Subjective Models of the Macroeconomy: Evidence from Experts and a Representative Sample

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Outline of talk

Motivation

- Macro-expectations are important for understanding individual economic behavior, macroeconomic modelling, and economic policy.

  Armona et al., 2018; Bachmann et al., 2015; Bailey et al., 2018; Coibion et al., 2018; Conlon et al., 2018; Crump et al., 2018; D'Acunto et al., 2019a; Haldane and McMahon, 2018; Kuchler and Zafar, 2019; Vellekoop and Wiederholt, 2018; Yellen, 2013.

- Central assumption in any (macro-)economic model with rational expectations: Agents form their expectations **in line with the true model**.

- Standard New-Keynesian models: Differential effects of supply- and demand-side shocks on unemployment and inflation.

Research questions

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1. How do households expect unemployment and inflation to respond to macroeconomic shocks?

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2. Are households' predictions in line with those of
   - experts
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3. What determines heterogeneity in predictions?

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2. Are households' predictions in line with those of
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3. What determines heterogeneity in predictions?

Challenge

Difficult to find clean exogenous variation in perceived likelihood of different **shocks** in the real world.

This paper

Samples

Representative sample of the **US population** (n≈2,200) and a set of leading **experts** (n≈1,100).

Methods

Hypothetical vignettes in which respondents predict future unemployment and inflation under different macroeconomic shocks.

- oil price
- government spending
- monetary policy
- income taxes

Elicit **measures of mechanisms** driving households' predictions.

Preview of results

Experts

- form their expectations in line with standard models and evidence
- there is little disagreement among experts

Households' predictions are

- dispersed
- close to the expert predictions for oil price and government spending
- very different for monetary policy and tax shocks
- better for unemployment than for inflation

Correlates of accurate predictions are

- age, education, wealth
- understanding of propagation mechanisms
- good-bad-heuristic

Literature

Subjective expectations in macroeconomics

Formation of macroeconomic expectations.

Armantier et al., 2016; Armona et al., 2018; Cavallo et al., 2017; Coibion et al., 2019; D'Acunto et al., 2019b,c; Fuster et al., 2019; Roth and Wohlfart, 2019.

Hypothetical vignettes

Vignettes used to study belief formation and behavior.

Christelis et al., 2017; Delavande and Zafar, 2018; Fuster et al., 2018; Wiswall and Zafar, 2017.

Outline of talk

Data

Online samples of the US population (n≈2,200), **representative** in terms of age, gender, region, income and education:

- Wave 1 (n=1,085): February and March 2019, *Research Now*.
- Wave 2 (n=1,151): July 2019, *Lucid*.

Expert samples (n≈1,100):

- Wave 1 (n=179): February and March 2019
  - Co-authors or discussants at major macro **conferences** (NBER, Cowles, SITE, . . .).
  - Experts in **policy institutions** (IMF, Bundesbank, ECB, . . .).
  - PhD students working in macro at Frankfurt, Bonn and Oxford.
- Wave 2 (n=908): July 2019, *ifo World Economic Survey*

Vignettes

Two variables are predicted ...

- unemployment u
- inflation π

... in four vignettes

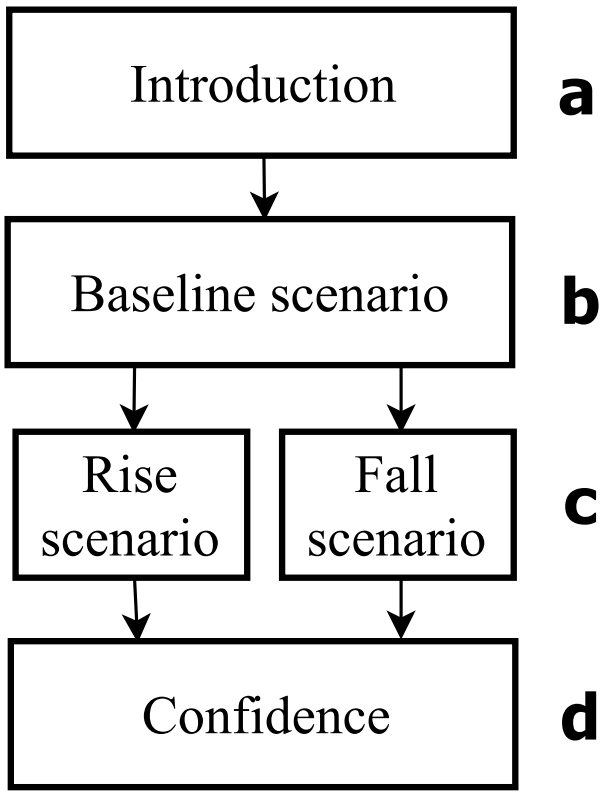
- price of crude oil
- total government spending
- federal funds target rate
- income tax rates

Goals

- identical for general population and expert sample
- accessible for the general population, but comparable to benchmarks from macroeconomic models and empirical estimates
- plausibly *exogenous* shocks to identify perceived effects of shock on u and π

Vignettes: Structure

Vignette Structure



Belief measurement

Use difference in predictions as outcome variable.

- **Perceived inflation response**
  $\Delta\pi_{i,r/f} = \pi_{i,r/f} - \pi_{i,baseline}$
- **Perceived unemployment response**
  $\Delta u_{i,r/f} = u_{i,r/f} - u_{i,baseline}$

Example: Oil price constant scenario

We would like you to think about the following hypothetical scenario.

Scenario: Oil price stays constant

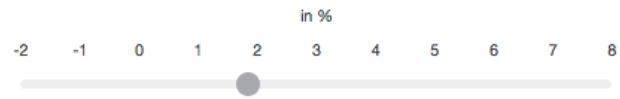
Imagine that the average **price of crude oil** stays **constant** over the next 12 months. That is, on average, the price of oil over the next 12 months will be the same as the current price.

***Reminder**: Please account for the actions of policymakers that you would expect in this scenario and include them in your predictions.*

Inflation rate

Under this scenario, what do you think the US **inflation rate** will be over the next 12 months?

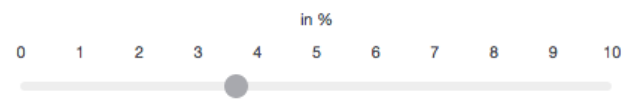
Note: The default position of the slider is the current level of the inflation rate: 1.8%



Unemployment rate

Under this scenario, what do you think the US **unemployment rate** will be 12 months from now?

Note: The default position of the slider is the current level of the unemployment rate: 3.6%



Example: Oil price increase scenario

We would like you to think about the following hypothetical scenario.

Scenario: Oil price rises

Imagine the average **price of crude oil** unexpectedly **rises** due to a problem with the local production technology in the Middle East. On average, the price will be $30 higher **for the next 12 months** than the current price.

***Reminder**: Please account for the actions of policymakers that you would expect in this scenario and include them in your predictions.*

Inflation rate

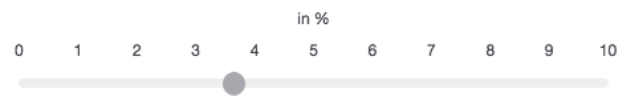
Under this scenario, what do you think the US **inflation rate** will be over the next 12 months?

Note: The default position of the slider is the current level of the inflation rate: 1.8%

Unemployment rate

Under this scenario, what do you think the US **unemployment rate** will be 12 months from now?

Note: The default position of the slider is the current level of the unemployment rate: 3.6%



Example: Government spending decrease scenario

Scenario: Government spending grows less

Imagine **federal government spending** unexpectedly **grows to a smaller extent** than usual over the next 12 months due to **cuts in spending** on defense. In particular, total government spending grows by 2.4 percentage points less than the usual growth that took place in the previous years.

The government announces: The change is temporary and occurs despite no changes in the government's assessment of national security or economic conditions. Moreover, federal taxes do not change in response to the spending cut.

Example: Interest rate decrease scenario

Scenario: Federal funds target rate falls

Imagine the **federal funds target rate** is unexpectedly **0.5 percentage points lower**. That is, in its next meeting, the Federal Open Market Committee announces that it is reducing the rate from 2.5% to 2%.

Imagine the committee announces it does so with no changes in their assessment of the economic conditions.

Example: Tax increase scenario

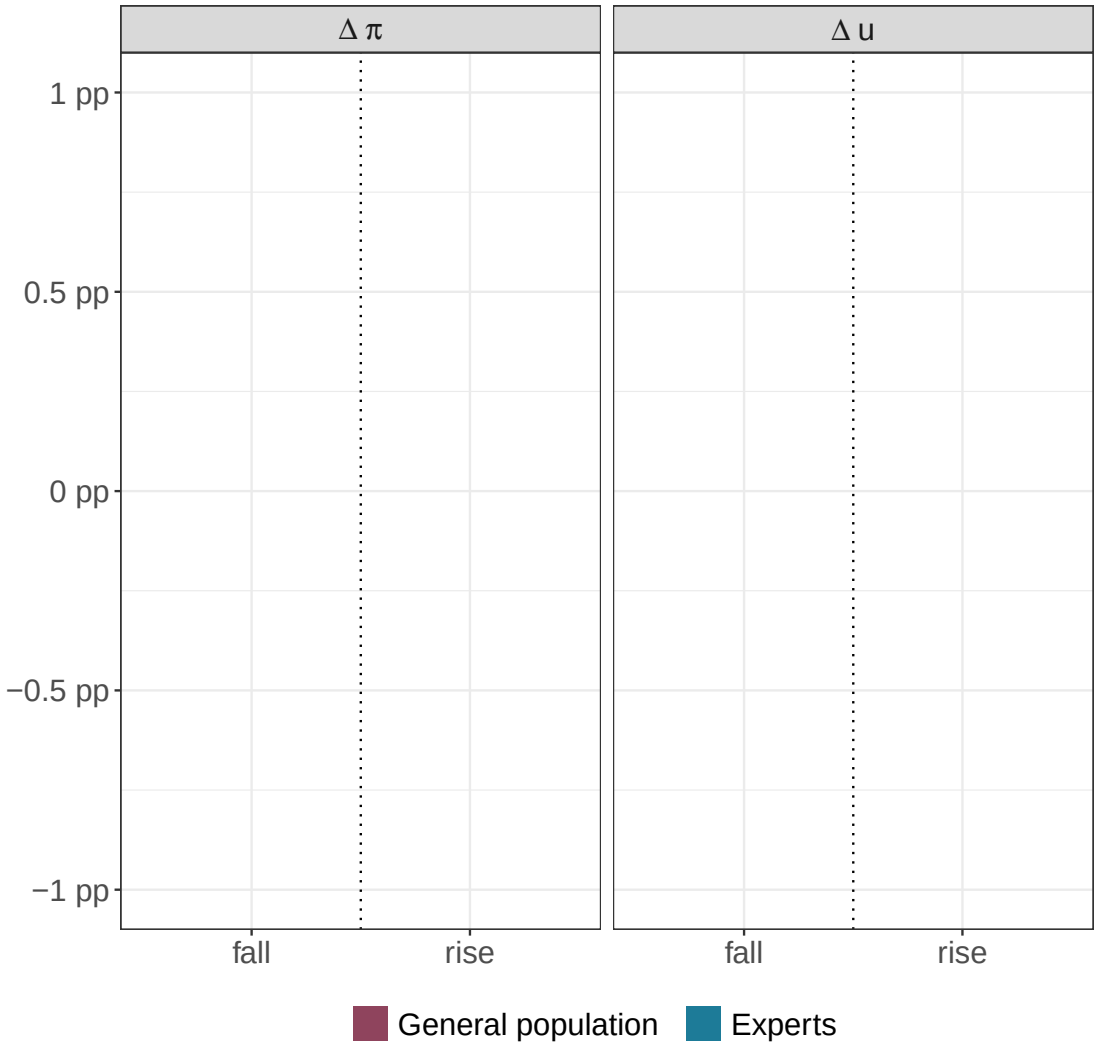
Scenario: Income tax rates increase

Imagine that **income tax rates** are unexpectedly **1 percentage point higher** for all households in the US over the next 12 months. This means that the typical US household would **pay about $400 more in taxes**.

The government announces: The tax change is temporary and occurs despite no changes in the government's assessment of the economic conditions. Moreover, government spending does not change in response to the tax increase.

Outline of talk

Results: Oil price vignette



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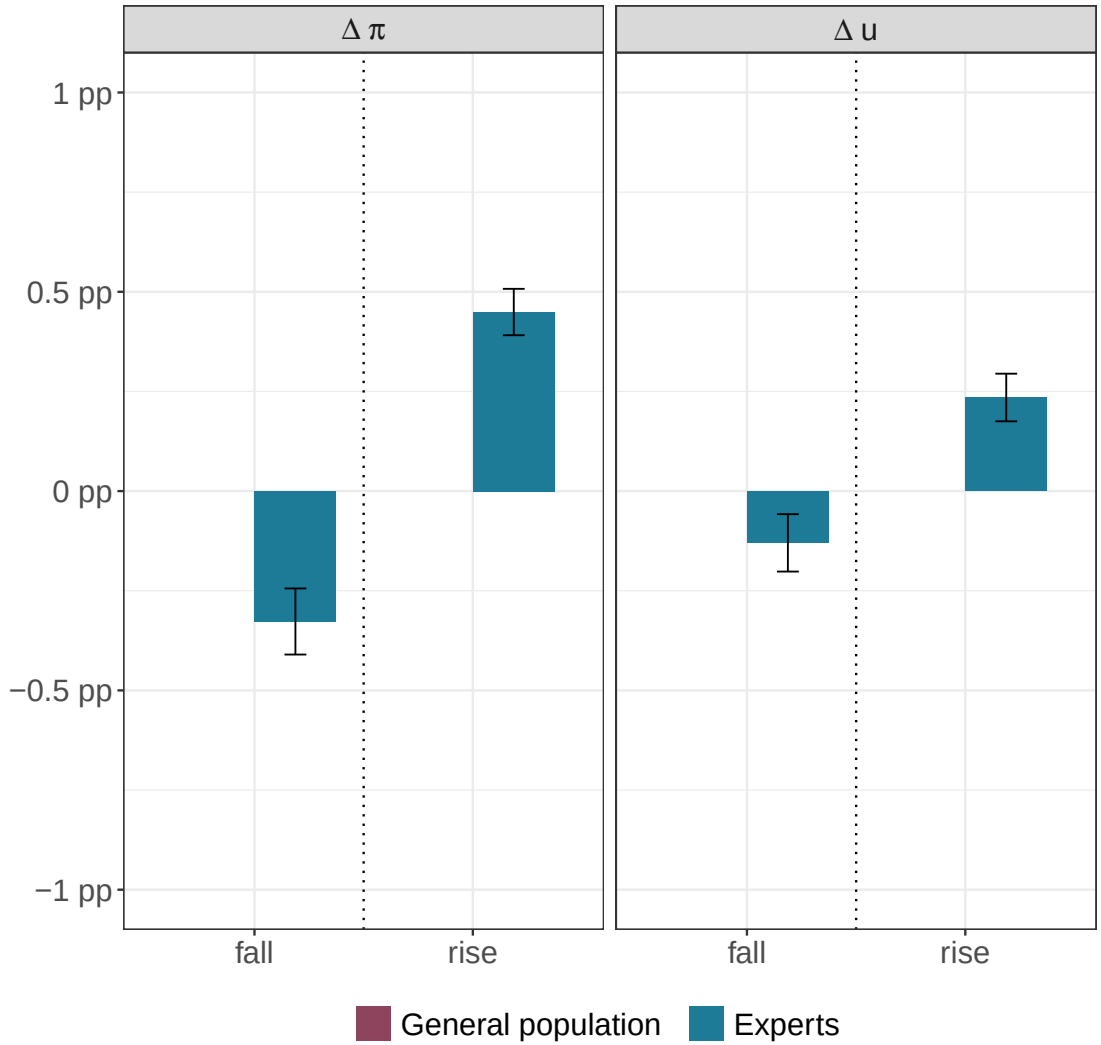
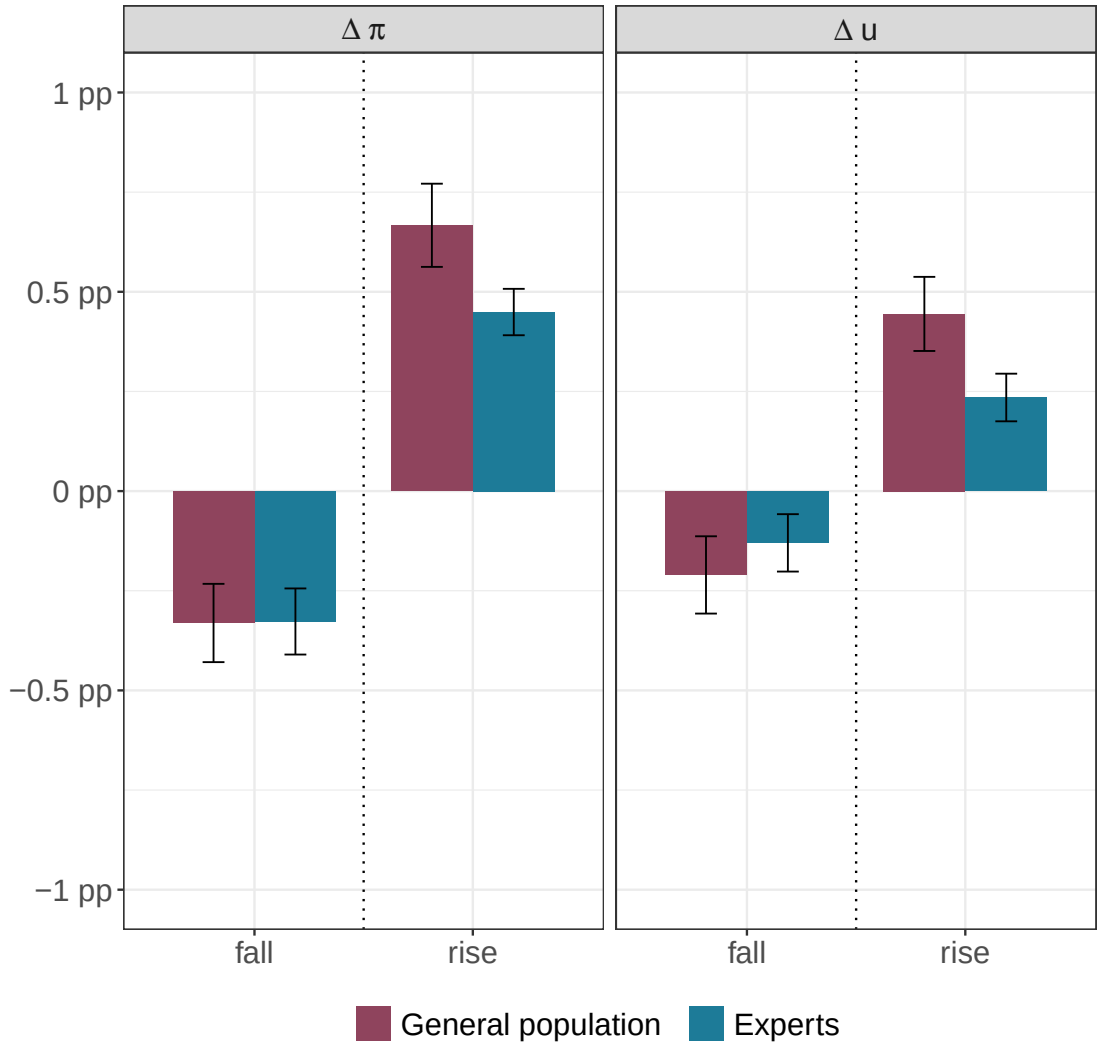
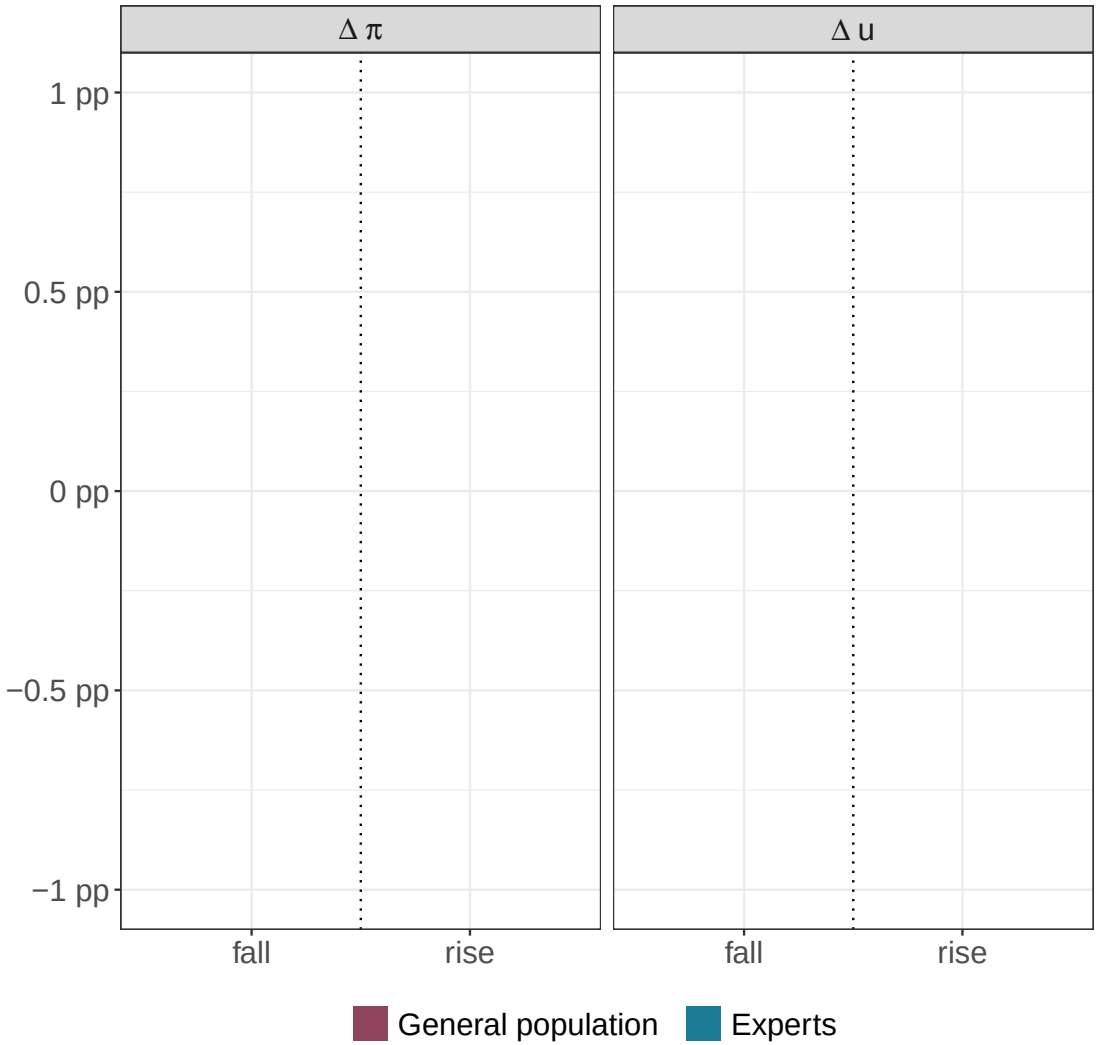


Results: Oil price vignette



Results: Government spending vignette



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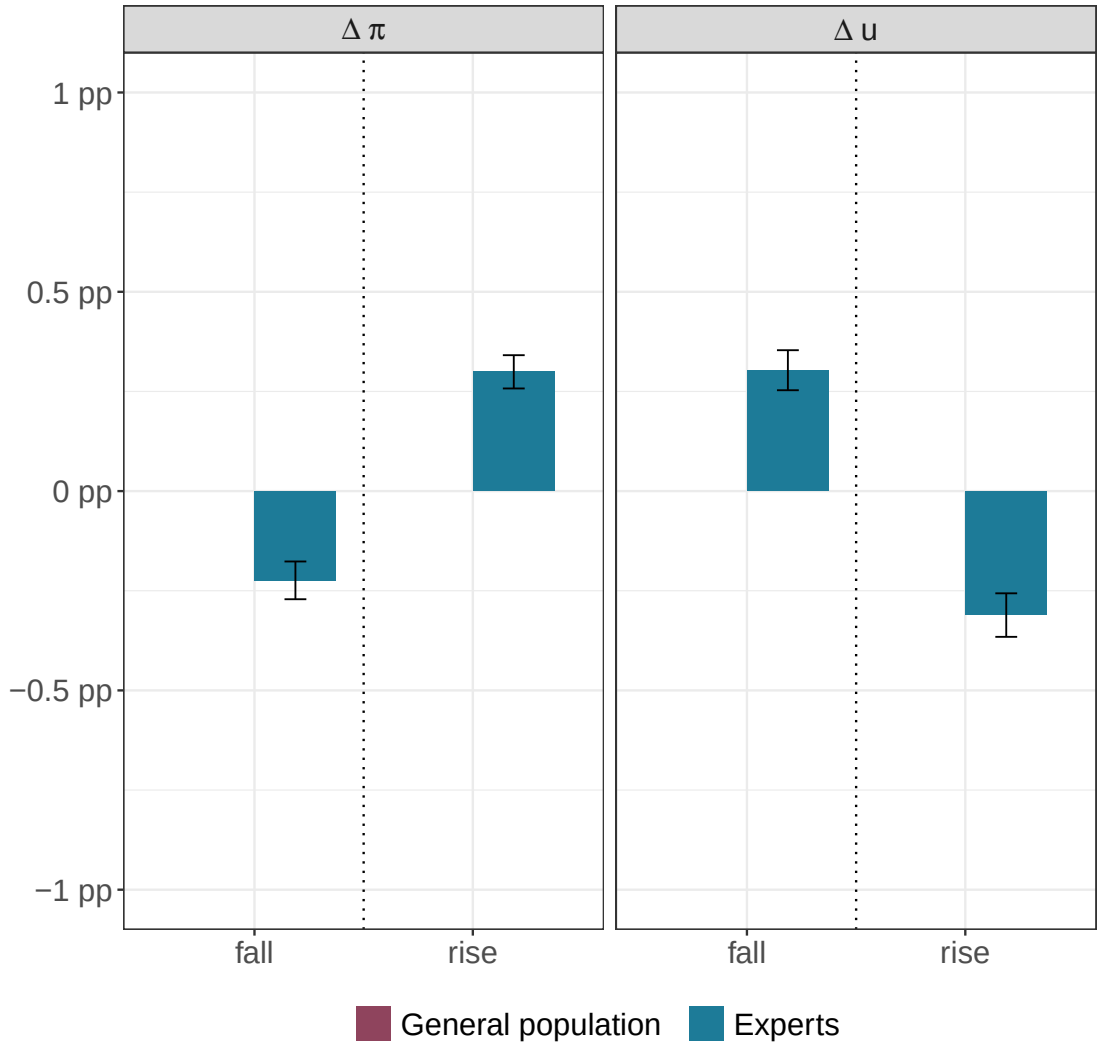

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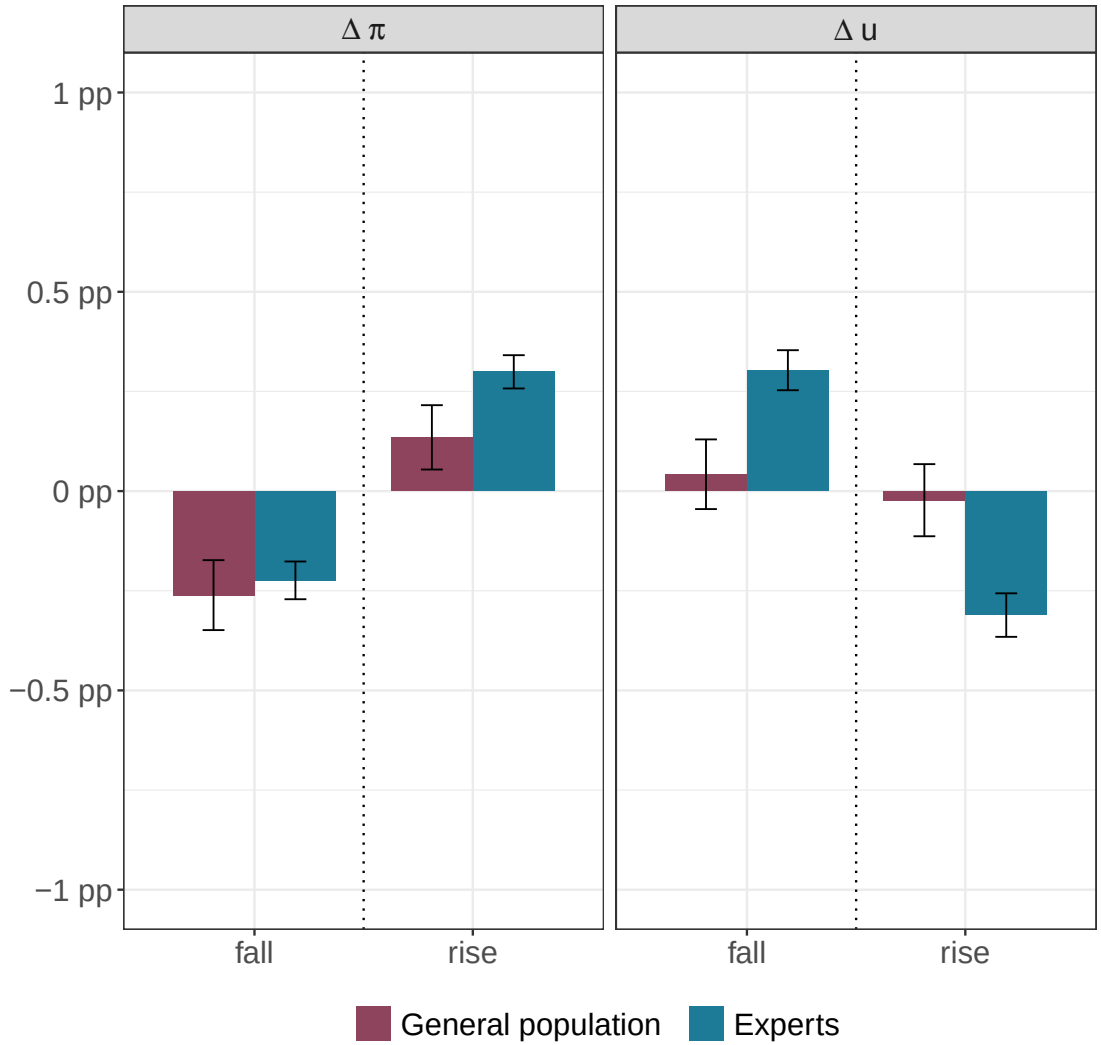
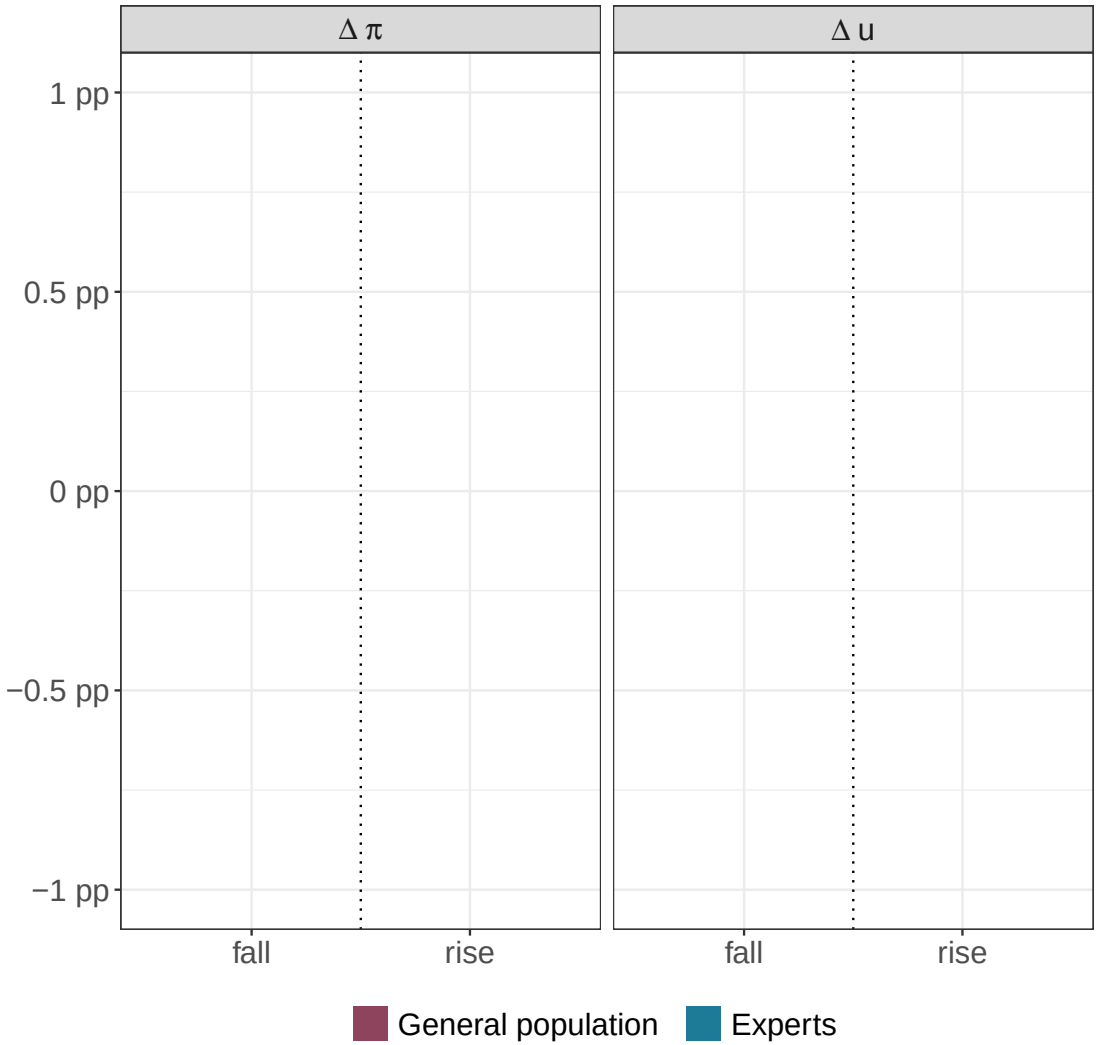


Results: Interest rate vignette



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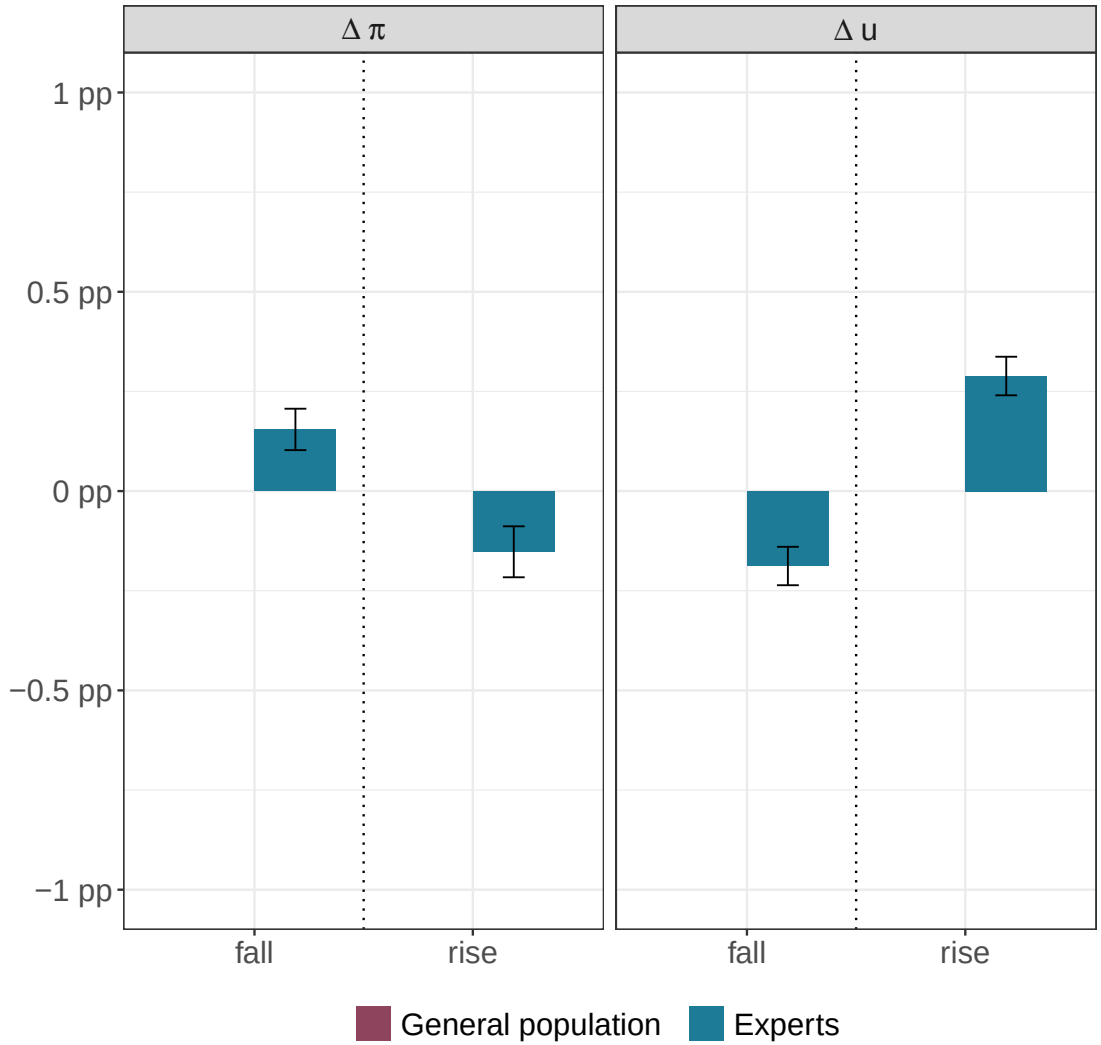

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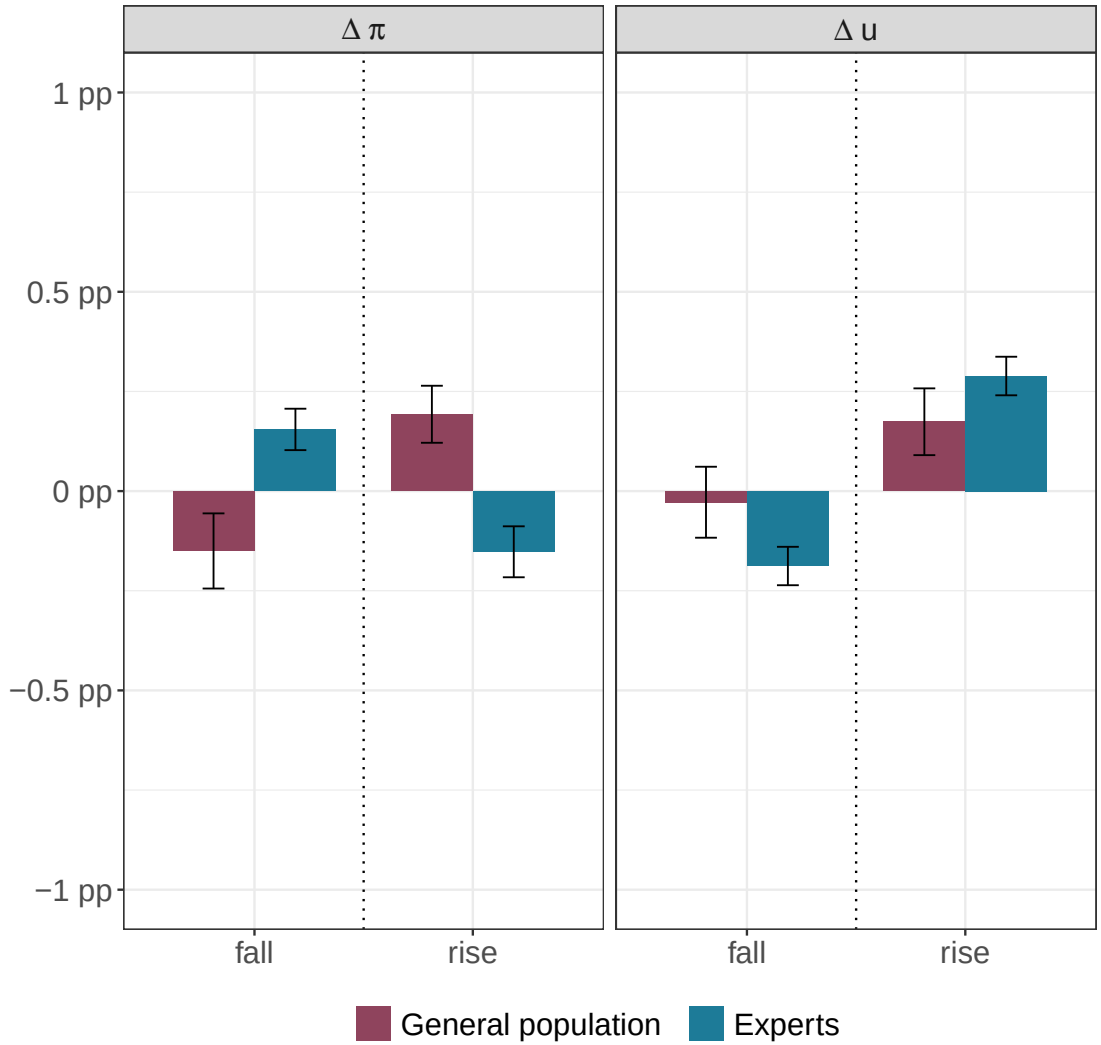
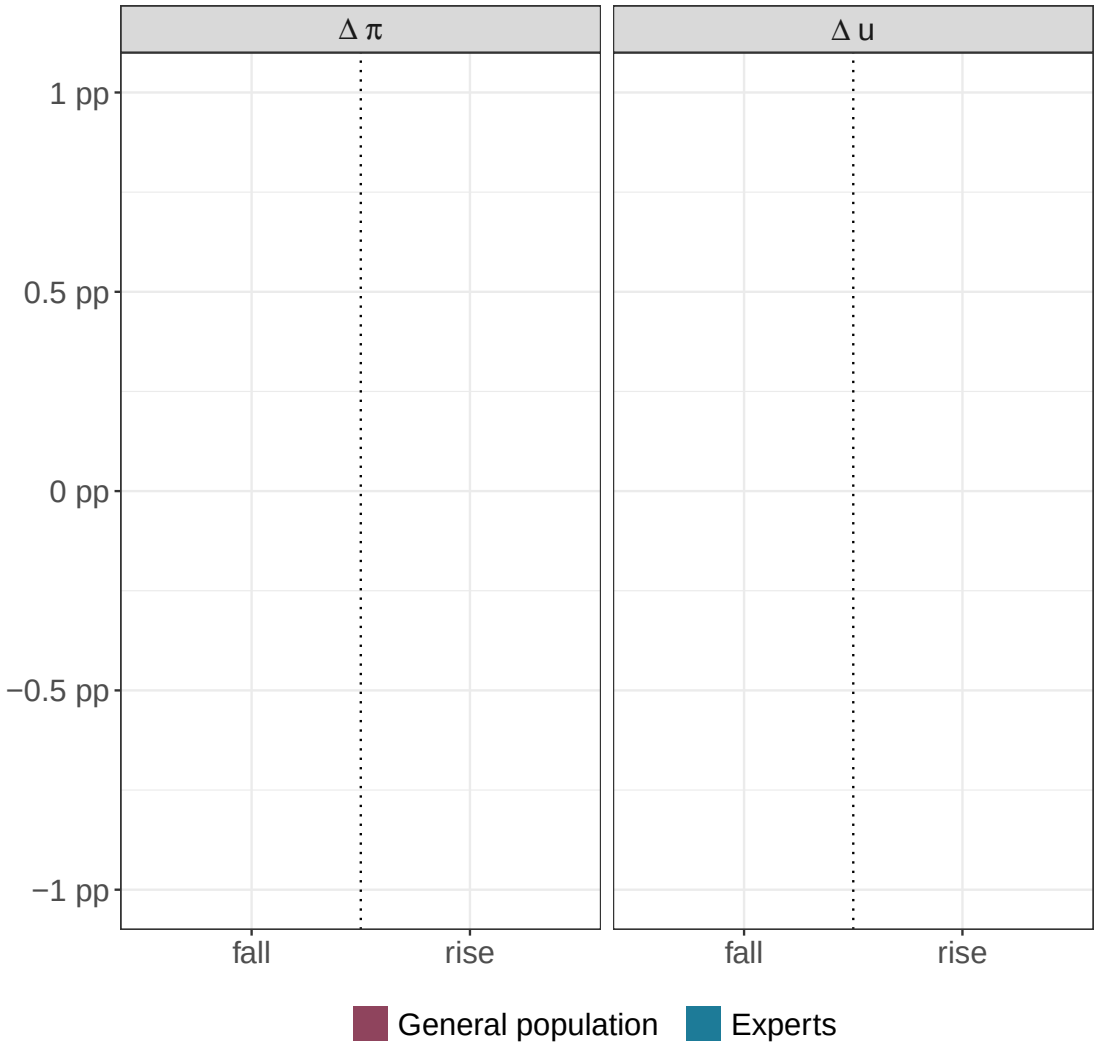


Results: Income taxes vignette



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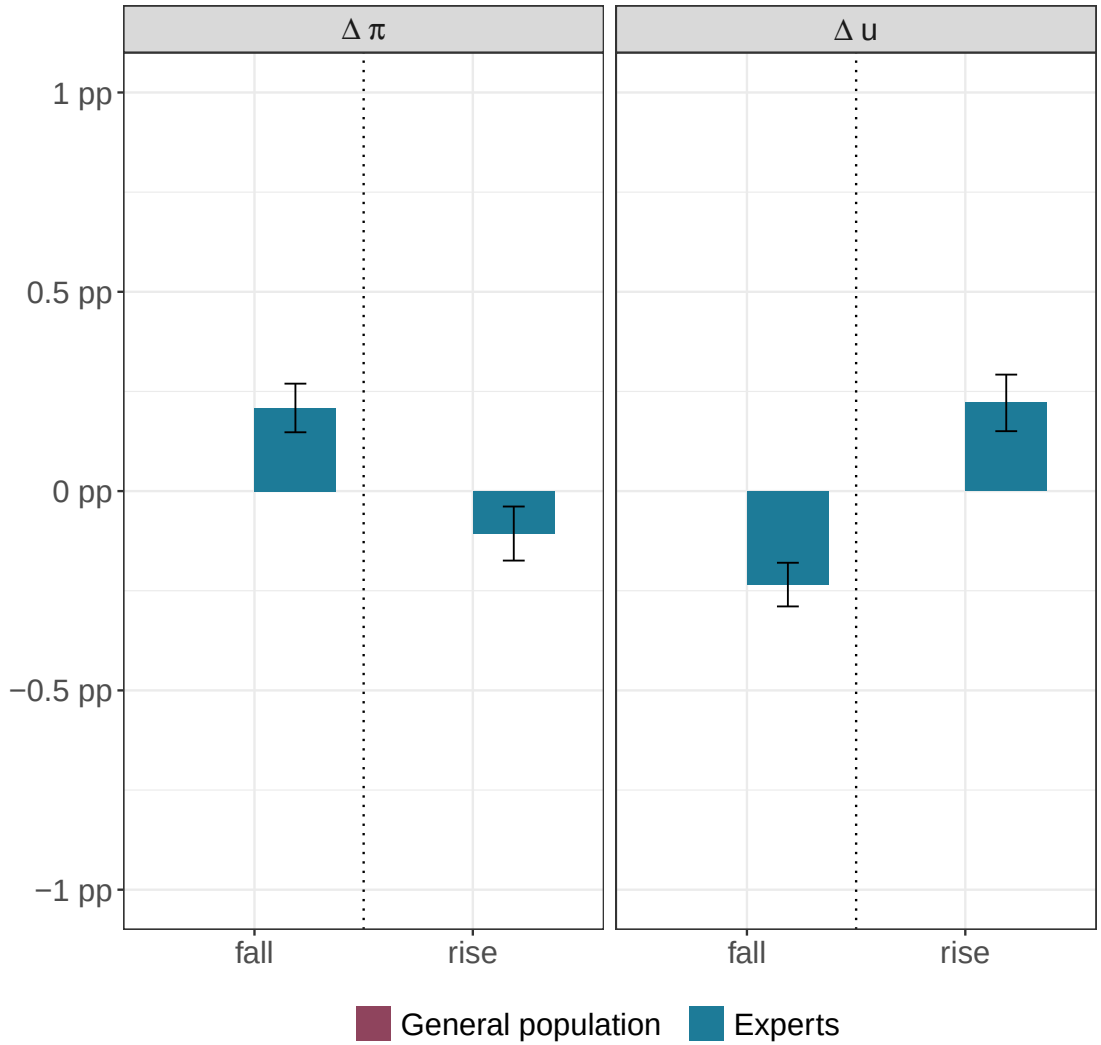

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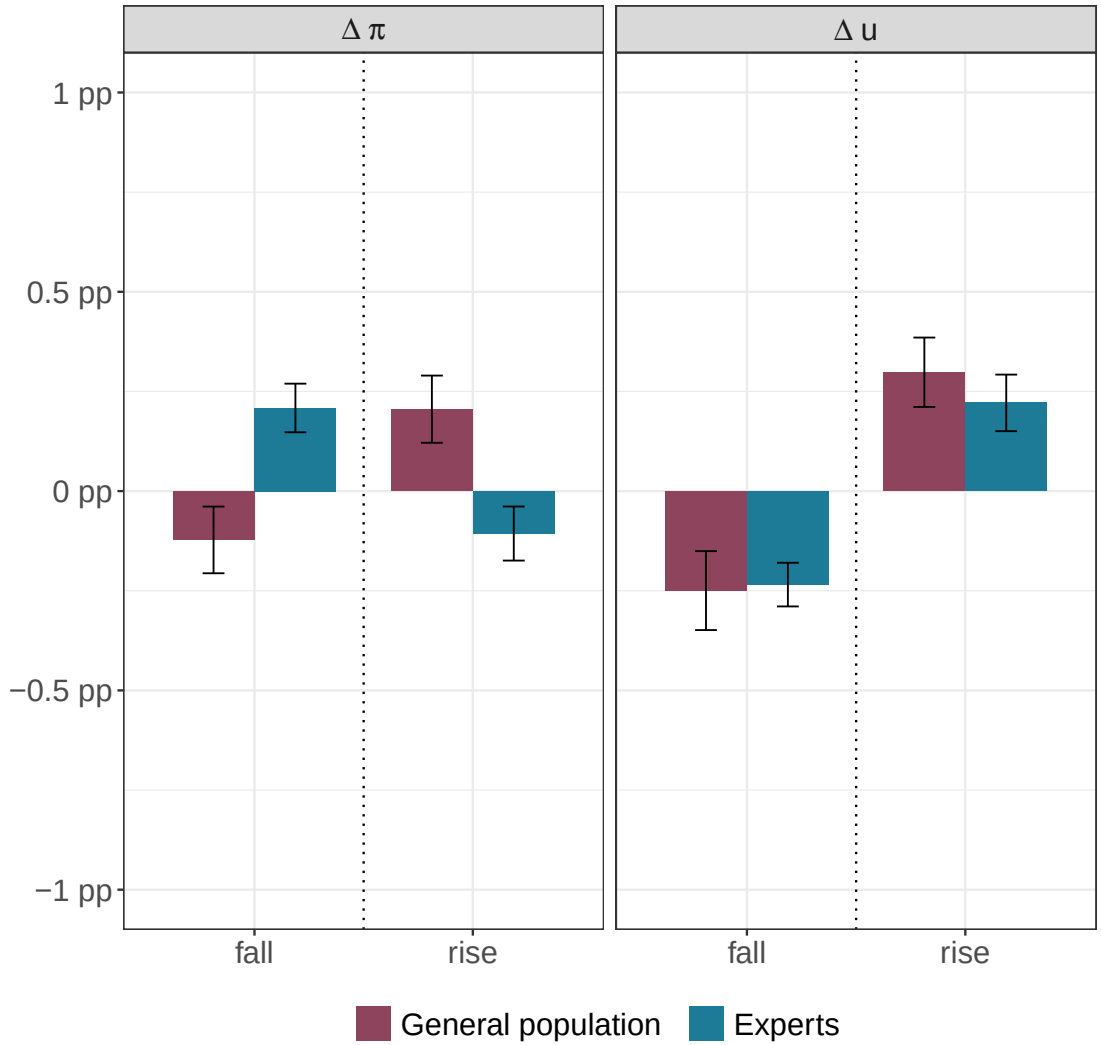
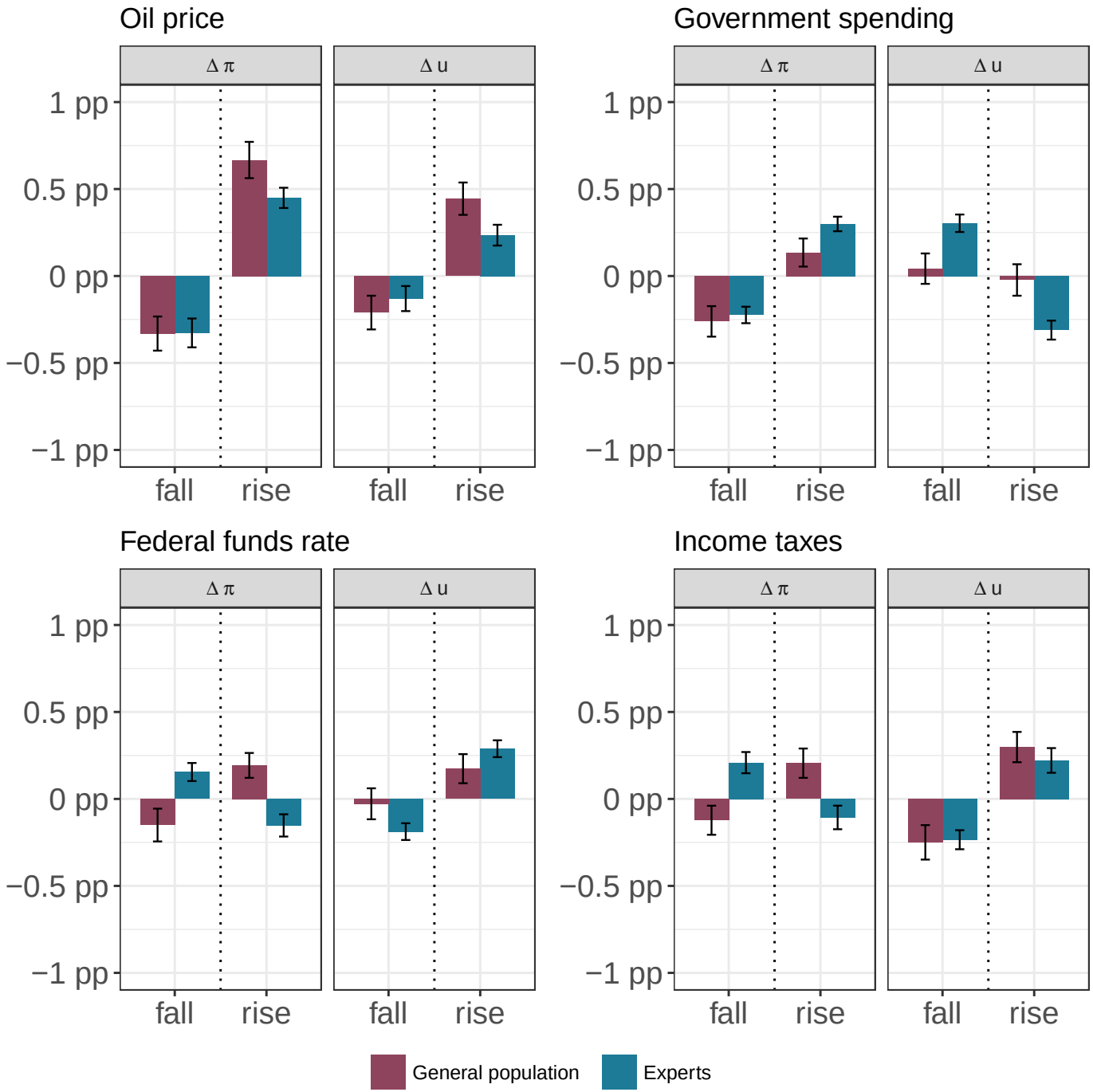



Oil price
Government spending
Federal funds rate
Income taxes
Δ π
Δ u
1 pp
0.5 pp
0 pp
−0.5 pp
−1 pp
fall
rise
General population
Experts

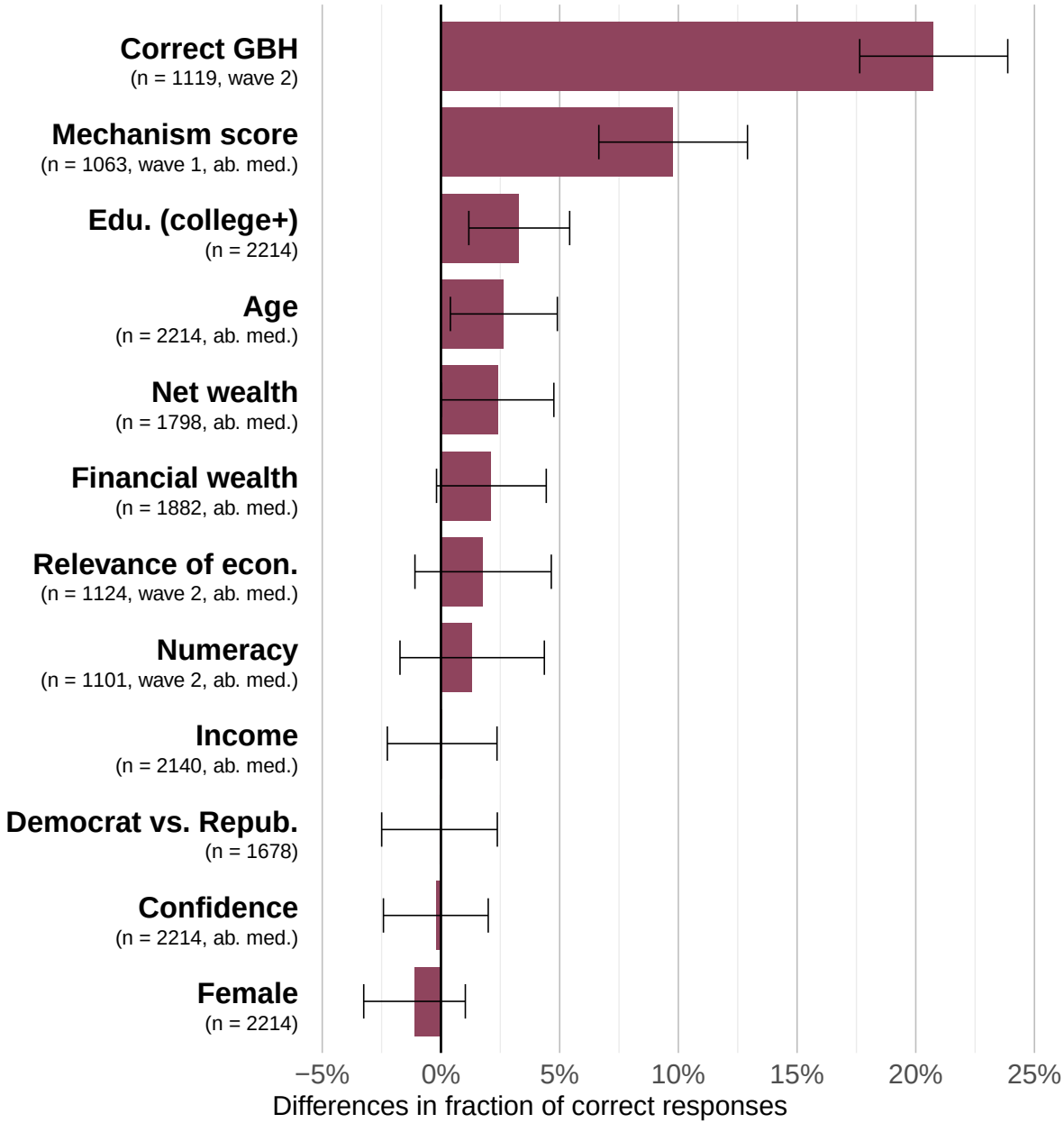
Robustness

Prediction results are robust to

1. misperceived endogeneity of interest rate shock
2. incentives for prediction accuracy
3. vignette and question order
4. excluding outliers that presumably paid less attention to the survey
5. survey wave effects

Outline of talk

Heterogeneity in forecast accuracy



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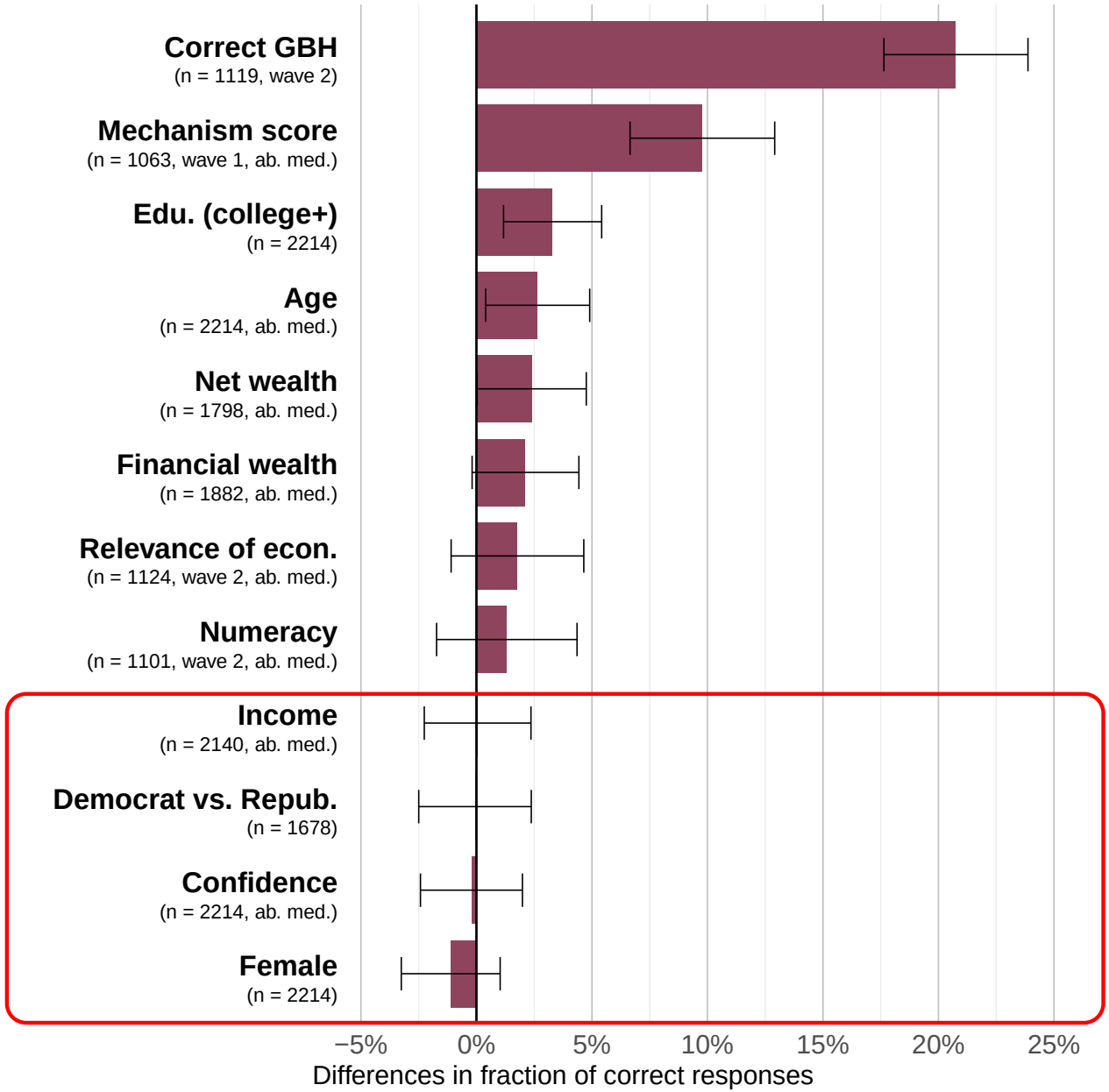

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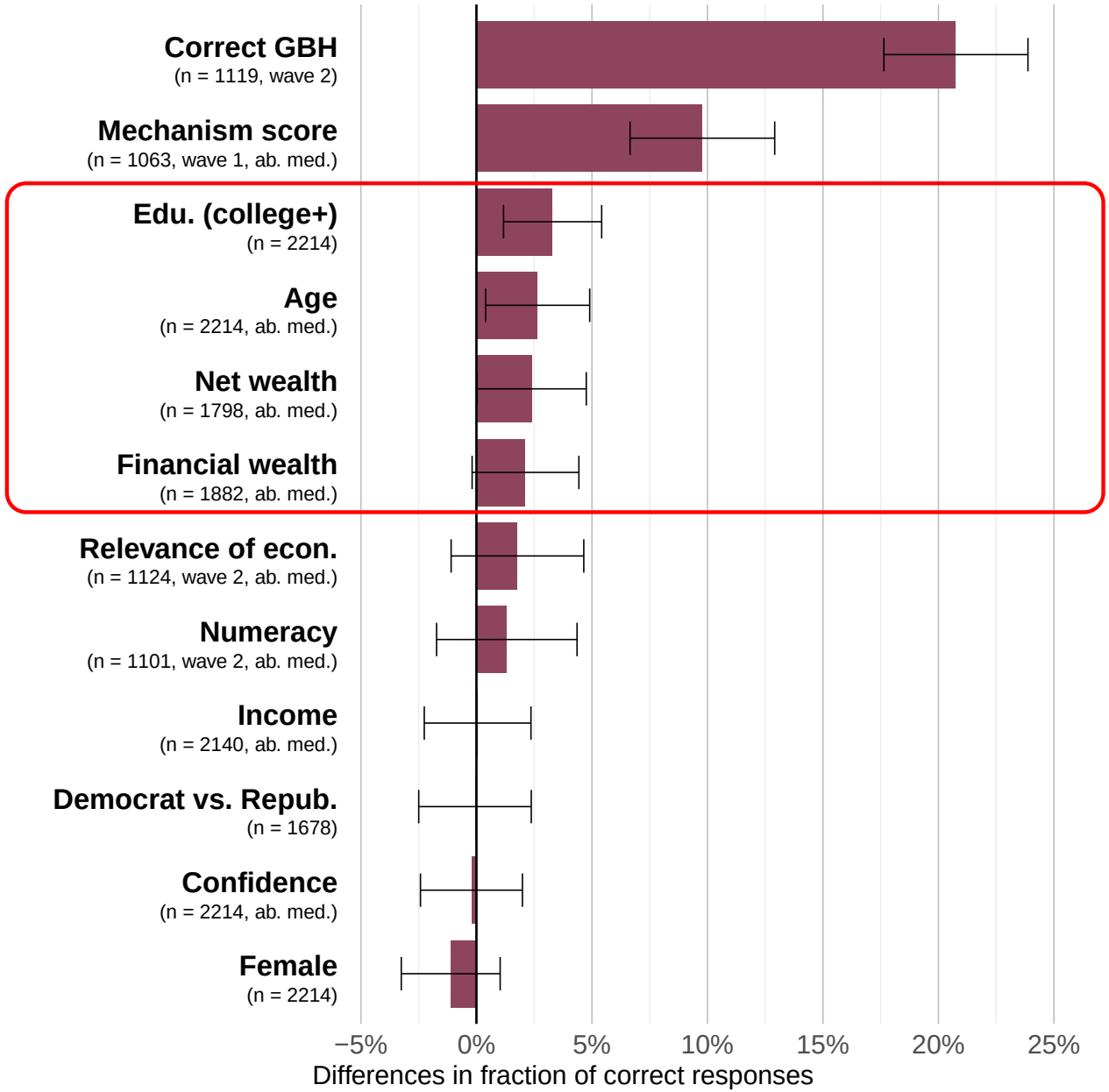

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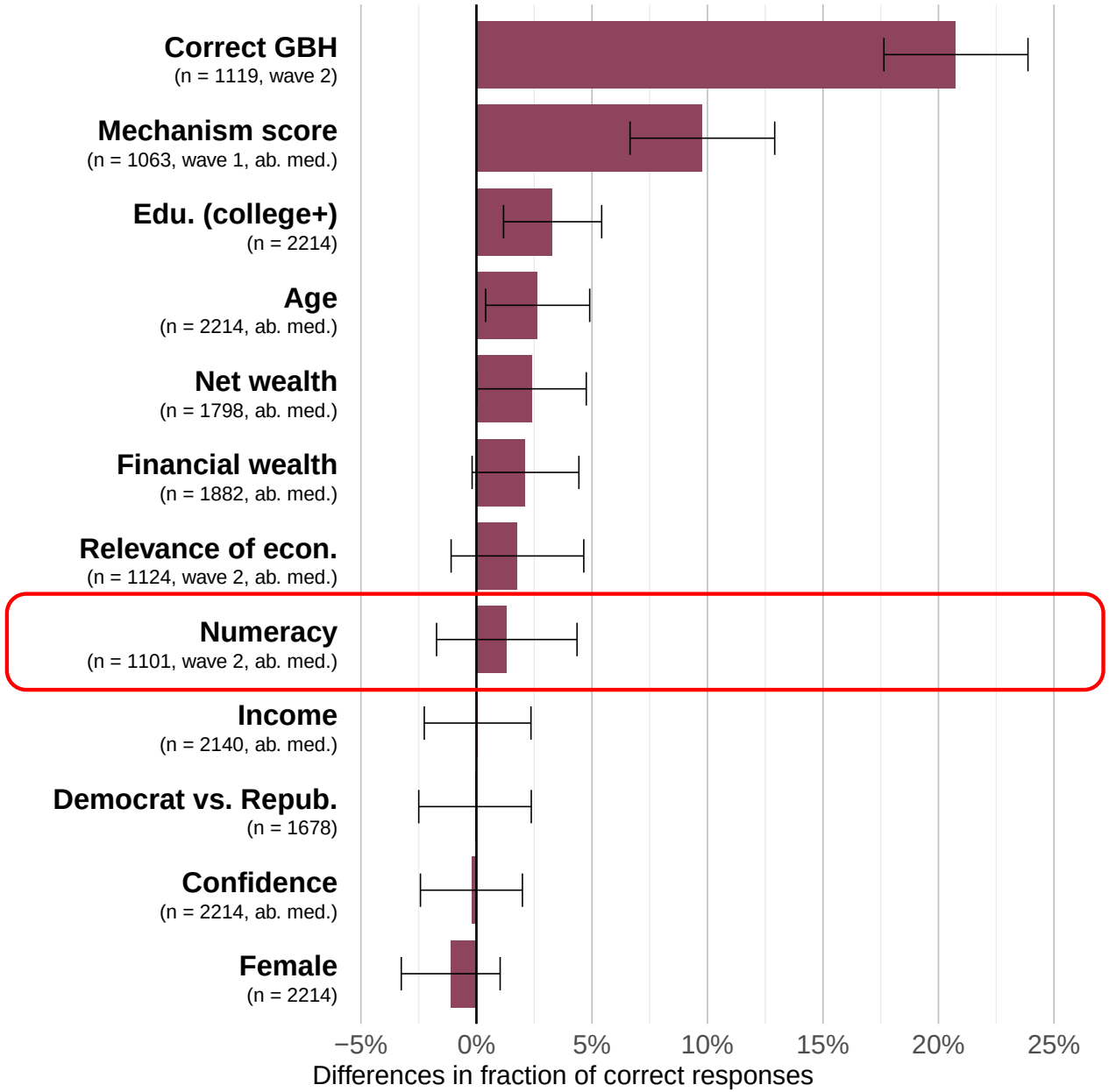

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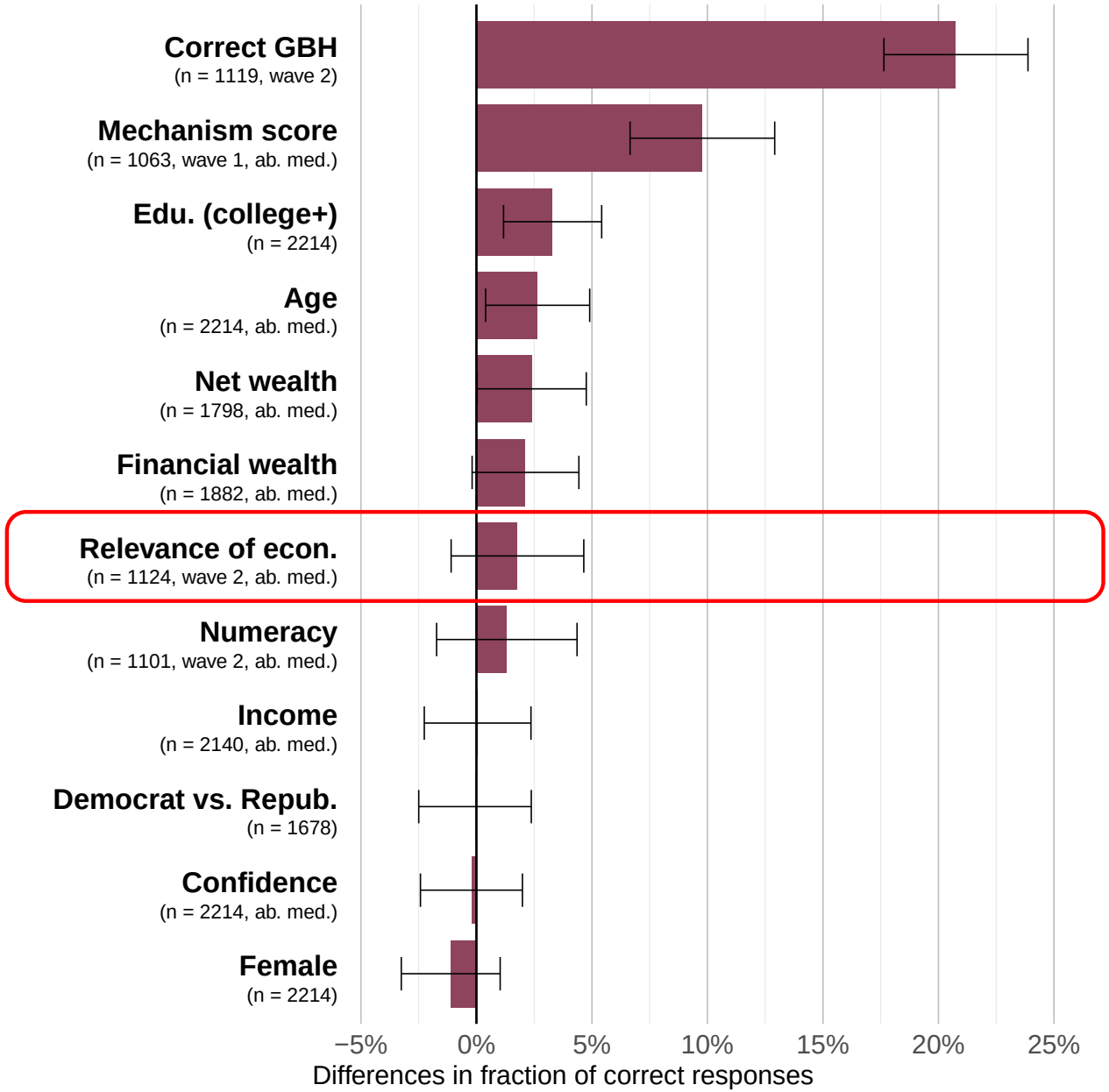

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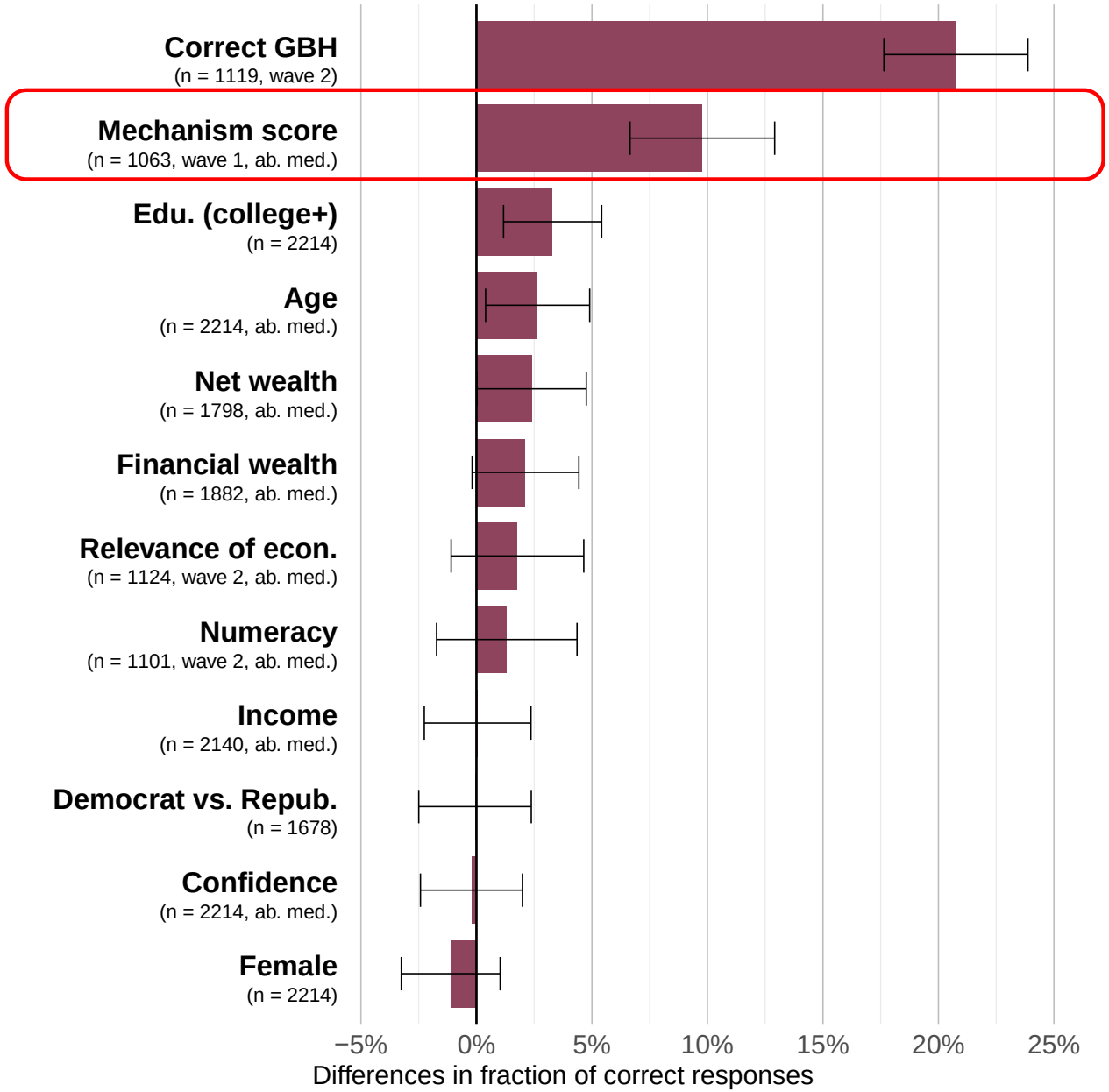

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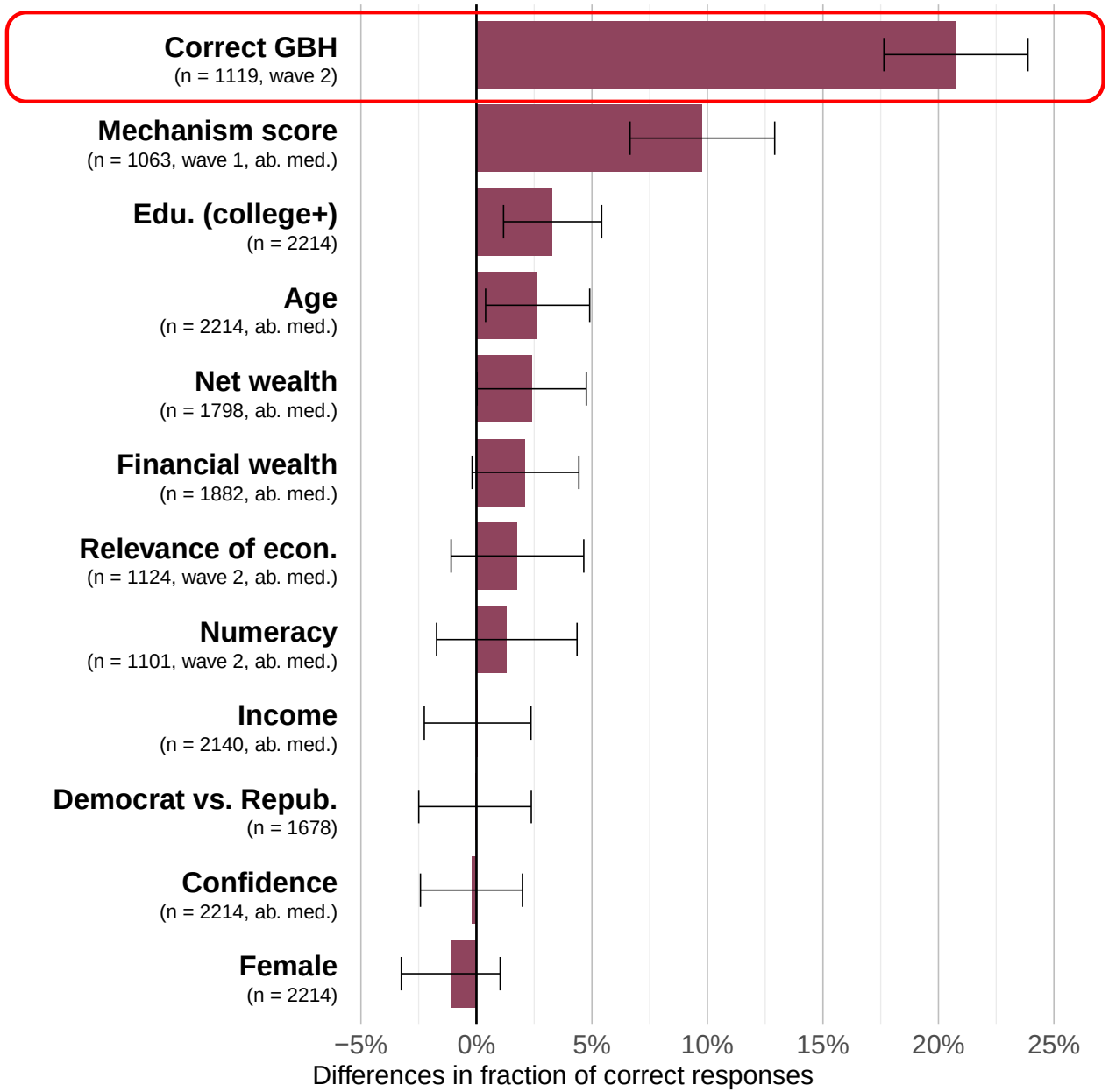


Good-bad-heuristic

Idea
Good causes good, bad causes bad.

Test

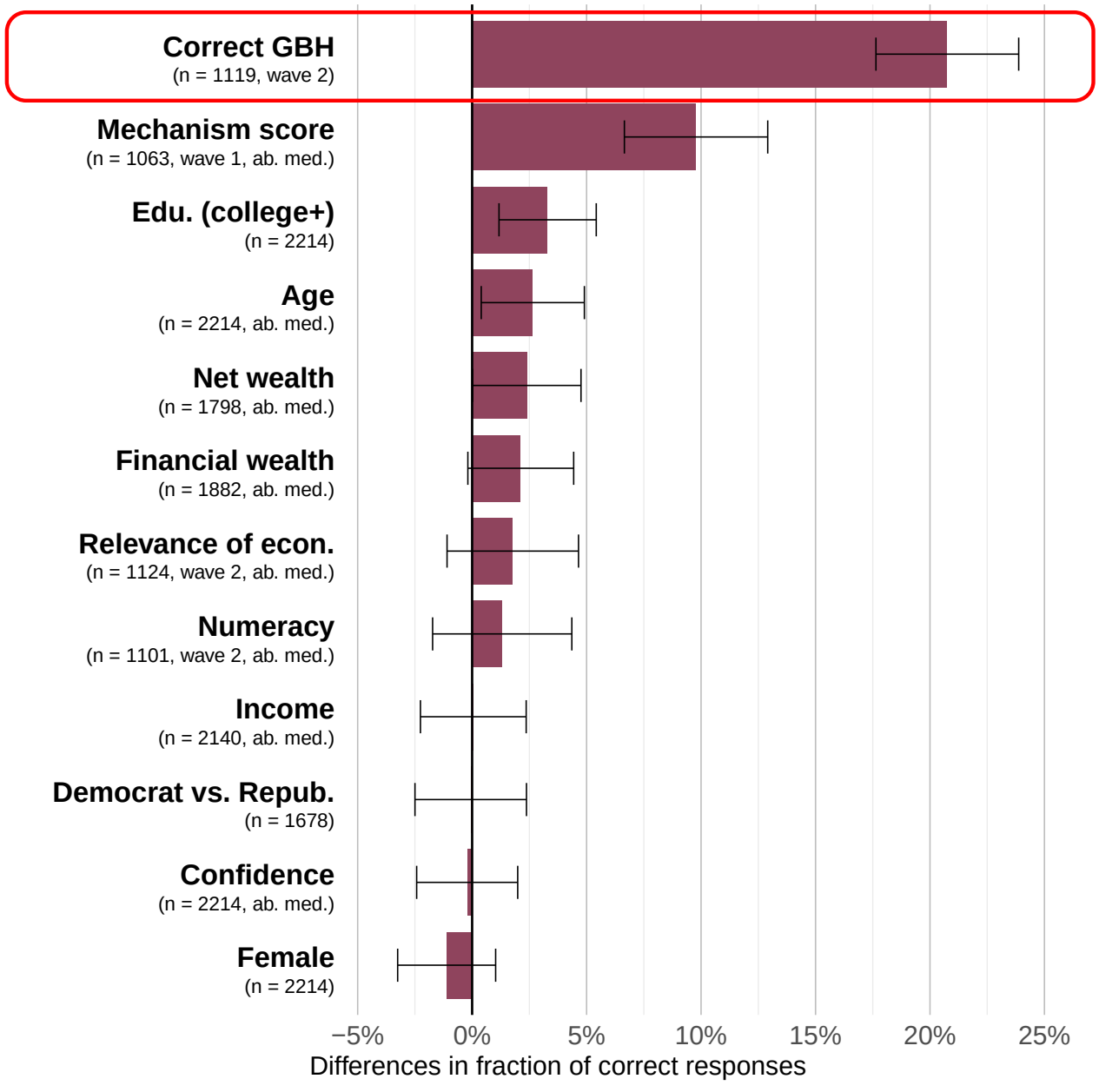
- Elicit affective evaluations of u and π and the shock variables.
- Shock has an increasing effect on $X \in \{u, \pi\}$ if the shock and X have the same valence.

Example

In your view, are **high rates of inflation** good or bad for ...?

	Very good	Good	Somewhat good	Neither good nor bad	Somewhat bad	Bad	Very bad
... your household.	○	○	○	○	○	○	○
... the US economy.	○	○	○	○	○	○	○

Heterogeneity in forecast accuracy



Outline of talk

Summary

Main research question

How do households expect unemployment and inflation to respond to macroeconomic shocks?

Design

Survey evidence from experts and the general US population, using hypothetical vignettes.

Key results

Households' predictions

- **aligned** with experts for oil price and government spending shocks.
- **different** from those of experts for monetary policy and tax shocks.
- better for u than π.
- strong predictive power of **good-bad-heuristic** in explaining forecast accuracy

Modeling implications

- Substantial disagreement in predictions supports models in which agents are **uncertain** about the true model.

  Evans and Honkapohja (2012); Milani (2007); Orphanides and Williams (2005)

- Understanding of the structure of the economy could reasonably proxy the average household's "subjective model" for **oil price shocks** and **government spending shocks**.

- Standard models or existing behavioral macro models cannot rationalize beliefs about inflation response to **tax shocks** and **monetary policy shocks**.

- Good-bad-heuristic hints at a potential role for **affective evaluations** or sentiment in expectation formation.

  Kamdar (2018)

Policy implications

- Miscalibrated beliefs can affect the **transmission** of monetary and fiscal policy.
- Differential announcement effects of government spending programs and tax cuts.
- Communication of policies to non-sophisticated economic agents.

Blinder et al. (2008); Coibion et al. (2019); Haldane and McMahon (2018); Hansen et al. (2017, 2019)

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