Estimating publication bias in observational studies

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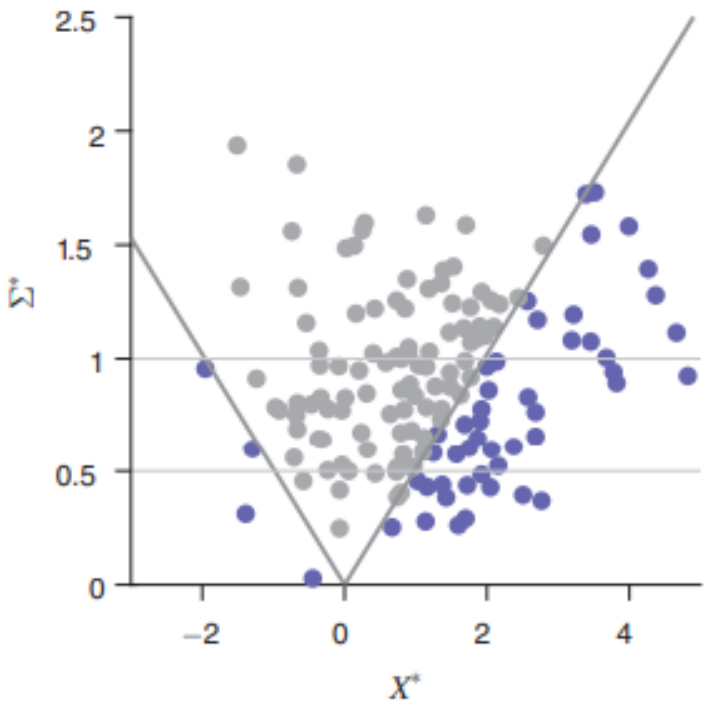
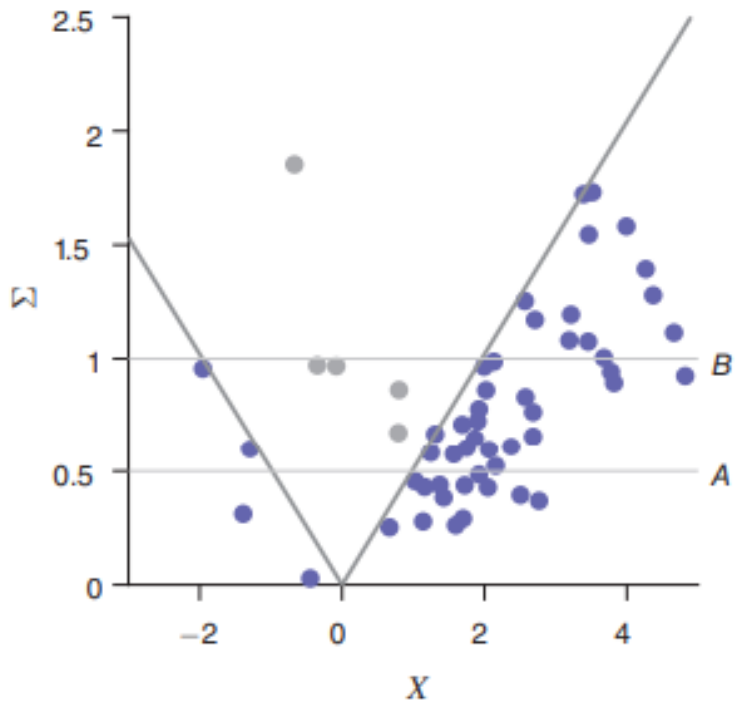
Motivation

- Publication of empirical studies depends on their results (effect size, significance, ...)
- This can lead to bias in the published estimates
- In experimental research, systematic replication studies were conducted to identify
- However, no systematic replication of observational studies done in economics
- This paper: Use newly available data since the study had been published to re-run the same specifications

Existing methods for observational research

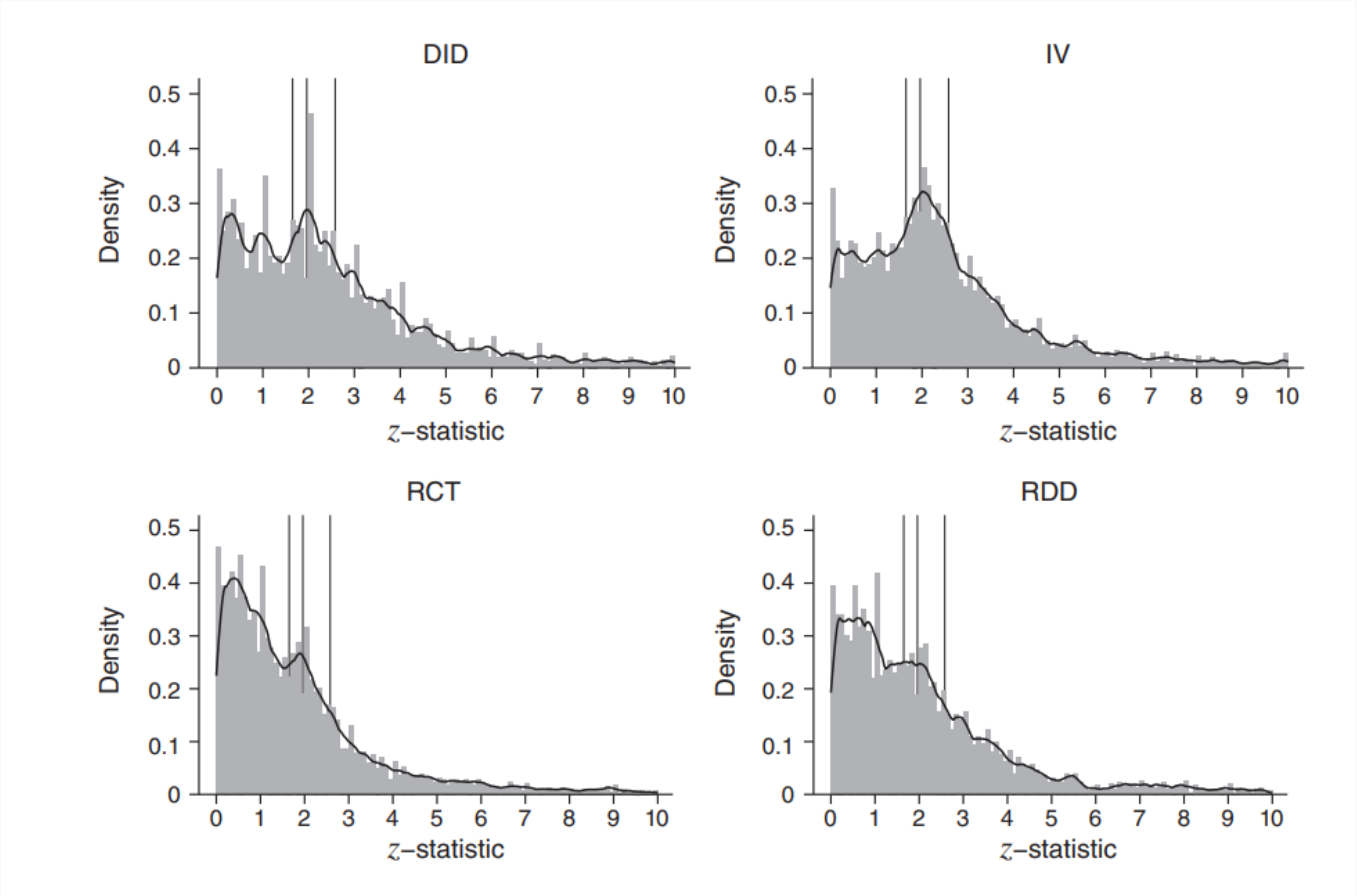
- Meta-analytic approach
  - Assume that effect sizes and standard errors are independent across all studies (very strong assumption)
  - Kvarven et al. (2020) compared the bias-adjusted effect sizes obtained using these methods are almost three times as large as those from the systematic replication studies





Existing methods for observational research

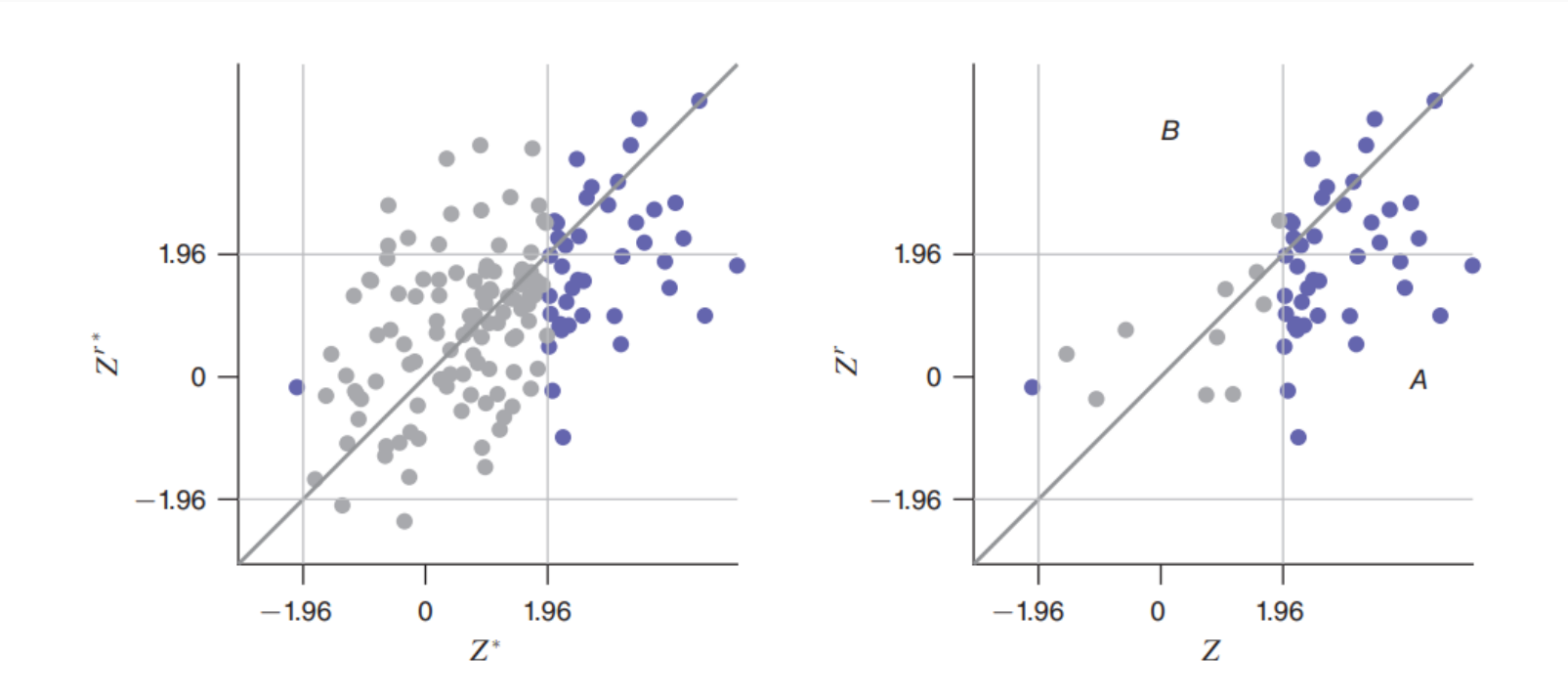
- Using the distribution of z-statistics (Brodeur et al., 2020)
  - Based on comparing the density of z-statistics around the significance threshold
  - Cannot detect p-hacking that would have large impact on the z-statistics



Andrews and Kasy (2019) approach

- Uses systematic replication studies
- Assumes the true effects for the original study and replication are draws from the same distribution
- Selection on publication identified up to scale from

$$\frac{f_{Z,Z^r}(b,a)}{f_{Z,Z^r}(a,b)} = \frac{p(b)}{p(a)}$$



Systemic replication of observational studies - MR

- Mendelian randomization studies
  - Genetic sequencing have become much cheaper in the past
  - One could estimate the published specifications using new data e.g., from FinnGen
  - Assumption of the true effects being from the same distribution likely satisfied

Systemic replication of observational studies - Economics

- One can also use newly available datasets (e.g., DHS surveys)
- Potential issue: the true effects might decline in time
  - Estimate the decline in the true effects using multiple time periods of the new data
  - Focus on effects where the decline is likely to be small
    - E.g., effects that according to the published research should persist over 100 years
- Examples: Acemoglu et al. (2014) and Michalopoulos and Papaioannou (2016)

Michalopoulos and Papaioannou (2016) table 2 - original

	All Ethnicity-Country Homelands						Ethnicity-Country H	
	All Observations				Excl. Outliers	Excl. Capitals	All Obser	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Panel A. Negative Binomial ML Estimates			
SPLIT (Partitioning)	0.4513***	0.3329**	0.4495***	0.4626***	0.4494***	0.4565***	0.9247***	0.8050***
	(0.1611)	(0.1851)	(0.1254)	(0.1201)	(0.1172)	(0.1236)	(0.1704)	(0.2372)
SPIL (Adjacent Split)	0.0481	0.3910	0.4619*	0.4920*	0.4834*	0.4256*	0.0879	0.5679
	(0.2789)	(0.3430)	(0.2626)	(0.2628)	(0.2686)	(0.2760)	(0.5748)	(0.4733)
Log Likelihood	-4506.794	-4280.172	-4119.95	-4108.723	-3993.148	-3781.286	-1697.469	-1561.61
R-square	0.203	0.528	0.645	0.633	0.168	0.182	0.148	0.343
					Panel B. Linear Probability Model (LPM) Estimates			
SPLIT (Partitioning)	0.0562**	0.0660***	0.0783***	0.0819***	0.0839***	0.0789***	0.0874**	0.0835*
	(0.0241)	(0.0238)	(0.0258)	(0.0266)	(0.0266)	(0.0266)	(0.0399)	(0.0484)
SPIL (Adjacent Split)	0.0571	0.1146***	0.1284***	0.1443***	0.1487***	0.1468***	0.1787***	0.2246***
	(0.0486)	(0.0394)	(0.0397)	(0.0408)	(0.0402)	(0.0408)	(0.0594)	(0.0604)
adjusted R-square	0.304	0.430	0.44	0.445	0.446	0.446	0.315	0.463
Simple Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Location Controls	No	No	Yes	Yes	Yes	Yes	No	No
Geographic Controls	No	No	No	Yes	Yes	Yes	No	No
Country Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Observations	1212	1212	1212	1212	1199	1165	579	579

Michalopoulos and Papaioannou (2016) table 2 - replication

	Model 1	Model 2	Model 3	Model 4
split10pc	-0.012	0.086	0.053	0.047
	(0.177)	(0.115)	(0.106)	(0.105)
spil	0.322	0.514*	0.313	0.370+
	(0.284)	(0.226)	(0.215)	(0.213)
Num.Obs.	1212	1212	1212	1212
Std.Errors	by: cluster	by: cluster	by: cluster	by: cluster
FE: wbcode		X	X	X
split10pc	0.018	0.014	-0.010	-0.008
split10pc	(0.023)	(0.022)	(0.025)	(0.024)
spil	0.038	0.044	0.015	0.021
spil	(0.056)	(0.047)	(0.050)	(0.052)
Num.Obs.	1212	1212	1212	1212
Std.Errors	by: wbcode & cluster	by: wbcode & cluster	by: wbcode & cluster	by: wbcode & cluster
FE: wbcode		X	X	X

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Acemoglu et al. (2014) table 5 - original

	Dependent Variable			
	Weight for Height *Z*-Score		Moderate to Severe Anemia	
	(1)	(2)	(3)	(4)
	A. Baseline Specification			
ln(number of ruling families)	.212	.211	−.099	−.091
	(.117)	(.117)	(.041)	(.040)
R^2	.045	.052	.055	.066
	B. Baseline Specification with Additional Geographic Controls			
ln(number of ruling families)	.189	.167	−.136	−.129
	(.127)	(.132)	(.039)	(.039)
R^2	.052	.059	.067	.077
Observations	1,521	1,519	1,423	1,421
Number of chiefdoms	116	116	114	114
District fixed effects	Yes	Yes	Yes	Yes
Mother controls	No	Yes	No	Yes

Acemoglu et al. (2014) table 5 - replication

	(1)	(2)	(3)	(4)
fam_num_ln	0.109	0.138	0.025	0.005
	(0.103)	(0.101)	(0.043)	(0.038)
Num.Obs.	2264	2264	2322	2322
R2	0.012	0.020	0.016	0.050
R2 Adj.	0.006	0.010	0.010	0.040
Std.Errors	by: CODE	by: CODE	by: CODE	by: CODE
fam_num_ln	0.083	0.108	0.025	0.005
	(0.113)	(0.112)	(0.043)	(0.038)
Num.Obs.	2264	2264	2322	2322
R2	0.016	0.023	0.016	0.050
R2 Adj.	0.007	0.010	0.010	0.040

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Thank you for your attention.