

# Expectations: From neuroscience to household finance and macroeconomics

Camelia M. Kuhnen

University of North Carolina  
Kenan-Flagler Business School  
&  
NBER

- How do people update beliefs about economic outcomes?
- Are there aggregate-level implications from micro-level findings about how we learn?

## Neuroscience insight:

- There is asymmetry in the brain regarding the processing of gain and loss information (Kuhnen and Knutson (2005); Knutson et al. (2008))

## Finance findings informed by this insight:

- Learning is different in the gain vs. loss domain: increased pessimism in the loss domain (Kuhnen (2015))

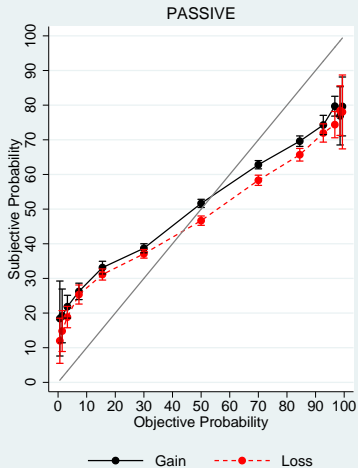
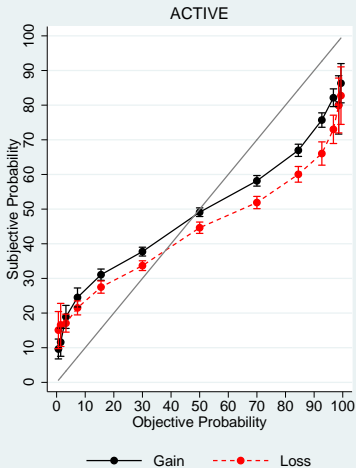
## Big picture implications:

- Recessions may be longer, more severe, because of undue pessimism

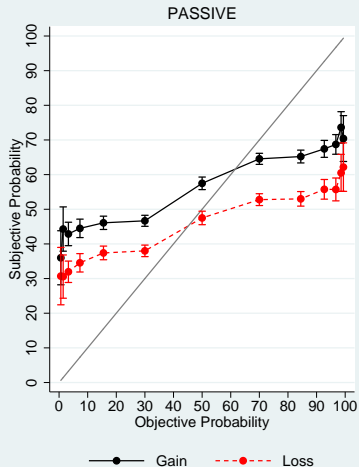
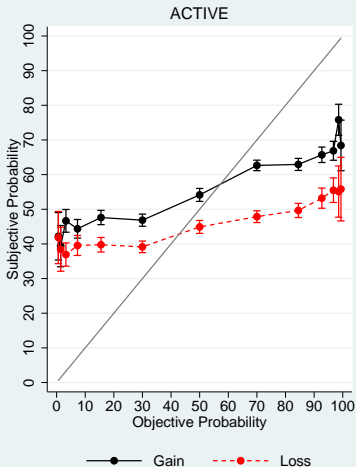
Kuhnen (2015): Learning from negative outcomes induces overly pessimistic beliefs about investment payoffs

- Risky asset: can pay from Good or from Bad dividend distribution (50% prior)
- Distributions have the same support: High and Low dividends
- The Good distribution has a higher chance of delivering the High dividend, relative to the Bad distribution
- Safe asset: has known payoff
- Two conditions: Gain domain and Loss domain
- The learning problem is the same in both domains: “What is the probability that the stock is paying from the Good distribution?”

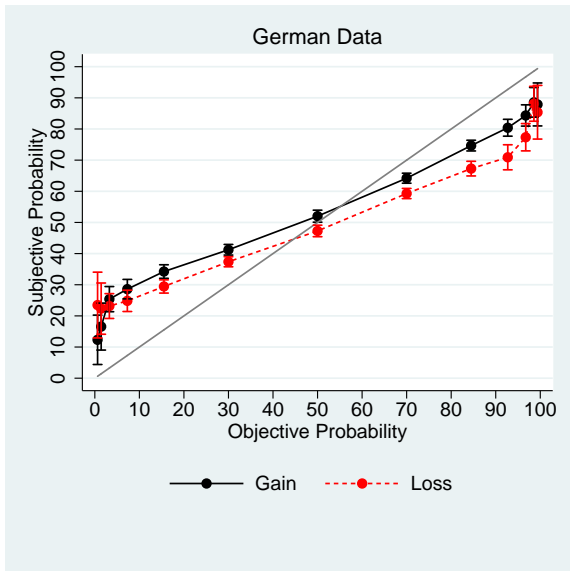
# Finance findings



# Finance findings: Replication in Romanian sample



# Finance findings: Replication in German sample



- Beliefs are overly pessimistic in the loss domain, relative to the gain domain
- Updating beliefs: stronger reaction to low outcomes in the loss condition vs. the gain condition
- Pessimistic beliefs in loss condition lead to avoiding stocks



## Neuroscience insight:

- Adversity shapes brain learning processes: increased sensitivity to loss information, decreased sensitivity to gain information (Nusslock and Miller (2016), Hanson et. al (2016))

## Finance findings informed by this insight:

- Low socioeconomic status (SES) individuals form more pessimistic beliefs about financial investments and economic opportunities, avoid investing in stocks, real estate (Kuhnen and Miu (2017), Das, Kuhnen and Nagel (2019))

## Big picture implications:

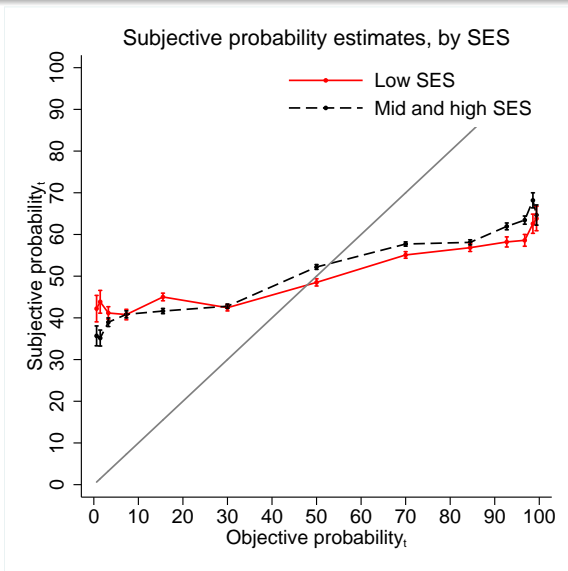
- Increase in wealth inequality over time, low investment by low SES people in education, human capital, new businesses

Kuhnen and Miu (2017)

Controlling for the priors and information sets of experiment participants:

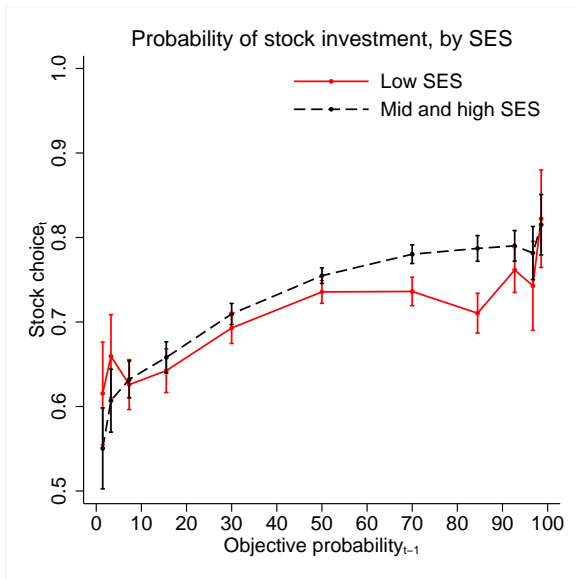
- Low SES induces pessimism about stocks
- Low SES people update less from high dividends
- Low SES people are less likely to invest in stocks, particularly when they are good investments objectively

# Low SES induces pessimism about stocks



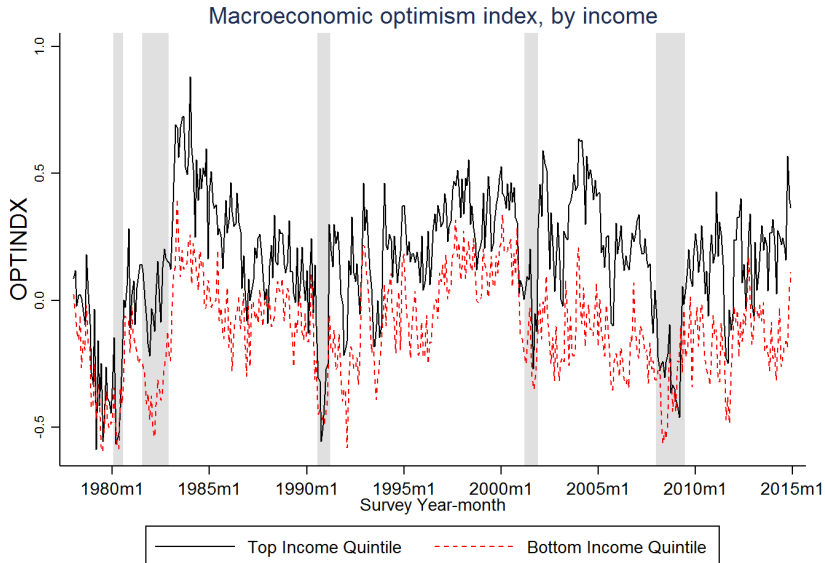
SES-related gap in beliefs doubles for active trials, loss condition.

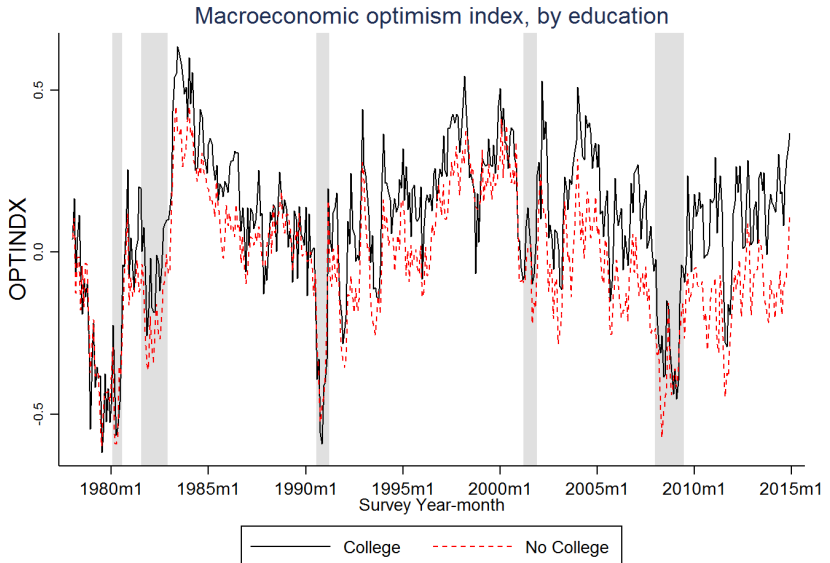
# Low SES people are less likely to invest in stocks

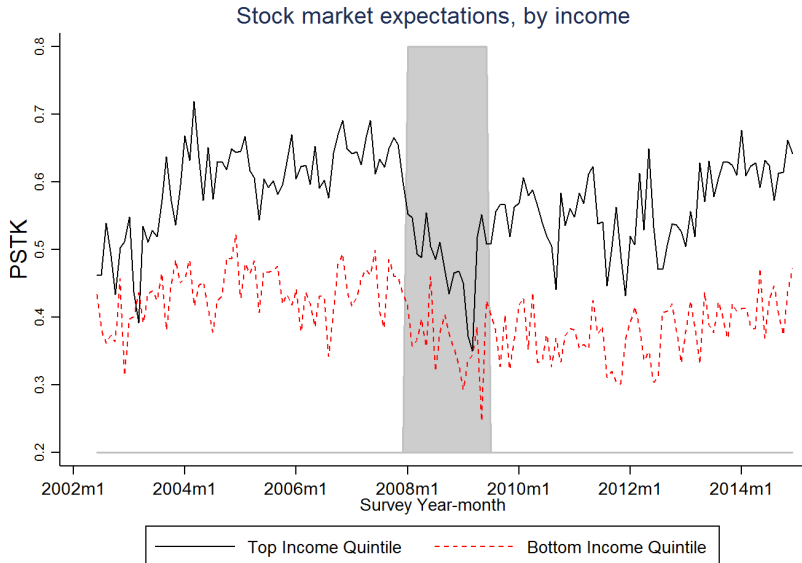


## Das, Kuhnen and Nagel (2019)

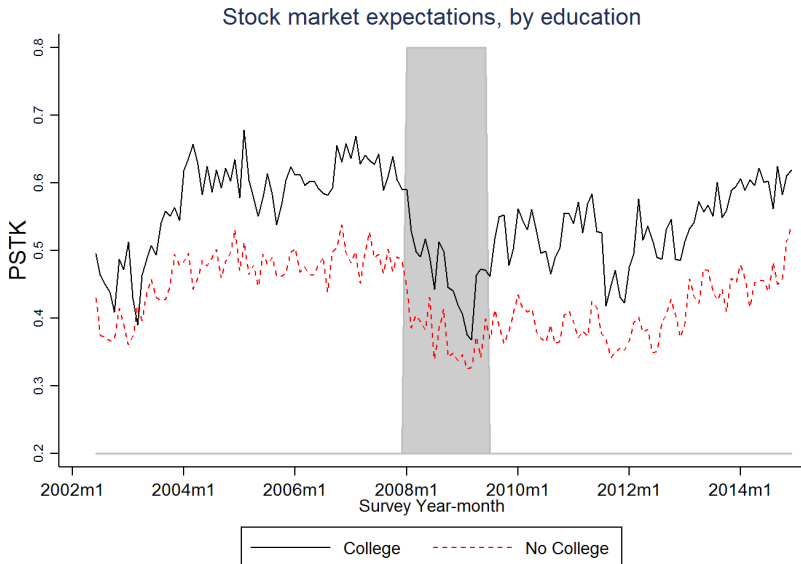
- Large scale evidence consistent with experimental findings
- 38 years, monthly data, 180000 person-month observations from the Michigan Survey of Consumers: SES measures, five macro-expectations measures, reported household choices
- Higher SES people are more optimistic about the macro-economy relative to lower SES people, but in recessions this expectations gap narrows











- Effect of income and education on equity investments, purchases of homes and durable goods: direct (e.g., access to brokers or retirement accounts) and indirect through the beliefs channel
- The indirect effect, through economic expectations, accounts for significant share of overall effect of high SES on increased investments in equities, homes and durables

## Neuroscience insight:

- Life adversity and environmental instability influence learning in the brain (Kidd et al. (2012), Sturge-Apple et al. (2016))

## Finance findings informed by this insight:

- Low SES individuals are more uncertain in their micro- and macro-level economic expectations, and more uncertain people engage in precautionary behaviors (Ferman, Kuhnen, Li and Ben-David (2019))

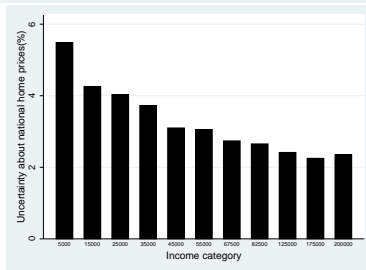
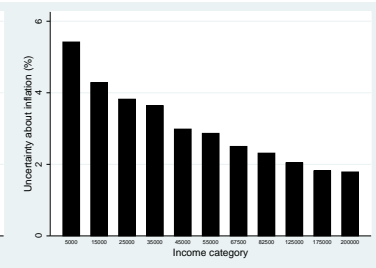
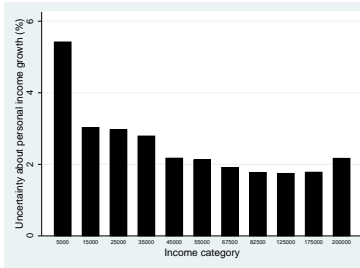
## Big picture implications:

- Uncertainty among low SES people prevents investments in financial assets, financial literacy may reduce uncertainty, policy interventions or messages may impact households differently due to differences in uncertainty

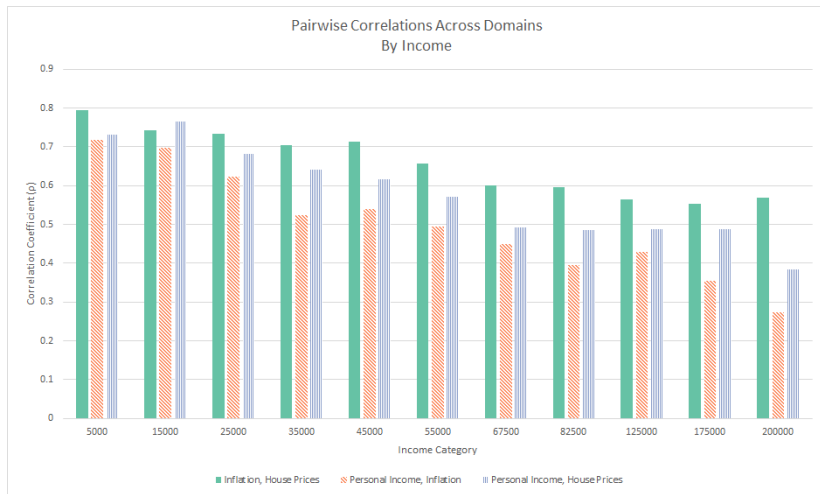
Ferland, Kuhnen, Li and Ben-David (2019)

- Data from the NY Fed Survey of Consumer Expectations, 2013-2017 (55 months), 1200 people per month
- Point estimates and standard deviation (uncertainty) for: personal income growth, inflation rate, rate of growth of national home prices, over subsequent 12 months
- Individuals with lower income and education levels, facing more precarious financial conditions and living in counties with higher unemployment are more uncertain in their micro- and macro-level economic expectations
- People with higher uncertainty regarding economic outcomes are more likely to engage in precautionary behaviors in terms of consumption, credit and investment decisions

# Finance findings



Uncertainty within-person correlates across economic domains,  
more so for low SES people



- There exists significant – and to a certain degree, predictable – heterogeneity across households in the uncertainty they have in their micro- and macro-economic expectations
- More uncertain individuals engage in precautionary behaviors: plan to lower consumption, line up additional lines of credit, invest less in equities

## Neuroscience insight:

- There is heterogeneity regarding brain response to adversity, self-efficacy helps deal with negative shocks (Harnett et al. (2015))

## Finance findings informed by this insight:

- People who have more positive beliefs regarding their ability to change their future through their actions (i.e., have high self-efficacy scores), are more likely later on to avoid being financially delinquent (Kuhnen and Melzer (2018))

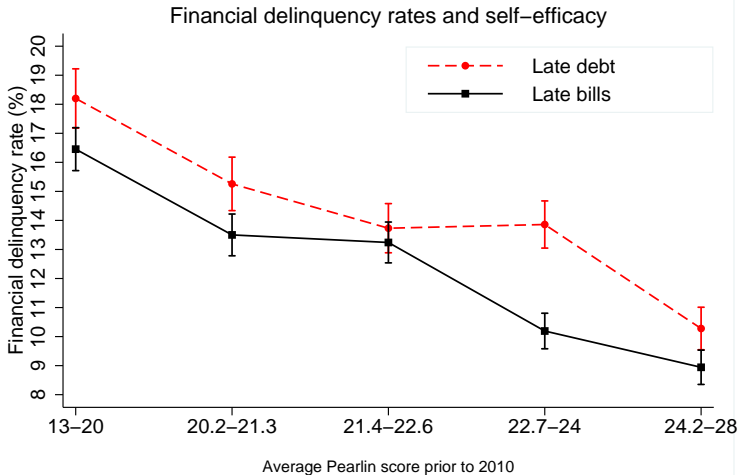
## Big picture implications:

- Non-cognitive skills can shape the financial health of populations, could be used to assess credit worthiness



## Kuhnen and Melzer (2018)

- Data from National Longitudinal Survey Youth 1979, Child and Young Adult sample (NLSY79CYA): 6,000 individuals tracked over time since young age, now adults with detailed financial information in 2010, 2012 and 2014
- People who have high self-efficacy scores are more likely later on to avoid being financially delinquent, especially when hit by shocks



Kuhnen and Melzer (2018)

- Effect of self efficacy on reducing financial distress holds controlling for:
  - cognitive ability, education, income, age, household size, leverage, risk aversion, patience, gender, race
  - mother fixed effects (within-sibling estimation)
- Effect is triple in size for people who have faced economic adversity early in life – had mother in lowest wealth tertile – relative to those whose mothers' wealth was in the top tertile
- Consequences: loss of traditional credit access, loss of assets
- Higher self-efficacy predicts more effort to protect against potential shocks (e.g., through insurance, emergency savings), and when negative shocks such as job loss and health events occur, lower chance of financial delinquency

- Neuroeconomics can help us better understand consumers and investors:
  - their expectations (my focus)
  - their risk tolerance
  - the effects of their social interactions
  - ...
- Exposure to other disciplines is good for economists.

- Das, S., Kuhnen, C. M. and Nagel, S.: 2019, Socioeconomic Status and Macroeconomic Expectations, *Review of Financial Studies*, forthcoming
- Ferland, E., Kuhnen, C. M., Li, G., and Ben-David, I.: 2019, Expectations uncertainty and household economic behavior, Working paper
- Kuhnen, C. M.: 2015, Asymmetric Learning from Financial Information, *Journal of Finance*, 70(5)
- Kuhnen, C. M. and Knutson, B.: 2005, The Neural Basis of Financial Risk-Taking, *Neuron*, 47(5):763-770
- Kuhnen, C. M. and Knutson, B.: 2011, The Influence of Affect on Beliefs, Preferences and Financial Decisions, *Journal of Financial and Quantitative Analysis*, 46(3): 605-626
- Kuhnen, C. M. and Melzer, B.: 2018, Non-cognitive abilities and financial delinquency: The Role of Self-Efficacy in Avoiding Financial Distress, *Journal of Finance*, 73 (6).
- Kuhnen, C. M. and Miu, A.: 2017, Socioeconomic status and learning from financial information, *Journal of Financial Economics*, 124 (2): 349-372