Universität Konstanz

JUST TAKING THE GIFT OR RETURNING THE FAVOR?

A Meta-Analysis on the Effects of Incentives for Survey Participation

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Motivation

- Problem of declining response rates over time (for empirical evidence on decreasing response rates see Aust & Schröder 2009; De Leeuw & De Heer 2002; Groves 2011; Schnell 1997)
- Especially low response rate in web surveys (Shih & Xitao Fan 2008)

➢ Increased risk of nonresponse bias

Methods to increase response rates:

- Careful survey design: total (Dillman 1978) or tailored design (Dillman 2007): incentives, reminder, personalization (e.g. hand signature), etc.

➢ We focus on incentives in self-administered surveys

Side note: incentive terminology

- **Conditional**: on completion of survey; after survey participation
- **Unconditional**: with survey request; before survey participation

- **Monetary**: cash or check incentive
- **Nonmonetary**: items, lottery incentives (in this study also monetary lotteries)

Theory I

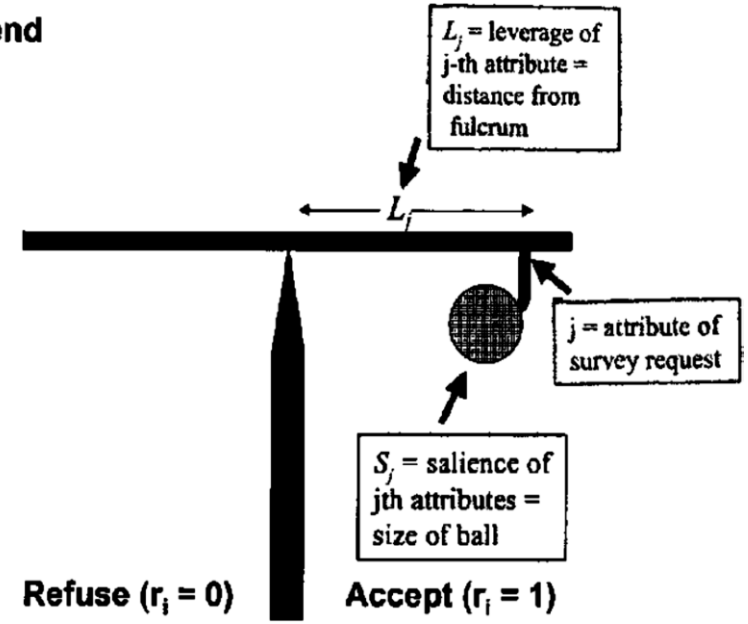
- **Norms of reciprocity** (Gouldner 1960; Mauss 1967)
  - Norm to repay gift (unconditional)
  - ➢ In general no sanctioning possible – no "loss of face" (Mauss 1967: 41)
- **Exchange theory** (Blau 1967)
  - Focus on possible future interactions (future gains)
  - Unconditional incentive "symbol of trust" (Dillman 1978: 16)
  - Social exchange (unconditional incentive - diffuse obligation) or economic exchange (conditional incentive - payment)
  - ➢ Most surveys only one-shot interaction – no future interactions

Theory II

- **Strict RC** pure utility maximizing actors: take incentive – but refuse participation to avoid opportunity costs
  - Surveys: low profit and low cost situation
  - ➢ Do only participate in case of conditional incentives
- **Bounded rationality** (Simon 1983)
  - Situations in which the actor isn't aware of all potential costs and benefits
  - ➢ Use of simple decision heuristics (e.g.: ignore requests from strangers)

Theory III

- **Leverage salience theory**
  (Groves et al. 2000)
  - Leverage (preference set)
  - Salience (trigger preference by making survey attribute salient)
  - ➢ Incentives can't convert "hard-core" nonrespondents, but unstable nonrespondents (unconditional = more salient)



(Groves et al. 2000: 300)

Hypotheses

- H_1: The higher the incentive, the higher the odds of response (effect with declining rate)
- $H_{2.1}$: Unconditional incentives are more effective than conditional incentives
- $H_{2.2}$: Conditional incentives are more effective than unconditional incentives
- H_3: Monetary incentives are more effective than nonmonetary incentives
- $H_{4:}$ The combination of monetary and unconditional incentives is even more effective

State of research

- Incentives as a central aspect to enhance survey participation.
  (e.g. Armstrong 1975; Edwards et al. 2009)

- Unconditional & monetary incentives more effective
- Relationship between incentive-value and odds of response unclear (linear, curvilinear)

- Incentives effective also in telephone (Singer et al. 2000) and face-to-face surveys

Research gap

- Most studies focus on mean effect sizes and bivariate subgroup analyses only
- No analysis of the heterogeneity of incentive conditions
- No in-depth theoretical explanation of incentive-mechanisms

➢ What are conditions of incentives to be effective under control of study characteristics?

Data

- (Hopefully) all published English and German language incentive experiments (Deadline March 2013)
- Inclusion criteria:
  - Self-administered survey
  - Non-incentive control group
  - Report on number of participants & nonrespondents
  - Description of incentive (incentive amount or incentive value)

Data

- Extensive literature search
  - Google Scholar, PubMed, Sociological Abstracts, Web of Knowledge, Web Survey Bibliography (WebSM)
  - relevant meta-analyses (e.g. the Cochrane Review: Edwards et al. 2009)*
- Coded effect size (ES) → Odds Ratio (OR)
  - Log(OR) unbound, thus better than Risk Ratio (biased if high control group risk) or Risk Difference (RD)
  - but lower interpretability

Dataset (meeting inclusion criteria):

133 publications/ 175 studies/ 320 trials

*Special thanks to Phil Edwards for the provision of his dataset (Edwards et al., 2002)!

Methods

Meta-Analysis (MA)

- Weighted mean effect size
  - Problematic if high degree of heterogeneity
- Problem of MAs "statistical fruit salad" (Brüderl 2004) ; problem similar to omitted variable bias (c.f. Greene 2012: 219)

➢ Control for heterogeneity by Meta Regression Analyses.
For all non-statisticians: we are trying to disentangle the fruits!

Methods

Meta Regression Analysis (MRA)

- Also possible in a common OLS framework

$$ES_i = \beta_0 + \beta_x M_i + \varepsilon_i$$

- Problem of heteroskedasticity

➢ WLS (weighted least squares) (Stanley & Doucouliagos 2013a: 12)

  – Inverse variance weighted

- Problem of dependent ES (one control-, mult. test-groups)

➢ Multilevel models: fixed- (FE-ML) random-effects (RE-ML)

Methods

Advantages of WLS-MRA

- Better coverage and less biased as models typically used in psychology or medicine, especially in case of heterogeneity) (Stanley & Doucouliagos 2013a; Stanley & Doucouliagos 2013b)
- Good implementation in statistical packages due to the relation to “normal” OLS

  (e.g. in Stata: regress AV UV [aweight=invVar]) (c.f. MAER-Net)

Publication bias

- "Publication of research findings based on the nature and direction of the research results" (Dickersin 2005: 13)
- Often triggered by significance thresholds (1/ 5/ 10%)

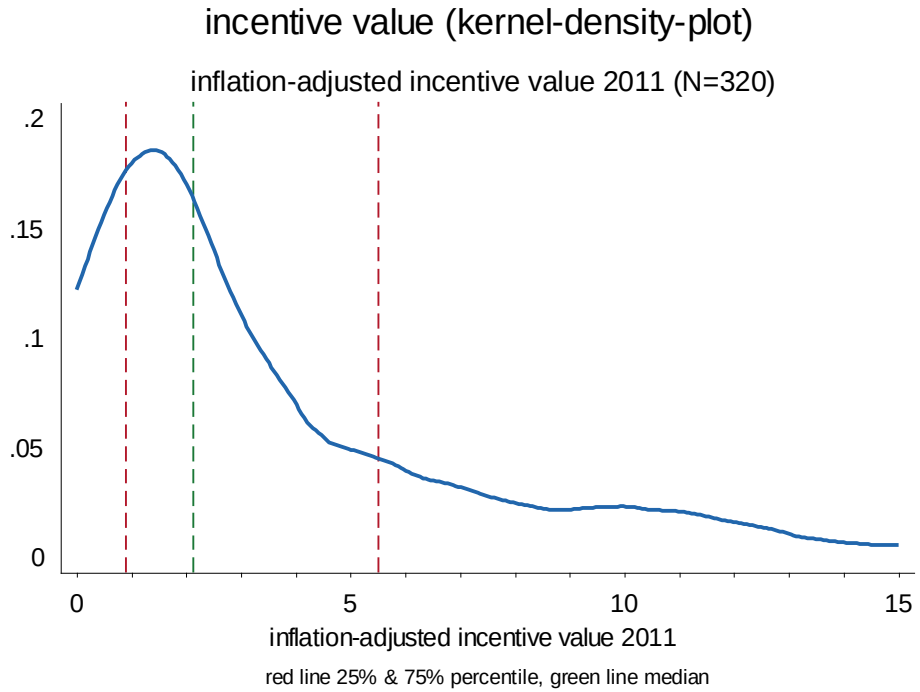
➢ Biased MRA (similar to nonresponse bias in surveys)

- **MRA identification method** (Stanley 2008)

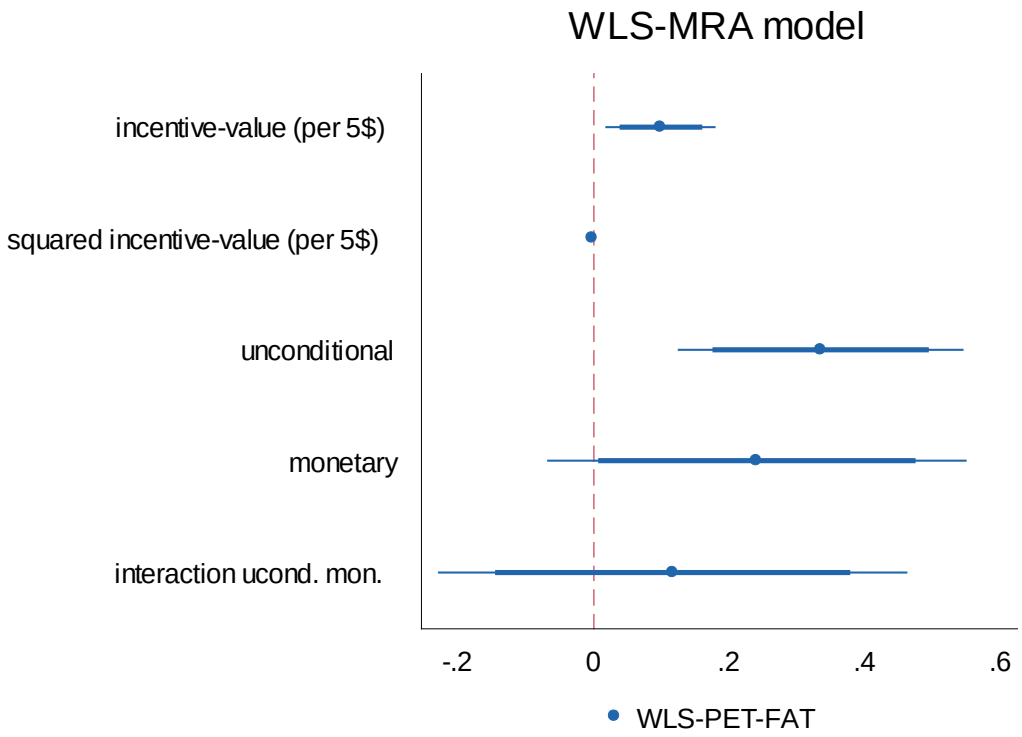
$$ES_i = \beta_0 + \beta_1 SE_i + \beta_x M_i + \varepsilon_i$$

  - β_0 Precision-Effect-Test (PET) – any genuine effect of treatment?
  - β_1 Funnel-Asymmetry-Test (FAT) – any publication bias?
  - **Correction**: PET with squared standard Error ($SE_i{}^2$; PEESE)

Descriptive results

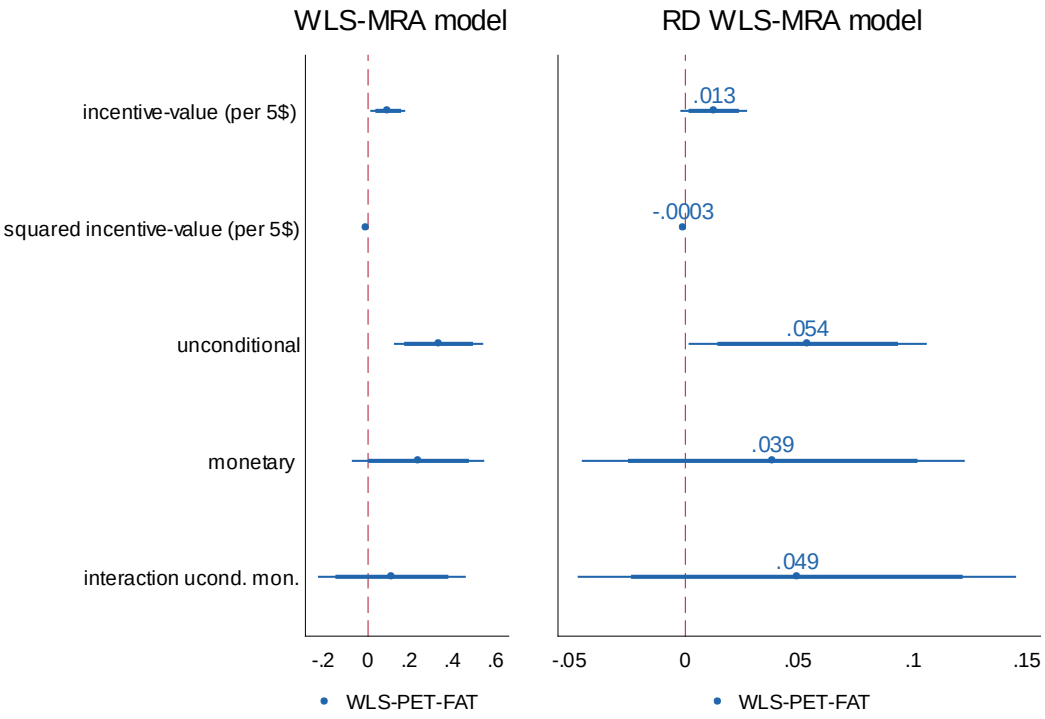


WLS-MRA



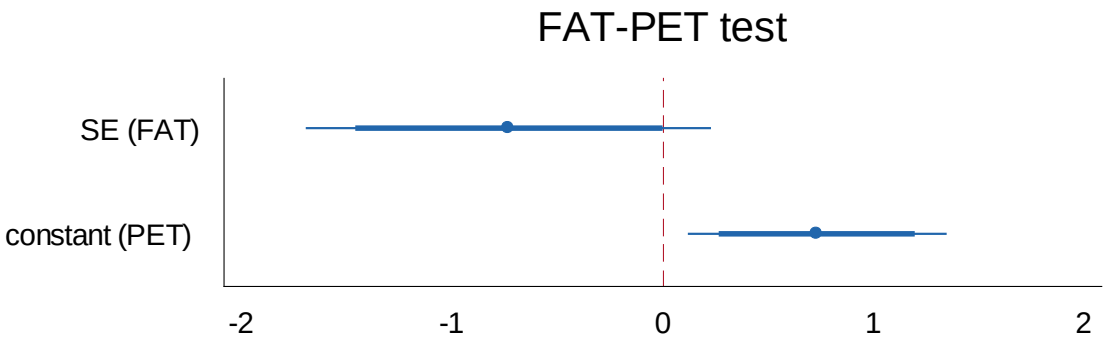
Model with clustered SEs; controls: country of survey, highest lottery incentive, netto sample, surveyed population, study topic, randomisation, survey mode, trial year, reminder not displayed

Illustration of effect sizes – RD model



Models with clustered SEs; controls not displayed

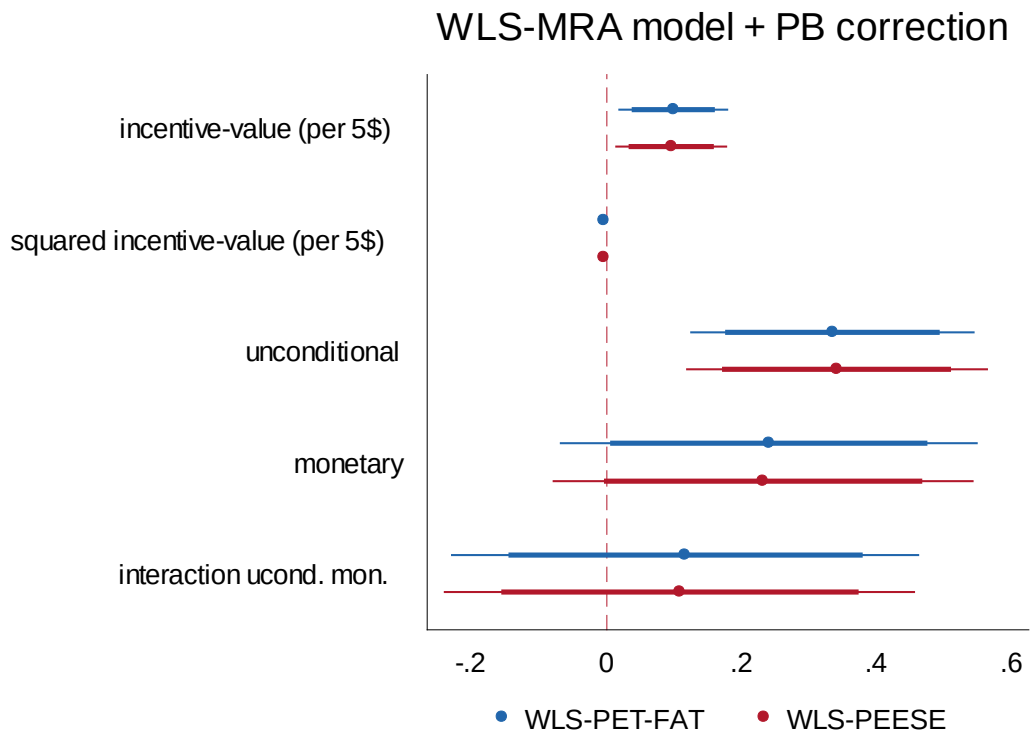
Publication bias test



WLS with clustered SEs; controls not displayed

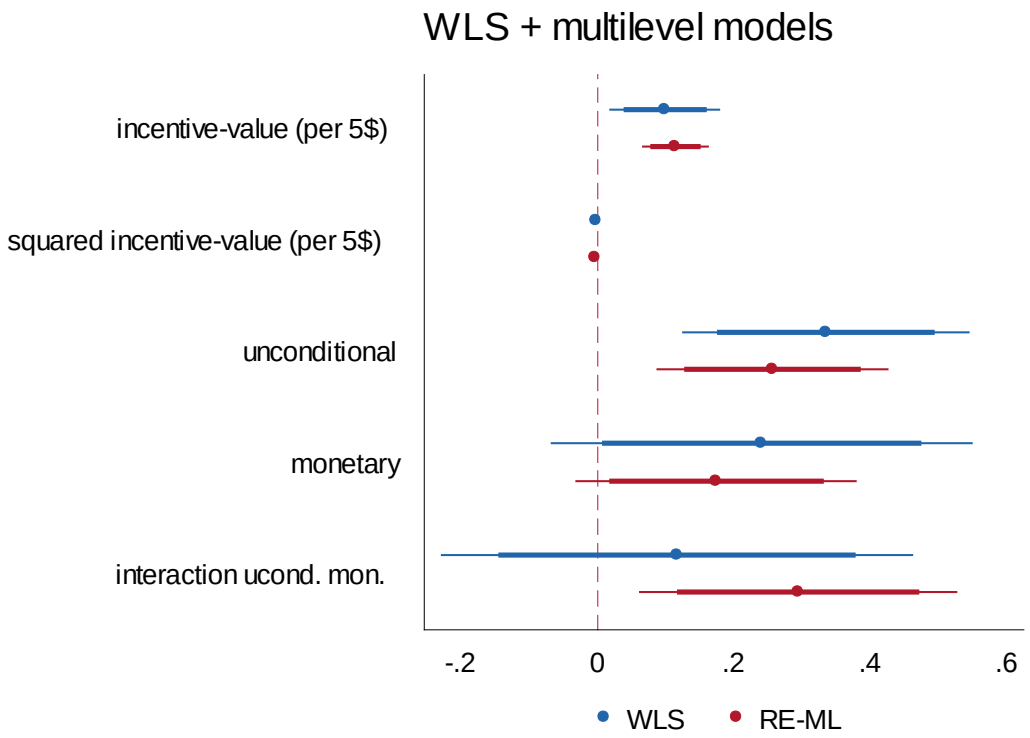
- Marginal significant FAT (but in the other direction as supposed (high SE - high effect)
- Small study effect?
- Significant PET – true overall effect

Publication bias correction



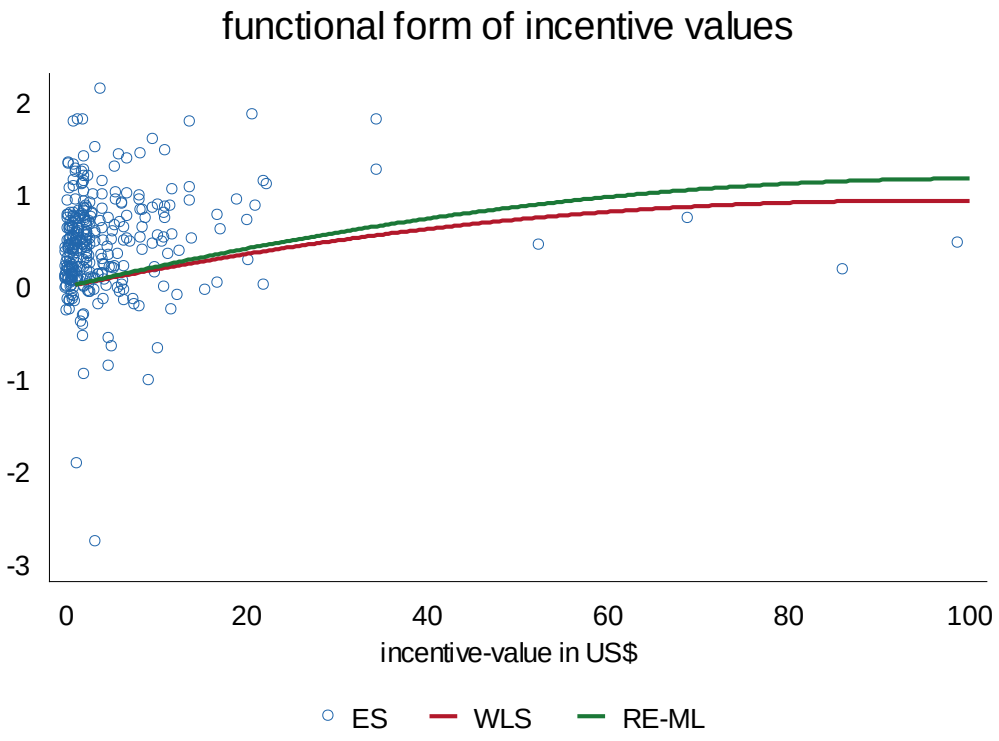
WLS with clustered SEs; controls not displayed

Multilevel implementation



WLS with clustered SEs; Controls not displayed; Multilevel necessary F(174, 138) = 2.94, random effects unbiased Chi2(6) = 6.92, thus FE-ML not displayed

The effect of the incentive-value



controls not displayed

Hypotheses revisited

- H_1 (+) the more US$ the better (effect with declining marginal rate: higher effect per US$ if low incentive)
- $H_{2.1}$ (+) unconditional incentives better
- $H_{2.2}$ (–) conditional incentives better
- H_3 (+) monetary incentives slightly better
- H_4 (+) combination of both strategies best (except WLS)

Main limitation

- **Nonresponse bias** is threatening the validity of survey results
  (c.f. Groves 2009: 59)

$$\bar{y}_r - \bar{y}_s = \frac{m_s}{n_s}(\bar{y}_r - \bar{y}_m)$$

  - Differences between respondents (r) and nonrespondents (m) matter
  - High nonresponse rates increase those potential differences

➢ Response rates are only half of the story

Discussion and outlook

- Strict RC not confirmed, but applicable if extended by the model of bounded rationality and the leverage salience theory
- Norms of reciprocity one possible mechanism besides ext. RC
- Exchange theory does not fit to one-shot situations

- Future work:
  - Disentangle ext. RC and norms of reciprocity (e.g. potential survey participation in a factorial survey experiment)
  - Include better nonresponse bias and data quality indicators
  - Tackle also issues of efficiency beside effectivity
  - Exchange theory better testable in panel incentive experiments (Fumagalli et al. 2013)

Thanks a lot for your attention!

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Appendix I

Data problems

- **solved**
  - Inflation adjusted incentive amount/ value (by CPI)
  - Continuity correction (+0.5) to make OR computation feasible
  - Multi-level structure due to dependent effects sizes (on control group)

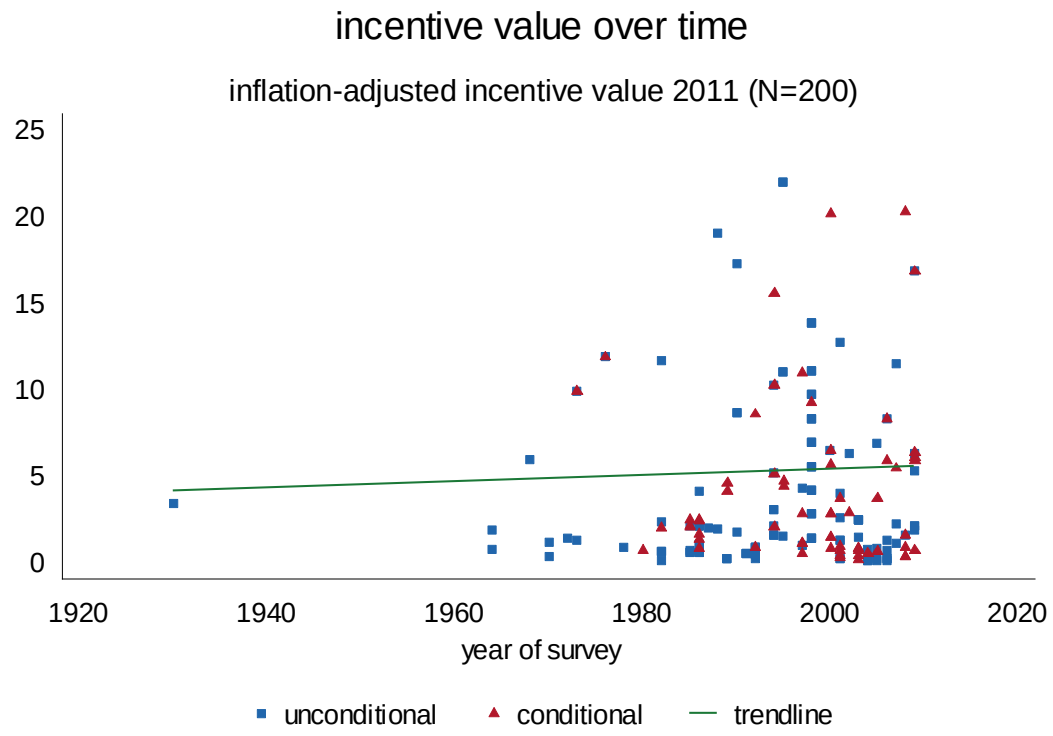
- **unsolved**
  - Missing study information (e.g. study sponsor)
  - Overestimation of the real inflation using the CPI by approximately 1.1% per year (Boskin et al. 1998:11)

Appendix II

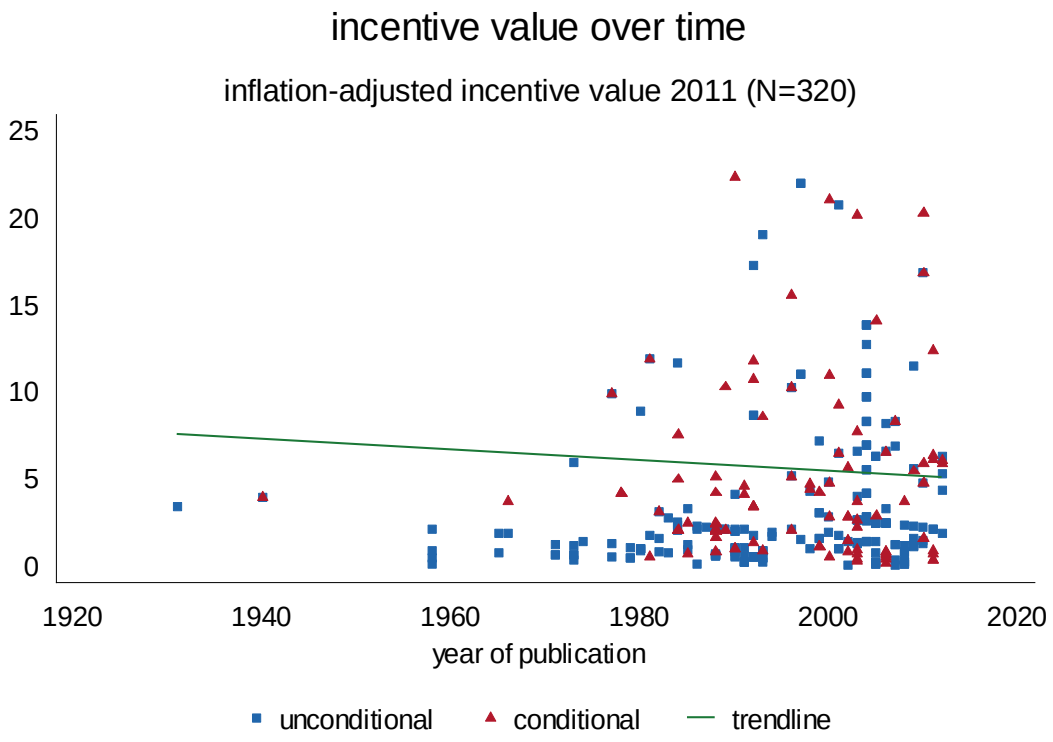
Incentive modes

monetary	**Time of payment**	
	conditional	unconditional
Nonmonetary	76	40
monetary	24	179

Appendix III



Appendix IV


incentive value over time
inflation-adjusted incentive value 2011 (N=320)
25
20
15
10
5
0
1920
1940
1960
1980
2000
2020
year of publication
unconditional
conditional
trendline

Appendix V

Robustness checks	WLS-FAT-PET		FE-ML		RE-ML	
VARIABLES	logOR	se	logOR	se	logOR	se
incentive-value (per 5$)	0.0996***	(0.0312)	0.122***	(0.0247)	0.115***	(0.0188)
squared incentive-value (per 5$)	-0.00266***	(0.000847)	-0.00285***	(0.000845)	-0.00280***	(0.000647)
unconditional	0.335***	(0.0807)	0.153	(0.0953)	0.257***	(0.0661)
monetary	0.241**	(0.119)	0.159	(0.106)	0.175**	(0.0803)
interaction ucond. mon.	0.117	(0.133)	0.442***	(0.124)	0.295***	(0.0907)
country: Europe (reference: Northern America)	0.00251	(0.0641)			-0.00479	(0.0801)
counrty: Australia/ Oceania	-0.0707	(0.0785)			-0.0515	(0.115)
country: Asia	0.190**	(0.0963)			0.234	(0.298)
highest lottery incentive	0.000410**	(0.000185)	0.000557**	(0.000277)	0.000384**	(0.000188)
adjusted sample	0.0186	(0.0517)			-0.0425	(0.0674)
pop: health (reference: general)	-0.137	(0.0928)			-0.109	(0.112)
pop: customers	-0.139	(0.123)			-0.170	(0.137)
pop: education	0.0157	(0.0702)			0.0686	(0.123)
pop: others	0.0111	(0.0723)			0.0884	(0.0945)
top: social (reference: market research)	-0.0312	(0.0616)			0.0193	(0.0876)
top: health	0.0344	(0.0772)			0.0702	(0.0971)
top: others	-0.160*	(0.0962)			-0.225*	(0.128)
qual: unclear (reference: nonrandom)	-0.243*	(0.125)			-0.264*	(0.136)
qual: random	-0.166	(0.121)			-0.190	(0.129)
internet	0.255***	(0.0928)			0.215*	(0.120)
year of study	-0.00747**	(0.00341)			-0.00675**	(0.00289)
reminder	-0.0214	(0.0200)			-0.0157	(0.0272)
SE (FAT)	-0.730*	(0.370)	0.824	(1.076)	-0.677*	(0.380)
constant (PET)	0.736***	(0.236)	-0.0456	(0.151)	0.681***	(0.167)
Observations	296		296		296	
R-squared	0.552		0.865			
Number of q_StudyID			157		157	
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

Appendix VI

Robustness checks	**WLS-FAT-PET**		**+ page lenght**		**outlier robust**	
VARIABLES	logOR	se	logOR	se	logOR	se
incentive-value (per 5$)	0.0996***	(0.0312)	0.0786**	(0.0303)	0.0968***	(0.0305)
squared incentive-value (per 5$)	-0.00266***	(0.000847)	-0.00193**	(0.000783)	-0.00261***	(0.000830)
unconditional	0.335***	(0.0807)	0.393***	(0.106)	0.317***	(0.0780)
monetary	0.241**	(0.119)	0.369***	(0.127)	0.218*	(0.119)
interaction ucond. mon.	0.117	(0.133)	-0.109	(0.154)	0.130	(0.134)
country: Europe (reference: Northern America)	0.00251	(0.0641)	-0.0317	(0.0881)	-0.00736	(0.0651)
counrty: Australia/ Oceania	-0.0707	(0.0785)	0.106	(0.140)	-0.0872	(0.0780)
country: Asia	0.190**	(0.0963)	0.120	(0.113)	0.190**	(0.0936)
highest lottery incentive	0.000410**	(0.000185)	0.000428	(0.000272)	0.000341*	(0.000174)
adjusted sample	0.0186	(0.0517)	0.0251	(0.0548)	0.0225	(0.0517)
pop: health (reference: general)	-0.137	(0.0928)	-0.198**	(0.0956)	-0.158*	(0.0884)
pop: customers	-0.139	(0.123)	-0.00134	(0.101)	-0.150	(0.122)
pop: education	0.0157	(0.0702)	0.189	(0.116)	0.00890	(0.0694)
pop: others	0.0111	(0.0723)	0.0323	(0.0766)	-0.00341	(0.0711)
top: social (reference: market research)	-0.0312	(0.0616)	0.196*	(0.101)	-0.0257	(0.0625)
top: health	0.0344	(0.0772)	0.162*	(0.0851)	0.0542	(0.0750)
top: others	-0.160*	(0.0962)	-0.0455	(0.0996)	-0.146	(0.0945)
qual: unclear (reference: nonrandom)	-0.243*	(0.125)	-0.319*	(0.174)	-0.242*	(0.124)
qual: random	-0.166	(0.121)	-0.238	(0.162)	-0.156	(0.119)
internet	0.255***	(0.0928)	0.110	(0.0903)	0.253***	(0.0926)
year of study	-0.00747**	(0.00341)	-8.64e-05	(0.00257)	-0.00788**	(0.00338)
reminder	-0.0214	(0.0200)	-0.0403**	(0.0195)	-0.0175	(0.0196)
SE (FAT)	-0.730*	(0.370)	-0.392	(0.311)	-0.616*	(0.366)
page lenght (questionaire)			-0.0109***	(0.00387)		
constant (PET)	0.736***	(0.236)	0.294	(0.217)	0.762***	(0.233)
Observations	296		179		294	
R-squared	0.552		0.537		0.562	
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						