Universität Zürich[UZH]

Soziologisches Institut – Prof. Dr. Katja Rost

META-ANALYSIS EXAMPLES IN BUSINESS

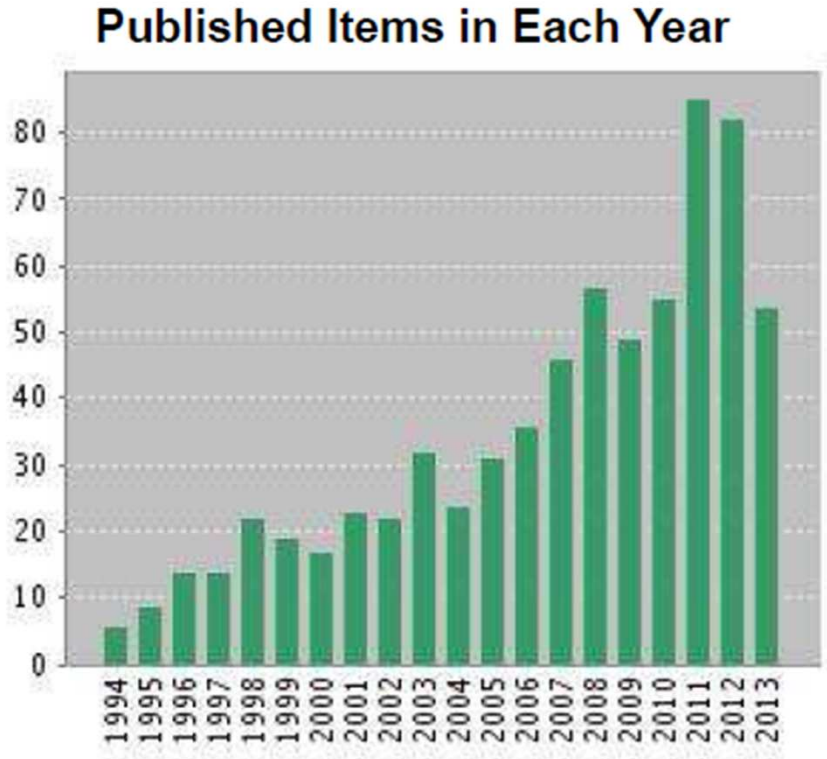
MAER-Net Colloquium 2013

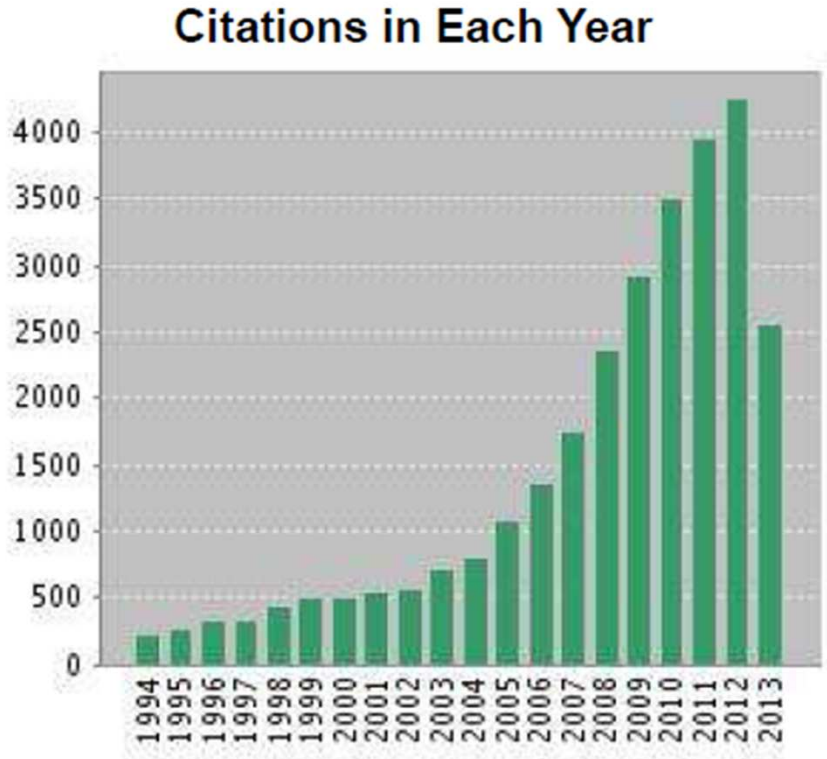
5 – 7 September 2013

Content

1. **What is published?**
2. What is missing?
3. Examples of my own research

Meta-analyses in Business Research

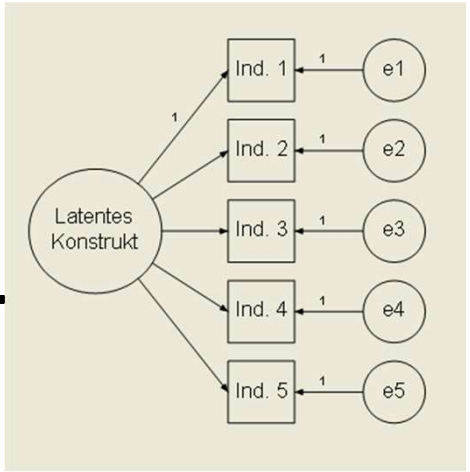




Does x increases Performance y?

Year	Citations	Title	Key-Constructs
2001	877	Relationship of core self-evaluations traits-self-esteem, generalized self-efficacy, locus of control, and emotional stability-with job satisfaction and job performance: A meta-analysis	self-assessment/job satisfaction/performance
2003	680	Corporate social and financial performance: A meta-analysis	social/financial performance
2003	670	Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis	conflict/team satisfaction/performance
1985	658	A meta-analysis and conceptual critique of research on role ambiguity and role conflict in work settings	role ambiguity/conflict
2000	613	A meta-analysis of antecedents and correlates of employee turnover: Update, moderator tests, and research implications for the next millennium	employee turnover
2001	566	The role of justice in organizations: A meta-analysis	org. justice
2005	565	Consequences of individuals' fit at work: A meta-analysis of person-job, person-organization, person-group, and person-supervisor fit	job-fit
1988	440	The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research	behavoiral attention/performance
1982	438	Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings	innovation
1984	415	A review and meta-analysis of research on the relationship between behavioral intentions and employee turnover	employee turnover
2002	408	The nature and dimensionality of organizational citizenship behavior: A critical review and meta-analysis	organizational citizenship behavior
1982	369	Validity of Self-Evaluation of Ability: A Review and Meta-Analysis	self-assessment/ratings
2002	365	Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: A meta-analysis	employee satisfaction/firm performance
2000	357	Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research	employee motivation
1988	353	A Meta-analysis of Self-supervisor, Self-peer, and Peer-supervisor Ratings	self-assessment/ratings
2002	346	Five-factor model of personality and job satisfaction: A meta-analysis	personality/job satisfaction
2001	340	Customer satisfaction: A meta-analysis of the empirical evidence	customer satisfaction

Methods inspired by Psychological Research



- Effect sizes
  - Bivariate correlation and scale reliability
  - Hunter and Schmid Artifact Adjustments
- Analysis
  - Mean comparison of sub-groups
  - Q-test for within-study-heterogeneity reduction
- File-drawer problem
  - Calculation of the number of additional unlocated studies needed to cause the correlation to decrease to a minimal critical level or zero

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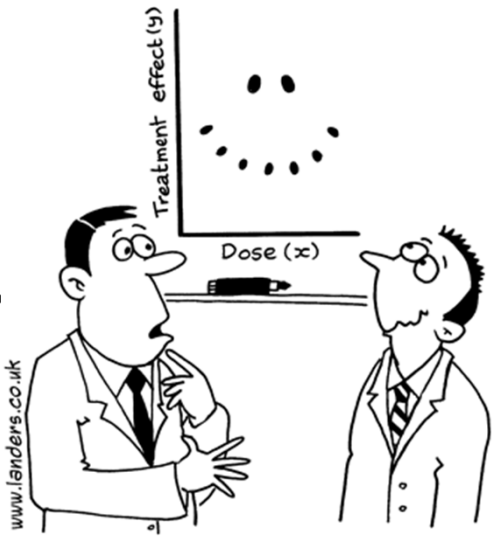
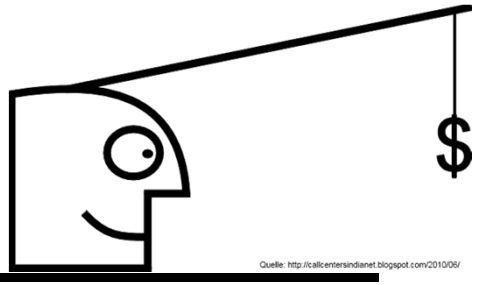
Meta-Regressions and Publication Bias



"It's a non-linear pattern with outliers.....but for some reason I'm very happy with the data."

- Objective measurements, e.g. profit
  - Hunter and Schmid is only valid for questionnaire data with latent constructs
- Cross-sectional or longitudinal data with many control variables and heterogeneous samples
  - Bivariate correlations are only valid for laboratory and field experiments
- Same data sources (e.g. Reuters) and dominant theories (e.g., P-A-theory, efficiency)
  - Publication biases do matter

Innovative research questions



- Go beyond gap spotting
  - "in the literature we find diverse results on xy … how big is the overall effect xy?"

- Theory, ideology or publication pressure drives publication bias

- Combination of meta-analysis with other research methods to support your theory

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Prominent Success Stories in Business Research

1. **Pay-for-Performance increases work effort.**

2. Pay-for-Performance for CEOs increases company performance.

3. Win-Win! Corporate Social Performance increases Corporate Financial Performance.

Meta-Analysis on field experiments

Study 1: Results of the Meta-analysis

Model	Number of Studies (number of subgroups)	Est.[a]	SE	*Z* Value	Heterogeneity (*Q* value)
Overall effect	46 (155)	0.23***	0.02	11.03	700.56***
Task type					
Noninteresting tasks	31 (82)	0.42***	0.03	16.24	338.88***
Interesting tasks	20 (73)	−0.13***	0.04	−3.46	235.17***
Journal					
Economic	11 (47)	0.26***	0.03	8.87	72.36***
Psychological	34 (99)	0.21***	0.03	6.75	616.09***

[a]In this column, positive values indicates that monetary rewards raise the work performance and negative values indicate that monetary rewards decrease the work performance.

Est., Estimate

***$p < .01$, **$p < .05$, *$p < .1$.

Weibel, A., Rost, K., Osterloh, M. (2010), Pay for Performance for the Public Sector – Benefits and (Hidden) Costs, Journal of Public Administration Research and Theory, 20(2), 387-412.

Validation by Vignette Experiments

Study 2: Empirical Results of the Multilevel Mixed-Effects Linear Regression (447 vignettes from 149 people)

		Dependent Variable											
		Additional Performance											
		Model 1			Model 2			Model 3			Model 4		
	Independent Variables:	Est.	Significance	*T*	Est.	Significance	*T*	Est.	Significance	*T*	Est.	Significance	*T*
	External incentive:												
2	Performance-contingent pay				.24	***	2.56	.23	***	2.75	.68		1.36
	Motivation:												
3	Intrinsic motivation							.60	***	10.12	.71	***	9.08
4	Extrinsic motivation							.11	*	1.88	−.03		−.53
	External incentive × motivation:												
	Performance-contingent pay × intrinsic motivation										−.25	**	−2.19
	Performance-contingent pay × extrinsic motivation										.14	*	1.66

Weibel, A., Rost, K., Osterloh, M. (2010), Pay for Performance for the Public Sector – Benefits and (Hidden) Costs, Journal of Public Administration Research and Theory, 20(2), 387-412.

Prominent Success Stories in Business Research

1. Pay-for-Performance increases work effort.

2. **Pay-for-Performance for CEOs increases company performance.**

3. Win-Win! Corporate Social Performance increases Corporate Financial Performance.

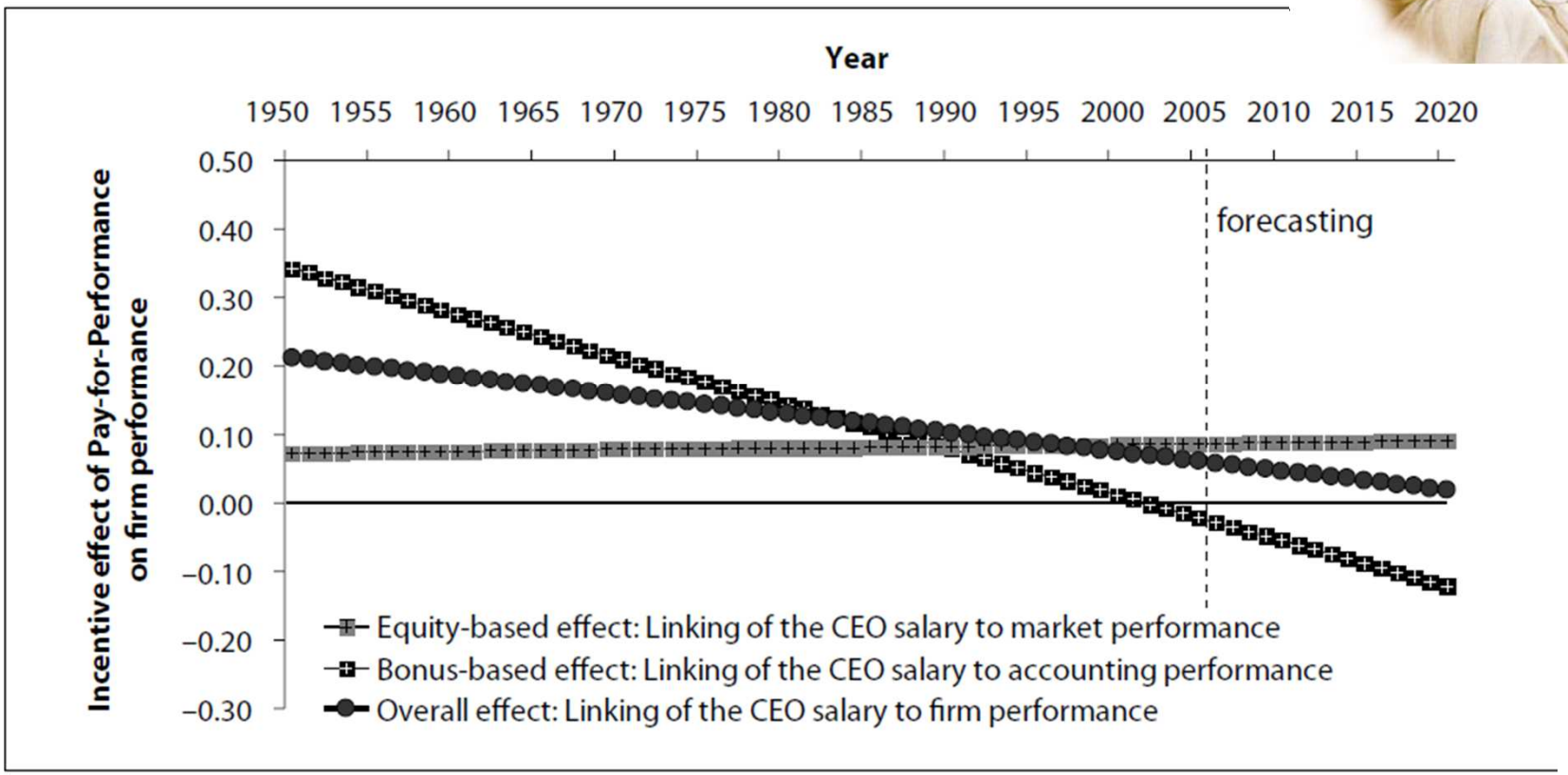
Overall Effects

Model	# Surveys # Sub groups	Est.	Surv. Err.	*Z*-Value	Heterogeneity *Q*-Value
Total effect	87 (259)	.08***	.001	52.39	4357.17***
Method of documenting results:					
Correlation	27 (93)	.14***	.012	21.08	700.81***
t-Value of the regression coefficient	60 (166)	.07***	.000	49.11	3632.98***
Group difference					92.17***
Type of performance link:					
Bonus-based effect: Linking of the CEO salary to accounting performance	48 (134)	.07***	.004	24.81	1248.19***
Equity-based effect: Linking of the CEO salary to market performance	39 (125)	.08***	.003	34.72	2070.59***
Group difference					5.92**
Type of pay link:					
Compensation includes cash-based plans (bonus)	47 (116)	.10***	.002	39.22	1365.76***
Compensation includes equity-based plans (stocks/options)	20 (38)	.04***	.002	12.56	313.44***
Compensation includes cash- and equity-based plans	20 (105)	.07***	.003	35.00	2590.10***
Total					156.69***

Significance levels: $^{**}p < 0.05$, $^{***}p < 0.01$.

Rost, K., Osterloh, M. (2009), Managementfashion Pay-for-Performance for CEOs, Schmalenbach Business Review (sbr), 61(4), 119-149.

Effects dependent on Time



Rost, K., Osterloh, M. (2009), Managementfashion Pay-for-Performance for CEOs, Schmalenbach Business Review (sbr), 61(4), 119-149.

Swiss data

Table 3: Pay-Performance sensitivity of executive compensation[16]

Change in average executive compensation 05- 06:	Log Total	Log Cash	Log Stocks	Log Stock Options	% Cash	% Stocks	% Stock Options
Market firm value in Tsd. SFR (03-05)	.25**	.19**	.06	.00	.17	–.13	–.02
Stock performance (03-05)	.10	–.01	.10	–.21*	.21	–.34***	.14
Ind.-adj. stock performance (03-05)	.01	.05	.07	–.15	.19*	–.26**	.04
Net value added in Tsd. SFR (04)	.18	–.25*	.04	–.19	–.09	–.05	.11

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, $N = 108$.

Rost, K., Osterloh, M. (2009), Managementfashion Pay-for-Performance for CEOs, Schmalenbach Business Review (sbr), 61(4), 119-149.

Swiss data

Table 4: Pay-for-Performance link of executive compensation[17]

Average executive compensation 05/06:	Log Total	Log Fixed	Log Vari-able	Log Bonus	Log Stocks	Log Stock Options	% Variable	% Bonus	% Stocks	% Stock Options
Past stock performance:										
*03-05	–.05	–.05	–.04	–.01	–.18*	–.07	.00	–.01	–.07	.10
*Ind-adj. 03-05	–.01	–.05	.04	.02	–.12	–.00	.08	.03	–.07	.14
Future stock performance:										
*05-08	–.10	–.08	–.02	–.07	.09	–.12	.04	.07	.10	–.14
*Ind-adj. 05-08	–.00	.04	.08	–.03	.08	.01	.05	–.11	.09	.15
*07-08	–.08	.03	–.08	.00	.11	–.07	–.07	–.03	.07	–.12
*Ind-adj. 07-08	–.05	.03	–.04	–.01	.08	–.03	–.04	–.06	.07	–.03
*11/07-01/08	–.09	.09	–.16*	–.04	.06	–.11	–.17*	–.04	.01	–.18*
*Ind-adj. 11/07-01/08	–.15	.10	–.22**	–.10	.02	–.10	–.22**	–.05	–.04	–.18*
Expected performance:										
*P/E Ratio 08&09	–.20**	–.07	–.19**	–.16*	–.08	–.07	–.07	–.05	–.04	–.00

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, $N = 108$.

Rost, K., Osterloh, M. (2009), Managementfashion Pay-for-Performance for CEOs, Schmalenbach Business Review (sbr), 61(4), 119-149.

Prominent Success Stories in Business Research

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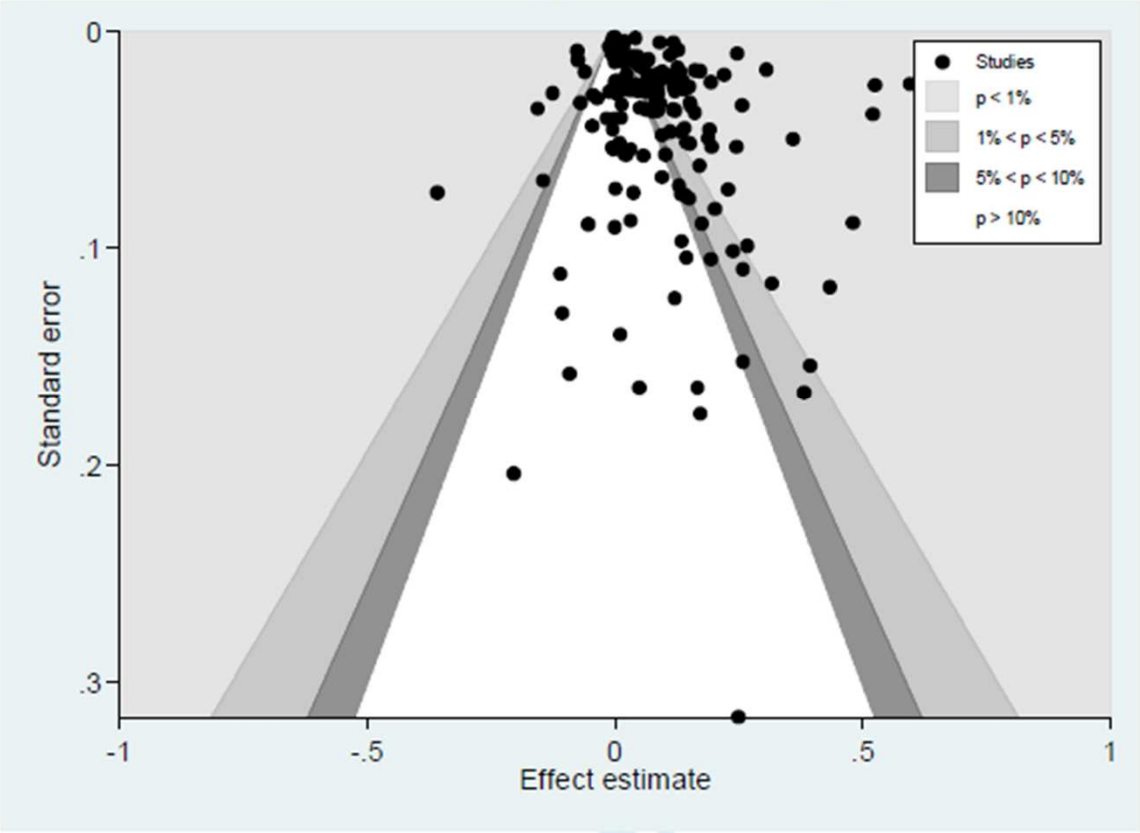
Meta-Analysis on Meta-Analyses (1)

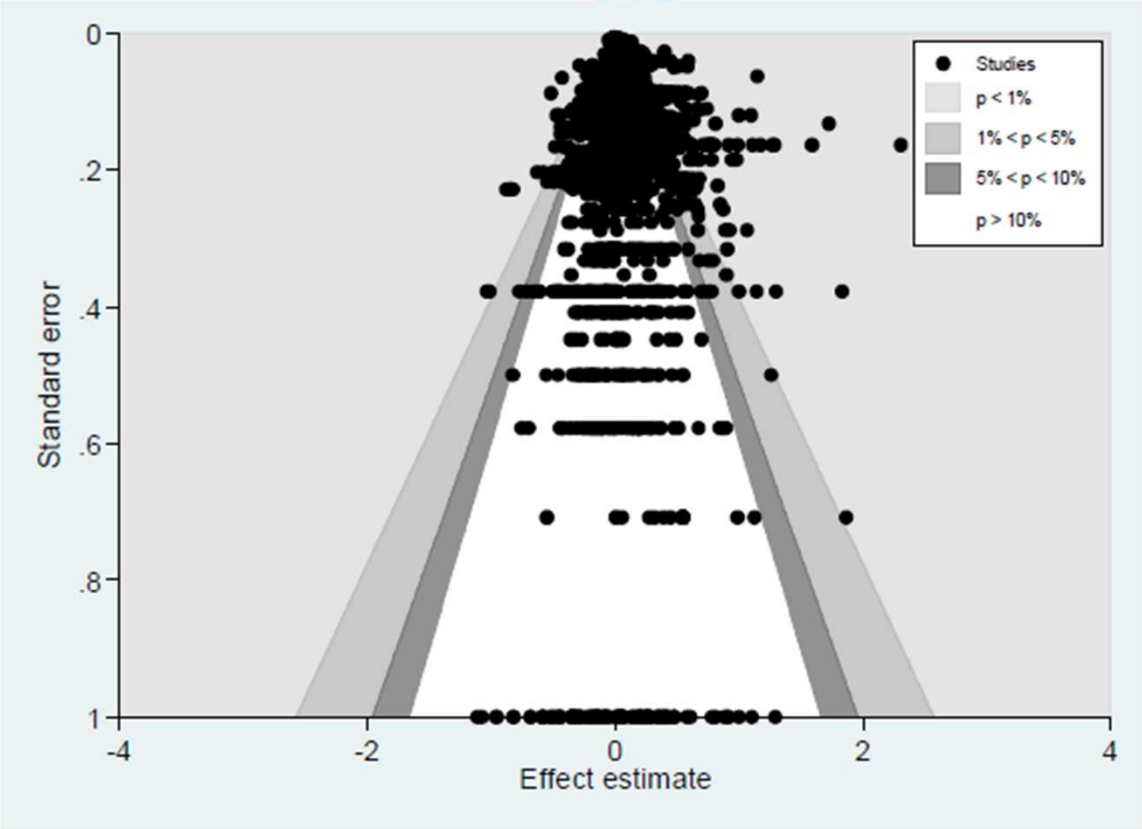
Figure 1 a/b. Contour-enhanced funnel plot of the meta-sample



Rost, K, Ehrmann, T. (2013), Reporting Biases in Positive Research Paradigms in Management: The Example of Win-Win Corporate Social Responsibility, forthcoming: Business & Society.

Meta-Analysis on Meta-Analyses (2)

Figure 1 a/b. Contour-enhanced funnel plot of the meta-sample



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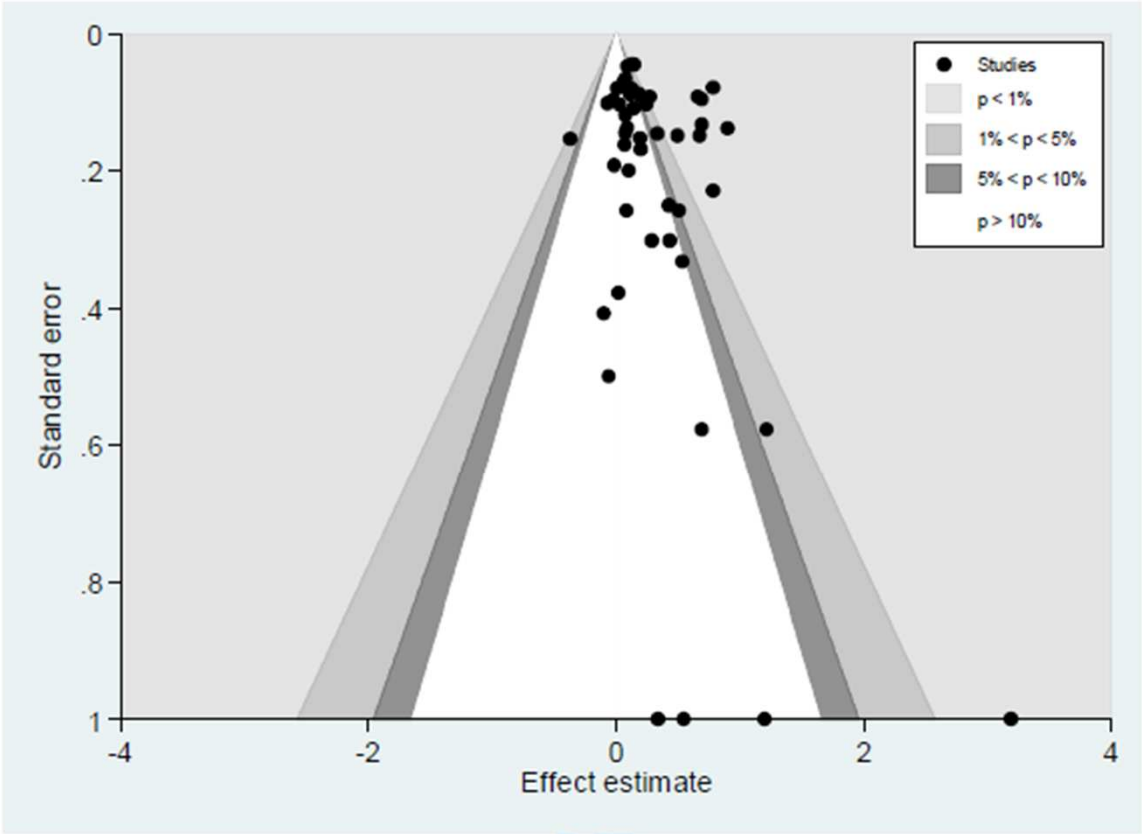
Legend:
Effect estimates are measured by Fisher's z (x axis) and accuracy by Fisher's z associated standard error (y axis)
Upper Figure study-effects (N=162): Egger's Test of Reporting bias B0= 2.46084** (p=0.000, t=4.81499)
Duval and Tweedie's Trim and Fill (random-effect model): observed effect=0.09019, adjusted effect: .03269
Lower Figure sub-effects (N=2663): Egger's Test of Reporting bias B0= .5188** (p=0.000, t=10.93495)
Duval and Tweedie's Trim and Fill (random-effect model): observed effect=0.07459, adjusted effect: .03704

Meta-Analysis on Meta-Analyses (3)

Figure B1. Contour-enhanced funnel plot of the meta-analysis of Orlitzky et al. (2003)

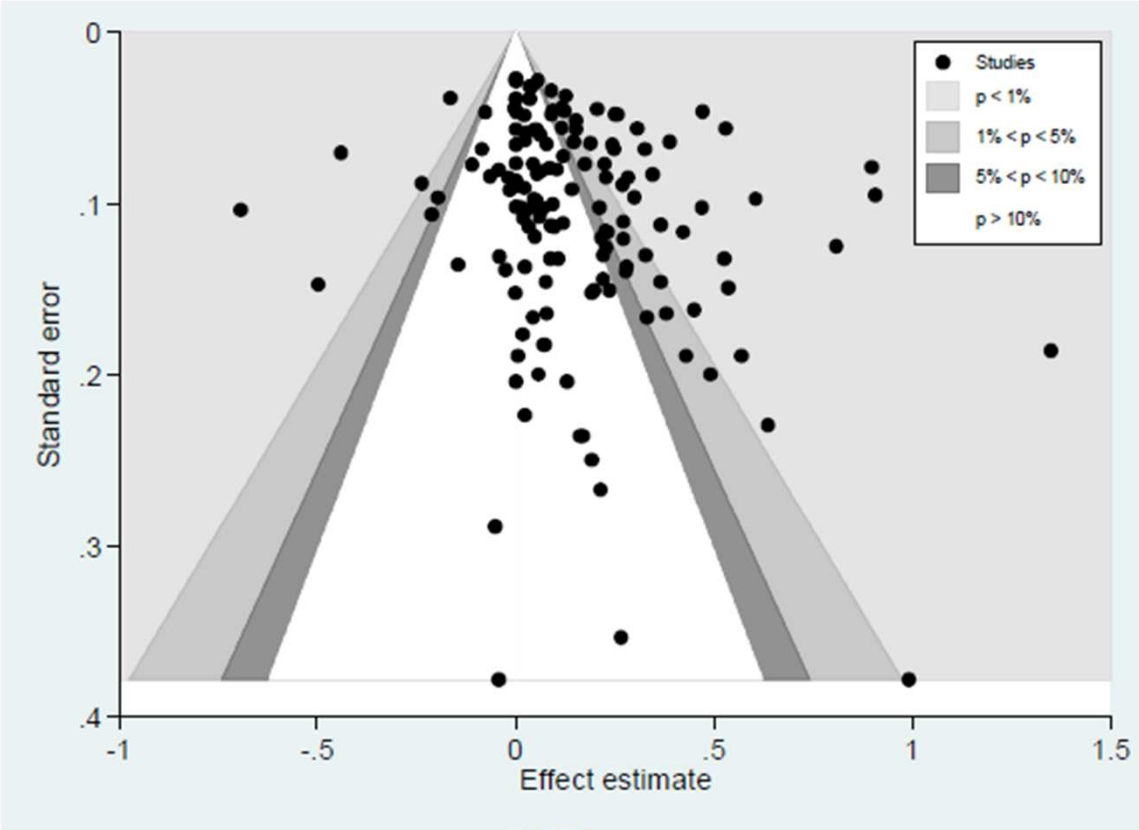


Rost, K, Ehrmann, T. (2013), Reporting Biases in Positive Research Paradigms in Management: The Example of Win-Win Corporate Social Responsibility, forthcoming: Business & Society.

Legend:
Effect estimates are measured by Fisher's *z* (x axis) and accuracy by Fisher's *z* associated standard error (y axis).
Egger's Test of Reporting bias B0= 1.06181* (p=0.031, t=1.90412)
Duval and Tweedie's Trim and Fill (random-effect model): observed effect=0.23526, adjusted effect: 0.12443.

Meta-Analysis on Meta-Analyses (4)

Figure B2. Contour-enhanced funnel plot of the meta-analysis of Margolis et al. (2007)



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Legend:
Effect estimates are measured by Fisher's *z* (x axis) and accuracy by Fisher's *z* associated standard error (y axis).
Funnel plot for the sub-effect sample.
Sub-effect sample (N=205): Egger's Test of Reporting bias B0= 1.2163*** (p=0.000, t=3.53000)
Duval and Tweedie's Trim and Fill (random-effect model): observed effect=0.13392, adjusted effect: 0.05132.
Study sample (N=148): Egger's Test of Reporting bias B0= 1.28231** (p=0.001, t=3.19314)
Duval and Tweedie's Trim and Fill (random-effect model): observed effect=0.13292, adjusted effect: 0.03664.

Drivers of "Effect Sizes" resp. of Publication Biases

Table 1b. FAT test: Determinants of the size and direction of estimated CSP-CFP effects

Model	Sub-effects weighted by random-effects		Sub-effects weighted by fixed-effects		Study-effects clustered by study	
Dependent variable: z-Value	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**
Std. CSP-CFP effect (1/Std. Err.)	.004	[1.00]	-.006.337	[-.96]	.029*	[2.03]
Reporting bias (Constant)	1.420***	[4.81]	2.593***	[3.75]	3.802*	[2.11]
Publication time/outlet:						
Publication after 1995	.656***	[5.04]	.730*	[2.54]	4.408*	[2.29]
Journal Impact Factor	.073*	[2.51]	.223**	[3.06]	.364	[.93]
Working Paper	-.016	[-0.07]	.639*	[2.06]	-5.201	[-1.59]
Theoretical aspects:						
Underlying Theory: Social Scien. Theory						
No Theory	.551***	[3.58]	.626	[1.55]	4.234**	[2.68]
Finance/ Economic Th.	.141	[.93]	.701	[1.93]	.980	[.65]
H0 hypothesis	-.395**	[-3.06]	-1.382**	[-3.06]	1.507	[.54]
CSP-CFP pros and cons discussion	-.672***	[-4.31]	-1.086***	[-3.66]	-3.824*	[-2.19]
Methodological aspects:						
Industry-fixed effects	-.449***	[-3.77]	-.089	[-.21]	-3.095*	[-2.13]
Firm-fixed effects	-.689***	[-3.66]	-1.374**	[-2.82]	-3.707*	[-1.99]
Time-lagged effects	.301	[1.59]	.341	[.85]	1.251	[.68]
Kind of Analysis: Regression						
Correlation	-1.006***	[-4.32]	-1.152*	[-2.55]	-1.304	[-.51]
T-test, mean comparison	-.321*	[-2.02]	-1.183***	[-3.79]	-.325	[-.22]

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