



The Role of Stock-Flow Reasoning in Understanding the Social Security Trust Fund

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Social Security Trust Fund

Social Security benefits are paid from the OASI and DI trust funds

- Funded through payroll taxes and interest
- Balance is accumulation of all prior annual surpluses and deficits

Annual Trustees Report provides historical values and long-run projections for the combined OASDI trust fund

- Projected depletion date (2035) is widely reported

What do people think is the effect of trust fund depletion on benefits?

- We focus on public perception (not policy impact nor projections themselves)

2022 Annual Report of Social Security and Medicare Boards of Trustees

Chart A—OASI, DI, and HI Trust Fund Ratios
[Asset reserves as a percentage of annual cost]

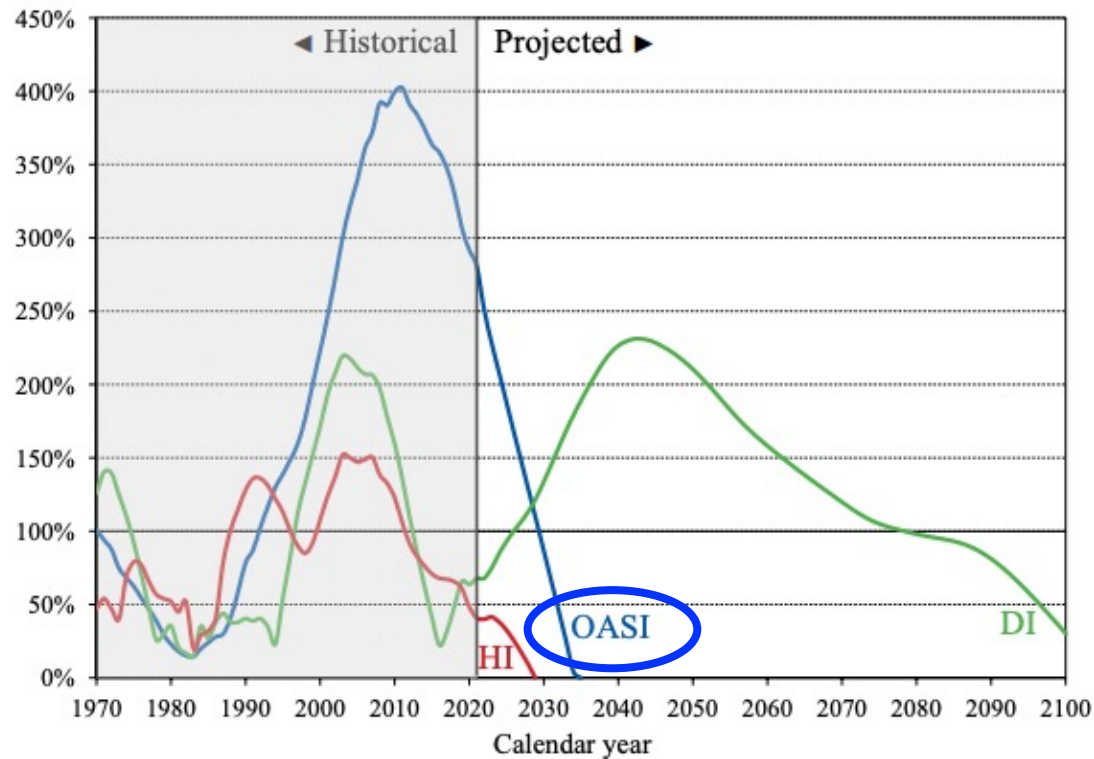
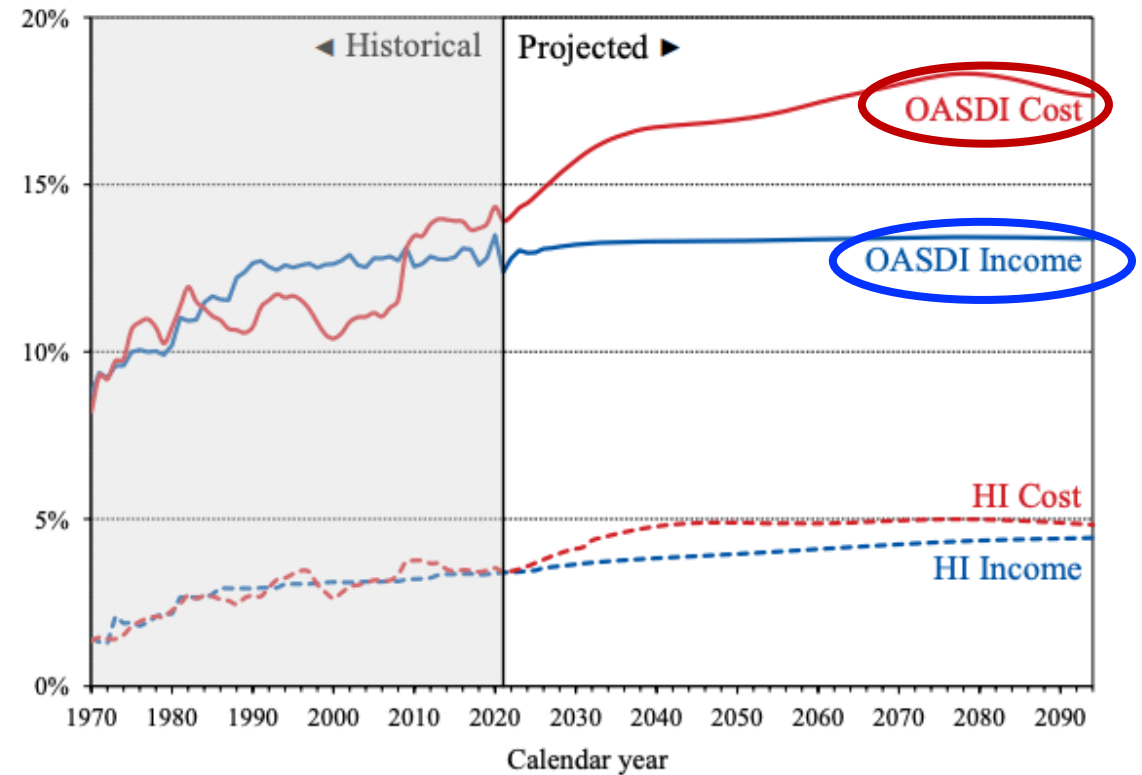


Chart B—OASDI and HI Income and Cost as Percentages of Their Respective Taxable Payrolls



Combined OASDI trust fund ratio roughly tracks OASI trust fund ratio

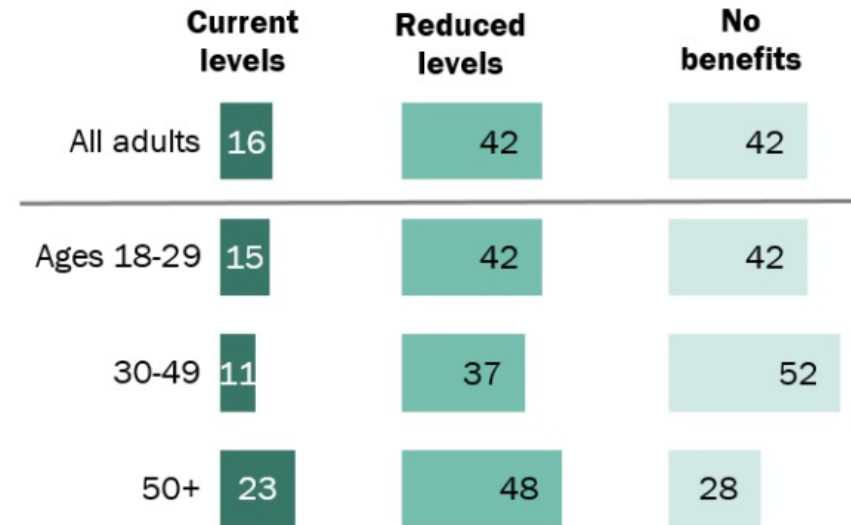
Public Perception is Pessimistic

Under current policy, if trust fund runs out, trustees project able to pay ~80% of scheduled benefits

Yet many Americans believe they will get **no benefits**, indicating the public may be miscalibrated

About four-in-ten Americans say, by the time they retire, Social Security won't have enough money to provide benefits

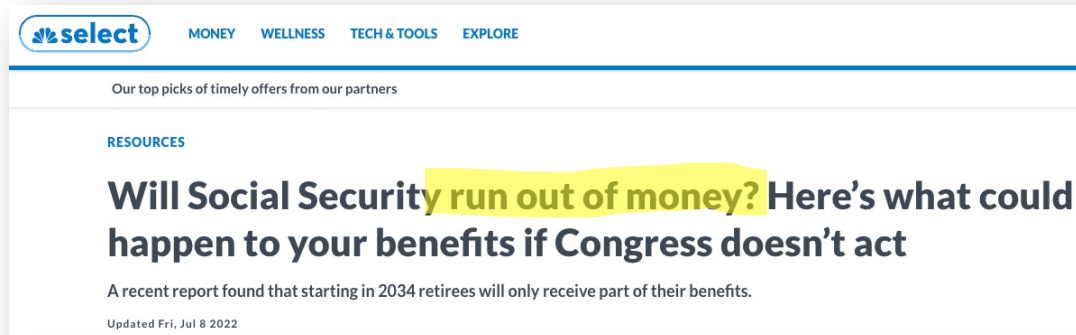
Among those who are not retired, % saying that, when they are ready to retire, Social Security will provide benefits at ...



Note: Share of respondents who didn't offer an answer not shown.
Source: Survey of U.S. adults conducted Dec. 11-23, 2018.
"Looking to the Future, Public Sees an America in Decline on Many Fronts"

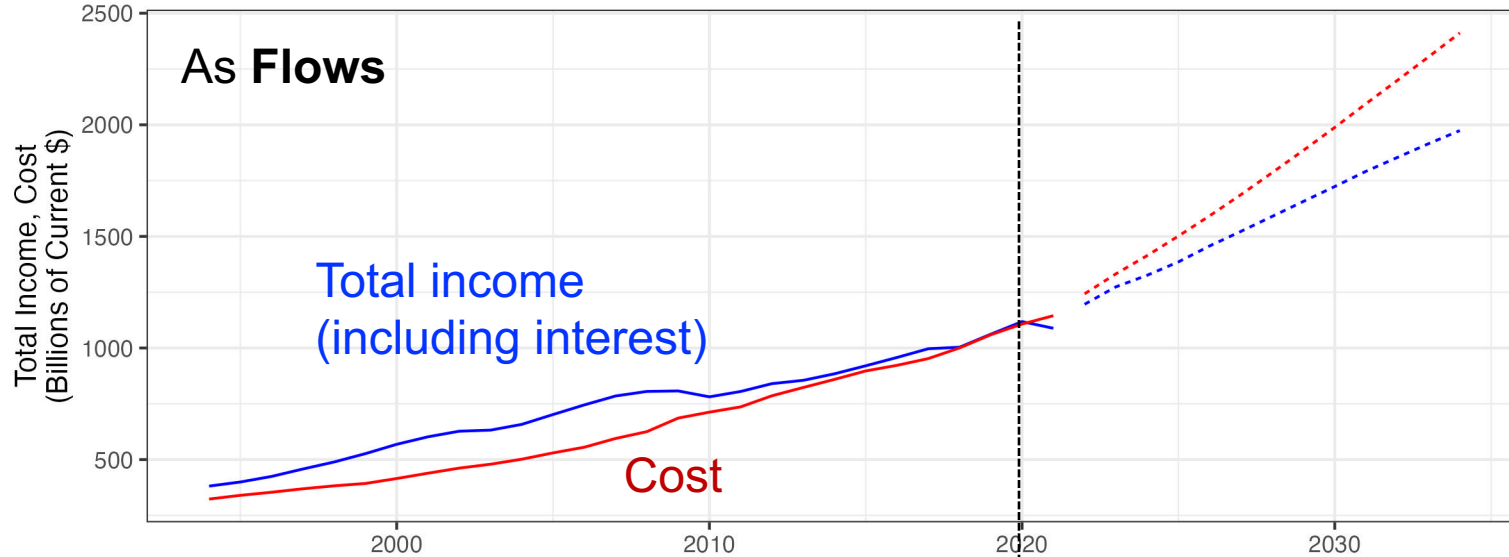
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Headlines Often Reinforce Misperceptions



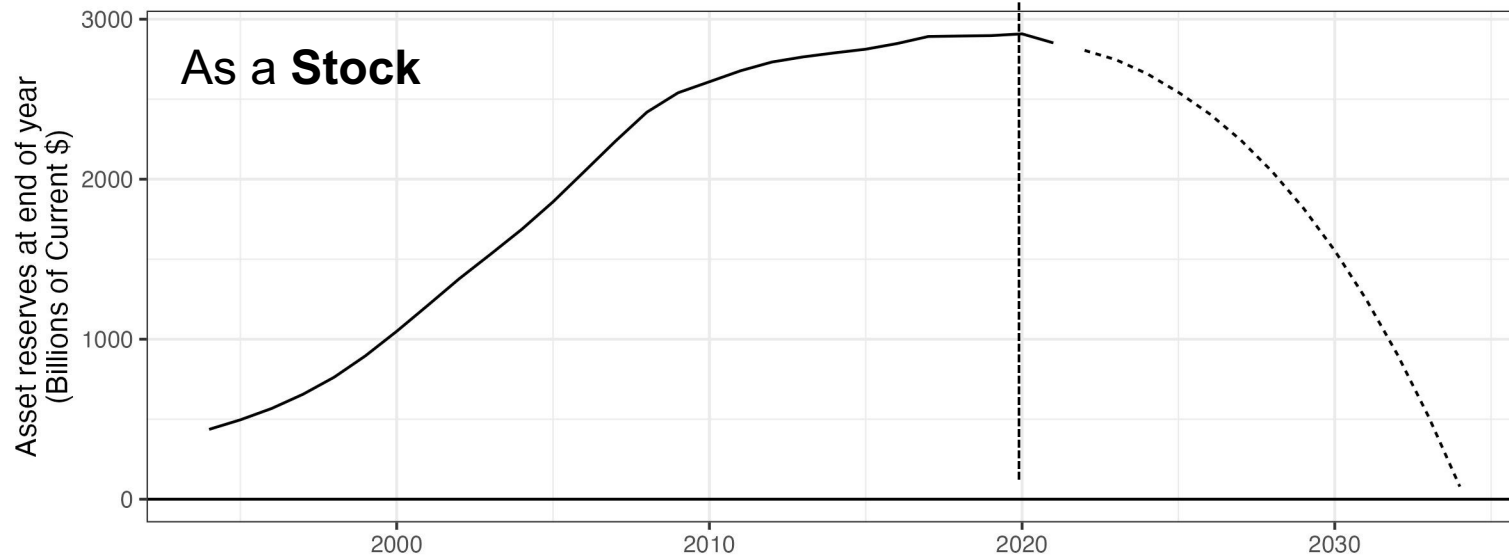
People may interpret “**fund runs out**” to mean “**benefits stop**”
Consistent with a general finding of **stock-flow reasoning errors**

People Have Difficulty Understanding Accumulation



If you integrate the net flow from the top chart, you get the bottom chart.

But calculus is hard.

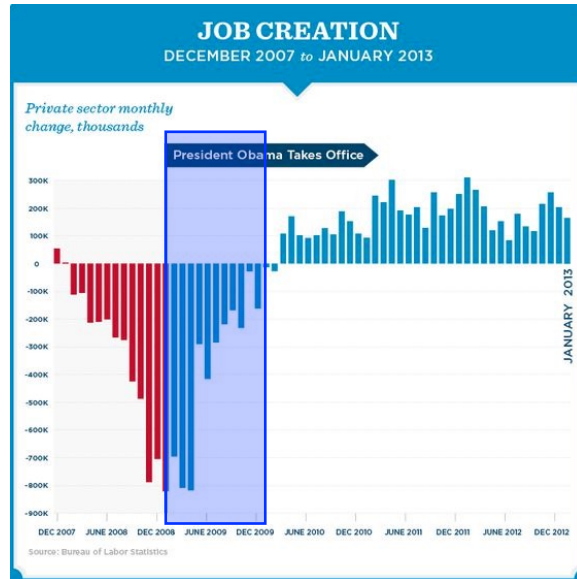


Booth Sweeney & Sterman 2000;
Cronin, Gonzalez, & Sterman 2009;
cf. Holahan & Schug 2000

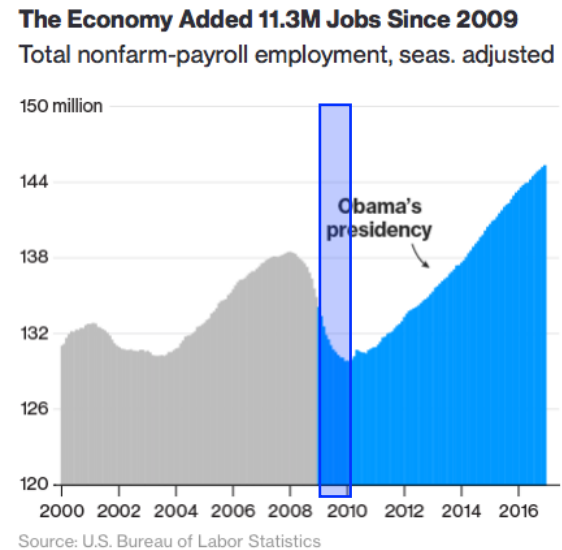
Stock-Flow Format Affects Judgments

Both charts show the same jobs data (shaded region is 2009)

Flow



Stock



Given the **flow** chart, people say economy *improved* in 2009

Given the **stock** chart, people say economy *worsened* in 2009

Such Reasoning Errors Are Widespread

Stock-flow reasoning errors apply broadly across different domains

- Economic growth
 - Spiller et al., 2020
- New vs. cumulative COVID cases
 - Reinholtz et al., 2021; Villanova 2022; Harman et al., 2021; Padilla et al., 2022
- Atmospheric CO₂
 - Sterman & Booth Sweeney, 2007; Sterman 2008
- Personal and corporate cash flows
 - Booth Sweeney & Sterman 2000; Newell et al. 2016; Spiller et al., 2020

These reasoning errors likely apply to OASDI trust fund as well

Experiments

We tested the impact of **stock vs. flow presentation** on **expectations about future benefits** in two experiments

- Participants were recruited via an online crowdsourcing marketplace (Amazon's Mechanical Turk)

All participants saw the same information about the trust funds

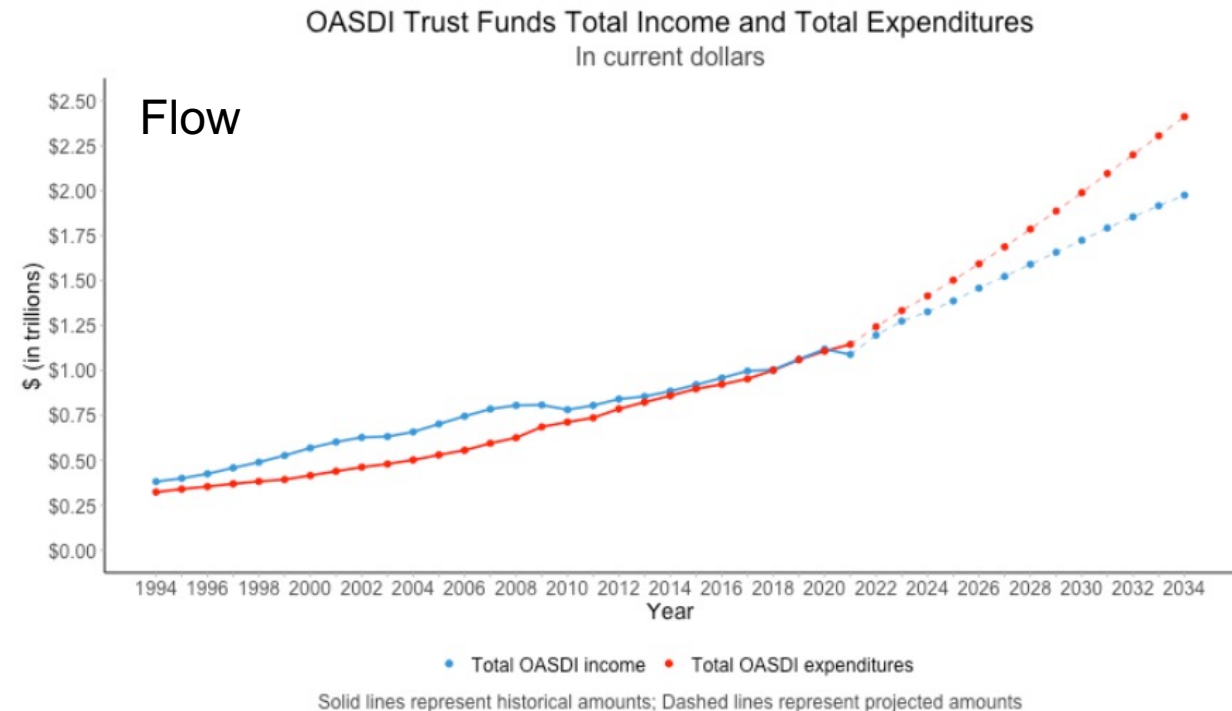
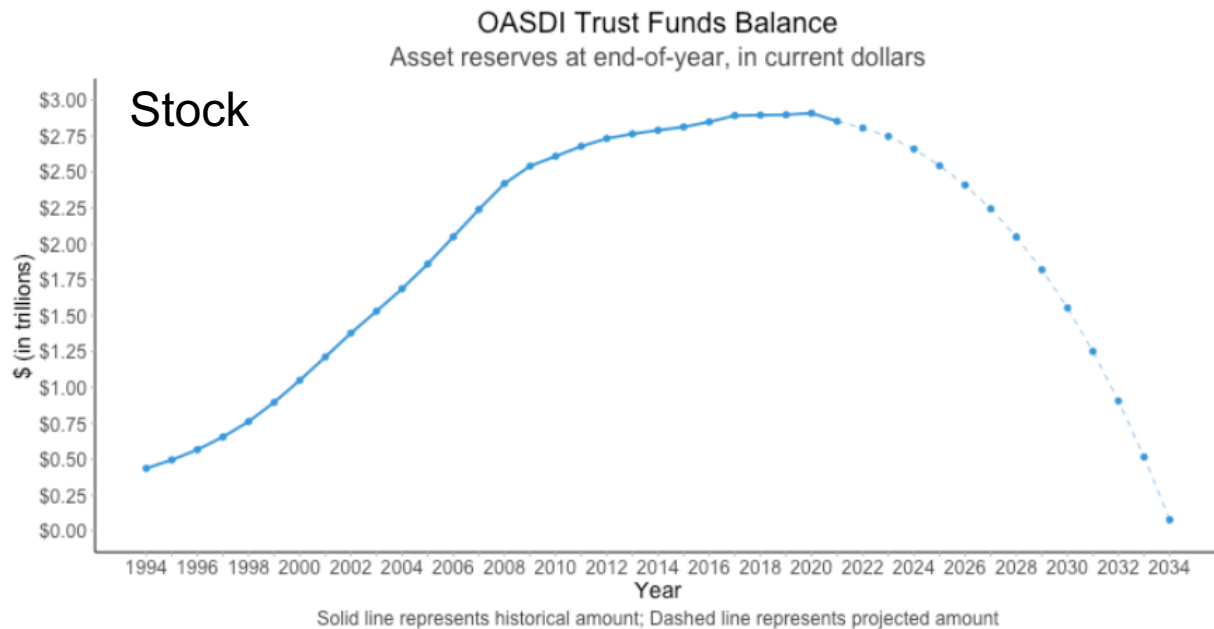
We varied whether charts displayed:

- a) past and projected **balance** of the trust fund (**stock**) or
- b) past and projected **inflows and outflows** of the trust fund (**flow**)

Experiment 1

$N = 1,001$ were randomly assigned to see **stock** or **flow** graph

- Participants were also given brief descriptions of OASDI trust fund and how to read the graph

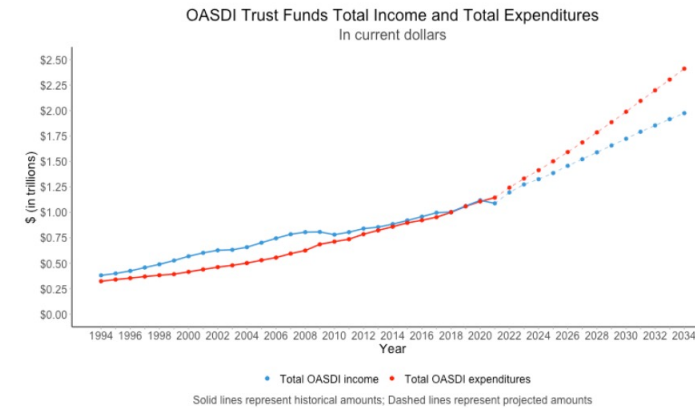
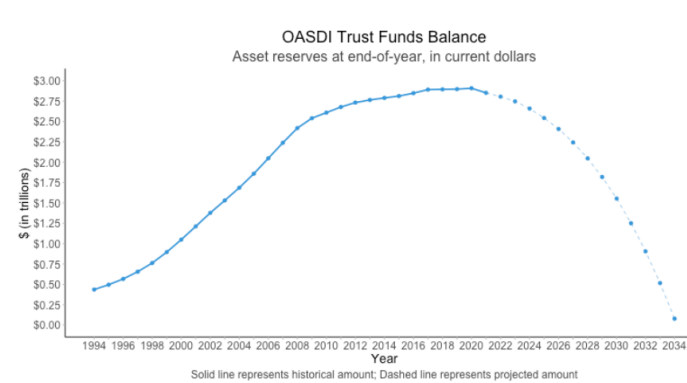


Key Questions for Participants

1. When did / will the trust funds' total costs exceed total income?
2. When did / will the trust funds run out of money?
3. What is most likely to happen to benefits if the trust funds are depleted? *[assuming no action taken on taxes]*
 - a) Social Security will no longer be able to pay out benefits
 - b) Social Security benefits will still get paid out and will be a smaller amount
 - c) Social Security benefits will still get paid out and will be the same amount
 - d) Social Security benefits will still get paid out and will be a larger amount

We combine these three responses as “benefits paid”

Experiment 1: Flow increased percentage who believe benefits will be paid



	Stock	Flow	Statistical test
Year costs exceed income	56% correct	56% correct	ns
Year trust fund runs out	80% correct	72% correct	p = .004
What happens to benefits?	36% benefits paid	44% benefits paid	p = .008

Experiment 2

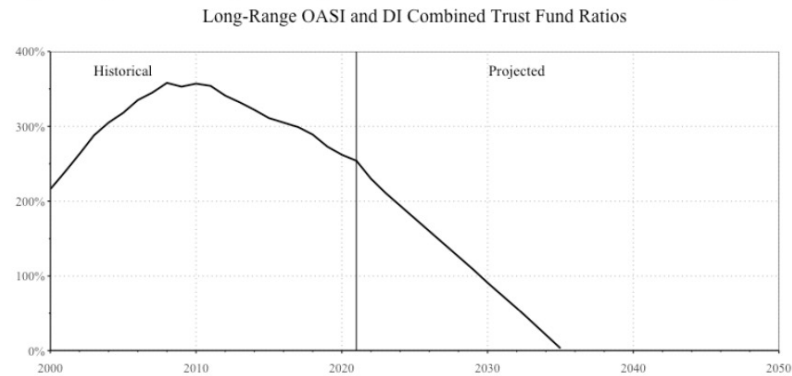
$N = 1,503$ participants

Adjusted graphs to align more closely with Trustees Report

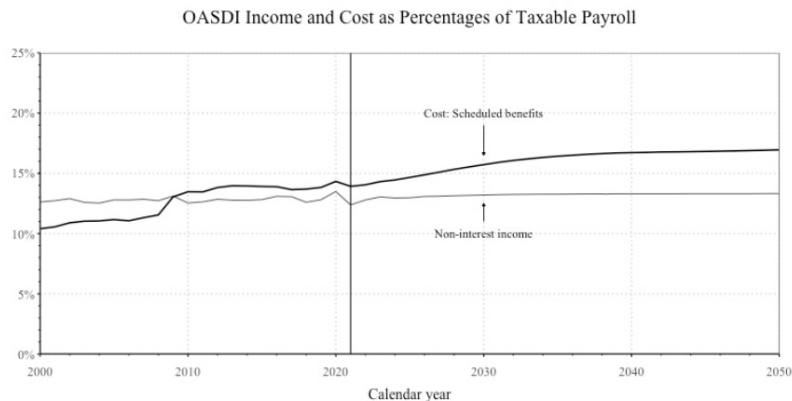
- Excluded interest income and changed y-axis metric

Tested an **Enhanced Flow** condition that emphasized shift in flow

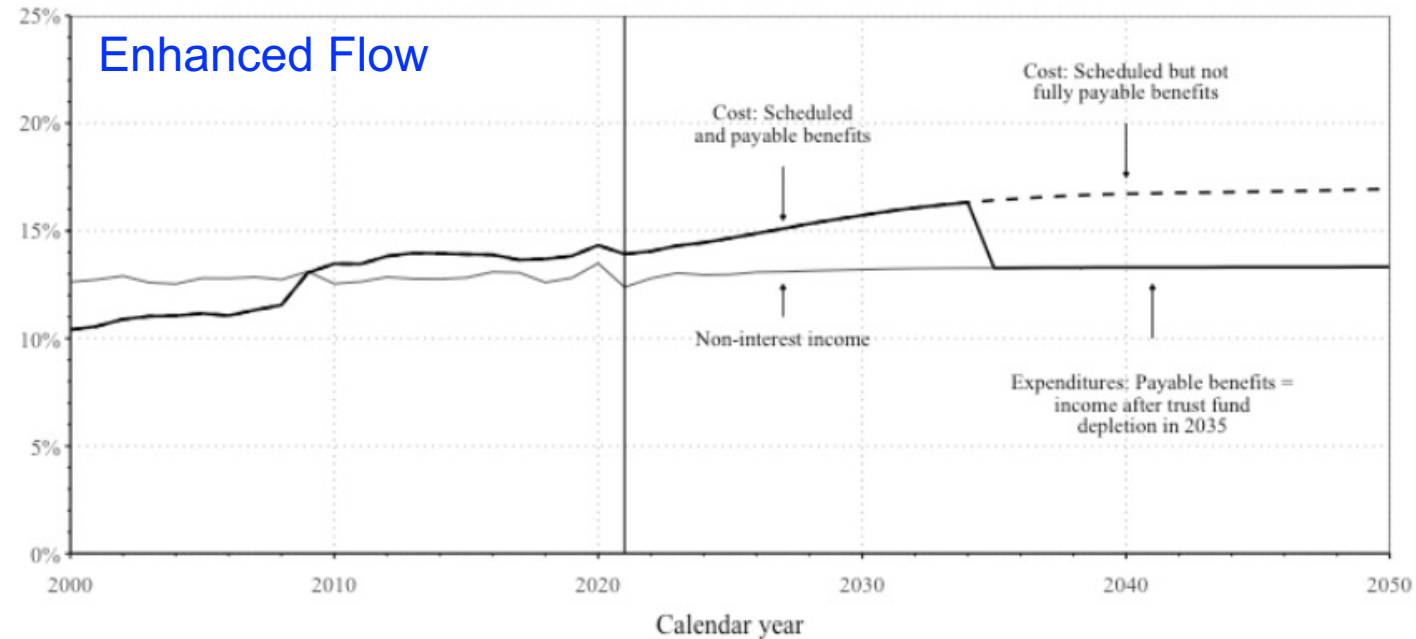
Stock



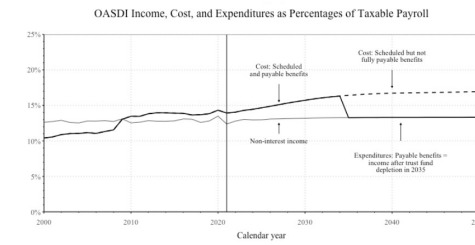
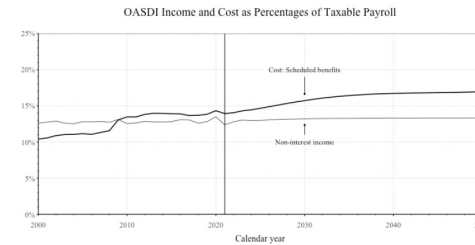
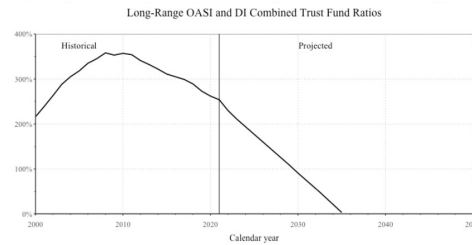
Flow



OASDI Income, Cost, and Expenditures as Percentages of Taxable Payroll



Experiment 2: Flow increased percentage who believe benefits will be paid



	Stock	Flow	Enhanced Flow	Stock vs. Flow
Year costs exceed income	47% correct	46% correct	43% correct	ns
Year trust fund runs out	74% correct	71% correct	73% correct	ns
What happens to benefits?	39% benefits paid	46% benefits paid	46% benefits paid	p = .027

Across both experiments, presenting **flow** (vs. stock) information increased inferences that **some benefits will be paid** post-depletion

Takeaways

People systematically conflate **trust fund balance** with **ability to pay benefits**

- Presenting flows increases belief that some benefits will be paid after depletion
- Level of misunderstanding remains high (> 50%)

Future directions

- Classify media headlines around each year's Trustees Report
- Consider alternative presentation techniques to further reduce misperception

This research reinforces importance of considering **content salience** (in addition to **content**) in trust fund communications

- cf. Quinby & Wettstein (2021)

Thank you

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