Biases in Fiscal Multiplier Estimates

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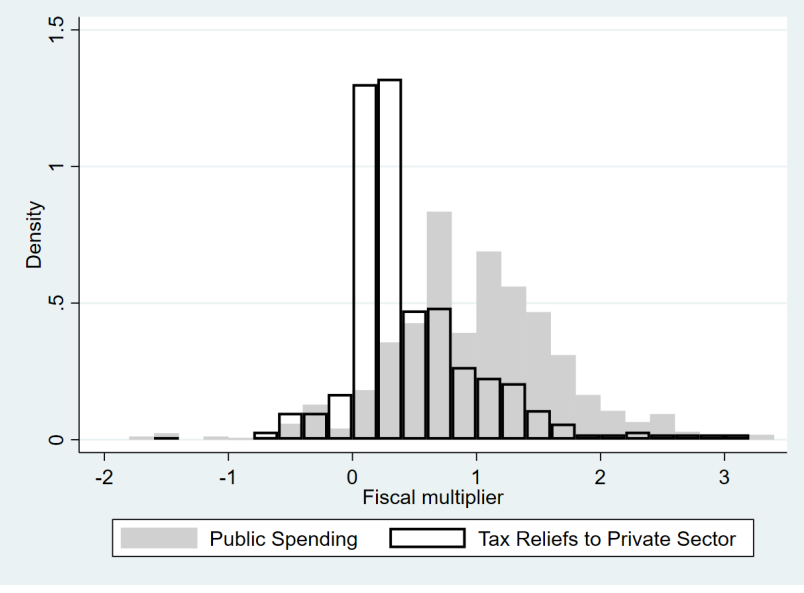
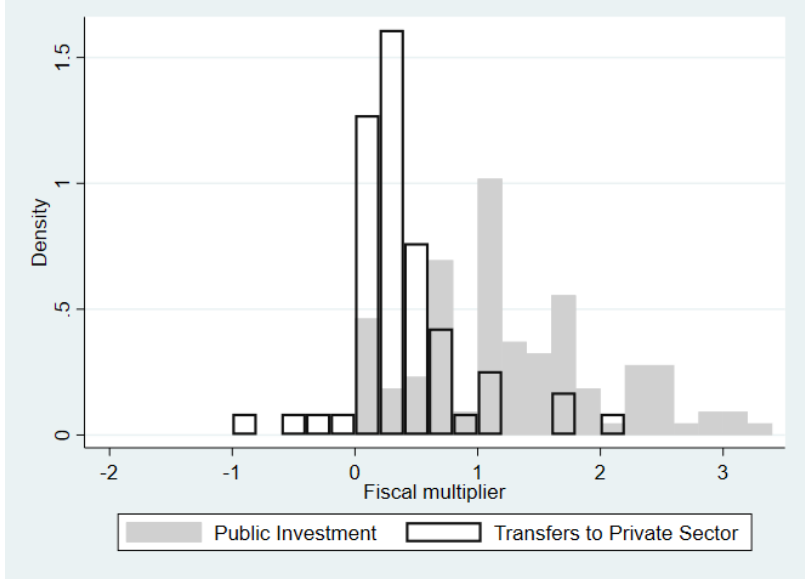
Fiscal multiplier estimates – important input for policy design

- There are objective reasons for a variation in multiplier estimates
- There could be subjective reasons originating from various biases (▸ Examples)



Spending and Tax Reliefs



Investment and Transfers

Source: Gechert (2015), own calculations.

This paper

First paper to comprehensively study all the biases for a topic of high relevance

We ask whether multiplier estimates are influenced by

- the authors' economic policy orientation / national imprint
- research funding
- a publication bias

Also, we suggest and study one amplifying and one mitigating factor:

- biases amplified if authors participate in the media debate?
- biases mitigated if authors experience monitoring by coauthors?

Methodology

- WLS regressions controlling for "objective" variation
- Fiscal multiplier estimates from a meta-study by Gechert (2015)

Contributions – ideological bias & national imprint

- Alesina et al. (2017) reveal that expert views on the right size of government are often influenced by national imprint
- Saint-Paul (2018) provides anecdotal evidence how revealed pol. preferences correspond to authors' beliefs in spending debates
- Dyson (1999), Brunnermeier et al. (2016), and Blesse et al. (2017) all recognize a fundamental divide in economic policy approaches for French and German economists and politicians

$\rightarrow$ National background is a promising proxy for an author's ideological prior

$\rightarrow$ We focus on actual empirical research results rather than economic policy preferences

Contributions – funding-induced bias

- Better reviews of books (Dobrescu et al. 2013) or movies (DellaVigna and Hermle 2014) if the authors / production company is connected to the media outlet?
- Evidence on bias in industry-financed research on new drugs (for a review, Sismondo 2008)

$\rightarrow$ Extend the debate to macro-economic research: study whether government-funded research projects obtain higher fiscal multiplier estimates

Contributions – publication bias

- Preference for statistically significant or surprising results in research (De Long and Lang 1992; Brodeur et al. 2016)

→ Test for a publication bias in fiscal multiplier studies (arguably due to preferences of editors, not researchers)

→ Augment Gechert‘s (2015) testing approach by employing different measures of author-specific publication pressure

Hypotheses

3 primary Biases

H1: Researchers from countries with a large government and high level of regulation present larger multiplier estimates than researchers from countries with a small government and low regulation.

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H2: Government-funded research provides larger fiscal multiplier estimates than non-government-funded research.

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H1: Researchers from countries with a large government and high level of regulation present larger multiplier estimates than researchers from countries with a small government and low regulation.

H2: Government-funded research provides larger fiscal multiplier estimates than non-government-funded research.

H3: Multiplier estimates are subject to a publication bias that leads to asymmetries in the precision of estimates and, possibly, smaller estimates in published studies (compared to working papers) and from authors with high publication pressure.

Hypotheses

2 amplifying/ moderating factors

H4: Active participation in the media debate on economic policy increases the effects of country imprint (H1) and financing source (H2) on multiplier estimates.

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H5: Mutual monitoring from (international) co-authors reduces the biases related to the hypotheses H1 (national imprint), H2 (donor interests), and H3 (publication bias).

Modeling approach (author *a*, estimate *i*)

$$Mult_{ai} = \beta_0 + \beta_1 Source_{ai} + \gamma_1 Model\_X_{ai} + \gamma_2 Type\_X_{ai} + \gamma_3 Country\_X_{ai} + \gamma_4 X_{ai} + \varepsilon_{ai}, \quad (1)$$

$Mult_{ai}$	size of fiscal multiplier estimate
$Source_{ai}$	measure for the bias-inducing source
$Model\_X_{ai}$	model employed: RBC, DSGE, VAR, or structural macro
$Type\_X_{ai}$	controls for multiplier-type (e.g., investment, transfer, or tax multiplier)
$Country\_X_{ai}$	dummies for country coverage of the multiplier estimate
X_{ai}	other controls (e.g., time horizon of the multiplier estimation)
ε_{ai}	unobserved error term (clustered by paper)

▸ Summary statistics

→ For hypotheses H4 and H5 (amplifying/ moderating factors) we rely on interaction models.

Data

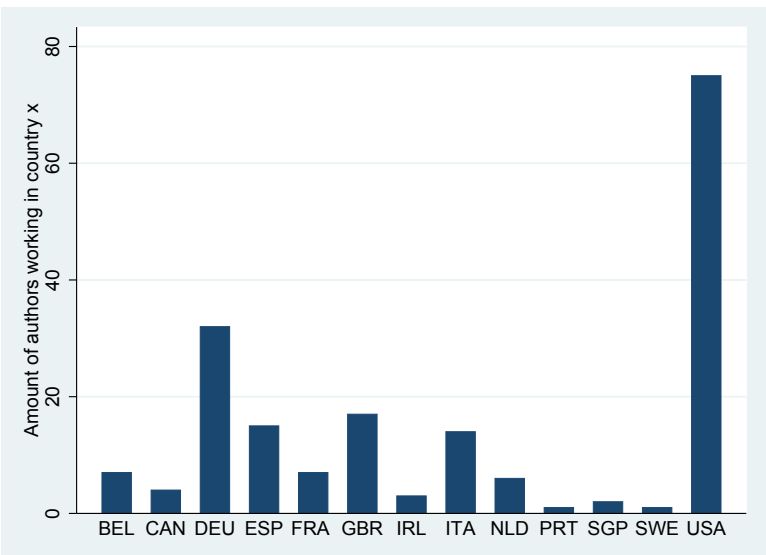
- 1,069 fiscal multipliers in Gechert (2015)
  - estimated by 171 authors
  - in the period 1992-2012
- From CVs & websites of authors
  - country of workplace and country of highest degree
  - workplace (at time of publication)
  - tenure / full professor status
- From the papers
  - research grants (for the project)
  - publication status

Measurements of national imprint

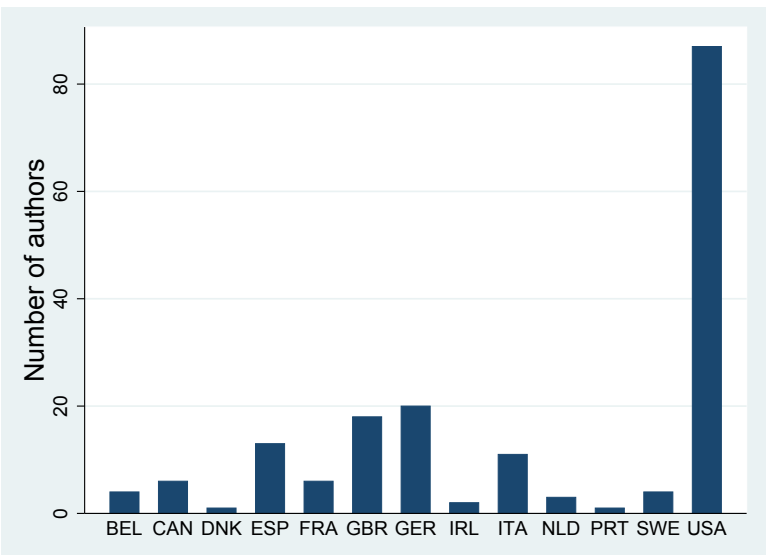
1. Government spending-to-GDP ratio
2. (Fraser) Economic Freedom Index

   ...both in a researcher's country of origin and year of paper publication

→ Assumption: relative size of government / economic freedom is driven by a country preference and the author herself has the same preference



Work country



Education country

Additional evidence: a direct survey of the authors

- Questions cover general macro-issues including fiscal and monetary policy
- 54 out of 159 contacted authors have participated (34%)

→ We derive an index of individual "market orientation" (vs. "government orientation")

- We also complement this using sources of revealed preferences:
  - signed petitions & open letters
  - campaign contributions (US)
  - IGM Economic Experts Panel

National imprint & individual market orientation

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Fiscal multiplier estimate											
Expenditure/GDP (workplace)	0.6939	2.8127***										
	(0.6663)	(1.0205)										
Expenditure/GDP (education)			1.1285*	4.6641***								
			(0.6580)	(1.3454)								
Economic freedom (workplace)					0.0659	-0.6207***						
					(0.1113)	(0.2110)						
Economic freedom (education)							-0.0795	-0.5472**				
							(0.1123)	(0.2173)				
Dummy: market orientation (survey responses)									-0.1583*	-0.1011		
									(0.0892)	(0.0763)		
Dummy: market orientation (survey & other sources)											-0.1820**	-0.2122***
											(0.0839)	(0.0799)
Multiplier type controls	×	×	×	×	×	×	×	×	×	×	×	×
Other controls	×	×	×	×	×	×	×	×	×	×	×	×
Model controls	×	×	×	×	×	×	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×	×	×	×	×	×	×
Country fixed effects		×		×		×		×		×		×
Observations	2,250	2,250	2,044	2,044	2,250	2,250	2,044	2,044	794	794	905	905
R-squared	0.2692	0.3348	0.2731	0.3046	0.2677	0.3409	0.2677	0.2935	0.3386	0.4336	0.3512	0.4211

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study. The expenditure-to- GDP ratio (columns 1-4) and the Fraser economic freedom index (columns 5-8) correspond to the year of publication.

▸ Full table

Funding – project grants and workplace

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Fiscal multiplier estimate					
Project grant	0.2801***	0.1754*				
(30 out of the 104 studies)	(0.1067)	(0.1030)				
Project grant [ref.: no grant]						
National science funding agency			0.5397***	0.4290**		
			(0.1232)	(0.1813)		
Government / ministry			0.0991	0.1944		
			(0.1462)	(0.1703)		
European Commission			0.0987	-0.0139		
			(0.2222)	(0.1365)		
National central bank			0.2804*	0.2431		
			(0.1463)	(0.1524)		
(Research) foundation / institute			-0.3582***	-0.3752**		
			(0.1321)	(0.1502)		
Multiplier type controls	×	×	×	×	×	×
Other controls	×	×	×	×	×	×
Model controls	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×
Country fixed effects		×		×		×
Observations	2,250	2,250	2,250	2,250	2,250	2,250
R-squared	0.2852	0.3333	0.3080	0.3446	0.2684	0.3299

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study.

▸ Coding of grants

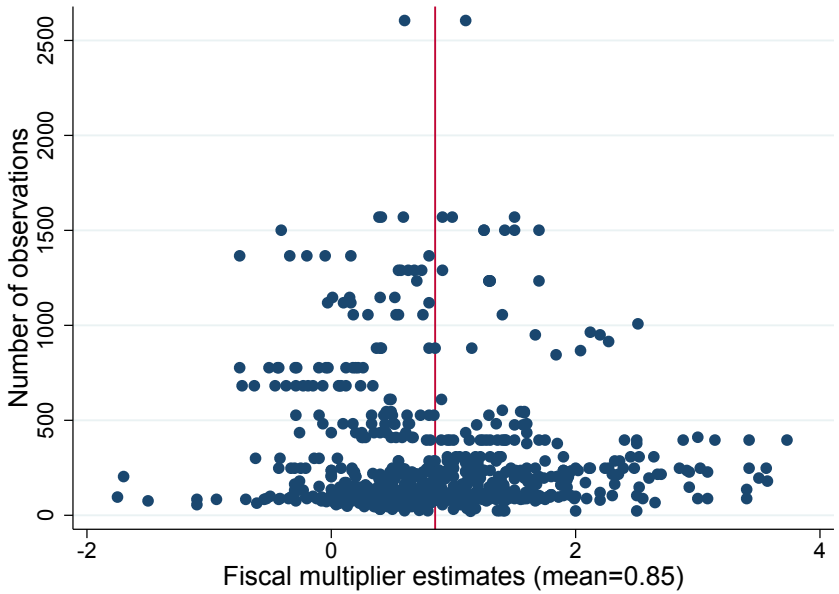
Funding – project grants and workplace (cont'd)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Fiscal multiplier estimate					
Workplace [ref.: university]						
Government institution					0.0724	0.1283
					(0.1047)	(0.1039)
Private institution					-0.0172	-0.0360
					(0.1106)	(0.1034)
International organization					-0.0210	-0.0420
					(0.0799)	(0.0903)
Central bank					-0.0240	0.0708
					(0.0795)	(0.0820)
Multiplier type controls	×	×	×	×	×	×
Other controls	×	×	×	×	×	×
Model controls	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×
Country fixed effects		×		×		×
Observations	2,250	2,250	2,250	2,250	2,250	2,250
R-squared	0.2852	0.3333	0.3080	0.3446	0.2684	0.3299

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study.

▸ Coding of workplaces

Publication bias – funnel plot & asymmetries



Funnel plot

- No obvious asymmetries visible
- The level of observation is paper-estimate

- A regression model to identify systematic asymmetries equally shows no sign of a publication bias (not shown, ▸ Results)
- $f(N)$ are functions of N (e.g., its log, square root, or their inverse)

$$mult_i = \beta_0 + \beta_1 f(N_i) + \varepsilon_i \quad (2)$$

Publication bias – type of publication and tenure

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Fiscal multiplier estimate					
Journal publication	-0.0085	-0.0069				
(34% of studies)	(0.0697)	(0.0632)				
Tenure position			-0.0613	-0.0340		
(35% of authors)			(0.0824)	(0.0619)		
Full professorship					-0.0124	0.0020
(27% of authors)					(0.0812)	(0.0536)
Multiplier type controls	×	×	×	×	×	×
Other controls	×	×	×	×	×	×
Model controls	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×
Country fixed effects		×		×		×
Observations	2,250	2,250	1,246	1,246	1,246	1,246
R-squared	0.2671	0.3279	0.2663	0.3470	0.2651	0.3467

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study. The reduced sample size is due to the fact that tenure/full professor status is only publicly available for 57% of authors.

Interaction: media involvement with national imprint

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Fiscal multiplier estimate							
Expenditure/GDP (workplace)	0.4495	3.0015***						
	(0.7092)	(1.0544)						
Expenditure/GDP (education)			-0.0209	3.5321***				
			(0.5833)	(1.2530)				
Exp/GDP × VoxEU	0.6113	-0.3664	2.3785**	1.6788*				
	(1.4052)	(0.7636)	(1.0220)	(0.9144)				
Economic freedom (workplace)					0.0130	-0.6627***		
					(0.1110)	(0.2143)		
Economic freedom (education)							0.0561	-0.4219*
							(0.1069)	(0.2142)
Economic freedom × VoxEU					0.1115	0.1343	-0.2967	-0.2575
					(0.2514)	(0.1063)	(0.1877)	(0.1744)
Publication on VoxEU	-0.2280	0.2071	-0.9026**	-0.6467	-0.8325	-0.9895	2.4024	2.0866
	(0.5820)	(0.3097)	(0.4401)	(0.3991)	(1.9570)	(0.8343)	(1.4626)	(1.3618)
Multiplier type controls	×	×	×	×	×	×	×	×
Other controls	×	×	×	×	×	×	×	×
Model controls	×	×	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×	×	×
Country fixed effects		×		×		×		×
Observations	2,250	2,250	2,044	2,044	2,250	2,250	2,044	2,044
R-squared	0.2702	0.3358	0.2833	0.3085	0.2687	0.3424	0.2743	0.2978

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study.

Interaction: media involvement with funding

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Fiscal multiplier estimate					
Project grant	0.3508**	0.2497*				
	(0.1592)	(0.1458)				
Project grant × VoxEU	-0.1022	-0.1318				
	(0.1621)	(0.1489)				
Grant category [ref.: no grant]						
National science funding agency			0.7021**	0.5360*		
			(0.3007)	(0.3032)		
interaction with VoxEU			-0.2060	-0.1654		
			(0.3124)	(0.3148)		
Government / ministry			-0.0254	-0.0433		
			(0.1378)	(0.1465)		
interaction with VoxEU			0.1900	0.3187		
			(0.1986)	(0.2147)		
European Commission			0.0944	-0.0279		
			(0.2203)	(0.1320)		
National central bank			0.1745	0.1252		
			(0.1650)	(0.1801)		
(Research) foundation / institute			-0.0145	0.0656		
			(0.1736)	(0.1902)		
interaction with VoxEU			-0.3993*	-0.5077*		
			(0.2271)	(0.2664)		
Publication on VoxEU	0.0001	0.0378	-0.0048	0.0472	0.0516	0.0792
	(0.0859)	(0.0630)	(0.0829)	(0.0600)	(0.0727)	(0.0581)
Multiplier type controls	×	×	×	×	×	×
Other controls	×	×	×	×	×	×
Model controls	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×
Country fixed effects		×		×		×
Observations	2,250	2,250	2,250	2,250	2,250	2,250
R-squared	0.2860	0.3342	0.3109	0.3471	0.2699	0.3324

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study.

Interaction: media involvement with funding (cont'd)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Fiscal multiplier estimate					
Workplace [ref.: university]						
Government institution					0.1353	0.1907*
					(0.1197)	(0.1051)
Private institution					0.0130	0.0067
					(0.1156)	(0.1132)
International organization					-0.0108	-0.0244
					(0.0787)	(0.0961)
Central bank					-0.0032	0.1023
					(0.0732)	(0.0842)
Government institution × VoxEU					-0.2081	-0.2585*
					(0.1432)	(0.1354)
Publication on VoxEU	0.0001	0.0378	-0.0048	0.0472	0.0516	0.0792
	(0.0859)	(0.0630)	(0.0829)	(0.0600)	(0.0727)	(0.0581)
Multiplier type controls	×	×	×	×	×	×
Other controls	×	×	×	×	×	×
Model controls	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×
Country fixed effects		×		×		×
Observations	2,250	2,250	2,250	2,250	2,250	2,250
R-squared	0.2860	0.3342	0.3109	0.3471	0.2699	0.3324

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study.

Interaction: co-authorship with national imprint, authors from different countries

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Fiscal multiplier estimate							
Expenditure/GDP (workplace)	1.1192	2.7700**						
	(0.8266)	(1.0767)						
Expenditure/GDP (education)			2.8092***	5.7708***				
			(0.9453)	(1.4015)				
Exp/GDP × mult. authors	-1.7665*	0.2588	-3.3821***	-3.6312***				
from different countries	(0.9805)	(0.9292)	(1.0260)	(1.1825)				
Economic freedom (workplace)					-0.0043	-0.6084***		
					(0.1667)	(0.2205)		
Economic freedom (education)							-0.3752**	-0.7213***
							(0.1782)	(0.2347)
Economic freedom × mult. authors					0.1458	-0.0378	0.5812***	0.5034***
from different countries					(0.1849)	(0.1448)	(0.1965)	(0.1881)
Multiple authors from	0.6726	-0.0960	1.4144***	1.5388***	-1.2044	0.2783	-4.5322***	-3.8932**
different countries	(0.4272)	(0.3961)	(0.4337)	(0.4764)	(1.4379)	(1.1177)	(1.5442)	(1.4864)
Multiplier type controls	×	×	×	×	×	×	×	×
Other controls	×	×	×	×	×	×	×	×
Model controls	×	×	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×	×	×
Country fixed effects		×		×		×		×
Observations	2,250	2,250	2,044	2,044	2,250	2,250	2,044	2,044
R-squared	0.2746	0.3349	0.2882	0.3157	0.2707	0.3409	0.2845	0.3051

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study.

Interaction: co-authorship with funding

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Fiscal multiplier estimate							
Project grant	0.3154**	0.1966						
	(0.1322)	(0.1243)						
Project grant × monitoring	-0.1944	-0.0799						
	(0.1615)	(0.1632)						
Grant category [ref.: no grant]								
National science funding agency			0.6089***	0.5669***				
			(0.1320)	(0.2059)				
interaction with monitoring.			-0.8717***	-0.8843**				
			(0.3279)	(0.4146)				
Government / ministry			0.1328	0.2537				
			(0.1732)	(0.2047)				
interaction with monitoring			0.1957	0.2649				
			(0.2403)	(0.2515)				
European Commission			0.0735	-0.0250				
			(0.2355)	(0.1323)				
National central bank			-0.0400	-0.1774				
			(0.1207)	(0.1409)				
(Research) foundation / institute			-0.5014***	-0.5389***				
			(0.1552)	(0.1984)				
interaction with monitoring			0.3765**	0.3511*				
			(0.1728)	(0.2015)				
Monitoring variable	-0.0497	0.0221	-0.0636	-0.0012	0.0694	-0.0034	0.1177	0.1301*
	(0.0864)	(0.0825)	(0.0880)	(0.0830)	(0.1255)	(0.1072)	(0.0787)	(0.0687)
Definition monitoring	mult. authors from diff. countries				mult. authors		non-gov. coauthor	
Multiplier type controls	×	×	×	×	×	×	×	×
Other controls	×	×	×	×	×	×	×	×
Model controls	×	×	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×	×	×
Country fixed effects		×		×		×		×
Observations	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250
R-squared	0.2886	0.3335	0.3190	0.3532	0.2710	0.3304	0.2687	0.3308

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study.

Interaction: co-authorship with funding (cont'd)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Fiscal multiplier estimate							
Workplace [ref.: university]								
Government institution					0.1958	0.1997	0.0676	0.0672
					(0.1820)	(0.1777)	(0.1119)	(0.1290)
Private institution					-0.0048	-0.0332	-0.0173	-0.0399
					(0.1202)	(0.1053)	(0.1111)	(0.1034)
International organization					-0.0003	-0.0452	-0.0204	-0.0464
					(0.0906)	(0.0913)	(0.0802)	(0.0919)
Central bank					-0.0402	0.0734	-0.0276	0.0694
					(0.0715)	(0.0842)	(0.0797)	(0.0824)
Gov. institution × monitoring					-0.2503	-0.1174	-0.0557	0.1348
					(0.1987)	(0.1864)	(0.1034)	(0.1384)
Monitoring variable	-0.0497	0.0221	-0.0636	-0.0012	0.0694	-0.0034	0.1177	0.1301*
	(0.0864)	(0.0825)	(0.0880)	(0.0830)	(0.1255)	(0.1072)	(0.0787)	(0.0687)
Definition monitoring	mult. authors from diff. countries				mult. authors		non-gov. coauthor	
Multiplier type controls	×	×	×	×	×	×	×	×
Other controls	×	×	×	×	×	×	×	×
Model controls	×	×	×	×	×	×	×	×
Country coverage	×	×	×	×	×	×	×	×
Country fixed effects		×		×		×		×
Observations	2,250	2,250	2,250	2,250	2,250	2,250	2,250	2,250
R-squared	0.2886	0.3335	0.3190	0.3532	0.2710	0.3304	0.2687	0.3308

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study.

Summary

- We find support for the ideology bias and a mitigating effect of (international) co-authorship

  $\rightarrow$ Result survives when: (i) relying on individual author indicators, (ii) employing alternative WLS specifications, or (iii) excluding the US

- Some (but inconclusive) evidence for the media-involvement amplifier and the funding bias

- No evidence of a publication bias in the considered studies

$\rightarrow$ Important issue for policy advice!

Thank you!

Questions? Comments?

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Subjective reasons for variation in multiplier estimates

Back

Challenges for research

- Lack of clear causal inference for macro policy questions
- Multipliers are politicized
  - Economic policy orientation of researchers
  - Funding / conflict of interest
  - Publication bias and career pressure

Tools: cherry-picking and/or unwitting selection of

- the method, identification strategy, specification, data, context
- unrealistic assumptions, incoherent models

Consequences

- Research finding only partially informative for policy advice
- Attention needs to be paid to the comparability and context of the study

Summary statistics

Back

Variable	Variable definition	Obs	Mean	Std.Dev.	Min	Max
Fiscal multiplier estimate	Fiscal multiplier estimate	2,250	0.829	0.696	-1.700	3.400
Expenditure/GDP (workplace)	Government expenditure to GDP Ratio (country of workplace)	2,250	0.429	0.056	0.216	0.653
Expenditure/GDP (education)	Gov. expenditure to GDP ratio (country of highest degree)	2,044	0.417	0.055	0.327	0.653
Economic freedom (workplace)	Fraser index of economic freedom (country of workplace)	2,250	7.722	0.344	6.982	8.690
Economic freedom (education)	Fraser index of economic freedom (country of highest degree)	2,044	7.835	0.343	6.982	8.443
Economic freedom (year of birth)	Fraser index of economic freedom (country and year of birth)	974	5.925	0.824	3.089	7.191
Economic freedom (year of publication)	Fraser index of economic freedom (country of birth, year of publication)	1,410	7.369	0.504	5.597	8.414
Dummy: market orientation (survey)	Dummy whether intensity score above its median value	794	0.496	0.500	0	1
Dummy: market orientation (survey & other sources)	Dummy for market orientation measured with survey answers, open letters and campaign contributions	905	0.470	0.499	0	1
CONS	Public consumption	2,250	0.177	0.382	0	1
SPEND	Unspecified public spending	2,250	0.381	0.486	0	1
INVEST	Public investment	2,250	0.0987	0.298	0	1
MILIT	Public military spending	2,250	0.0227	0.149	0	1
TAX	Tax reliefs to private sector	2,250	0.225	0.418	0	1
TRANS	Transfers to households	2,250	0.0502	0.218	0	1
EMPLOY	Direct public employment	2,250	0.0222	0.147	0	1
DEF	Unspecified tax relief or spending increase	2,250	0.0227	0.149	0	1
group: EU/EMU/OECD	Multiplier estimated for a group of EU, EMU, and OECD countries	2,250	0.071	0.257	0	1
group: EU/EMU	Multiplier estimated for a group of EU and EMU countries	2,250	0.138	0.345	0	1
group: Ind. & Dev.	Multiplier estimated for a group of industrial and developing countries	2,250	0.011	0.105	0	1
group: Dev.	Multiplier estimated for a group of developing countries	2,250	0.015	0.120	0	1
single: Ind. (low exp/GDP)	Multiplier estimated for a single industrial country (low expenditure/GDP)	2,250	0.507	0.500	0	1
single: Ind. (high exp/GDP)	Multiplier estimated for a single industrial country (high expenditure/GDP)	2,250	0.214	0.410	0	1
Subnational governm.	Multiplier estimated for a group of subnational gov. entities	2,250	0.014	0.118	0	1
Theoretical/NA	Multiplier estimated from a purely theoretical model	2,250	0.029	0.169	0	1
VAR	Vector Autoregression Model	2,250	0.406	0.491	0	1
RBC	Real Business Cycle Model	2,250	0.052	0.222	0	1
NK DSGE	New Keynesian DSGE Model	2,250	0.358	0.480	0	1
MACRO	Macro Model	2,250	0.088	0.283	0	1
SEE Model	Single Equation Estimation Model	2,250	0.096	0.294	0	1

Summary statistics (cont'd)

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Variable	Variable definition	Obs	Mean	Std.Dev.	Min	Max
PEAK	Peak Multiplier	2,250	0.302	0.459	0	1
HORIZON	Horizon of measurement	2,250	1.687	0.991	0	3.871
HORIZON^2	Horizon of measurement squared	2,250	3.827	3.407	0	14.99
PEAK$\times$HOR	Peak multiplier $\times$ Horizon	2,250	0.330	0.715	0	3.178
PEAK$\times$HOR^2	Peak multiplier $\times$ Horizon squared	2,250	0.620	1.584	0	10.10
M/GDP (in %)	Average Import-to-GDP ratio	2,250	20.84	11.34	6	63
Project grant	Study received at least one project grant	2,250	0.185	0.388	0	1
National science funding agency	Study received a grant from a nat. science funding agency	2,250	0.093	0.291	0	1
Government / ministry	Study received a grant from a government / ministry	2,250	0.057	0.232	0	1
European Commission	Study received a grant from the European Commission	2,250	0.036	0.185	0	1
National central bank	Study received a grant from a national central bank	2,250	0.040	0.196	0	1
(Research) foundation / institute	Study received a grant from a research foundation / institute	2,250	0.037	0.190	0	1
University	Working at a university	2,250	0.554	0.497	0	1
Government institution	Working at a public institution	2,250	0.074	0.261	0	1
Private institution	Working at a private institution	2,250	0.021	0.145	0	1
International organization	Working at an international organization	2,250	0.156	0.363	0	1
Central bank	Working at a central bank	2,250	0.214	0.410	0	1
Journal publication	Refereed journal article	2,250	0.420	0.494	0	1
Tenure position	Researcher has a tenure position	1,246	0.660	0.474	0	1
Full professorship	Researcher is a full professor	1,246	0.521	0.500	0	1
Publication on VoxEU	Author has published on VoxEU.com	2,250	0.458	0.498	0	1
Multiple authors	Study written by multiple authors from different countries	2,250	0.859	0.348	0	1
Multiple authors from diff. countries (workplace)	Study by multiple authors from different countries (workplace)	2,250	0.335	0.472	0	1
Multiple authors from diff. countries (education)	Multiple authors who received their highest degree in different countries	2,250	0.469	0.499	0	1
Coauthors not from governm. institution	At least one author working at a government and one elsewhere	2,250	0.024	0.154	0	1

Full table – national imprint & individual market orientation

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Fiscal multiplier estimate											
Expenditure/GDP (workplace)		0.6939	2.8127***										
		(0.6663)	(1.0205)										
Expenditure/GDP (education)				1.1285*	4.6641***								
				(0.6580)	(1.3454)								
Economic freedom (workplace)						0.0659	-0.6207***						
						(0.1113)	(0.2110)						
Economic freedom (education)								-0.0795	-0.5472**				
								(0.1123)	(0.2173)				
Dummy: market orientation (survey responses)										-0.1583*	-0.1011		
										(0.0892)	(0.0763)		
Dummy: market orientation (survey & other sources)												-0.1820**	-0.2122***
												(0.0839)	(0.0799)
Model Type (baseline: VAR)	RBC	-0.5249***	-0.5205***	-0.5183**	-0.5565***	-0.6115***	-0.4956***	-0.5379**	-0.5363**	-0.8096**	-0.9158***	-0.7171**	-0.6254***
		(0.1928)	(0.1500)	(0.2134)	(0.2005)	(0.2127)	(0.1592)	(0.2217)	(0.2155)	(0.3370)	(0.1868)	(0.3166)	(0.2117)
	NK DSGE	-0.1151	-0.2038**	-0.0666	-0.1617*	-0.1661	-0.2037**	-0.0573	-0.1152	-0.0805	0.0448	-0.0328	0.0967
		(0.1023)	(0.0881)	(0.0988)	(0.0969)	(0.1076)	(0.0890)	(0.1100)	(0.1080)	(0.1068)	(0.1001)	(0.1099)	(0.1058)
	MACRO	0.1780	0.1787**	0.1395	0.2012**	0.1718*	0.1628*	0.1766*	0.2114**	-0.0057	0.2228**	0.0314	0.1518
		(0.1075)	(0.0874)	(0.0971)	(0.0859)	(0.0994)	(0.0854)	(0.0904)	(0.0986)	(0.0892)	(0.0987)	(0.0920)	(0.1117)
	SEE Model	-0.0496	-0.1191	-0.0186	-0.0480	-0.1273	-0.1112	-0.0455	-0.0717	0.2072	0.4104	-0.1519	-0.1841
		(0.1626)	(0.1467)	(0.1721)	(0.1567)	(0.1659)	(0.1414)	(0.1775)	(0.1577)	(0.2550)	(0.2918)	(0.2332)	(0.2462)
Multiplier Type (baseline: Governm. Consumption)	SPEND	-0.0341	-0.0014	-0.0406	-0.0035	-0.0318	0.0336	-0.0449	-0.0060	0.0229	-0.0378	0.0337	0.0044
		(0.0808)	(0.0843)	(0.0790)	(0.0802)	(0.0837)	(0.0831)	(0.0809)	(0.0837)	(0.0740)	(0.0822)	(0.0811)	(0.1019)
	INVEST	0.3788**	0.3492**	0.4206**	0.4093**	0.3803**	0.3534**	0.4161**	0.4178**	0.5530***	0.5105**	0.6328***	0.5803***
		(0.1538)	(0.1561)	(0.1826)	(0.1822)	(0.1538)	(0.1574)	(0.1842)	(0.1851)	(0.1883)	(0.1926)	(0.1778)	(0.1904)
	MILIT	-0.0635	-0.1795	-0.0569	-0.1271	-0.0861	-0.1618	-0.0729	-0.1175	0.5108**	0.3108	-0.0168	-0.0981
		(0.1858)	(0.1763)	(0.1760)	(0.1812)	(0.1877)	(0.1849)	(0.1742)	(0.1864)	(0.1935)	(0.2125)	(0.2291)	(0.2215)
	TAX	-0.3978***	-0.3551***	-0.3468***	-0.3222***	-0.3967***	-0.3437***	-0.3434***	-0.3317***	-0.4287***	-0.3923***	-0.2038	-0.1866
		(0.1072)	(0.1132)	(0.1121)	(0.1127)	(0.1070)	(0.1117)	(0.1141)	(0.1144)	(0.1231)	(0.1384)	(0.1306)	(0.1431)
	TRANS	-0.5363***	-0.5467***	-0.4178***	-0.4168***	-0.5374***	-0.5360***	-0.4271***	-0.4131***	-0.6497***	-0.6591***	-0.5115***	-0.5180***
		(0.1075)	(0.1112)	(0.1218)	(0.1195)	(0.1075)	(0.1094)	(0.1223)	(0.1173)	(0.1138)	(0.1163)	(0.1222)	(0.1332)
	EMPLOY	-0.0086	0.1676	0.0887	0.1807	0.0309	0.1472	0.0644	0.1772	0.1245	0.0837	0.0184	-0.0234
		(0.1466)	(0.1323)	(0.1526)	(0.1457)	(0.1378)	(0.1281)	(0.1523)	(0.1453)	(0.1626)	(0.1713)	(0.2953)	(0.2725)
	DEF	-0.1207	-0.1312	-0.1436	-0.1354	-0.1087	-0.1298	-0.1349	-0.1083	-	-	-0.0615	-0.0944
		(0.1010)	(0.1074)	(0.1192)	(0.1208)	(0.1015)	(0.1133)	(0.1206)	(0.1249)			(0.1679)	(0.1827)

Full table – national imprint & individual market orientation (cont'd)

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Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Fiscal multiplier estimate											
Country coverage (baseline: group: EU/EMU/OECD)	group: EU/EMU	0.5346***	0.4839***	0.5145***	0.4585**	0.5608***	0.5387***	0.5498***	0.5180**	0.4363**	0.0222	0.5657***	0.3687
		(0.1710)	(0.1744)	(0.1898)	(0.1768)	(0.1716)	(0.1786)	(0.1937)	(0.2050)	(0.1721)	(0.1423)	(0.1994)	(0.2235)
	group: Ind. & Dev.	0.6463*	0.5743*	0.9964***	0.9495***	0.6787*	0.7387**	1.0878***	1.1461***	0.4673	0.3866*	1.1081***	1.2847***
		(0.3403)	(0.3011)	(0.3544)	(0.2609)	(0.3560)	(0.3053)	(0.3369)	(0.2474)	(0.3199)	(0.1950)	(0.2859)	(0.2630)
	group: Dev.	0.0862	0.1020	0.1210	0.1276	0.0703	0.1094	0.1137	0.1316	-0.1775	-0.1514*	0.0155	0.0614
		(0.1381)	(0.1424)	(0.1465)	(0.1552)	(0.1382)	(0.1499)	(0.1462)	(0.1659)	(0.1248)	(0.0897)	(0.1671)	(0.1601)
	single: Ind.	0.4468**	0.5428***	0.4225**	0.4743***	0.4509***	0.5902***	0.4346**	0.4961***	0.2399	0.0786	0.3794**	0.3854**
	(low exp/GDP)	(0.1707)	(0.1675)	(0.1746)	(0.1800)	(0.1709)	(0.1716)	(0.1745)	(0.1877)	(0.1609)	(0.1184)	(0.1841)	(0.1929)
	single: Ind.	0.3942***	0.5772***	0.3891**	0.4771***	0.4263***	0.6285***	0.4018**	0.5047***	0.2825	0.1798	0.3242*	0.3822*
	(high exp/GDP)	(0.1500)	(0.1594)	(0.1558)	(0.1681)	(0.1529)	(0.1653)	(0.1531)	(0.1810)	(0.1702)	(0.1160)	(0.1933)	(0.1999)
	Subnational gov.	0.6972	0.8287	0.6801	0.6500	0.7514	0.8365	0.7006	0.6957	-0.4203	-0.8185**	0.0465	0.1477
		(0.6220)	(0.6244)	(0.6182)	(0.6139)	(0.6174)	(0.5965)	(0.6100)	(0.5727)	(0.3816)	(0.3199)	(0.3345)	(0.3843)
	Theoretical/NA	0.0021	-0.0350	0.0095	0.0075	-0.0326	-0.0544	-0.0005	-0.0613	-0.2584	-0.1788*	-0.0634	0.0087
		(0.1461)	(0.1382)	(0.1559)	(0.1478)	(0.1493)	(0.1449)	(0.1583)	(0.1643)	(0.1580)	(0.0914)	(0.1698)	(0.1486)
Control Variables (baseline: cumulative multiplier)	PEAK	0.1933	0.2988**	0.1554	0.1757	0.1907	0.3164**	0.1318	0.1516	0.0218	0.0058	0.1751	0.1904*
		(0.1403)	(0.1357)	(0.1389)	(0.1342)	(0.1368)	(0.1321)	(0.1379)	(0.1333)	(0.1306)	(0.1007)	(0.1293)	(0.1071)
	HORIZON	-0.0668	0.0196	-0.1951	-0.1795	-0.0482	0.0058	-0.2029	-0.1928	-0.1078	-0.0630	-0.0869	-0.0064
		(0.1538)	(0.1337)	(0.1321)	(0.1281)	(0.1536)	(0.1313)	(0.1396)	(0.1325)	(0.1036)	(0.1014)	(0.1016)	(0.1109)
	$HORIZON^2$	0.0488	0.0291	0.0864**	0.0817**	0.0417	0.0347	0.0867**	0.0831**	0.0555*	0.0489*	0.0544*	0.0366
		(0.0396)	(0.0335)	(0.0345)	(0.0339)	(0.0397)	(0.0332)	(0.0366)	(0.0356)	(0.0308)	(0.0291)	(0.0283)	(0.0317)
	PEAK×HOR	-0.0725	-0.1840	0.0501	0.0576	-0.1239	-0.1591	0.0443	0.0432	0.0874	0.0732	-0.0010	-0.0406
		(0.2149)	(0.1821)	(0.2068)	(0.1932)	(0.2200)	(0.1861)	(0.2165)	(0.2062)	(0.2011)	(0.1643)	(0.1939)	(0.1972)
	$PEAK \times HOR^2$	0.0546	0.0827	0.0181	0.0129	0.0721	0.0705	0.0237	0.0201	0.0053	0.0195	0.0276	0.0433
		(0.0633)	(0.0546)	(0.0634)	(0.0599)	(0.0647)	(0.0569)	(0.0653)	(0.0638)	(0.0688)	(0.0603)	(0.0603)	(0.0627)
	M/GDP (in %)	-0.0106***	-0.0098***	-0.0111***	-0.0126***	-0.0102***	-0.0100***	-0.0111***	-0.0122***	-0.0117***	-0.0089***	-0.0103***	-0.0081***
	(country sample)	(0.0036)	(0.0033)	(0.0035)	(0.0036)	(0.0036)	(0.0032)	(0.0036)	(0.0037)	(0.0027)	(0.0020)	(0.0022)	(0.0024)
Constant		0.3513	-0.9314	0.2252	-1.7794**	0.1498	5.0804***	1.3216	4.7000***	0.9649***	0.8979***	0.6943***	0.5753***
		(0.4023)	(0.6158)	(0.3325)	(0.7415)	(0.8827)	(1.5367)	(0.9543)	(1.6219)	(0.1640)	(0.0996)	(0.1904)	(0.1918)
Country fixed effects			×		×		×		×		×		×
Observations		2,250	2,250	2,044	2,044	2,250	2,250	2,044	2,044	794	794	905	905
R-squared		0.2692	0.3348	0.2731	0.3046	0.2677	0.3409	0.2677	0.2935	0.3386	0.4336	0.3512	0.4211

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Standard errors are clustered by paper. The expenditure-to-GDP ratio corresponds to the year of publication with the exception of columns (5) and (10).

Coding scheme – project grants

National science funding agency	European Commission	Government	Central Bank	(Research) Foundation / Institute
National Science Foundation	European Commission	Pierre Werner Chair Programme on Monetary Union	Banco D'Espania	Stanford Center for Economic Policy
Social Sciences and Humanities Research Council of Canada		World Bank (Knowledge for World Program)	Fondation Banque de France	Barcelona GSE Research Network (CREA)
German Research Foundation		Arbeitskammer Wien		Sloan Foundation
Irish Research Council for the Humanities and Social Sciences		Spanish Ministry of Education and Science		Centre for Macroeconomics (CfM)
		Spanish Ministry of Science and Technology		Institute for New Economic Thinking (INET)

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Coding scheme – workplaces

Government institution	Private institution	International organization	Central Bank
Belgian Federal Planning Bureau	Goldman Sachs	IMF	National central banks (ITA, ESP, DEU, BEL)
Economic Bureau of Spanish Prime Minister	Hans-Böckler Foundation	OECD	ECB
European Commission	Moody's Analytics	World Bank	Federal Reserve System
French Ministry of the Economy and Finance			Federal Bank of Chicago, Kansas City, Minneapolis, New York, Chicago
INSEE France			
Office of the (US) Vice President Elect			

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Publication bias – asymmetries

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Fiscal multiplier estimate									
Const.	0.767*	0.862***	0.979**	0.906***	0.266	2.363	0.768	0.627	0.579*	0.648***
	(0.446)	(0.151)	(0.469)	(0.212)	(2.398)	(2.190)	(0.662)	(0.438)	(0.337)	(0.222)
$f(N)$	0.012	-0.002	-0.750	-0.919	0.781	0.662***	-0.015	0.001	0.596	0.577
	(0.086)	(0.009)	(2.276)	(2.274)	(0.488)	(0.183)	(0.093)	(0.013)	(1.785)	(1.618)
$f(N)$-specification	$log(N)$	$\sqrt{N}$	$1/log(N)$	$1/\sqrt{N}$	$log(N)$	$\sqrt{N}$	$log(N)$	$\sqrt{N}$	$1/log(N)$	$1/\sqrt{N}$
Multiplier type controls							×	×	×	×
Other controls							×	×	×	×
Model controls							×	×	×	×
Country coverage							×	×	×	×
Country fixed effects							×	×	×	×
Observations	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616	1,616
R-squared	0.0002	0.0005	0.0011	0.0017	0.0300	0.1409	0.3293	0.3292	0.3294	0.3294

Notes: *** p<0.01, ** p<0.05, * p<0.1. Standard errors are clustered by study. The models include all data-based observations (i.e., excluding non-estimated DSGE, structural Macro and RBC models) which explains the reduced sample size. For columns (1) - (4) and (7) - (10), the dependent variable is the (unweighted) fiscal multiplier estimate from the primary studies. For columns (5) and (6), we follow Stanley and Doucouliagos (2012) and also weight the dependent variable (i.e., the fiscal multiplier estimate) by $log(N)$ and $\sqrt{N}$, respectively.

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