The Effect of Financial Education on Downstream Financial Behaviors

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- Economic importance of financial literacy is documented in a large and growing empirical literature (e.g., Lusardi and Mitchell 2014, *JEL*)

- National strategies and school-based financial education are prominent strategies to combat low levels of financial literacy

  - ➢ Financial education programs currently seek to reach over 5 billion people in 60 countries (OECD 2015).

- Yet, academics and the public often debate the effectiveness of financial education (e.g., Hastings et al. 2013*, Annu. Rev. Econ*; Fernandes et al. 2014, *ManSci*; Miller et al. 2015, *WBRO;* Kaiser and Menkhoff 2017, *WBER*)

Pacific Standard

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THE QUEST TO IMPROVE AMERICA'S FINANCIAL LITERACY IS BOTH A FAILURE AND A SHAM

Financial literacy promotion may sound perfectly sensible—who wouldn't want to teach children and adults the secrets of managing money?—but in the face of recent research it looks increasingly like a faith-based initiative.

HELAINE OLEN · JAN 7, 2014

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Why Investor Education Doesn't Work – And How to Change That

Employer-sponsored 401(k) meetings aren't always effective.

ECONOMIC VIEW

Financial Literacy, Beyond the Classroom

By Richard H. Thaler

Oct. 5, 2013

TIME

FINANCIAL EDUCATION

Financial Education Is All the Rage but Does it Work?

Reaching consumers with advice and information just before making a financial decision is the new target. But is that really more effective than teaching personal finance in K-12?

By Dan Kadlec @dankadlec | Oct. 25, 2013

Why financial literacy programs don't work

BY ATTY. DODO DULAY   JANUARY 01, 2019

HOME / OPINION / OP-ED COLUMNS / WHY FINANCIAL LITERACY PROGRAMS DON'T WORK

- <u>First Meta-analysis</u> to comprehensively study the literature by Fernandes, Lynch, and Netemeyer (2014), *ManSci*
  - Compiled an extensive dataset of effect sizes
  - "manipulated fin. literacy" (i.e., treatment effects of interventions)
    - 13 RCTs
    - 75 quasi-experimental settings
  - and "measured fin. literacy" (i.e., correlation in observational studies)
   - 111 observational studies (25 IV and 86 OLS)

- The paper by Fernandes et al. (2014) is mainly cited for two findings emphasized in the introduction:

1) "We find that interventions to improve financial literacy explain only 0.1% of the variance in financial behaviors studied" (Fernandes et al. 2014, p. 1861)

2) "Intervention effects may decay over time – the case for 'just in time financial education'."(Fernandes et al. 2014, p. 1866)

Figure 4 Partial Correlation of Financial Education Interventions with Financial Behavior as a Function of Number of Hours of Intervention and Number of Months Since Intervention
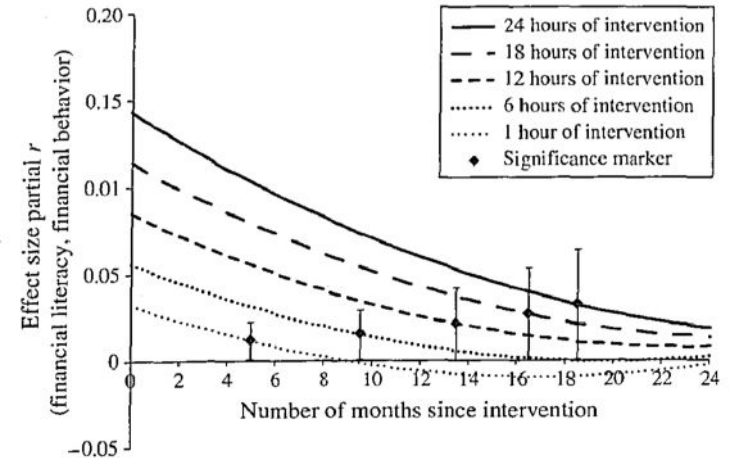
Last Paper included in
Fernandes et al. (2014), *ManSci*
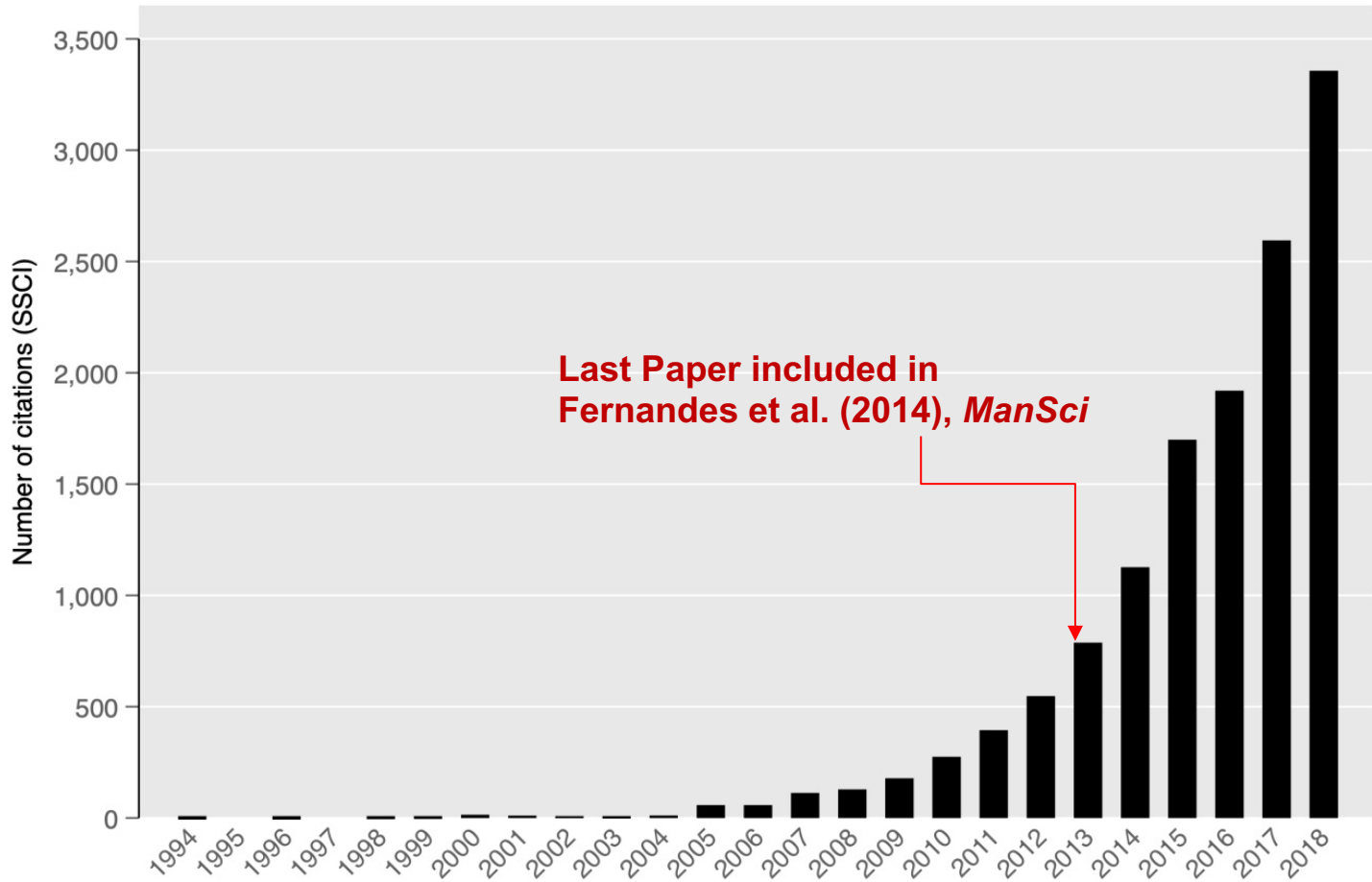
- (1) We take stock of the <u>new evidence</u>
  - Focus on rigorous RCTs
  - Include all earlier studies and more than quintuple the number of RCTs from 13 to 68
    - Total individuals in sample increased from ~23,000 to ~145,000
    - Many more studies and in top economics-journals

- (2) Careful <u>meta-analysis</u> of these RCTs:
  - Account for between study heterogeneity in true effects
  - Probe sensitivity of results to the choice of model and interpretation of results
  - Consider the power of underlying studies
  - Considering potential publication bias
  - Analysis of intensity and decay of effects
  - Minor point: Correct some coding errors in the sample of 13 RCTs (15 observations) in Fernandes et al. (2014)

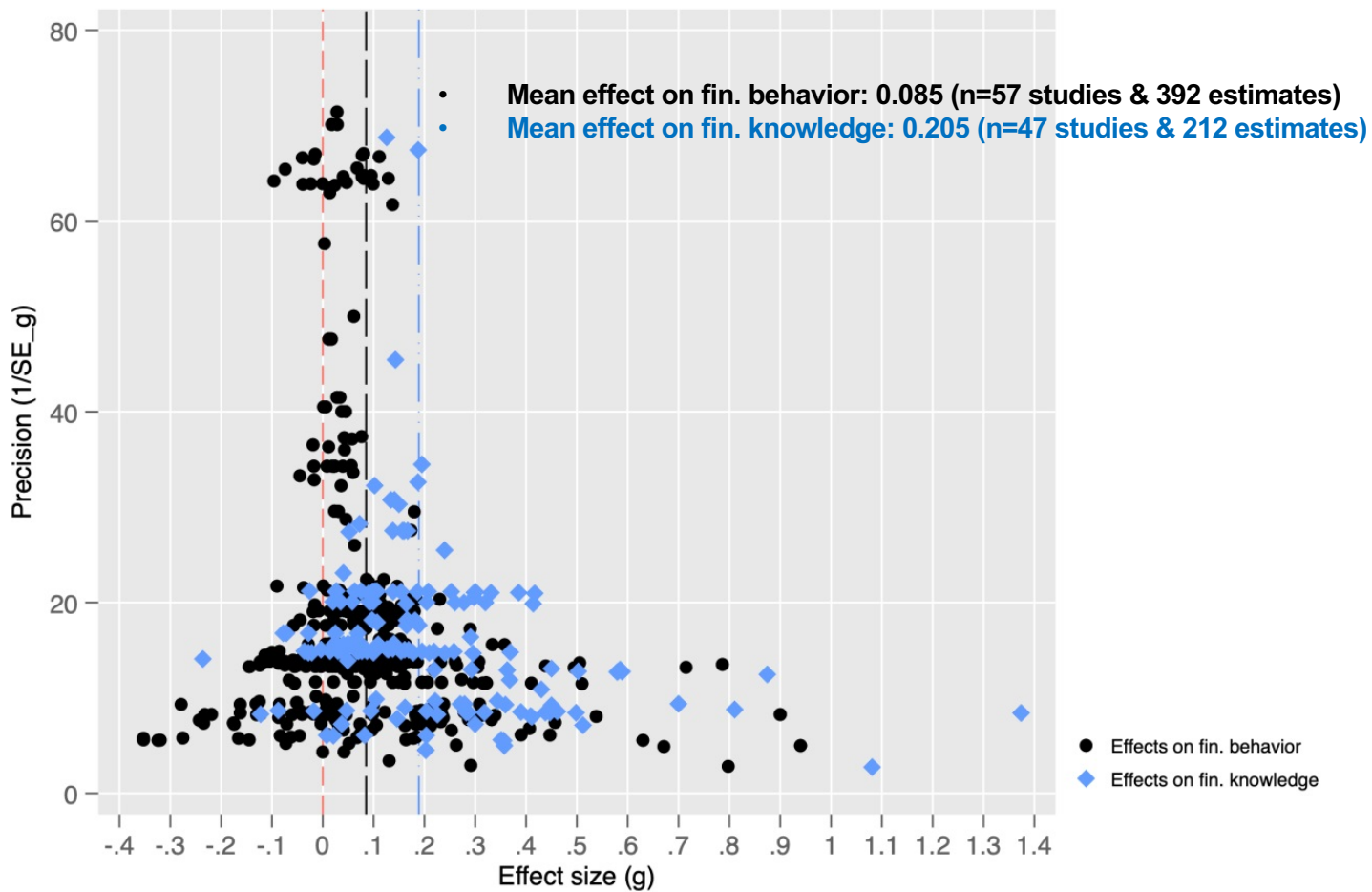- (3) Back of the envelope calculation to translate statistical effect sizes into <u>economic effect sizes</u>

  – Convert "(partial) r" or "standard deviation units" into meaningful economic effect sizes

  – What does "% of variance explained" mean in economic terms?

- Recent work shows clear evidence of positive effects of financial education on financial behaviors (+knowledge)
  - Statistical <u>effect size is at least twice as large </u> as the effect reported in Fernandes et al. (2014)
  - Economic effect size may be much larger than suggested by these statistical effect sizes
- This effect is mainly driven by the recent evidence (but effect may be even larger when accounting for between study heterogeneity in true effects beyond within-study measurement error)

Mean effect on fin. behavior: 0.085 (n=57 studies & 392 estimates)
Mean effect on fin. knowledge: 0.205 (n=47 studies & 212 estimates)

● Effects on fin. behavior
◆ Effects on fin. knowledge

Comparison the new evidence to the result in Fernandes et al. (2014)

Treatment effects on financial behaviors (WLS 1/Var_g)
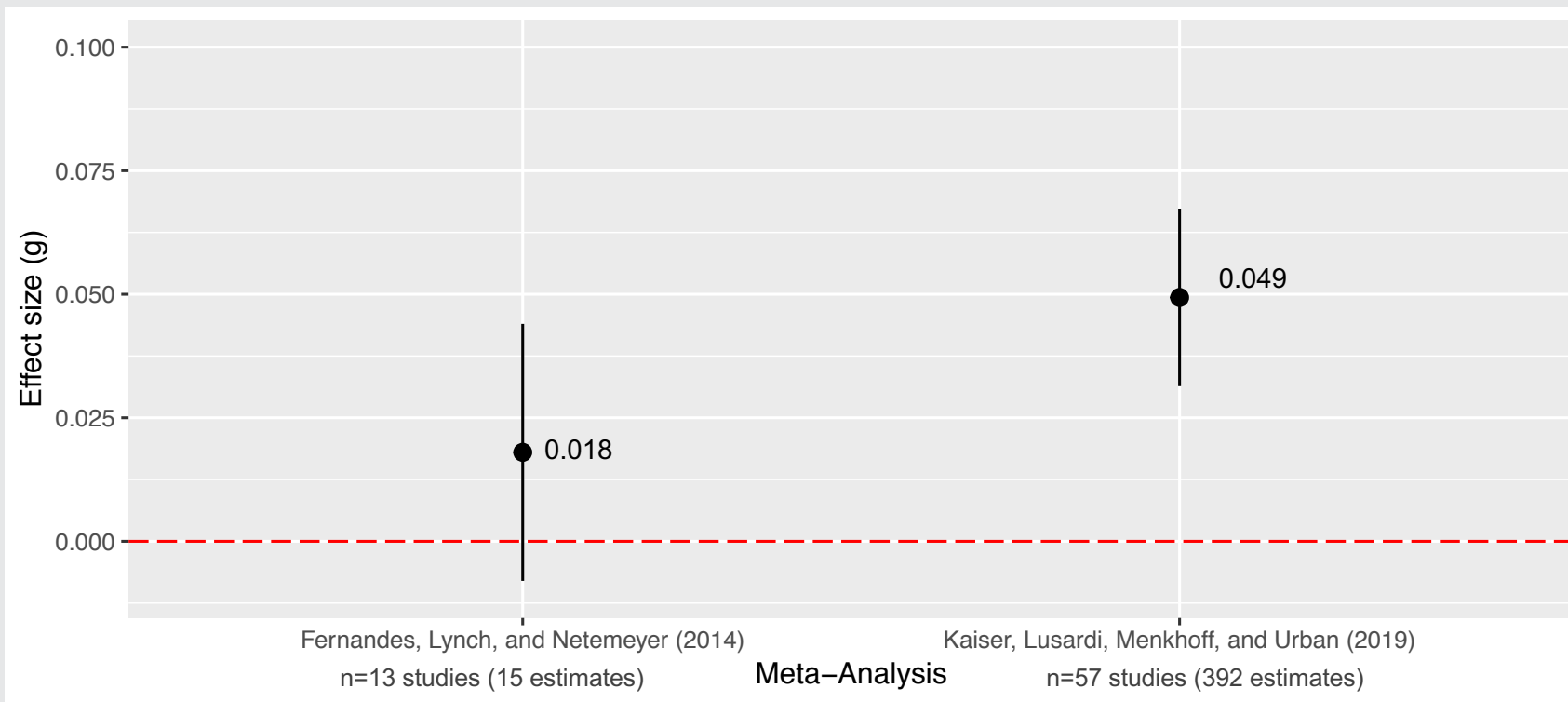
Treatment effects by outcome domain (WLS (1/Var))

Domain	Effect size (g)
(1) Fin. knowledge (47 studies, 212 effect sizes)	.156
(2) Borrowing (21 studies, 93 effect sizes)	-.0137
(3) Budgeting (17 studies, 43 effect sizes)	.083
(3) Saving (50 studies, 224 effect sizes)	.0663
(4) Insurance (6 studies, 19 effect sizes)	.0364
(6) Remittances (6 studies, 16 effect sizes)	.0129

- Fernandes et al. report weighted average effects $(1/SE^2)$

  - Strong assumption of a common true effect of financial education despite very heterogenous interventions

- For the sake of comparison we used the exact same approach here

- Conversion of effect size used in Fernandes et al. (r or partial r) to standardized mean difference (g)

➤ Now we also use methods that account for between-study heterogeneity in true effects

Modelling between-study heterogeneity in true effects again doubles the effect size
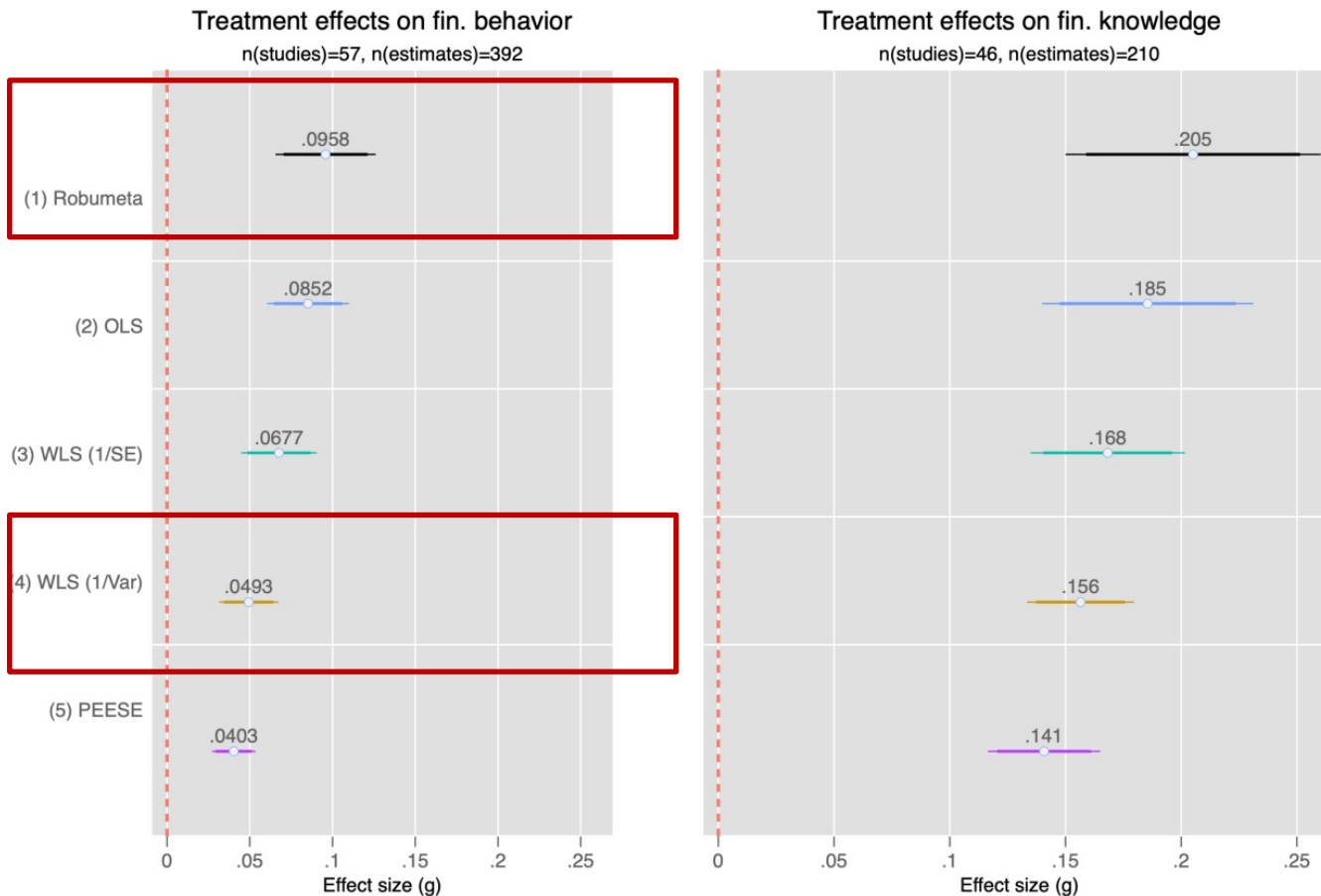
- Fernandes et al. (2014) effect size measure creates the illusion of miniscule effects, when they can be economically significant.

  - "variance explained" is a misleading concept

- Consider the following <u>example</u>:
  - Median effect of structured pedagogy interventions in developing countries = 0.13 SD units. (Evans et al. 2019)
  - In the Fernandes et al. (2014) metric: this intervention explains 0.36% of the variance in learning outcomes.
    - Seems small?
  - Evans et al. (2019) report that this effect = ~0.6 years of "business as usual schooling"
  - In separate analysis they estimate the returns to literacy in Kenya. The net present value of this intervention is 1,338 USD at an average annual income of 1,079 USD in 2015 PPP.
    - Economically, this effect appears to be large.

Example: Economic significance in the context of financial education

- Large-scale RCT in Brazil (Bruhn et al. 2016, *AEJ: Applied*) reports an average effect of financial education treatment on the "percent of disposable money saved" of **0.07 SD** units (t-stat=3.34) (p.278, Table 5, C9).

  - In the metric of Fernandes et al. (2014) that would translate to: r= 0.0349 or "explaining 0.12 % of the variance" (r^2).

  - However, this **effect corresponds to an increase of 11.2 % in the amount of disposable money saved** relative to the control group (i.e., economically relevant).

Subgroup analyses

Subgroup	Effect size (g)	SE	p-value	95% CI Lower bound	95% CI Upper bound	n(Studies)	n(effects)
Panel A: Treatment effects on financial behaviors							
(a) By country income							
High income economies	0.104	0.035	0.007	0.031	0.176	27	87
Developing economies	0.093	0.014	0.000	0.065	0.122	31	305
(b) By respondent income							
Low income individuals	0.097	0.020	0.000	0.056	0.139	41	315
General population	0.092	0.023	0.002	0.042	0.143	16	77
(c) By type of publication							
Top econ. journals	0.085	0.022	0.002	0.037	0.133	15	135
Other publications	0.101	0.020	0.000	0.060	0.142	42	257
Panel B: Treatment effects on financial knowledge							
(a) By country income							
High income economies	0.2583	0.0447	0.0000	0.1663	0.3504	26	132
Developing economies	0.1384	0.0233	0.000	0.0893	0.1876	20	78
(b) By respondent income							
Low income individuals	0.225	0.042	0.000	0.137	0.311	28	116
General population	0.185	0.035	0.000	0.111	0.259	18	94
(c) By type of publication							
Top econ. journals	0.1687	0.0513	0.0182	0.0413	0.2961	7	45
Other publications	0.2116	0.0320	0.000	0.1466	0.2767	39	165

	(1) Robumeta	(2) OLS	(3) WLS (1/SE)	(4) WLS (1/Var)	(5) PEESE
Intensity (hours)	0.00277	0.00251	0.000466	-0.000250	0.0000920
	(0.00230)	(0.00177)	(0.00111)	(0.000418)	(0.000352)
Delay (months)	-0.00251	-0.00144	0.00250	0.00371**	0.00222*
	(0.00391)	(0.00264)	(0.00178)	(0.00140)	(0.00122)
Delay × Delay	0.0000210	-0.0000382	-0.000170*	-0.000197**	-0.000136
	(0.000221)	(0.000129)	(0.0000957)	(0.0000864)	(0.0000832)
Intensity × Delay	-0.000250	-0.000284*	-0.000101	-0.0000262	-0.0000362
	(0.000225)	(0.000169)	(0.000111)	(0.0000398)	(0.0000308)
Intercept	0.0967***	0.0958***	0.0784***	0.0663***	0.0503***
	(0.0192)	(0.0122)	(0.00936)	(0.00892)	(0.00924)
SE^2 as covariate	no	no	no	no	yes
n (Studies)	49	49	49	49	49
n (Effect sizes)	363	363	363	363	363

➢ Standard errors for the coefficients are very large, so there is a lot of uncertainty around this prediction.
➢ Even more so, if you have an even smaller set of observations as in Fernandes et al. (2014)

External Validity

- There are concerns that RCTs have limited external validity.

- This study increases the number of individuals in the interventions from Fernandes, Lynch, and Netermeyer (2014) from 23,000 to over 140,000.

  ➤ But what about scale?

- Findings are consistent with recent work studying post-2000 state-mandated financial education in U.S. high schools that relies upon quasi-experimental research. (Brown et Al, 2016; Harvey, 2019; Urban et Al, 2018; Stoddard and Urban, 2019)

- Findings also consistent with large-scale RCTs, such as the school-based widespread RCTs (e.g., Frisancho (2018))

1) Recent work shows clear evidence of positive effects of financial education on financial behaviors (+knowledge)
   - Statistical effect size is <u>at least twice as large </u>as the effect in Fernandes et al. (2014)
   - It may be up to five times as large (when allowing for between-study heterogeneity in true effects)
   - Robust to a lot of different approaches to meta-analysis and even when accounting for publication selection for statistical significance

2) Policy recommendations should be based on economic effect sizes, not statistical effect sizes

3) No evidence of "rapid decay" but no evidence against it either

Thank you!

Questions? Contact: Tim Kaiser, tkaiser@diw.de

Meta-Analysis	ES (95% CI)	Studies	Design
Fernandes et al. (2014)	0.018 (-0.008, 0.044)	15	RCTs
Fernandes et al. (2014)	0.068 (0.062, 0.074)	75	Quasi Exp.
Miller et al. (2015)	0.036 (0.011, 0.060)	20	RCTs & Quasi Exp.
Kaiser and Menkhoff (2017)	0.075 (0.050, 0.100)	40	RCTs
Kaiser and Menkhoff (2017)	0.083 (0.059, 0.107)	50	Quasi Exp.
Kaiser and Menkhoff (2018) [Youth]	0.077 (0.047, 0.107)	16	RCTs
Kaiser and Menkhoff (2018) [Youth]	0.061 (0.004, 0.118)	6	Quasi Exp.
Overall (I-squared = 73.3%, p = 0.001)	0.060 (0.044, 0.076)		

NOTE: Weights are from random effects analysis

-.118   0   .118

Meta-Analysis	ES (95% CI)	Studies	Design
Kaiser and Menkhoff (2017)	0.237 (0.160, 0.313)	33	RCTs
Kaiser and Menkhoff (2017)	0.338 (0.214, 0.462)	34	Quasi
Steinert et al. (2018)	0.120 (0.022, 0.218)	12	RCTs
Kaiser and Menkhoff (2018) [Youth]	0.189 (0.066, 0.311)	14	RCTs
Kaiser and Menkhoff (2018) [Youth]	0.490 (0.309, 0.671)	17	Quasi
Frisancho (2018) [Youth]	0.170 (0.105, 0.235)	10	RCTs
Overall (I-squared = 73.0%, p = 0.002)	0.237 (0.158, 0.317)		

NOTE: Weights are from random effects analysis

-.671   0   .671