New Directions for Research on Financial Education

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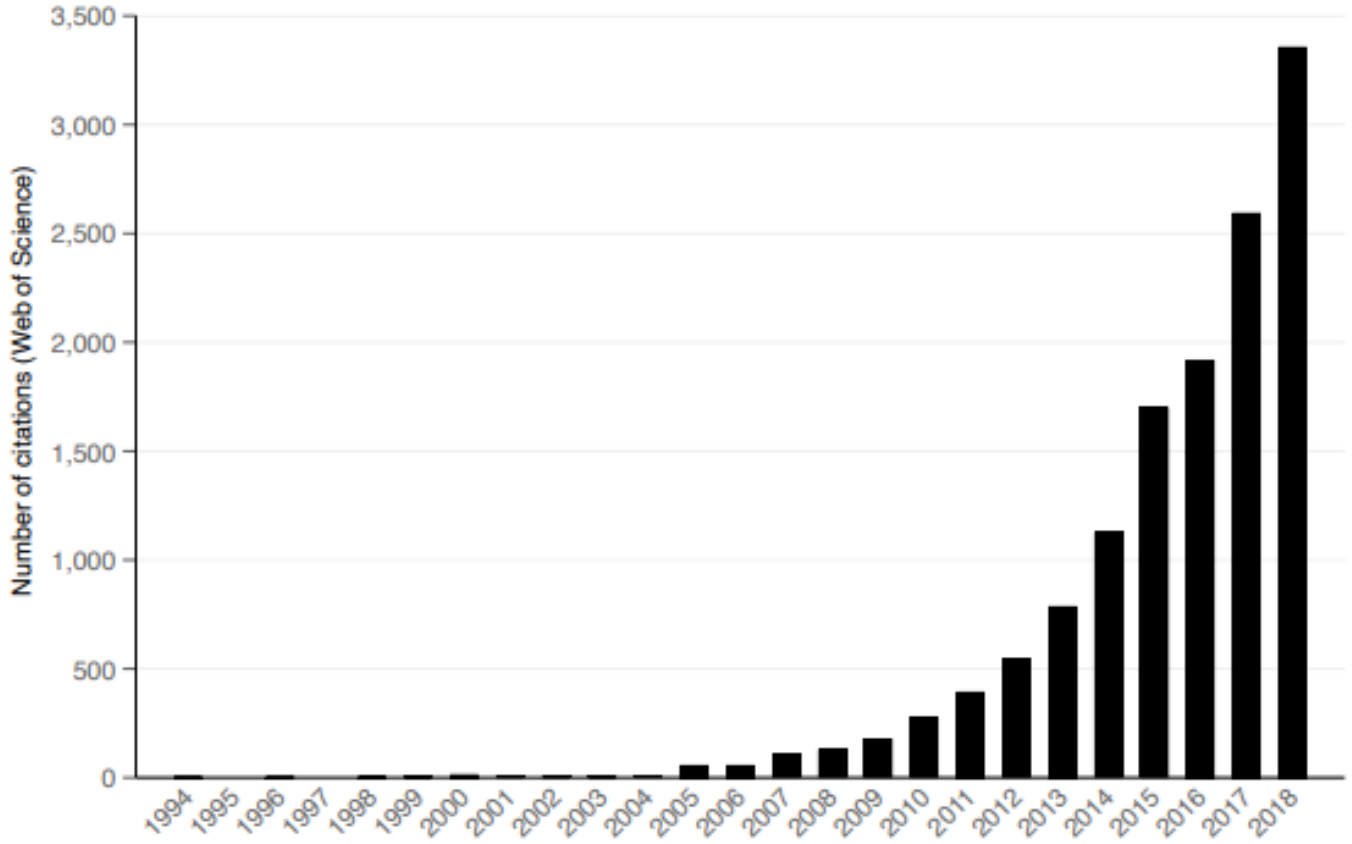
Financial Literacy Boot Camp
Stanford, June 2025

Introduction

- Over the last 20 years, there has been an explosion of interest in financial literacy and financial education

Figure 1: Citations in the SSCI to the term "financial literacy" per year



Notes: Number of citations within the social science citation index (Web of Science) to articles including the term "financial literacy" in the title or the abstract. Data from October 11, 2019.

Introduction

- The literature on financial education has focused on the measurement of Average Treatment Effects (ATEs) for financial literacy and specific behaviors, such as saving and indebtedness.
- Normative evaluations have been based on preconceptions about the types of behaviors that are good (e.g., high saving) and bad (e.g., high indebtedness).
- For the most part, those preconceptions have not been rooted in rigorous welfare principles.

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- For the most part, those preconceptions have not been rooted in rigorous welfare principles.

- **Theme of my presentation:** Work in this area would benefit from a more rigorous focus on the measurement of welfare effects.

Outline of the Presentation

I. Does financial education change behavior for the right reasons?

II. Can improvements in financial knowledge lead to worse financial decisions?

III. How does poor financial knowledge interact with other biases?

IV. Does financial education involve unconventional costs and benefits?

I.
Does Financial Education Change Behavior for the Right Reasons?

Does financial education change behavior for the right reasons?

Ambuehl, Bernheim, and Lusardi, "Evaluating Deliberative Competence: A Simple Method with an Application to Financial Choice," AER, 2022.

- Objective: Improve methods for evaluating impact of policies, such as financial education, that seek to improve the quality of decision making.
- Focus is on comprehension of compound interest
  - Foundational concept in finance
  - People tend to suffer from a known bias (*exponential growth bias*)
    Wagenaar and Sagaria, 1975, Eisenstein & Hoch, 2007, Stango & Zinman, 2009, Almenberg & Gerdes, 2012, Levy & Tasoff, 2016
  - Suitable for an experiment: relatively easy to explain in a brief intervention

Does financial education change behavior for the right reasons?

Structure of the experiment

- Stage 1: Educational intervention
  - Treatment: A narrated video of a section on compound interest from a popular investment guide (Malkiel and Ellis).
  - Experiment A: The educational intervention does not include practice and feedback
  - Experiment B: The educational intervention does include practice and feedback
  - Control: A narrated video based on another section of the same investment guide covering an unrelated topic.

Does financial education change behavior for the right reasons?

Structure of the experiment

- Stage 1: Educational intervention
- Stage 2: Valuation decisions
  - WTP for interest-paying instruments that mature at a specified point in time
  - Example: a $10 investment in an asset that pays 2% interest per day, compounded daily, for 36 days

Does financial education change behavior for the right reasons?

Structure of the experiment

- Stage 1: Educational intervention
- Stage 2: Valuation decisions
- Stage 3: Financial literacy assessment
  - Exam-style questions that assess ability to estimate or calculate compound interest

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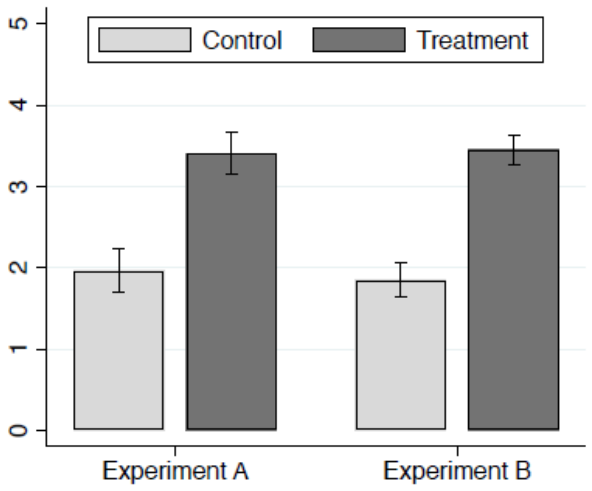
Remarks

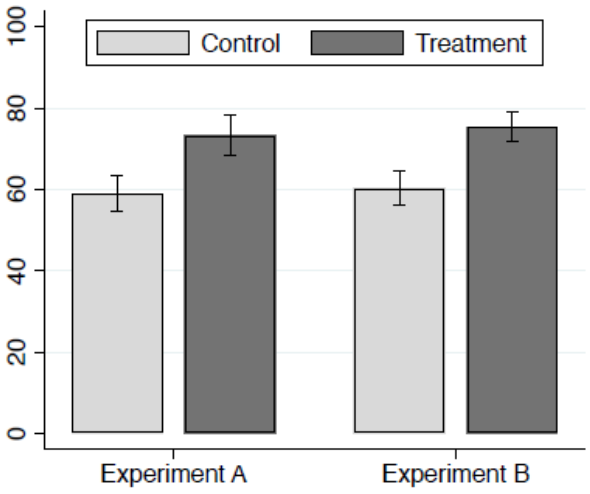
- You can think of this component of the experiment as a standard evaluation of ATEs for two interventions, one with practice and feedback, one without
- Other components will be described when relevant

Does financial education change behavior for the right reasons?

- ATEs for test scores and valuations indicate that the intervention is highly successful, and equally successful regardless of whether it includes practice and feedback:



A. Test scores



B. Valuations in complex frame

- Both interventions appear to have the "right effects" on behavior (valuations) for the "right reasons" (financial literacy)

Does financial education change behavior for the right reasons?

Further investigation calls this conclusion into question

- The intervention includes both substance and rhetoric
- Substance: a conceptual explanation of compound interest and the Rule of 72
- Motivational rhetoric, e.g.:

  Albert Einstein is said to have described compound interest as the most powerful force in the universe.

- We ask: *What drives the results?*

Does financial education change behavior for the right reasons?

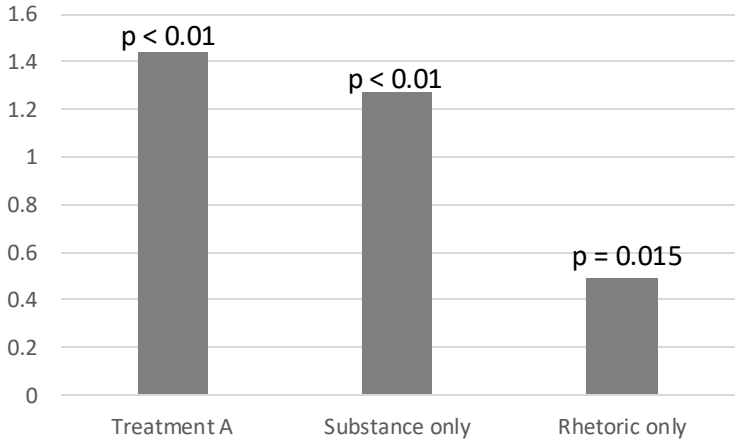
Two additional versions of Experiment A

- Substance only: Eliminates all of the rhetorical components
- Rhetoric only: Eliminates substantive material that assists with calculations (Rule of 72)

If the intervention has the right effect for the right reason (as suggested by the effect on financial literacy), the substantive components of the intervention should be doing most of the work.

Does financial education change behavior for the right reasons?

As expected, the effect on test scores comes primarily from the substantive components of instruction…



A. Effect on test scores

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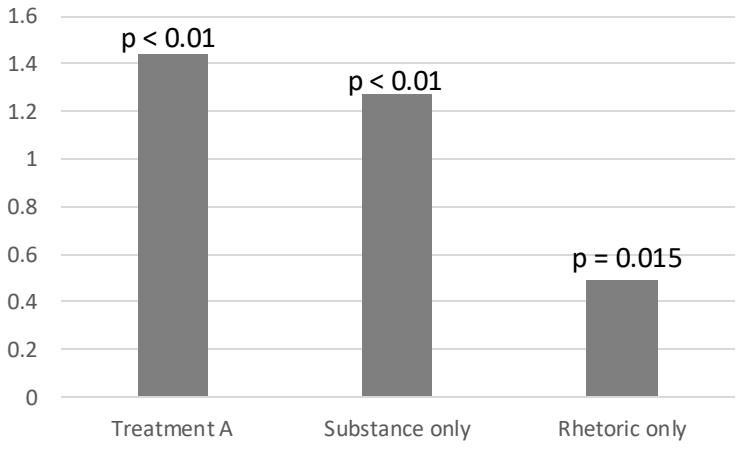
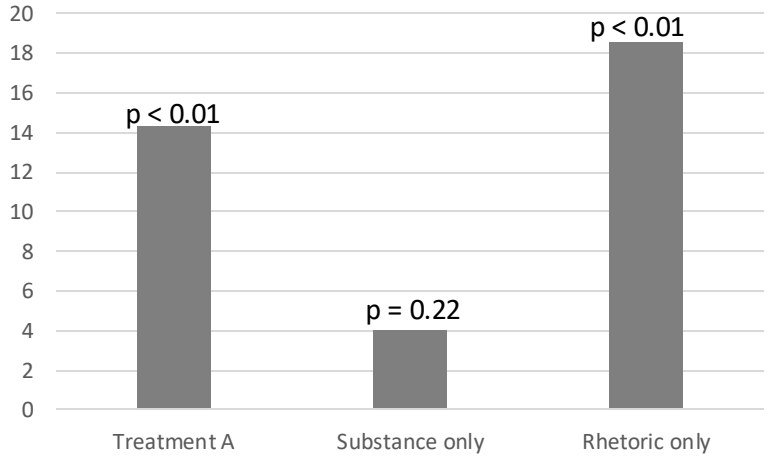


A. Effect on test scores

But, contrary to expectations, the effect on valuations comes mostly from the motivational rhetoric!



B. Effect on valuations

Does financial education change behavior for the right reasons?

Even so, could financial education at least right effects for the wrong reasons?

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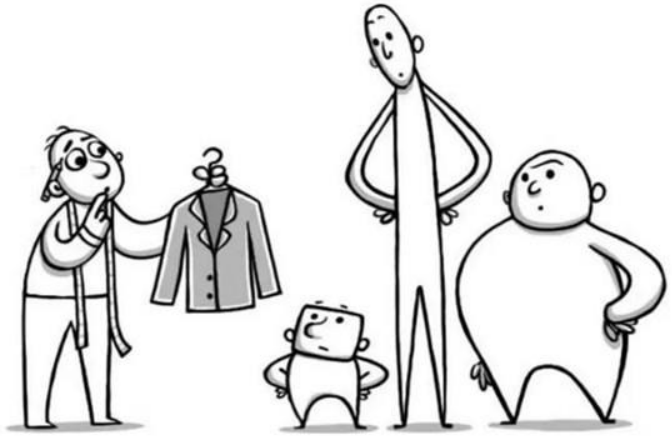
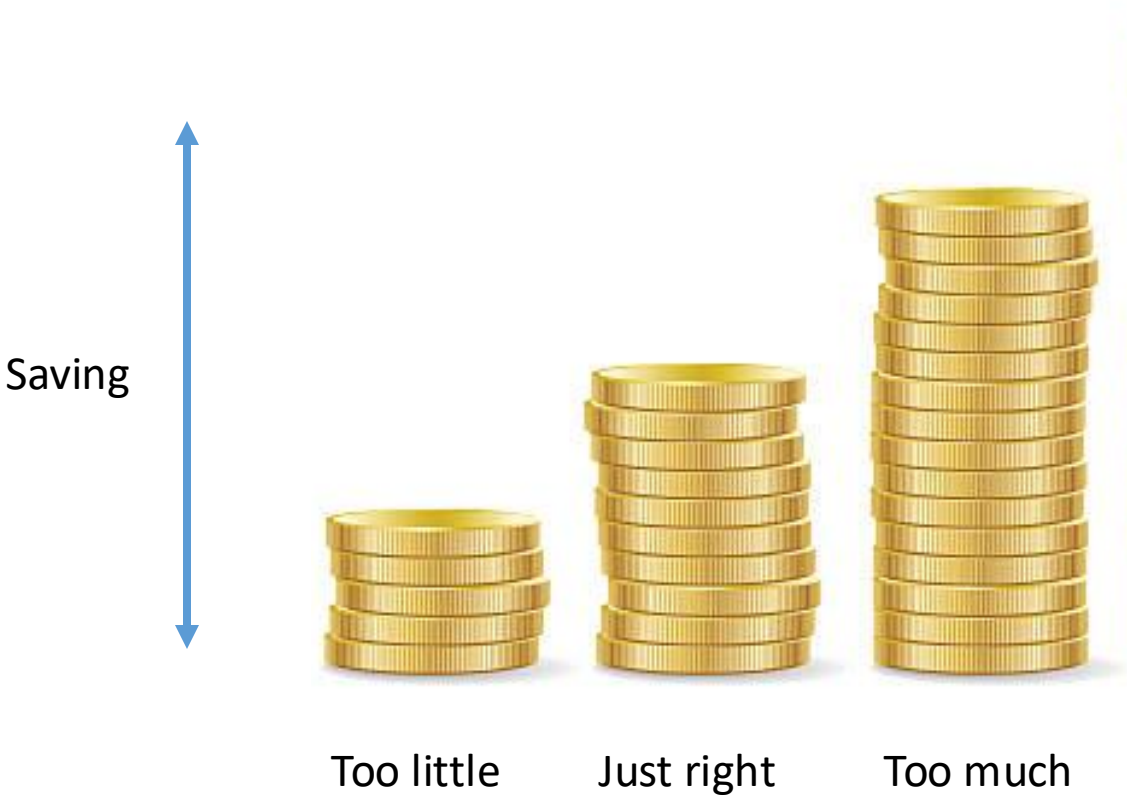
Unlikely because of *heterogeneity*.



- Getting the right outcome for the wrong reasons is the result of coincidence.
- With heterogeneity, the fact that the wrong reasons happen to produce the right answer for one person doesn't mean they'll happen to produce the right answer for another.
- The only reliable way to consistently get the right answer is to get it for the right reasons.

Does financial education change behavior for the right reasons?

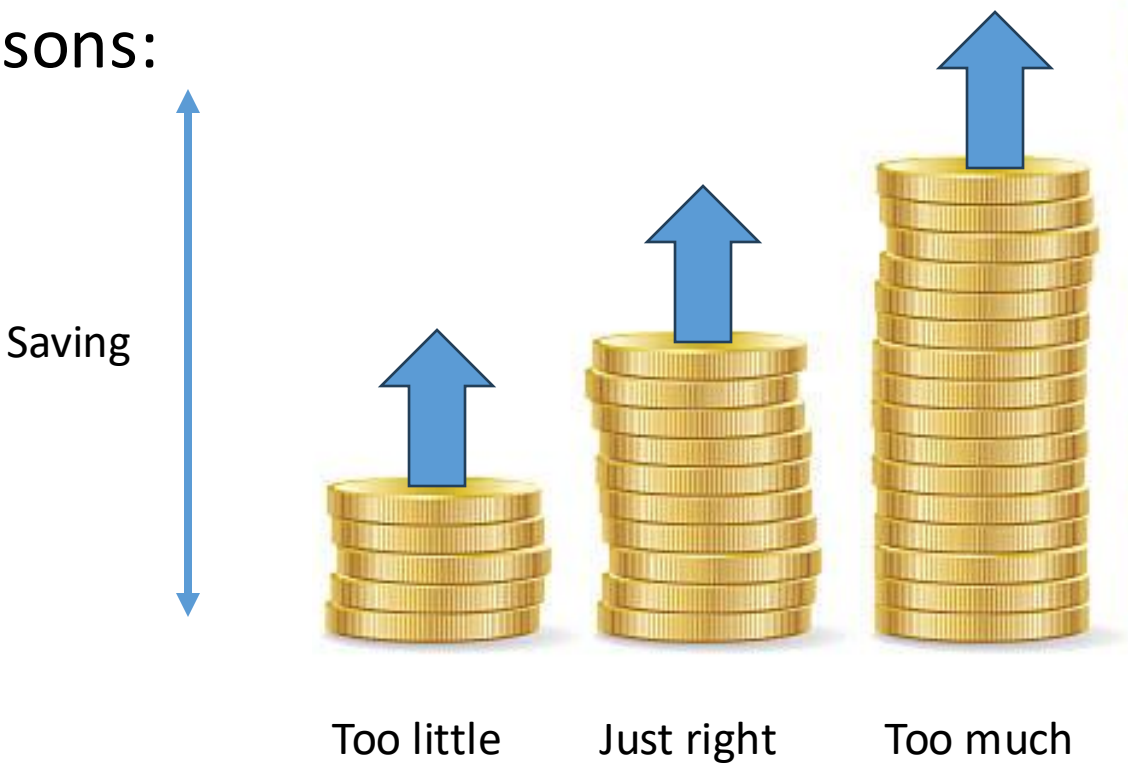


Does financial education change behavior for the right reasons?

What we HOPE to see:

Does financial education change behavior for the right reasons?

What are LIKELY to see if the effect occurs for the wrong reasons:



Does financial education change behavior for the right reasons?

The experiment also assesses *money-metric biases*

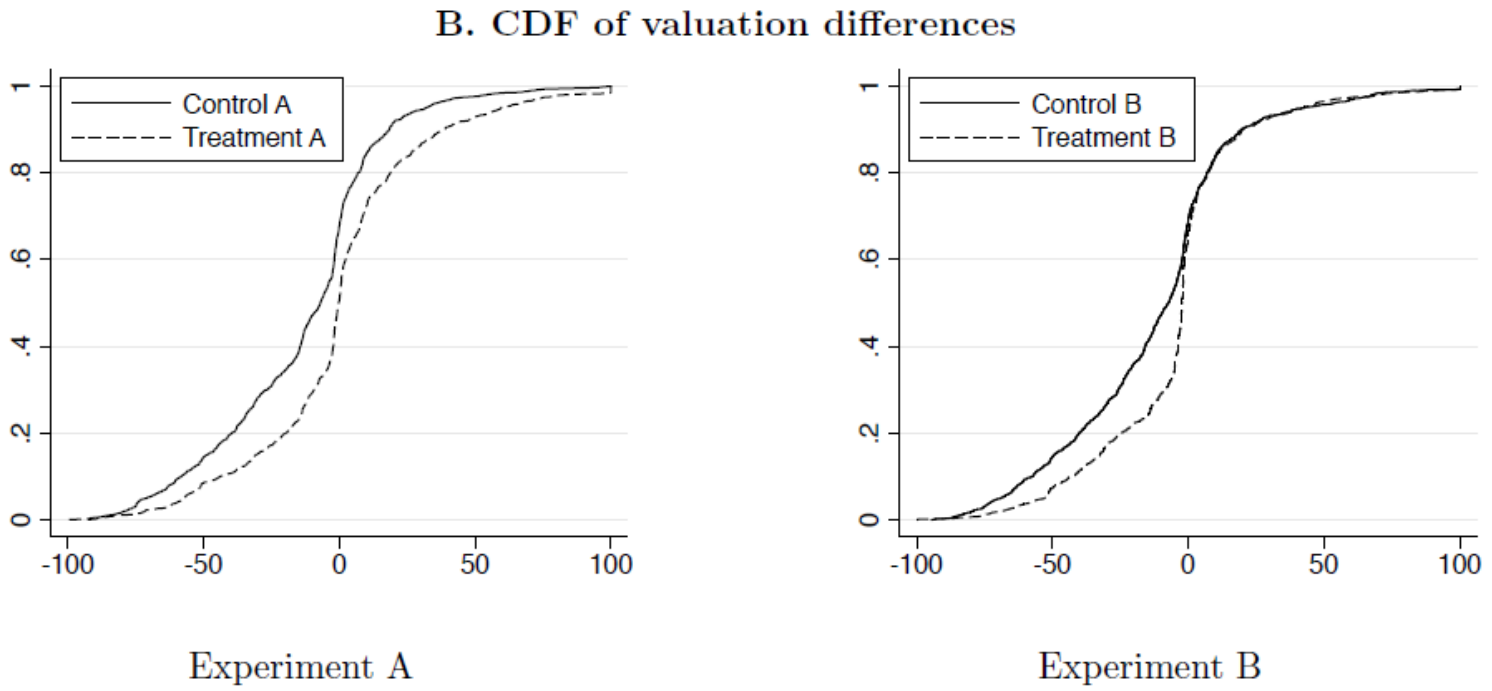
General strategy: study two objectively equivalent decision problems, one with naturally occurring complexity, the other simplified to make the consequences transparent, and define the "Welfare Relevant Domain" (WRD) to include only the second.

Specific strategy uses *paired valuation tasks:* e.g., in addition to assessing (i) WTP for a $10 investment in an asset that pays 2% interest per day, compounded daily, for 36 days, also assess (ii) WTP for $20 in 36 days.

The money-metric bias is the difference in valuations

Does financial education change behavior for the right reasons?

- Intervention A (without practice and feedback) fails because the impact on the money-metric bias is uncorrelated with the initial bias.
- Intervention B (with practice and feedback) succeeds because the bias and the effect are negatively correlated

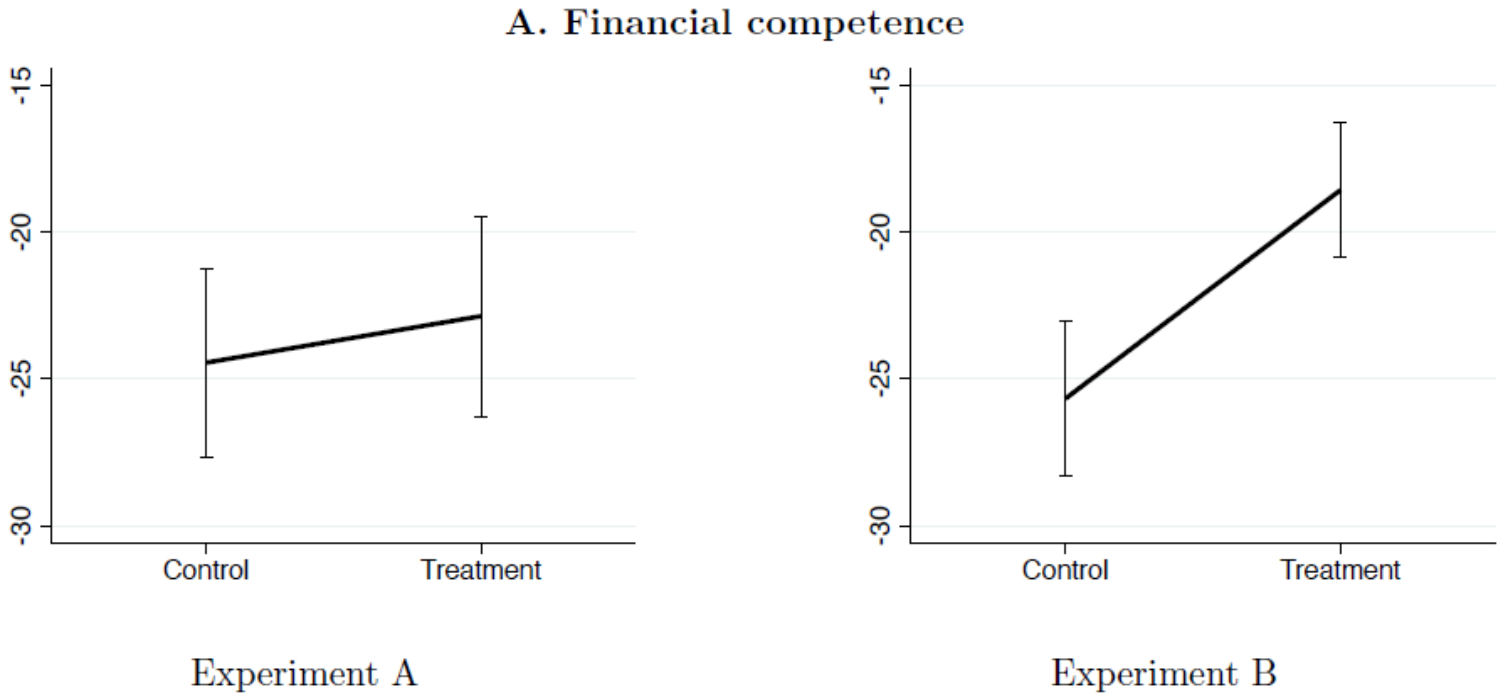


Does financial education change behavior for the right reasons?

- In place of conventional outcome metrics, the paper proposes using the absolute value or the square of money metric bias (*deliberative competence*)
- These measures can be rationalized as the dollar-equivalent welfare loss a consumer suffers due to characterization failure when making her decision in the complex frame.
  - Imagine the consumer deciding whether to buy similar financial instruments in settings where the price will be realized from some distribution
  - Absolute money metric bias gives the largest possible loss (i.e., the most costly mistake the individual can make)
  - Squared money metric bias approximates the expected loss

Does financial education change behavior for the right reasons?

- According to such measures, the intervention unambiguously improves the quality of financial decision making only if it includes practice and feedback:



Does financial education change behavior for the right reasons?

Lessons:

- It's not enough to find that financial education affects financial literacy and behavior in "desired" directions. To say something about the quality of decision making, you have to investigate the reasons for those effects.
- It's not enough to focus on ATEs. You have to consider the heterogeneity of biases, the heterogeneity of treatment effects, and the correlations between the two.
- It's not enough to focus on conventional outcome measures. One needs to use measures, such as *deliberative competence*, that have welfare interpretations.

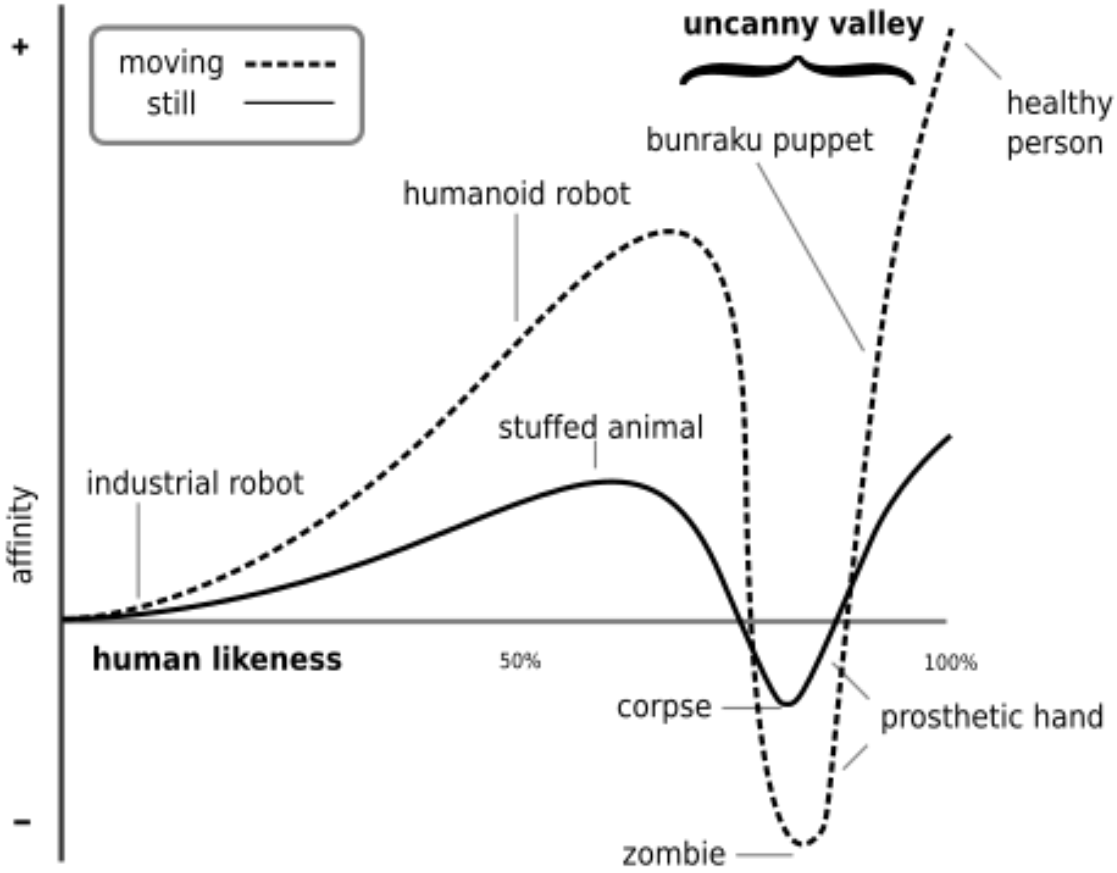
II.
Can improvements in financial knowledge lead to worse financial decisions?

Can improvements in financial knowledge lead to worse financial decisions?

- It's reasonable to think that very low financial knowledge leads to poor financial decisions, and very high financial knowledge leads to good financial decisions
- But is it reasonable to expect that, between these extremes, the relationship is monotonic?

Can improvements in financial knowledge lead to worse financial decisions?

A cautionary tale



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Why might monotonicity fail?

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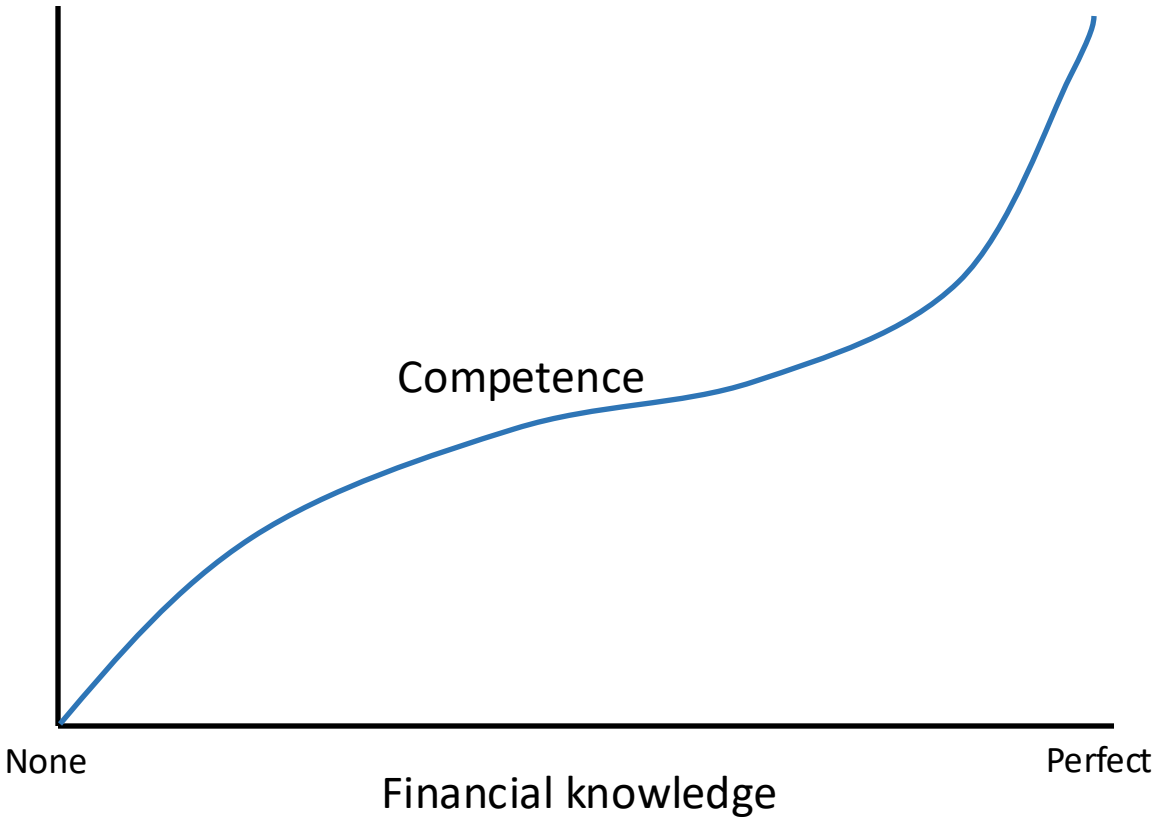

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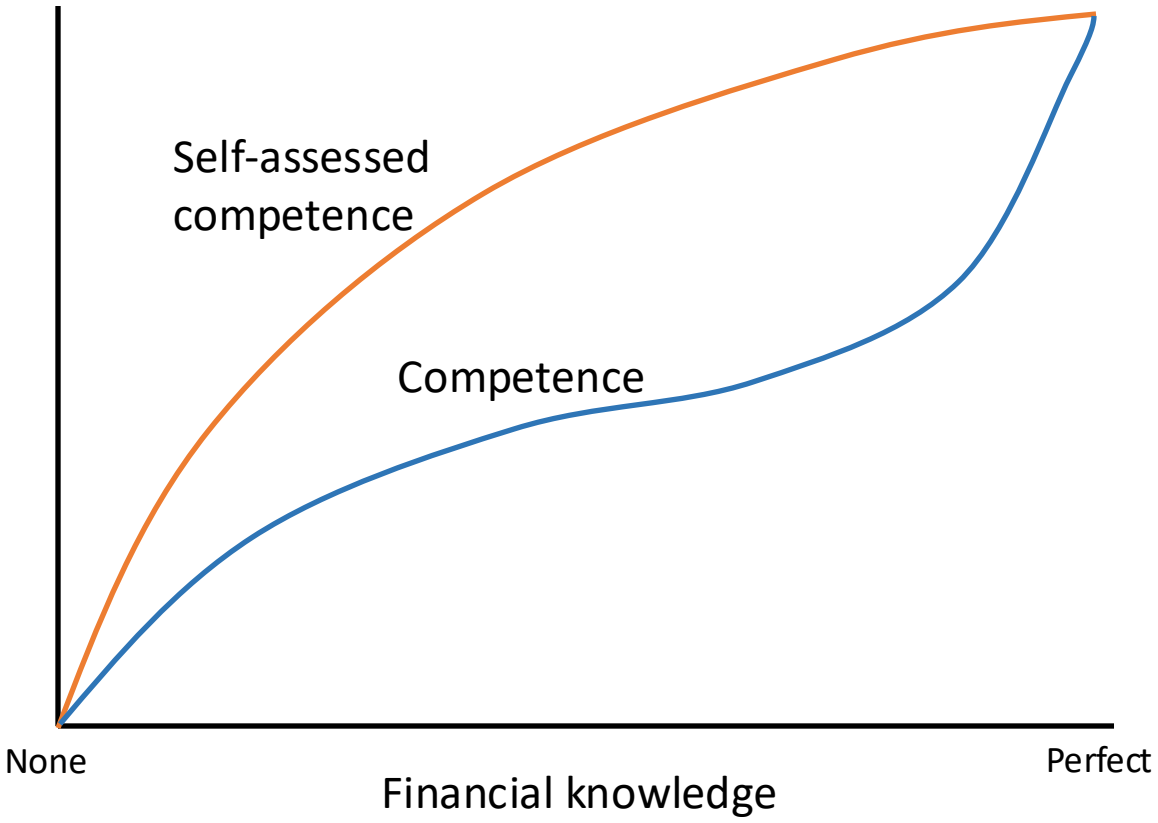

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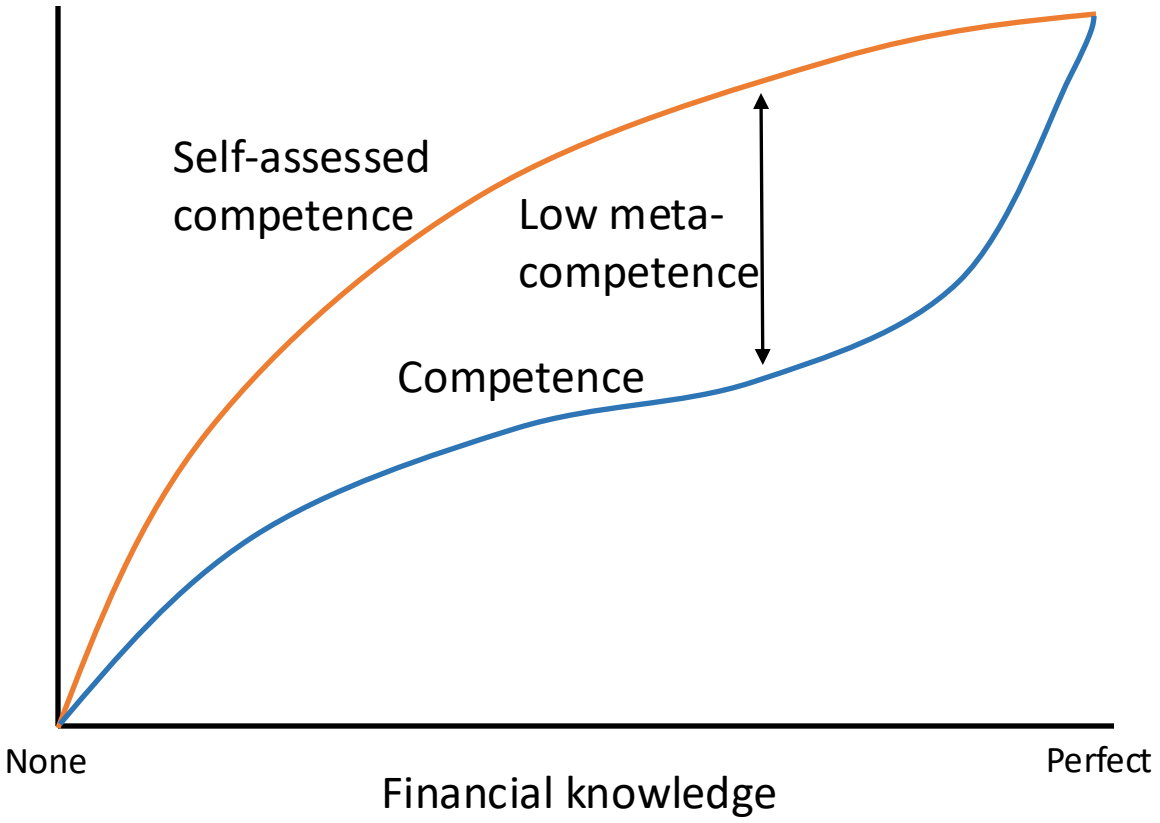

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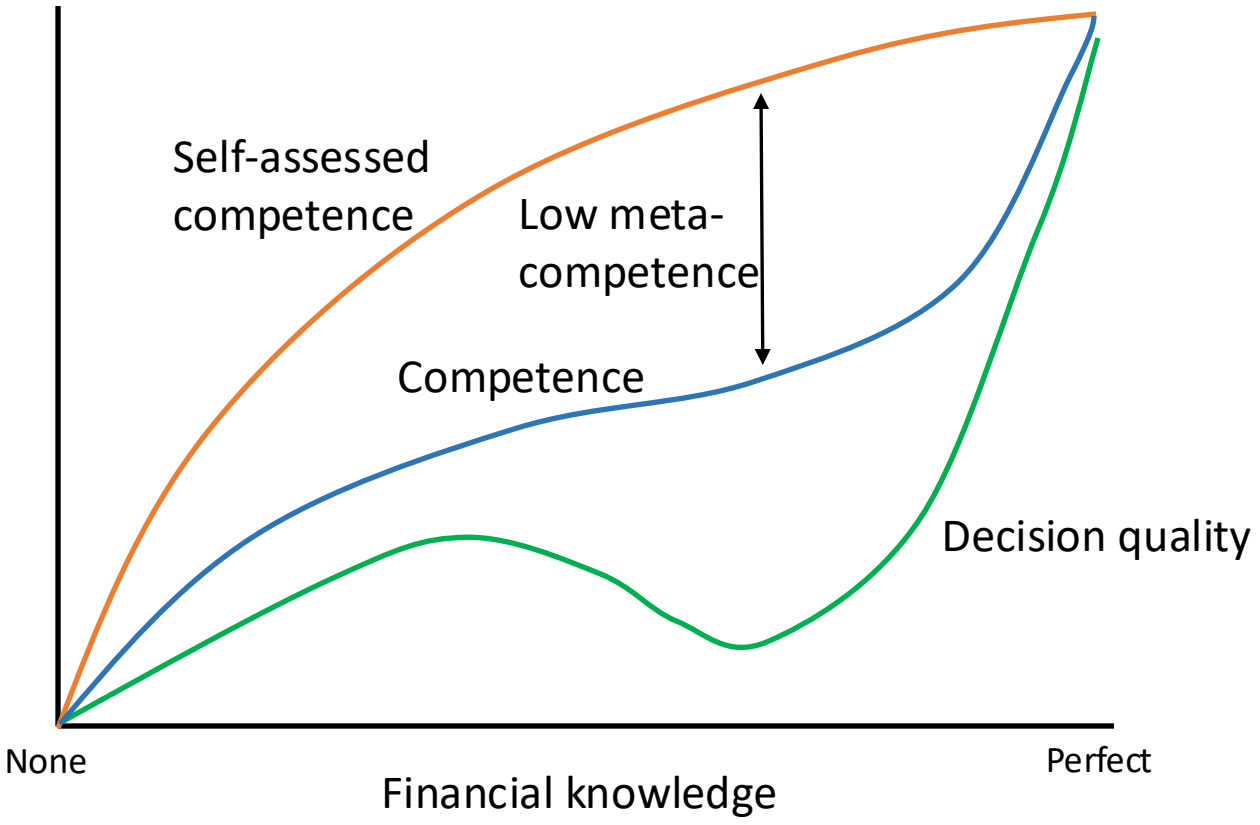

Can improvements in financial knowledge lead to worse financial decisions?

Why might low meta-competence impair the quality of decision making? (Current work with Annamaria Lusardi and Hakan Ozyilmaz)

- As an alternative to making decisions entirely on their own, people can seek advice from others—family, friends, and professional advisors.
- People who have high self-assessed competence are less likely to seek advice and may have a lower WTP for assistance. So they may be more likely to make decisions entirely on their own. That's not good if they're wrong about their competence.
- People who have high self-assessed competence are more likely to dispense advice, and to sound like they know what they're talking about.

Can improvements in financial knowledge lead to worse financial decisions?

A related phenomenon:

- If someone doesn't know about a financial instrument or strategy, they can't misuse it. Filling that knowledge gap therefore creates the risk of making damaging mistakes.
- Example: Options and other derivatives are increasingly available to retail traders, but amateurish trading in such instruments can be dangerous. Consequently, introducing people to options and derivatives creates the potential for major risk exposures.

Can improvements in financial knowledge lead to worse financial decisions?

Lessons:

- When designing financial education programs, it may be important to give people a feel for the scope of what they don't know.
- Educating people about the types of aid and assistance that are available, and about the ways to access that assistance, may be as important as improving their financial literacy.
- When assessing financial education programs, it may be important to evaluate effects on meta-competence separately from effects on competence.

III.
How does poor financial knowledge interact with other biases?

How does poor financial knowledge interact with other biases?

- Behavioral Economics documents a variety of purported biases that may infect financial decision making.
- Correcting one source of poor decision making may be counterproductive when other sources of poor decision making are present.
- Example: suppose people have unrealistically optimistic expectations about a class of investments, but are also "present-biased"
  - Maybe a good policy would avoid correcting their expectations
- How do we evaluate financial education policies in the presence of other distortions, particularly considering that our understand of those distortions may be incomplete?

How does poor financial knowledge interact with other biases?

- This is an old question that arose long ago outside of behavioral economics: how should we evaluate a policy that ameliorates or aggravates a distortion when there are other distortions elsewhere in the economy?
- Lipsey and Lancaster (1956) argued that the right way to handle these types of issues is to analyze all distortions and all remedies simultaneously (*comprehensive second-best welfare analysis*).
- Due to feasibility concerns, the overwhelming preference of economists is to address distortions and their solutions one or two at a time (i.e., solve the overall policy puzzle piece by piece).
  - Meade (1955): proposed compartmentalizing by evaluating one policy targeting one distortion, but accounting for all other distortions (*narrow second-best welfare analysis*).
  - Concerns about feasibility remain, and there's a conceptual problem: why take another distortion into account if another policy will correct it? E.g., why distort consumers' expectations of investment returns to counter time inconsistency if we can combine effective education with commitment opportunities?

How does poor financial knowledge interact with other biases?

- The dominant approach in Behavioral Public Economics: analyze a small number (usually just one) of biases and associated policies while assuming (implicitly) that the consumer's decision-making apparatus is otherwise flawless (*myopic welfare analysis*)
  - Tractable, but there is no reason to think that this "piecemeal" approach yields desirable solutions (Lipsey and Lancaster, 1956)
- Ambuehl, Bernheim, and Lusardi (*AER*, 2022) propose an alternative approach to compartmentalization: evaluate policies designed to address a single bias (or small collection) under the assumption that effective remedies for other biases *will be forthcoming* (*idealized welfare analysis*)
  - Avoids the Lipsey-Lancaster critique of myopic welfare analysis
  - Logically permits a compartmentalized approach to resolving biases (solving problems one at a time)

How does poor financial knowledge interact with other biases?

- A natural concern: Idealized welfare analysis may be no simpler than comprehensive welfare analysis, because it requires us to figure out how the consumer would behave if all other biases were corrected
- We show that, under a separability condition, the deliberative competence metric we propose (calculated myopically) nevertheless approximates the idealized welfare effect up to an unknown multiplicative scalar
  - Despite the unknown scale, we can rank policies according to their effectiveness, gauge the percentage differences between the dollar-equivalents of the associated benefits, and aggregate over decision problems.

How does poor financial knowledge interact with other biases?

Illustration:

- A financial instrument z yields a future payoff $f(z)$, which the consumer perceives as $g(z,\theta)$, where θ is an educational policy.
- For simplicity, the consumer expects to spend income when it is received, and evaluates outcomes according to the utility function $c_1 + \gamma u(c_2)$, where c_1 is current consumption and c_2 is future consumption
- WTP for z is $\gamma u\big(g(z,\theta)\big)$, but it should be $\gamma u\big(f(z)\big)$. The measured WTP error is $E_M = \gamma u\big(f(z)\big) - \gamma u\big(g(z,\theta)\big)$
- Suppose that, possibly unknown to the analyst, the consumer discounts the future excessively due to present bias, and that the appropriate normative standard is $c_1 + \delta u(c_2)$.
- Assuming correction of the present bias, the idealized WTP error is $E_I = \delta u\big(f(z)\big) - \delta u\big(g(z,\theta)\big)$
- Notice that $E_I = kE_M$, where $k = \delta/\gamma$ is a multiplicative constant.

How does poor financial knowledge interact with other biases?

- Therefore, myopic welfare analysis of the deliberative competence metric yields the correct sign for the welfare effect, correctly ranks policies from the perspective of idealized welfare analysis, and properly measures their proportional costs and benefits
- For arbitrary decision utility functions and objective functions satisfying a separability condition, the same finding holds to a first-order approximation (i.e., for “small” securities)

How does poor financial knowledge interact with other biases?

Lessons:

- When evaluating financial education policies, it's essential to explain the position one is taking concerning other biases that may impact decisions and how other policies may be used to address those biases.

- In settings where other biases are suspected, it is important either to take those biases into account or to use evaluation metrics that are robust with respect to their potential existence.

IV.
Does financial education involve unconventional costs and benefits?

Does financial education involve unconventional costs and benefits?

- So far, we've focusing on consequences of financial education that are associated with the *instrumental value of knowledge*: knowledge affects beliefs, which in turn affect consequences through choices.

- Knowledge, and the beliefs that follow from it, may also have *non-instrumental costs and benefits*.

Does financial education involve unconventional costs and benefits?

Rather than love, than money, than fame, give me truth.

Henry David Thoreau

Versus

When ignorance is bliss, 'tis folly to be wise.

Thomas Gray

Does financial education involve unconventional costs and benefits?

Implications for financial education and literacy:

- Consider someone who avoids financial decision making because they find thinking about it extremely stressful. If making them think about it only improves their decisions a little bit, does it make them better off?

or

Does financial education involve unconventional costs and benefits?

- Alternatively, does truth have intrinsic value? Do people prefer not to “live a lie”? (e.g., Nozick’s “experience machine”)

Does financial education involve unconventional costs and benefits?

- In principle, one can address these possibilities within the standard welfare paradigm by asking, do people have desires pertaining to the emotional consequences of their beliefs, or to the truth of those beliefs?
- However, it's impossible to evaluate the intrinsic value of correct beliefs using standard choice-based welfare methods, because one cannot knowingly choose to hold a false belief.
- Two possible solutions (current work with Gonzalo Arrieta and Lukas Bolte):
  - Hypothetical choices
  - Surrogate choices

Does financial education involve unconventional costs and benefits?

Suppose that while traveling on vacation a few months ago, you visited a small furniture shop, at which you saw a beautiful desk that you considered purchasing.

- *You enjoyed talking to the owner about the desk. During your conversation, you learned that he was about to close the store and retire because of health issues, so there's no opportunity to buy anything from the store in the future.*
- *While at the store, another customer told you they had heard the owner had worked as a fireman and was a local hero because he had risked his life to save multiple people in a catastrophic fire.*
- *When considering whether to buy the desk, it occurred to you that it would be nice to support someone who had been so selfless.*

Does financial education involve unconventional costs and benefits?

Situation 1: You bought the desk.

Please consider the following two cases.

---

*Case 1A: The other customer was wrong: the owner never worked as a fireman and was definitely not a local hero. In fact, he had a reputation for being generally disagreeable and unkind to his employees. You **don't** know this information. Considering that **you bought the desk**, would you **now** want to learn the truth about the owner? (Remember that the store has closed, so the information will not be useful for any future decision.)*

Does financial education involve unconventional costs and benefits?

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Pilot results:
37% strictly prefer to learn the truth (intrinsic value)
41% strictly prefer to remain ignorant (belief-based utility)
22% are indifferent

Does financial education involve unconventional costs and benefits?

- Two types of participants, choosers and observers
- Choosers
  - Receive a random bonus payment; amount is not revealed
  - Decide whether to buy an object at a stated pre-tax price
  - 1-in-20 chance of paying a sales tax; realization is not revealed
- Observers
  - Know that the sales tax was actually in effect
  - Also knows the Chooser was virtually certain the tax was not in effect
  - Observes the Chooser's purchase decision, as well as their WTP for the object
  - Decides whether to reveal that the tax was in effect, at some cost to the Chooser (assess WTP for revelation of truth)

How does poor financial knowledge interact with other biases?

- Pilot results suggest that intrinsic preferences for accurate beliefs is conditional:
  - Substantial WTP to convey the truth if the Chooser bought but should not have bought
  - Little evidence of a WTP to convey the truth if the Chooser bought and should have bought, or didn't buy and should not have bought
  - Paradoxically, the truth appears to matter intrinsically only if it would have been consequential

Conclusions

- Research on financial education should be focused on the normative question of whether policies make people better off, rather than merely whether they promote financial literacy and particular modes of behavior.

- That focus requires us to address questions such as:

    1. Does financial education change behavior for the right reasons?
    2. Can improvements in financial knowledge lead to worse financial decisions?
    3. How does poor financial knowledge interact with other biases?
    4. Does financial education involve unconventional costs and benefits?