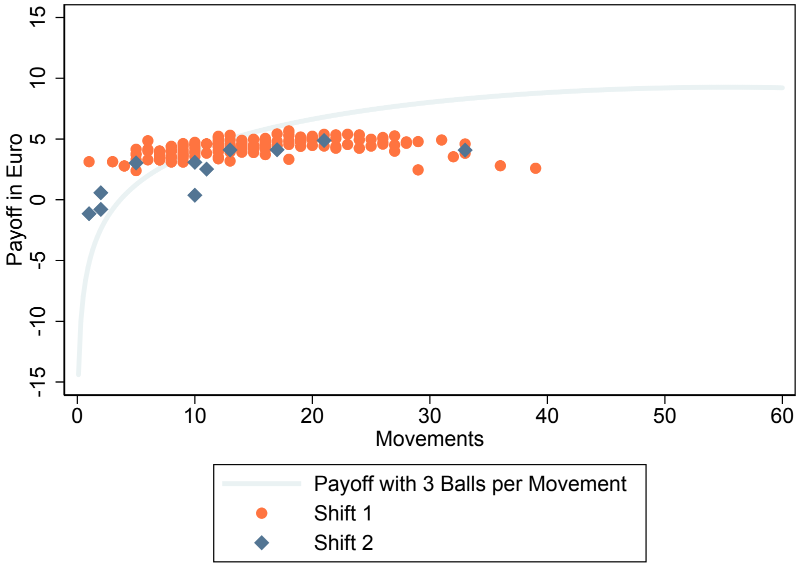

Behavior in T4 After 90 Seconds

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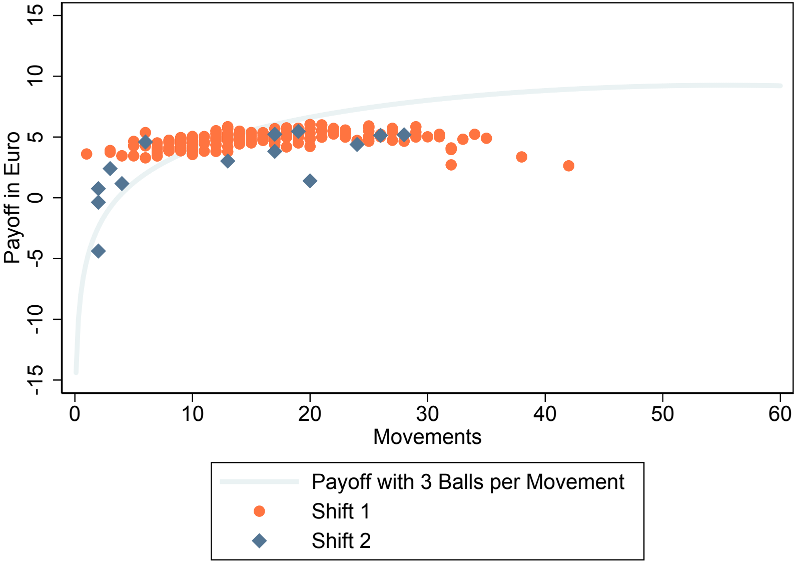

Behavior in T4 After 100 Seconds

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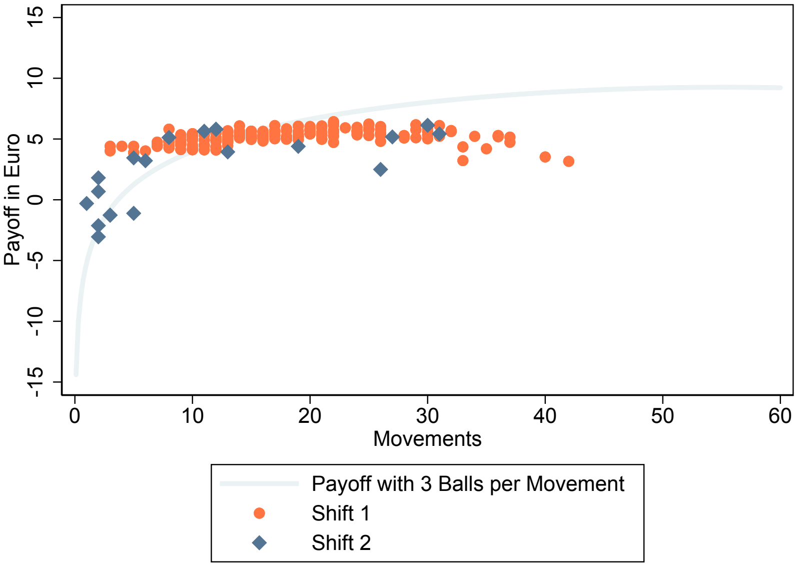

Behavior in T4 After 110 Seconds

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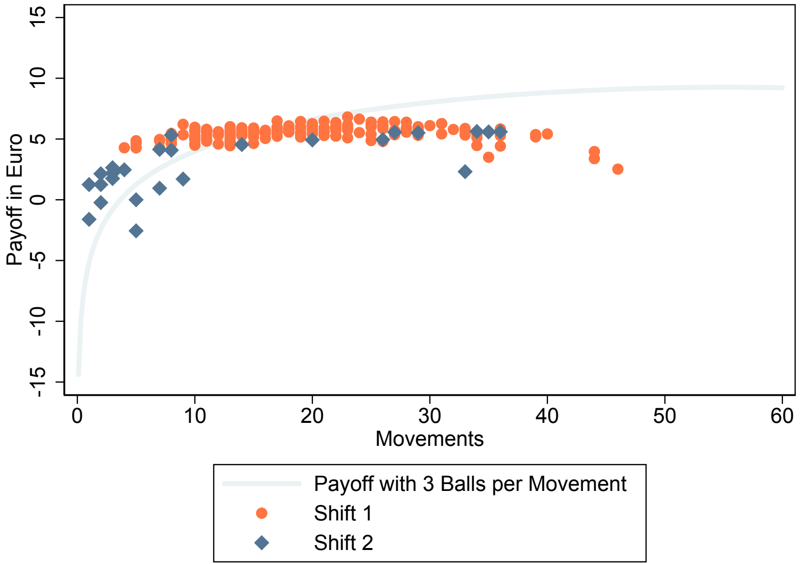

Behavior in T4 After 120 Seconds

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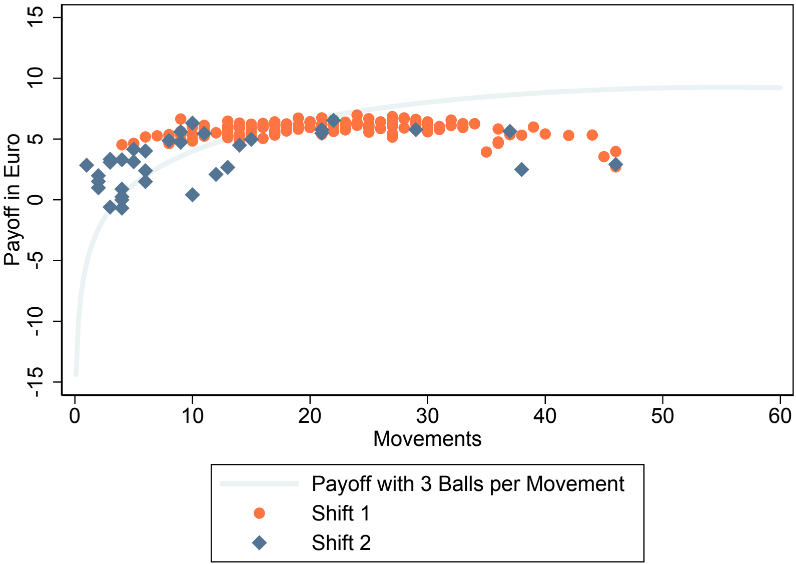

Behavior in T4 After 130 Seconds

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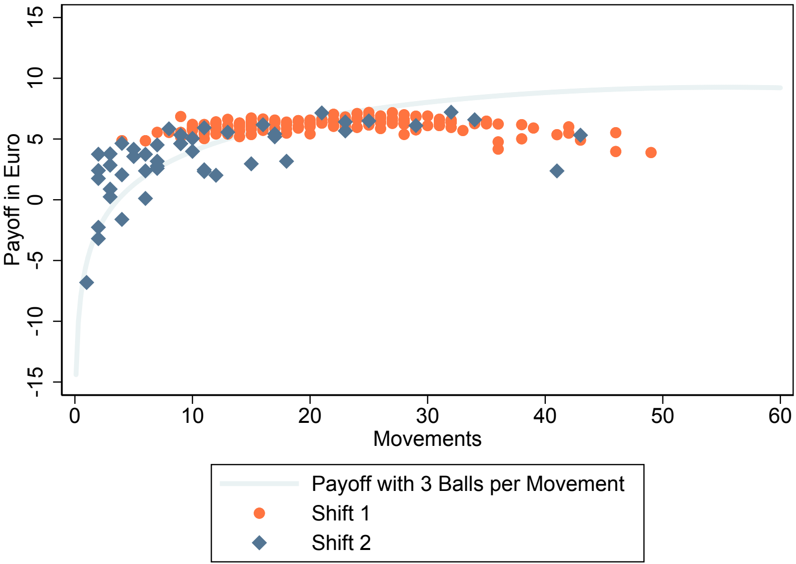

Behavior in T4 After 140 Seconds

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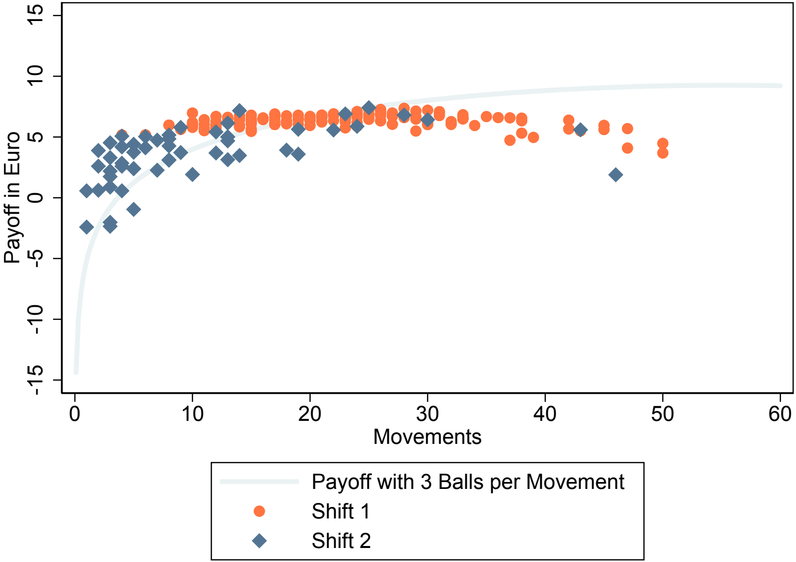

Behavior in T4 After 150 Seconds

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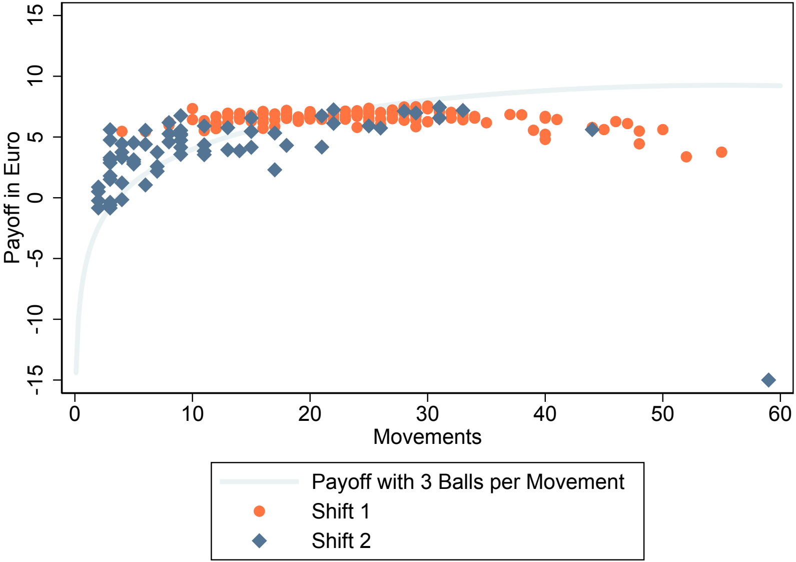

Behavior in T4 After 160 Seconds

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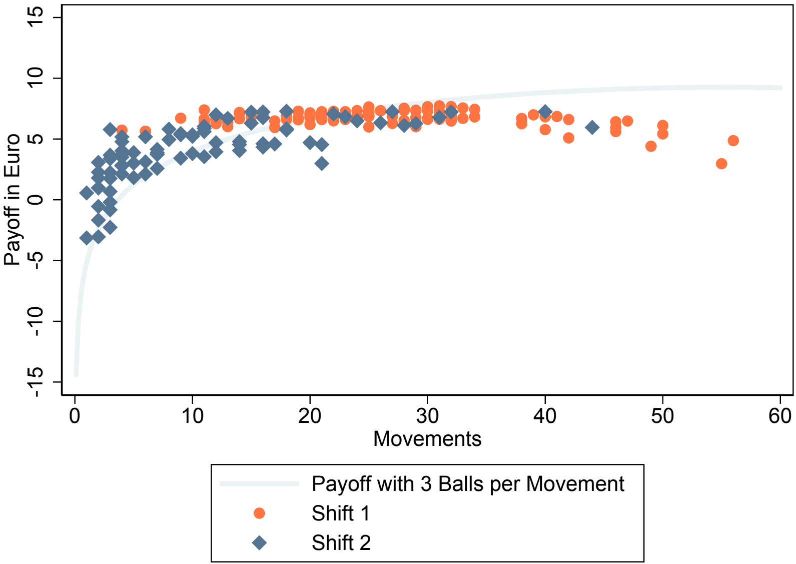

Behavior in T4 After 170 Seconds

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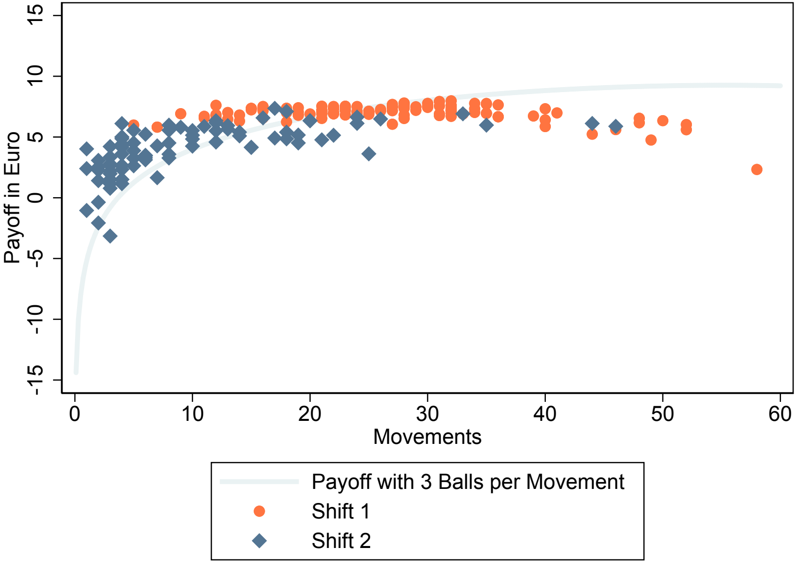

Behavior in T4 After 180 Seconds

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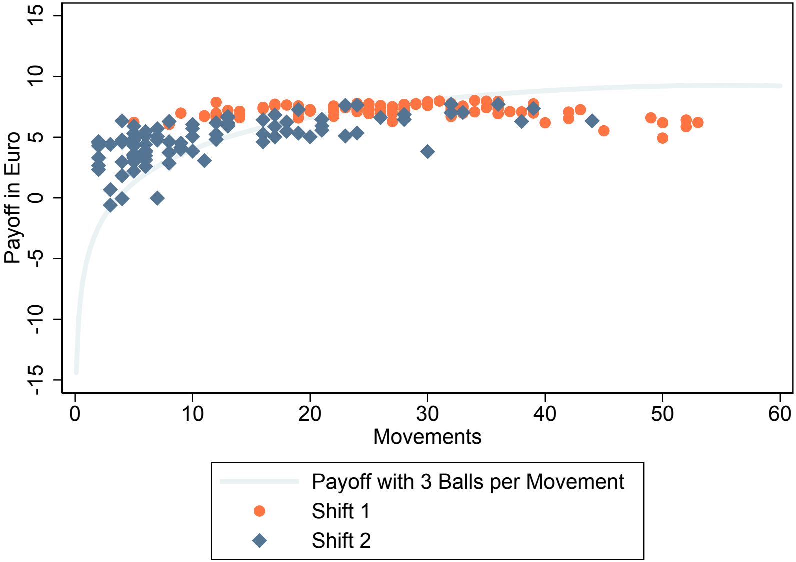

End of first period

Now wage can be either high or low

Behavior in T4 After 190 Seconds

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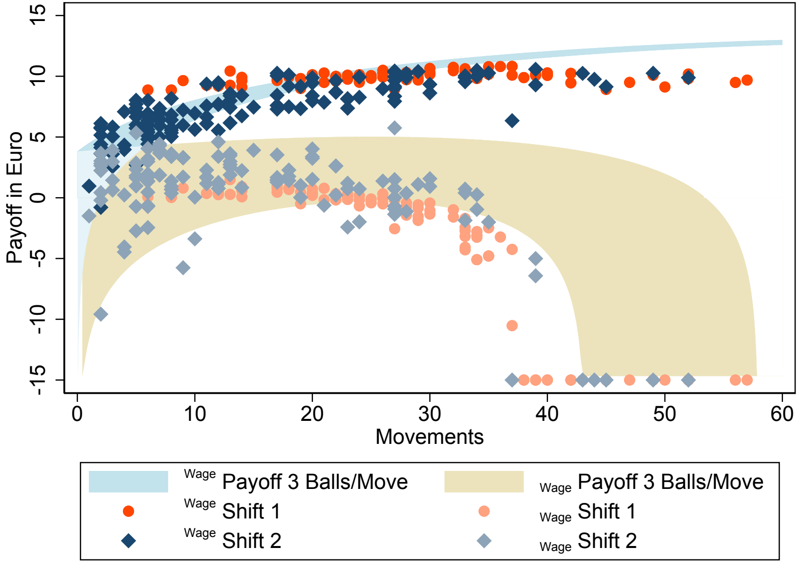

Behavior in T4 After 200 Seconds

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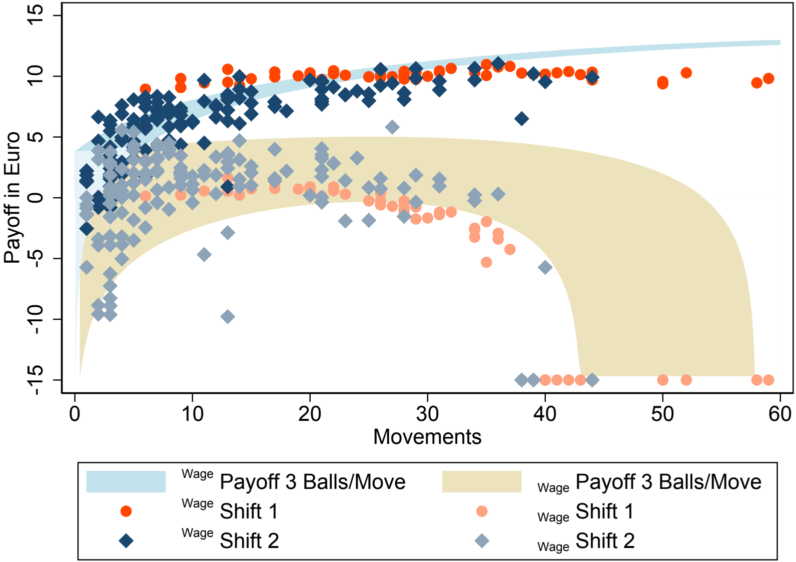

Behavior in T4 After 210 Seconds

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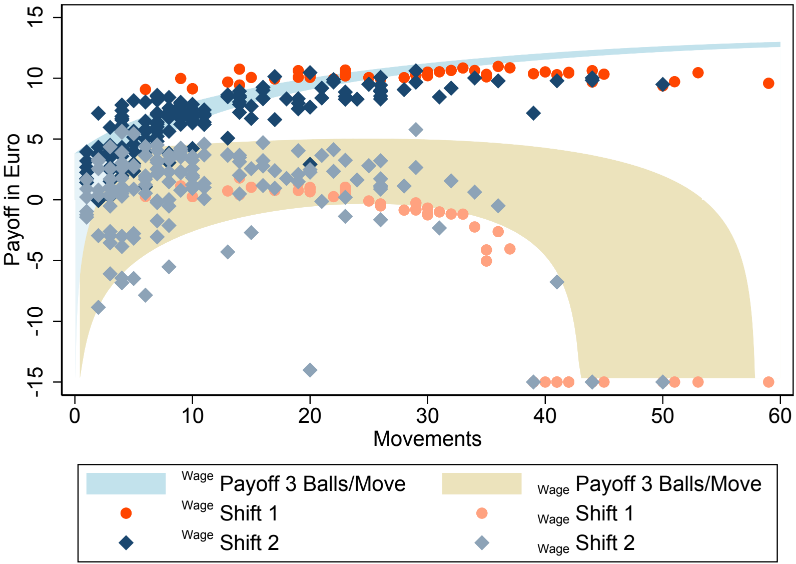

Behavior in T4 After 220 Seconds

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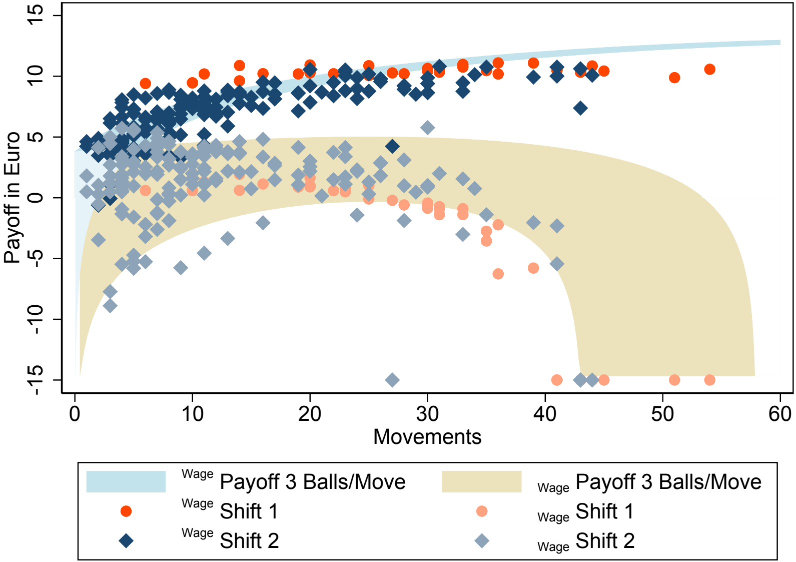

Behavior in T4 After 230 Seconds

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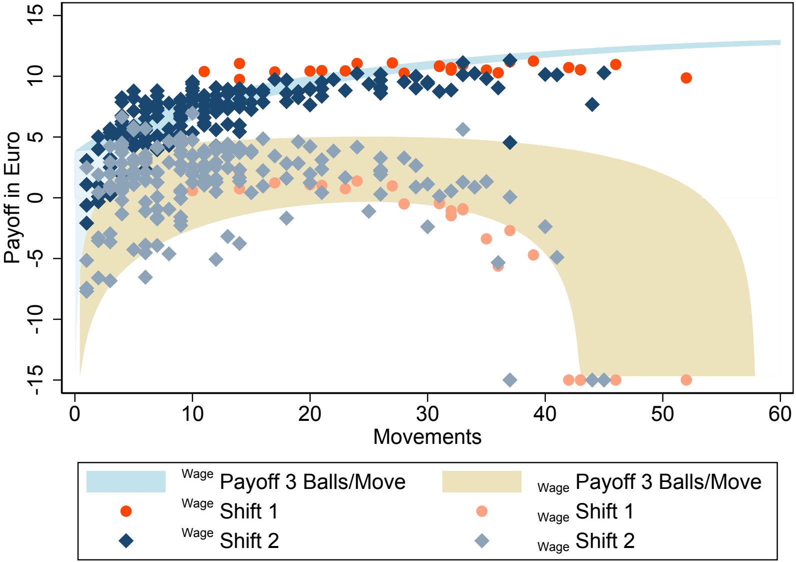

Behavior in T4 After 240 Seconds

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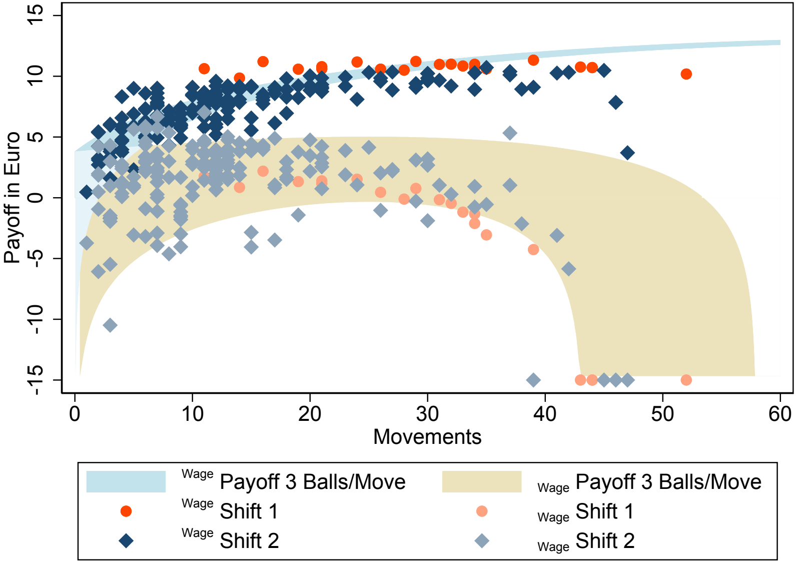

Behavior in T4 After 250 Seconds

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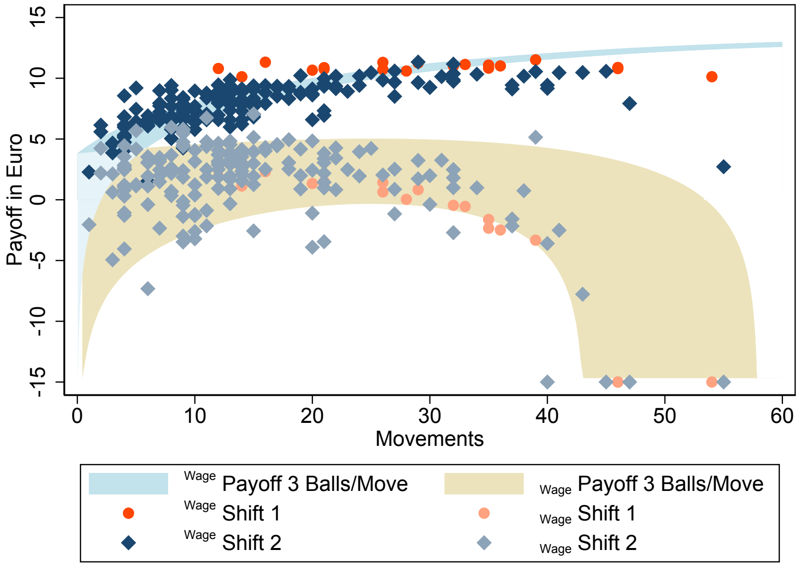

Behavior in T4 After 260 Seconds

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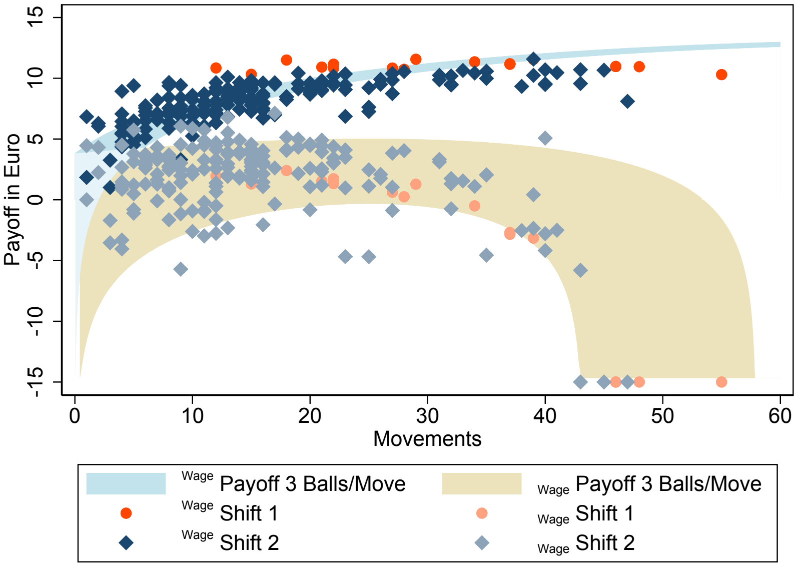

Behavior in T4 After 270 Seconds

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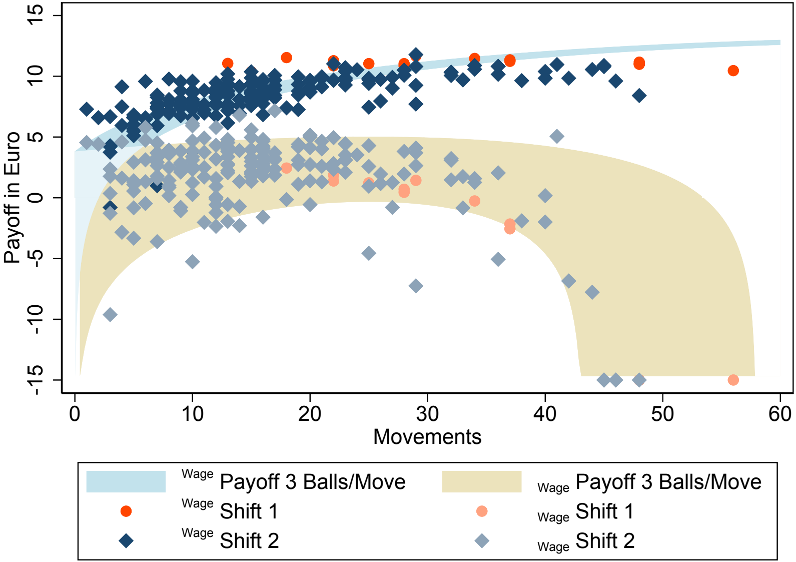

Behavior in T4 After 280 Seconds

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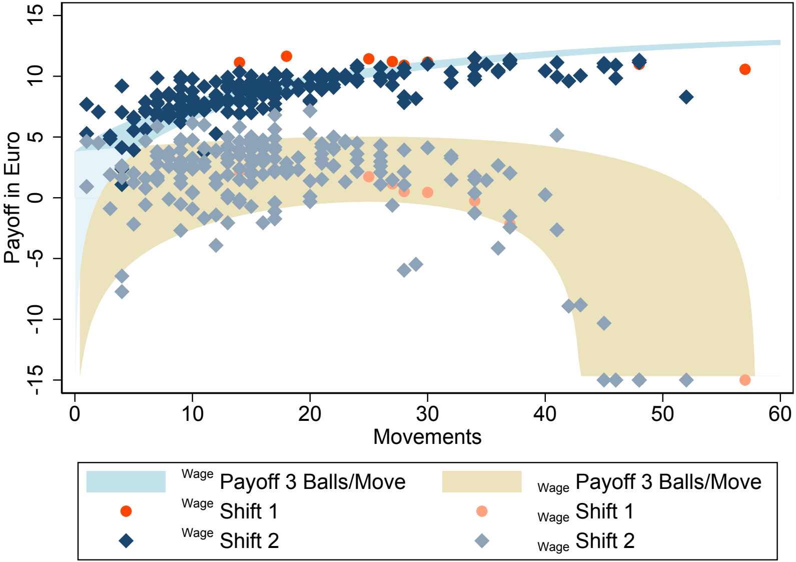
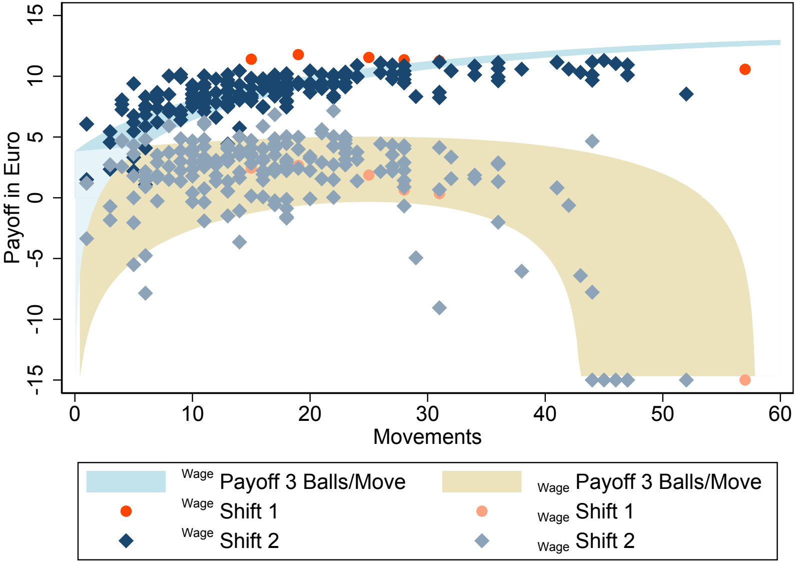


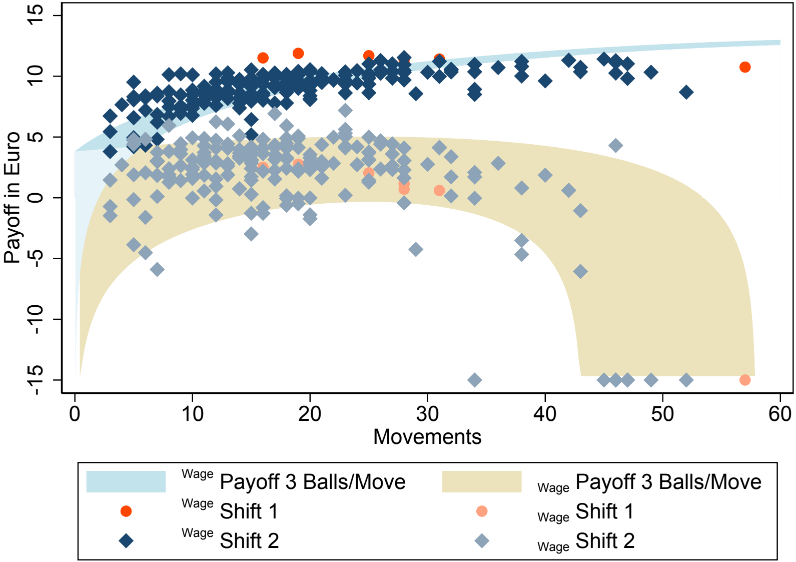
Behavior in T4 After 290 Seconds

Skip Data



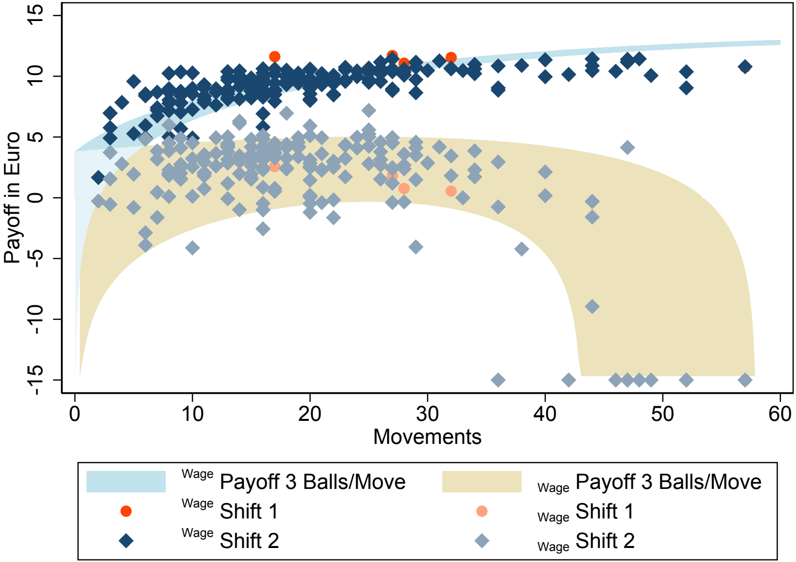
Behavior in T4 After 300 Seconds

Skip Data

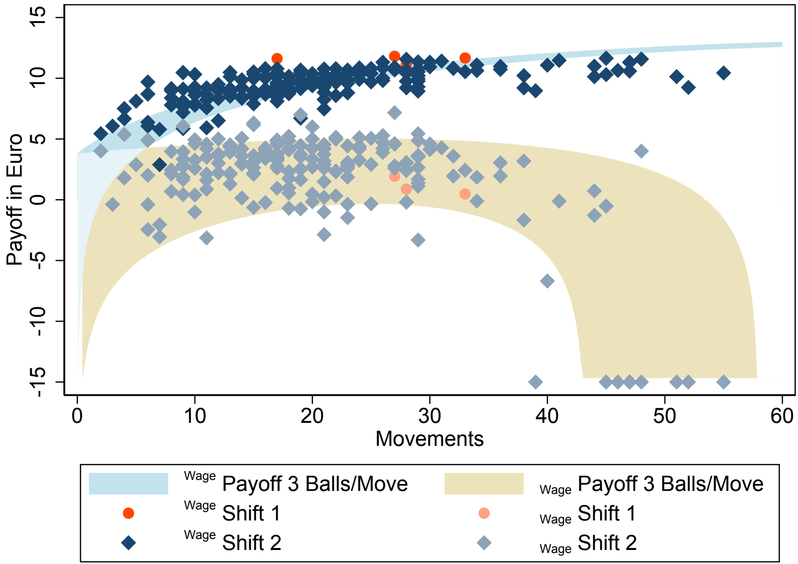


Behavior in T4 After 310 Seconds

Skip Data

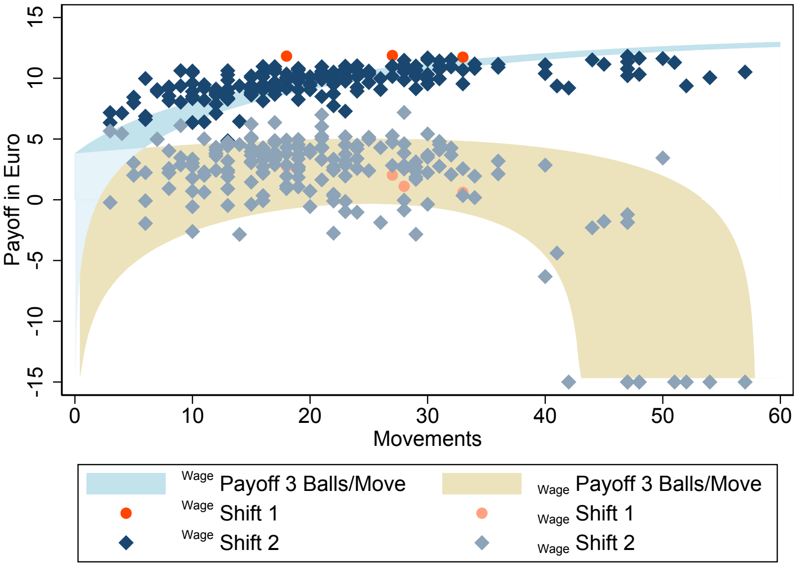


Behavior in T4 After 320 Seconds



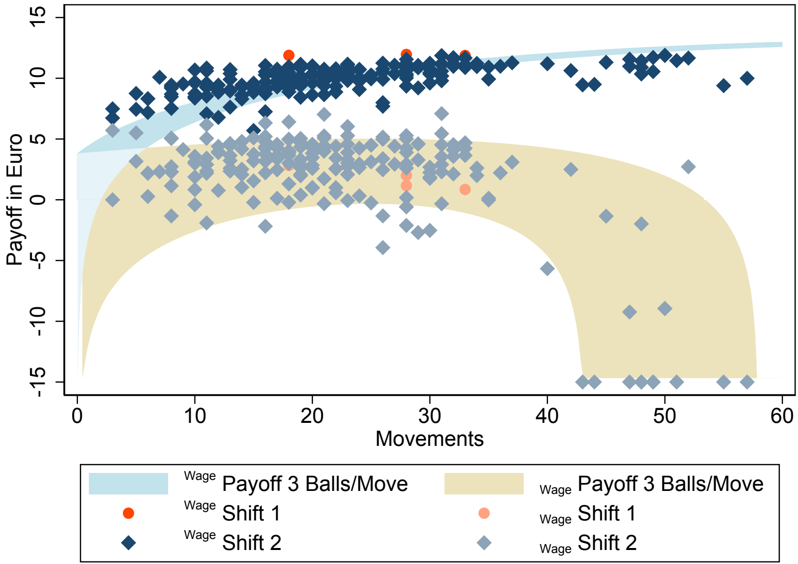
Behavior in T4 After 330 Seconds

Skip Data



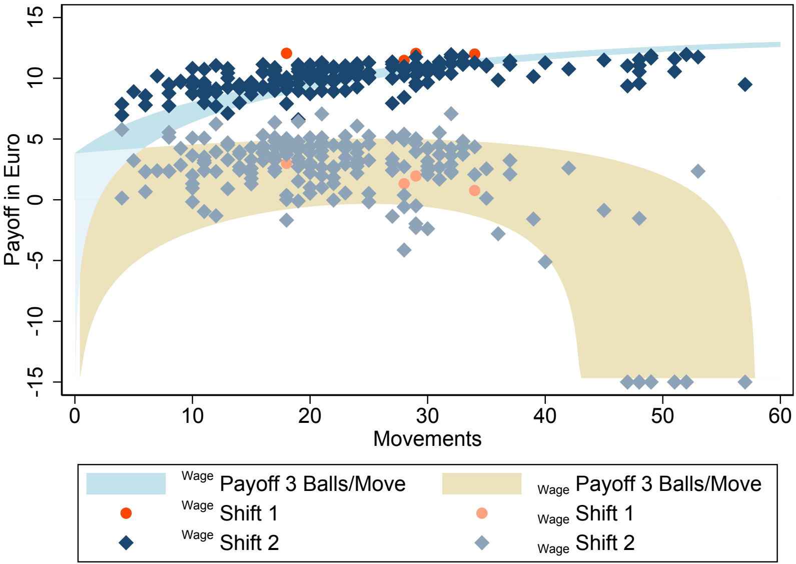
Behavior in T4 After 340 Seconds

Skip Data



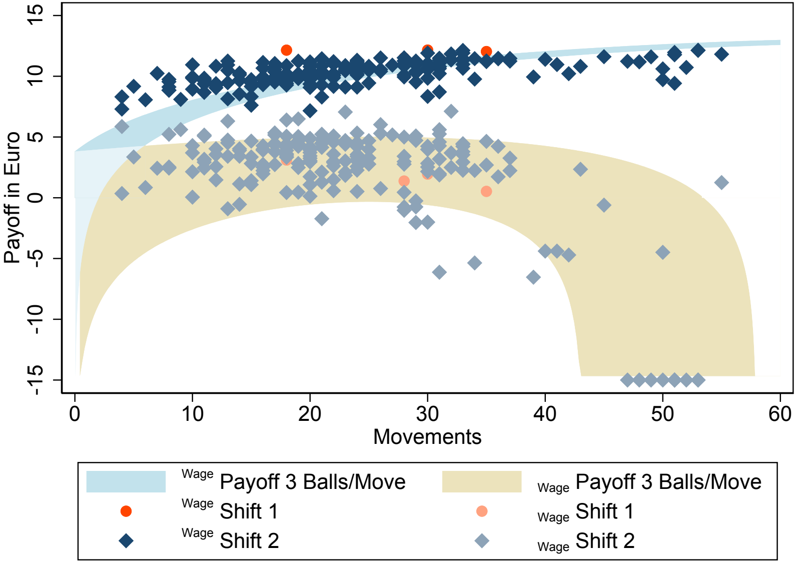
Behavior in T4 After 350 Seconds

Skip Data



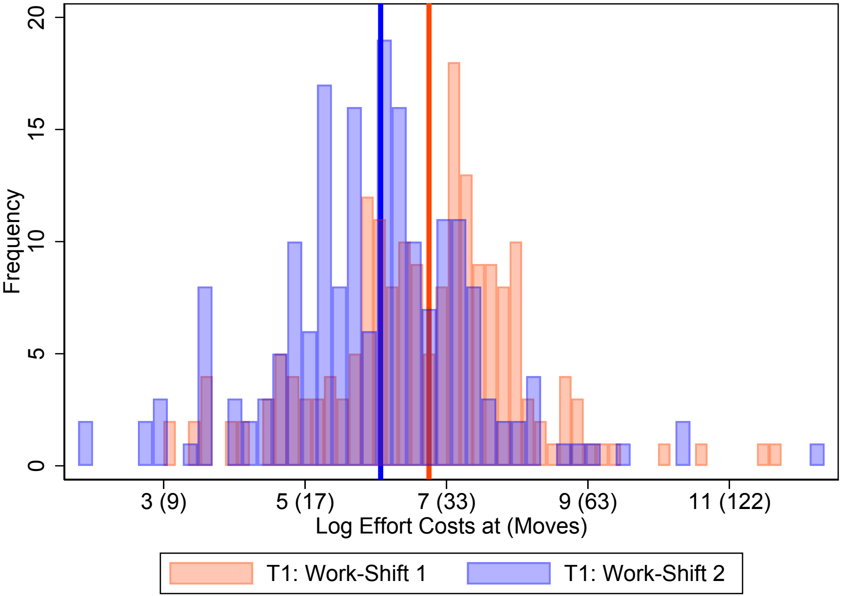
Behavior in T4 After 360 Seconds

Skip Data

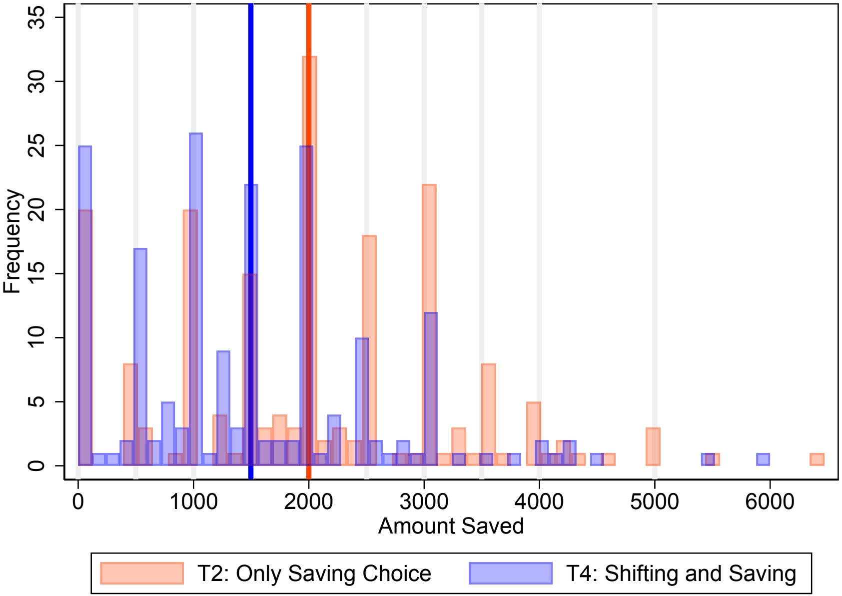


End of second period

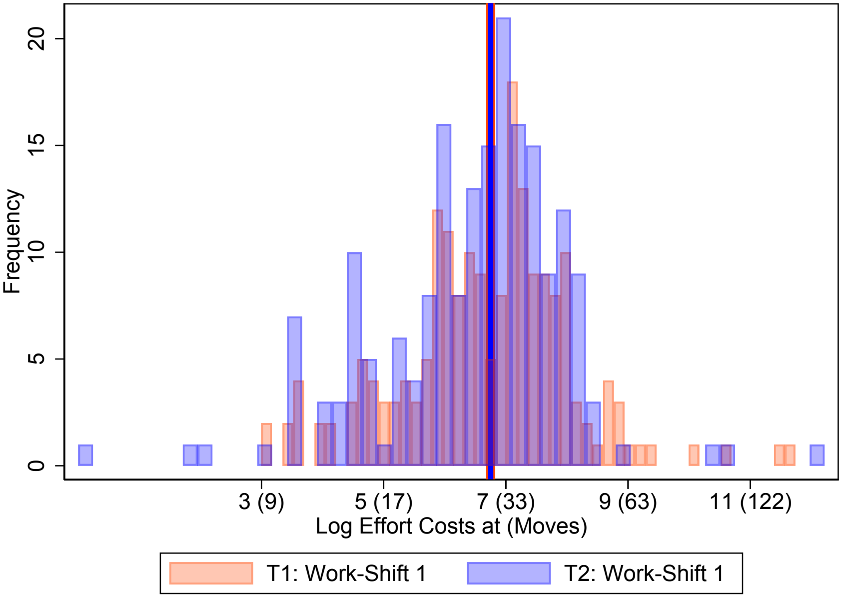
H1: Effort Smaller in Second Work-Shift than in First Work-Shift



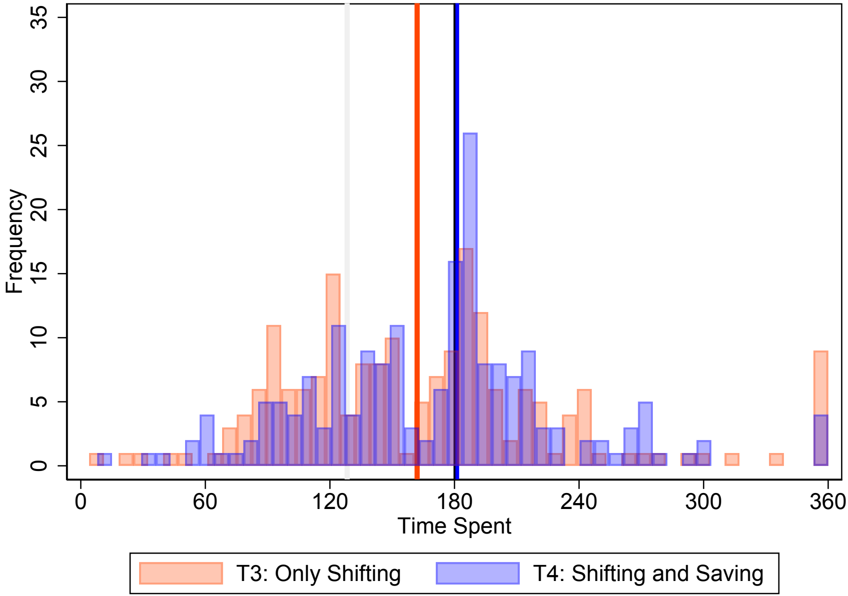
H2i: Precautionary Savings are Positive for Most



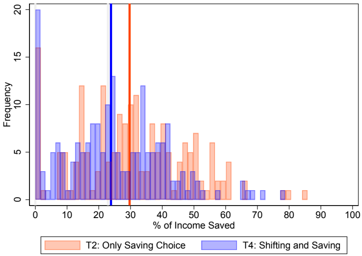
H2ii: Absence of Precautionary Effort (Higher First Shift Effort)

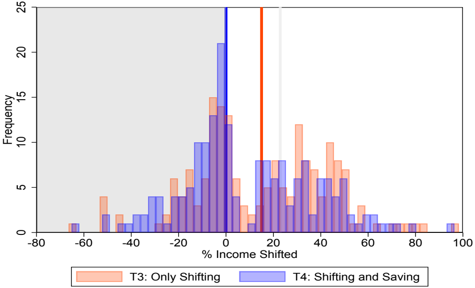


H3i: Work-Shift 1 is Shorter Than Work-Shift 2 for Most



Saving vs Shifting

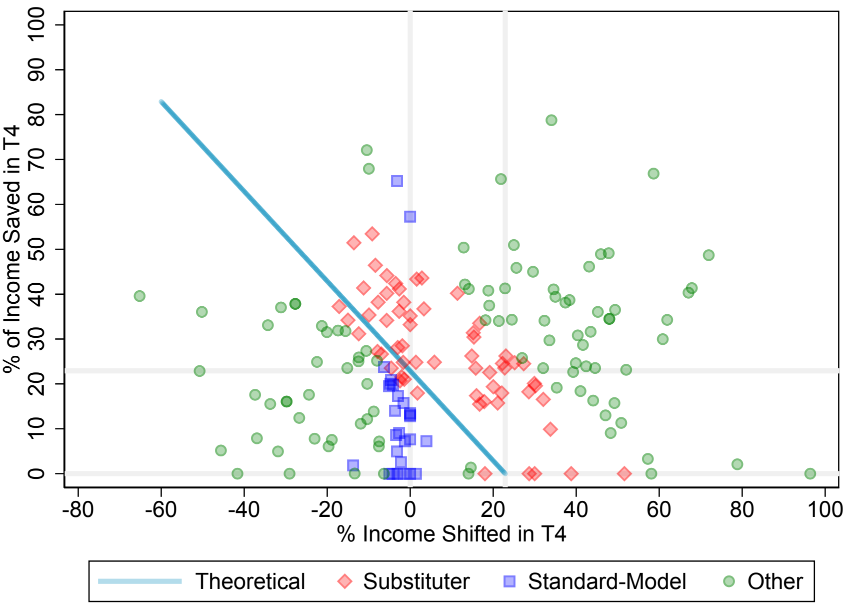




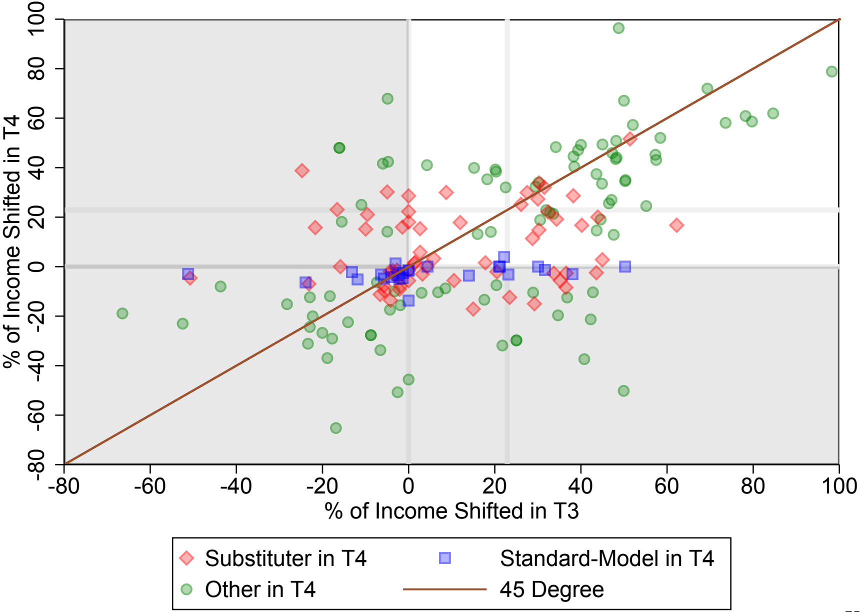
H4i: Less Savings if Work-Shift Choice Allowed

Longer First Work-Shift if Saving Allowed

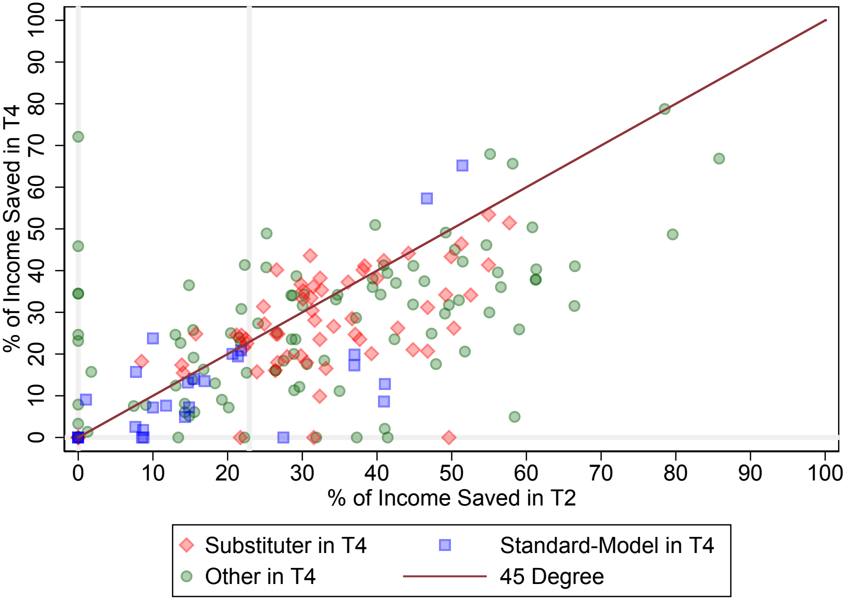
Shifting as a Substitute for Savings



Longer First Work-Shift if Saving Allowed



Less Savings if Work-Shift Choice Allowed



Statistical and Economic Significance

H1: Effort Smaller in Second Work-Shift than in First Work-Shift			
	T1 Shift 1	T1 Shift 2	Difference 95% Conf. Interval
Movements	32.71	26.54	4.61-7.75
Log Effort Cost	6.66	5.99	0.52-0.83

H2i: Proportion With Savings Higher than 100 Points		
	T2	T4
Mean (%)	89.58	86.98
Std. Err. (%)	(2.20)	(2.43)
95% Conf. Interval	85.26-93.90	82.22-91.74

H2ii: Absence of Precautionary Effort (Higher First Shift Effort)			
	T1 Shift 1	T2 Shift 1	Difference 95% Conf. Interval
Movements	32.70	30.73	-3.59 to -0.37
Log Effort Cost	6.66	6.46	-0.35 to -0.05

H3i: Proportion With Work Shift 1 Shorter than 180 Seconds		
	T3	T4
Mean (%)	58.85	47.40
Std. Err. (%)	(3.55)	(3.60)
95% Conf. Interval	51.89-65.81	40.33-54.46

Are Shifting and Saving Perfect Substitutes?

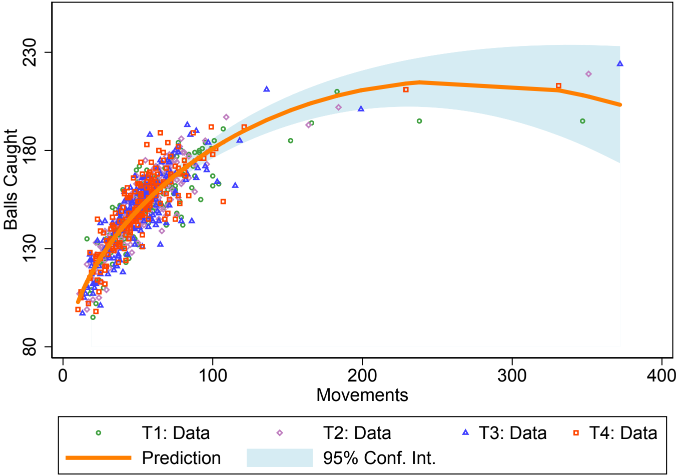
	Expected Euro earnings	Low Euro earnings	High Euro earnings
Treatment I	(baseline)	(baseline)	(baseline)
Treatment II	2.434***,[b]	5.009***,[b]	-0.140
	(0.412)	(0.583)	(0.365)
Treatment III	1.088**,[a,c]	2.789***,[a,c]	-0.613
	(0.525)	(0.681)	(0.518)
Treatment IV	2.092***,[b]	4.692***,[b]	-0.509
	(0.543)	(0.679)	(0.534)
Constant	8.764***	2.385***	15.143***
	(0.710)	(0.838)	(0.674)
R^2	0.014	0.043	0.001
Observations	768	768	768

Robust standard errors clustered at subject level.
Significantly different from zero at the 1%-level: ***, 5%-level: **.
Significantly different from Treatment II's coefficient at the 1%-level: [a], from Treatment III's: [b], from Treatment IV's: [c].
Source: Own calculations.

Differences in Treatments: H2i, H3i, H4

	Savings	Time Shift 1	Time Shift 1 ≤180	Income Cut	Income Cut>0	Balls per Move S1	Balls per Move S2
Treatment II-I	2012***			2012***	2061***	0***	0
	(90.0)			(90.0)	(139.5)	(0.1)	(0.1)
Treatment III-I		-14***	-59***	935***	2104***	0*	0**
		(5.1)	(3.2)	(146.9)	(172.8)	(0.1)	(0.1)
Treatment IV-I	1511***	-9**	-55***	2117***	2507***	0***	0***
	(80.7)	(4.4)	(3.5)	(158.8)	(167.0)	(0.1)	(0.1)
Constant (I)	0	180***	179***	0	142	3***	3***
	(49.9)	(2.8)	(1.5)	(75.7)	(119.1)	(0.1)	(0.1)
Subject FE	✓	✓	✓	✓	✓	✓	✓
Observations	576	576	397	768	516	767	755
Treatment II-IV	500***			-106	-431***		
	(82.2)			(153.7)	(136.6)		
Treatment III-IV		-5	-8**	-1183***	-420***		
		(4.7)	(3.5)	(153.8)	(148.2)		
Constant (IV)	1511***	171***	126***	2118***	2668***		
	(41.1)	(2.3)	(1.9)	(87.5)	(78.9)		
Subject FE	✓	✓	✓	✓	✓		
Observations	384	384	205	576	451		

Ability to Catch Balls and Prediction



Ability function estimated from real effort task ($R^2 : 0.77$):

$$\text{balls}(\text{moves}) = 63.337 + 12.491 \times \sqrt{\text{moves}} - 0.001 \times \text{moves}^2$$

Differences in Treatments and Predictions: H2i, H3i, H4

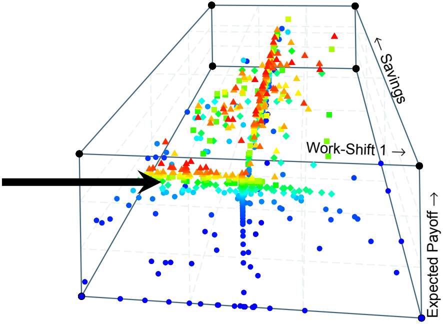
	I	II	III	IV
	Prediction Mean Std. Dev.	Prediction Mean Std. Dev.	Prediction Mean Std. Dev.	Prediction Mean Std. Dev.
Production function predictions				
Balls Caught in Period 1	79	78	79	78
	78	78	79	78
	(10.8)	(10.5)	(11.6)	(11.4)
Balls Caught in Period 2	75	74	71	71
	74	73	71	73
	(10.4)	(11.1)	(12.3)	(12.2)
Model predictions				
Movements in Period 1	25	25	25	25
	33***	31***	33***	32***
	(18.4)	(17.4)	(19.1)	(17.8)
Movements in Period 2	17	20	20	20
	27***	25***	21	22*
	(17.5)	(14.9)	(21.6)	(19.8)
Savings	0	1917	0	Substitutes?
	0	2012	0	1511
	(0.0)	(1244.7)	(0.0)	(1115.6)
Time Spent in Shift 1	180	180	131	Substitutes?
	180	180	166***	171
	(0.0)	(0.0)	(70.5)	(61.0)
Observations	192	192	192	192

Behavioral Strategies

	Static Models	Intertemporal Models			Combined
	(1) Hand-to-Mouth	(2) Saving	(3) Shifting	(4) Extended	(1)+(4)
TI	96.9%	—	—	—	96.9%
TII	8.3%	43.8%	—	43.8%	52.1%
TIII	17.7%	—	20.3%	20.3%	38.0%
TIV	4.2%	41.7%	21.4%	80.7%	84.9%

Conclusions

- Overall, the model predicts actual behavior quite well
- Precautionary saving exists for 82% to 94% of subjects
- Precautionary shifting exists for 40% to 66% of subjects
- Shifting and saving are **substitutes**, though not perfect substitutes
- Behavioral strategies and effect of flexible work time on savings identifiable with data on shifts and shift- and period-specific wages



Thanks for your attention!

davud.rostam-afschar@uni-hohenheim.de

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Literature I

Jump back to motivation

Study	Data Set	Data Period	Measures of Risk	Precautionary Saving
Lab experiment				
Meissner and Rostam-Afschar (2017)	Students at TU-Berlin	Eight life cycles à 25 periods	35% of expected value with probability 0.5	No evidence
Bostian and Heinzel (2012)	Students at the University of Virginia	204 life cycles à two periods	two realizations with different probabilities	No evidence
Brown, Chua, and Camerer (2009)	Students at National University of Singapore and California Institute of Technology	Seven life cycles à 30 periods	Log-normally distributed	Undersaving
Ballinger, Palumbo, and Wilcox (2003)	Students at Univeristy of Huston and Stephen F. Austin State University	One life cycle à 60 periods	Two treatments: 3 francs (5%) or 5 francs (5%); otherwise, 4 francs, 50% 8 francs and 50% 0 francs	$> 0\%$, but undersaving
Hey and Dardanoni (1988)	Students at University of York	between 5 and 15 periods	normally distributed	—
Wealth regression				
Mastrogiacomo and Alessie (2014)	DHS	1993-2008	Subjective earnings variance, second income earner	30%
Fossen and Rostam-Afschar (2013)	SOEP	2002, 2007, 1984-2007	Heteroskedasticity function	0-20%
Hurst, Lusardi, Kennickell, and Torralba (2010)	PSID	1984, 1994, 1981-1987, 1991-1997	Permanent and transitory components of earnings regression	$< 10\%$
Bartzsch (2008)	SOEP	2002, 1980-2003	Variance of income	0-20%
Fuchs-Schündeln and Schündeln (2005)	SOEP	1992-2000	Civil servant indicator	12.9-22.1%
Carroll and Samwick (1998)	PSID	1984, 1981-1987	Variance of income	32-50%
Lusardi (1998)	HRS	1992	Self-reported	1-3.5%
Lusardi (1997)	SHIW	1989	Self-reported	2.8%
Kazarosian (1997)	NLS	1966-1981	Permanent and transitory components of earnings regression	29%
Guiso, Jappelli, and Terlizzese (1992)	SHIW	1989	Self-reported	2%
Dardanoni (1991)	UK Family Expenditure Survey	1984	Variance of labor income	$> 60\%$

Table continued on next page

Literature II

Study	Data Set	Data Period	Measures of Risk	Precautionary Saving
Hours of work regression				
Jessen, Rostam-Afschar, and Schmitz (2017)	SOEP	2001-2012	Standard deviation of past detrended log wages	1.16 hours per week
Benito (2006)	BHPS	1991-2007	Difference between actual and expected financial situation	< 1.4 hours per week
Parker, Belghitar, and Barmby (2005)	PSID	1968-1993	Standard deviation of past wages	1.68 hours per week
Pistaferri (2003)	SHIW	1989, 1991, and 1993	Subjective information on future income	negligible
Saving regression				
Broadway and Haisken-DeNew (2017)	HILDA, CASiE	2002, 2006 and 2010	Subjective and objective uncertainty	0.35%
Ventura and Eisenhauer (2006)	SHIW	1993;1995	Average income variance	15-36%
Skinner (1988)	CEX	1972-1973	Occupation indicators	0%
Estimation of Consumption Euler Equation				
Dynan (1993)	CEX	Four quarters of 1985	Consumption variability	0%
Skinner (1988)	CEX			56%
Method of Simulated Moments				
Cagetti (2003)	SCF, PSID	1989, 1992, 1995; 1984, 1989,1994	Permanent and transitory components of earnings regression	50-100%
Gourinchas and Parker (2002)	CEX, PSID	1980-1993	Permanent and transitory components of earnings regression, prob of zero earnings	60-70%
Numerically Simulated Consumption Function				
Pijoan-Mas (2006)	PSID			18.0%
Zeldes (1989)	from other studies			1.6-10%
Skinner (1988)	CEX			56%
Calibrated Closed Form Consumption Function				
Caballero (1991)				> 60%

Notes: Importance figure is sometimes calculated from several sources in the respective paper, please read the paper for details. Datasets are De Nederlandsche Bank household survey (DHS), German Socio-Economic Panel (SOEP), Italian Survey of Household Income and Wealth (SHIW), Household, Income and Labour Dynamics in Australia (HILDA), Consumer Attitudes, Sentiments and Expectations (CASiE), British Household Panel Survey (BHPS), National Longitudinal Survey (NLS), Health and Retirement Study (HRS), Consumer Expenditure Survey (CEX), Survey of Consumer Finances (SCF), Panel Study of Income Dynamics (PSID).

Characteristics

Jump back to preference elicitation

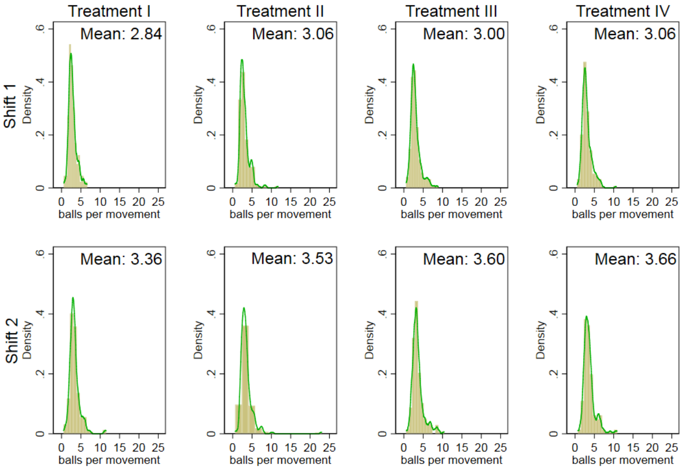
	%	SD		%
Age	23.0	(3.90)	*Field*	
Female	60.9	(48.92)	Psychology	1.56
Semester	5.0	(3.84)	Other	8.85
Extremely risk averse	42.2		Economics	10.42
Very, very risk averse	10.9		Humanities	10.42
Very risk averse	15.6		Sciences	12.5
Risk averse	9.4		Other social science	17.19
Not risk averse	4.7		Law	18.75
Risk loving	2.6		Business	20.31
Other	14.6		*Subjective Effort*	
Variance			Not demanding at all	6.25
Extremely prudent	65.1		Not demanding	28.65
Very prudent	7.3		Not demanding, not effortless	35.42
Prudent	4.7		Somewhat demanding	21.35
Not prudent	4.2		Quite demanding	6.77
Other	18.8		Very demanding	1.56
Stakes			*Attention to Risk*	
Extremely prudent	68.2		Inattentive	7.29
Very prudent	7.8		Risk pessimist	59.38
Prudent	3.6		Risk realist	24.48
Not prudent	4.7		Risk optimist	8.85
Other	15.6			
RRA greater 1	46.9			
RP greater 2	89.6			
RRA greater 1 and RP greater 2	41.1			

Source: Authors’ calculations.

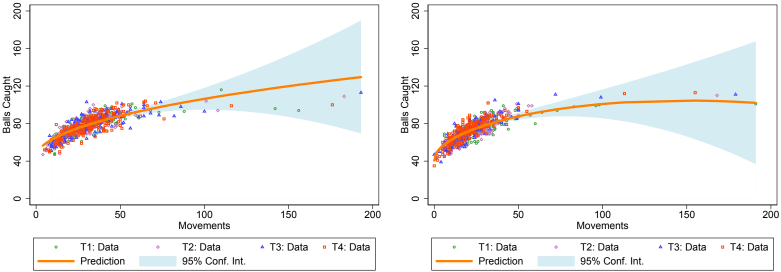
Pairwise correlations of balls per movement in the two work-shifts

	T1, shift 1	T1, shift 2	T2, shift 1	T2, shift 2	T3, shift 1	T3, shift 2	T4, shift 1
T1, shift 1	1						
T1, shift 2	0.548***	1					
T2, shift 1	0.598***	0.542***	1				
T2, shift 2	0.464***	0.451***	0.525***	1			
T3, shift 1	0.503***	0.420***	0.605***	0.521***	1		
T3, shift 2	0.547***	0.474***	0.586***	0.421***	0.564***	1	
T4, shift 1	0.550***	0.462***	0.615***	0.477***	0.729***	0.512***	1
T4, shift 2	0.553***	0.570***	0.597***	0.429***	0.533***	0.626***	0.620***

Means and kernel density distributions of balls per movement



Ability to Catch Balls and Prediction



Period 1 (R^2 : 0.65):

$$\text{balls}(\text{moves}) = 43.8091 + 6.3099 \times \sqrt{\text{moves}} - 0.0001 \times \text{moves}^2$$

Period 2 (R^2 : 0.73):

$$\text{balls}(\text{moves}) = 40.8174 + 6.9724 \times \sqrt{\text{moves}} - 0.0010 \times \text{moves}^2$$