



EUROPEAN CENTRAL BANK

EUROSYSTEM

The Effect of Macroeconomic Uncertainty on Household Spending

Olivier Coibion

UT Austin
and NBER

Dimitris
Georgarakos

European Central
Bank and University
of Glasgow

Yuriy
Gorodnichenko

UC Berkeley and
NBER

Geoff Kenny

European Central
Bank

Michael Weber

University of
Chicago and NBER

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Disclaimer

The views expressed are my own and do not necessarily reflect the views of the European Central Bank or those of the euro system.

Motivation

- **High uncertainty** induces households to spend less and firms to reduce their investment and employment: intuitive idea / omnipresent in policy discussions esp. during crisis times
- C. Romer (CEA Chair, 2009): *“Volatility, according to some measures, has been over five times as high over the past six months as it was in the first half of 2007. The resulting uncertainty has **almost surely** contributed to a decline in spending.”*
- Bloom (2014): the empirical evidence on economic agents’ behaviour is at best *“**suggestive**”* and *“more empirical work on the effects of uncertainty would be valuable, particularly work which can **identify clear causal relationships.**”*

Macroeconomic Uncertainty and Households

Estimating the effects of macroeconomic uncertainty on households' choices has proven remarkably challenging:

- **Confounding aggregate** factors (pandemics, revolutions, natural disasters)
- **Correlations** with (time-varying) **household unobservables**
- **Separately identifying** the effects of expectations about first and second moments, since most large uncertainty events are also associated with significant deteriorations in the expected economic outlook

What We Do

- **RCT: induce exogenous variation** to household expectations and uncertainty about future economic growth in the euro area
- **Estimate the effect of uncertainty** (net of first moment expectations) on household:
 - **Spending** (non-durables and durables)
 - **Propensity to invest** in financial and real assets
- **Heterogeneous** effects of uncertainty across household groups

Consumer Expectations Survey (CES)

- **Internet panel** administered by the **ECB**; *DE, FR, ES, IT, BE, NL*; ~ 10,000 households; pilot started January 2020 (January 2021: +5 EA countries; 19,000 households); **monthly** frequency; nationally **representative**
- Household **expectations** (*e.g., inflation, income, house prices, interest rates, GDP growth, labor markets*) and **behavior** (*e.g., spending, investment*)
- **September 2020**: 10 min special-purpose survey following the regular survey wave
- Non-durable consumption; **October, January 2021**; 10 items; follow-up checking screen and monthly running sum; consumption of larger items (extensive margin)
- For a description see: *ECB Evaluation Report (OP, 2021)* and *Georgarakos and Kenny (JME, 2022)*

An RCT Approach to the Question

Elicit (1st & 2nd moment) **prior** expectations and planned decisions



Information treatment



Measure **posterior** (1st & 2nd moment)
beliefs



Measure ex-post decisions
consumption/ investment



Control group (no information)



Measure **posterior** (1st & 2nd moment)
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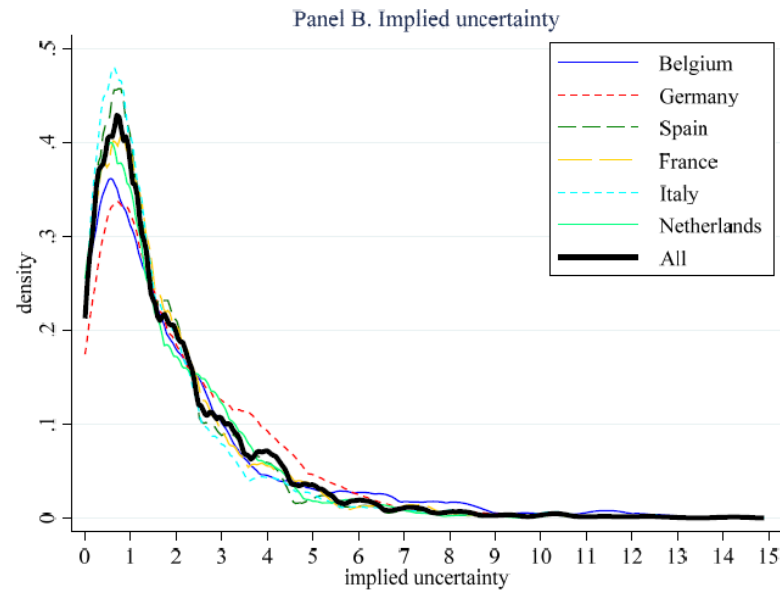
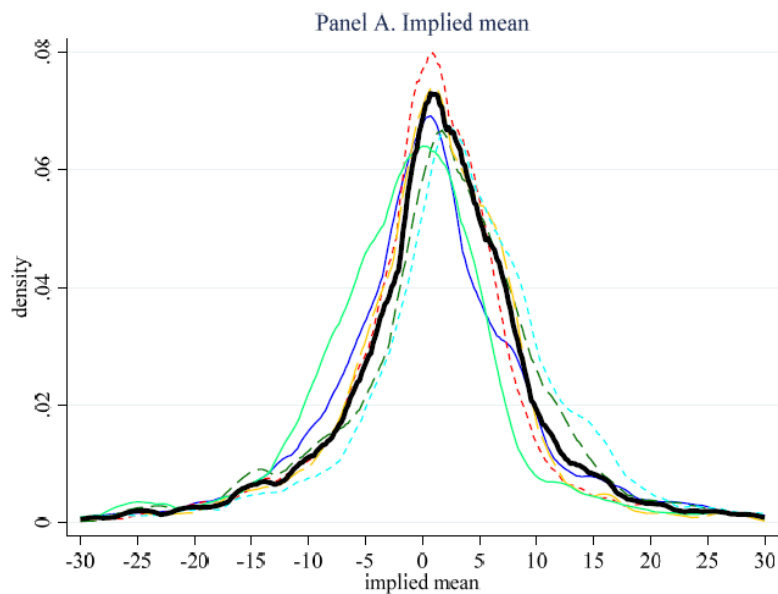
Pre-Treatment Expectations: 1st & 2nd Moments

Guiso, Japelli and Pistaferri (2002): **triangular distribution**

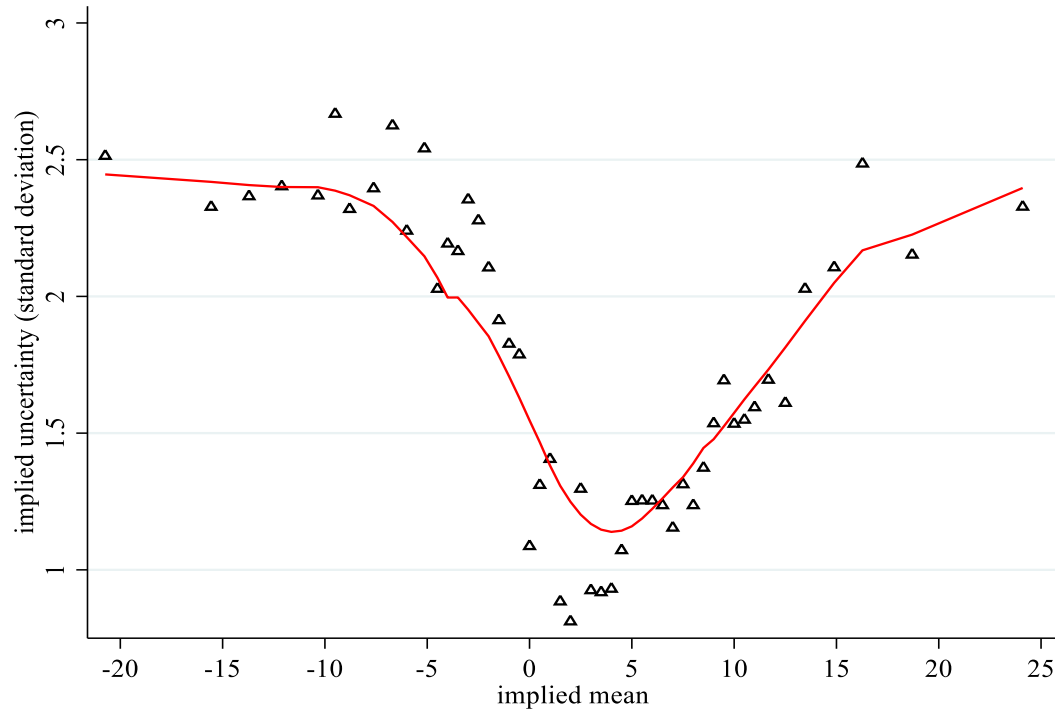
“Please give your best guess about the lowest growth rate (your prediction for the most pessimistic scenario for the euro area growth rate over the next 12 months) and the highest growth rate (your most optimistic prediction).”

“What do you think is the percentage chance that the growth rate of the euro area economy over the next 12 months will be greater than $([low\ growth\ rate] + [high\ growth\ rate])/2\%$?”

Distribution of Forecasts for GDP Growth in EA



Joint distribution of implied mean and uncertainty for GDP Growth in EA



Treatments

*T1: “The **average** prediction among professional forecasters is that the euro area economy **will grow at a rate of 5.6%** in 2021. By historical standards, this is a strong growth.”*

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T3: “The **average** prediction among professional forecasters is that the euro area economy will **grow at a rate of 5.6%** in 2021. By historical standards, this is a strong growth. At the same time, professional forecasters are uncertain about economic growth in the euro area in 2021, with **the difference between the most optimistic and the most pessimistic predictions being 4.8 percentage points**. By historical standards, this is a big difference.”

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T3: “The **average** prediction among professional forecasters is that the euro area economy will **grow at a rate of 5.6%** in 2021. By historical standards, this is a strong growth. At the same time, professional forecasters are uncertain about economic growth in the euro area in 2021, with **the difference between the most optimistic and the most pessimistic predictions being 4.8 percentage points**. By historical standards, this is a big difference.”

T4: “Professional forecasters are uncertain about economic growth in the country you are living in in 2021, with **the difference between the most optimistic and the most pessimistic predictions being <X%> percentage points**. By historical standards, this is a big difference.”

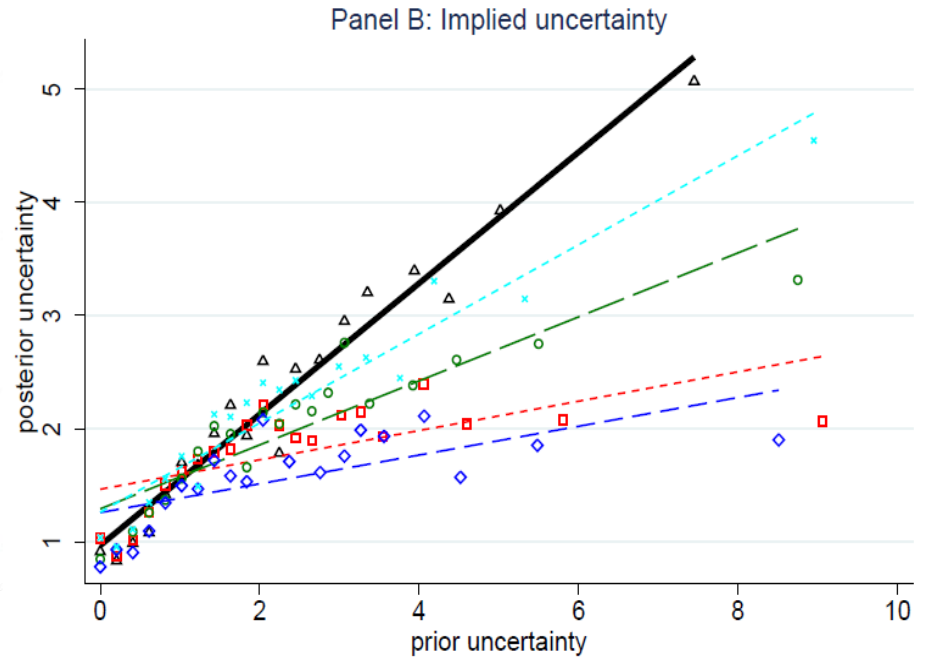
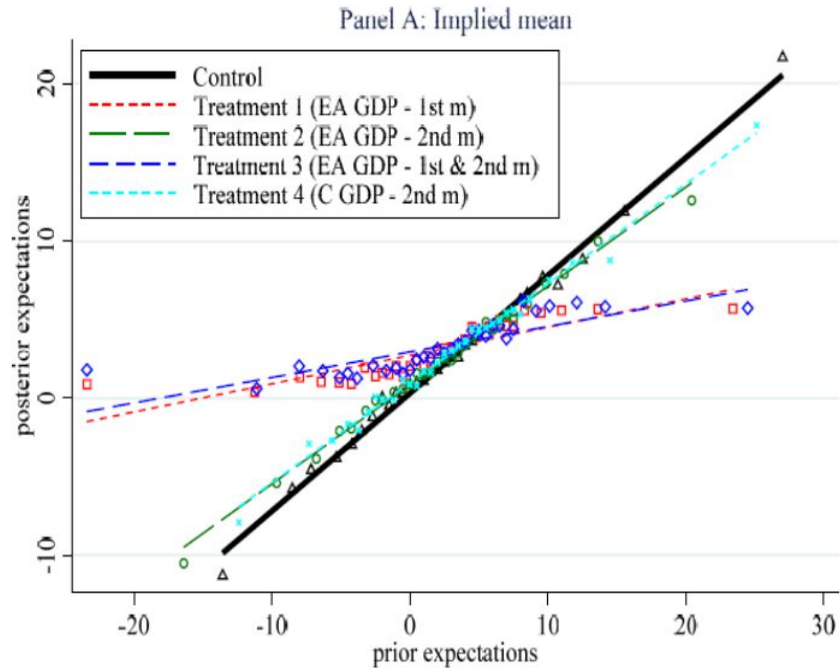
Post-Treatment Expectations: 1st & 2nd Moments

Altig et al. (2020): Three-scenarios

*“What do you think will be the approximate growth rate in the euro area **over the next 12 months** for each of the scenarios below? We start with your prediction for the most pessimistic scenario for the euro area growth rate over the next 12 months (LOWEST growth rate) and end with your most optimistic prediction (HIGHEST growth rate).”*

*“Please assign a **percentage chance** to each growth rate to indicate how likely you think it is that this growth rate will actually happen in the euro area economy over the next 12 months. Your answers can range from 0 to 100, where 0 means there is absolutely no chance that this growth rate will happen, and 100 means that it is absolutely certain that this growth rate will happen. The sum of the points you allocate should total to 100.”*

Treatment Effects on Household Beliefs about GDP Growth in EA



Post-Treatment Behavior: Consumption

Non-durables 1) food, beverages, groceries, tobacco, restaurants, cafes, canteens; 2) housing (incl. rent), utilities, furnishing, housing equipment, small appliances and routine maintenance of the house; 3) clothing, footwear; 4) health care and personal care products; 5) transport; 6) travel, recreation, entertainment and culture; 7) education and other. [**October/January waves**]

'Big ticket' items (extensive margin): house, car, durables, holidays, luxury goods
[**October wave**]

Post-Treatment Behavior: Estimation

$$(\log Spend_i) \times 100 = \alpha_1 Post_i^{mean} + \beta_1 Post_i^{uncert} + \alpha_0 Prior_i^{mean} + \beta_0 Prior_i^{uncert} + Controls + error_i$$

$$\begin{aligned} Post_i^{mean} &= a_0 + \sum_{j=1}^3 a_j \times I\{i \in Treat\ j\} \\ &+ \sum_{j=1}^3 b_j \times I\{i \in Treat\ j\} \times Prior_i^{mean} \\ &+ \sum_{j=1}^3 c_j \times I\{i \in Treat\ j\} \times Prior_i^{uncert} + error_i \end{aligned}$$

$$\begin{aligned} Post_i^{uncert} &= \tilde{a}_0 + \sum_{j=1}^3 \tilde{a}_j \times I\{i \in Treat\ j\} \\ &+ \sum_{j=1}^3 \tilde{b}_j \times I\{i \in Treat\ j\} \times Prior_i^{mean} \\ &+ \sum_{j=1}^3 \tilde{c}_j \times I\{i \in Treat\ j\} \times Prior_i^{uncert} + error_i \end{aligned}$$

Effects of 1st and 2nd moments about GDP Growth in EA on **nondurable consumption**

	One month after treatment	Four months after treatment
	(1)	(2)
Posterior: mean	-0.82 (0.52)	-0.26 (0.49)
Posterior: uncertainty	-4.61** (2.23)	-4.51** (2.25)
Observations	4,572	4,113
R-squared	0.19	0.17
1 st -stage F stat (mean)	131.00	129.3
1 st -stage F stat (uncertainty)	28.68	25.60

- mainly through: *health and personal care products; recreation activities and entertainment*

Effects of 1st and 2nd moments about GDP Growth in EA on purchases of **durables/luxury goods** and services

	Home	Durable	Car	Holiday	Luxury
	(1)	(2)	(3)	(4)	(5)
Posterior: mean	-0.01	0.07	0.08	-0.02	-0.06
	(0.05)	(0.34)	(0.09)	(0.23)	(0.11)
Posterior: uncertainty	-0.18	-1.81	-0.13	-2.74***	-1.02*
	(0.18)	(1.54)	(0.38)	(1.04)	(0.57)
Plan to buy a given durable	0.03**	0.23***	0.05***	0.15***	0.14***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.03)
Observations	4,605	4,621	4,606	4,616	4,610
R-squared	0.01	0.08	0.01	0.07	0.03
1 st -stage F stat (mean)	130	131.4	132.2	127.7	129.2
1 st -stage F stat (uncertainty)	28.10	27.42	28.19	28.14	27.38

Post-Treatment Behavior: Investment

Financial Portfolios: *“Imagine that you receive €10,000 to save or invest in financial assets. Please indicate in which of the following asset categories you will save/invest this amount.”*

1) current and savings accounts; 2) stocks and shares; 3) mutual funds and collective investments; 4) retirement or pension products; 5) short term bonds; 6) long term bonds; and 7) Bitcoin or other crypto assets. [**September wave, post-RCT**]

Real Estate: *“Is buying real estate in your neighbourhood today a good or a bad investment?”*

1-very bad ... 5- very good [**October wave**]

Effects of 1st and 2nd moments about GDP Growth in EA on allocation of a hypothetical 10,000 euro windfall across **financial asset classes**

	Saving account	Stocks	Mutual funds	Investment retirement account	Bonds	Crypto-currencies
	(1)	(2)	(3)	(4)	(5)	(6)
Posterior: mean	-0.05 (0.40)	0.37** (0.19)	-0.01 (0.20)	-0.25 (0.21)	-0.09 (0.21)	-0.10* (0.06)
Posterior: uncertainty	-3.16* (1.86)	0.70 (0.78)	-2.05** (0.98)	0.40 (0.92)	0.18 (0.90)	-0.48** (0.23)
Actual share of investment	0.29*** (0.03)	0.39*** (0.05)	0.50*** (0.05)	0.15*** (0.02)	0.33*** (0.10)	0.01* (0.01)
Observations	2,657	2,646	2,653	2,649	2,650	2,646
R-squared	0.17	0.13	0.20	0.06	0.08	0.03
1 st -stage F stat (mean)	87.97	81.91	86.51	85.98	86.03	83.64
1 st -stage F stat (uncertainty)	19.36	19.58	18.30	19.08	18.75	19.76

Effects of 1st and 2nd moments about GDP Growth in EA on **uncertainty** about **own household income**

	Uncertainty about personal income growth		
	One month after treatment	Two months after treatment	Three months after treatment
	(1)	(2)	(3)
Posterior: mean	0.00 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Posterior: uncertainty	0.07** (0.04)	0.11*** (0.04)	0.04 (0.04)
Prior: uncertainty (personal income growth)	0.67*** (0.02)	0.66*** (0.02)	0.63*** (0.02)
Observations	3,924	3,752	3,708
R-squared	0.53	0.50	0.49
1 st -stage F stat (mean)	136.8	130.5	124.2
1 st -stage F stat (uncertainty)	29.55	24.15	24.78

Heterogeneity

Exposure to macroeconomic risk is **unevenly distributed** across households due to differences in probability of losing a job in a recession, exposure to portfolio risk, etc.

a) **'High risk' sector**: agriculture, manufacturing, construction, trade, transport, hotels, bars, restaurants, arts or entertainment vs. **'Low risk' sector**: information/communication services, administrative services, public administration, education, and health sectors vs. **Retired**

b) Financial portfolios: **only in safe** assets vs. **incl. risky** financial assets (Mankiw and Zeldes 1991)

Effects of 1st and 2nd moments about GDP Growth in EA on nondurable consumption by **sector** and **portfolio riskiness**

	'High Risk' Sector	'Low Risk' Sector	Retired	Portfolio incl. risky assets	Portfolio only in safe assets
	(1)	(2)	(3)	(4)	(5)
Posterior: mean	-0.58	-0.95	-0.52	-1.30	-0.53
	(1.02)	(0.73)	(1.47)	(1.07)	(0.68)
Posterior: uncertainty	-8.85**	2.48	-8.15	-14.15***	-1.06
	(3.71)	(3.13)	(7.69)	(5.11)	(2.79)
Observations	1,282	1,816	675	1,327	2,432
R-squared	0.17	0.21	0.19	0.11	0.18
1 st -stage F stat (mean)	43.72	53.14	22.11	39.94	81.68
1 st -stage F stat (uncertainty)	10.11	13.59	5.82	9.04	18.29

'High Risk' (affected) sector includes: Agriculture; Industry; Construction; Trade; Transport; Hotels, bars and restaurants; Arts and entertainment. The 'Low Risk' (less affected) sector includes: Information and communication services; Administrative and support services; Public admin incl. military; Education; Health sector; Other.

'Retired' includes respondents who are retired at the time of the survey. Portfolio incl. risky assets' includes respondents who owns stocks or shares in mutual funds.

'Portfolio only in safe assets' includes respondents who own neither stocks nor shares in mutual funds.

Conclusions

- Use an **RCT** to address empirical challenges in identifying the effect of macro uncertainty on household behaviour
- Elevated macroeconomic uncertainty:
 - strongly **inhibits consumer spending** (on non-durables, holiday packages, luxury goods)
 - **reduces** household **propensity to invest in risky financial** assets (via MF)
 - **no effects** on investment attitudes towards **real estate**
- Plausible **heterogeneous effects** by: sector of employment and portfolio riskiness

Conclusions

Franklin D. Roosevelt: *“The only thing we have to fear is fear itself.”*

Recessions are characterized by increased macroeconomic uncertainty and thus an economic recovery may require: **management of expectations** and **assurances by policymakers, provision of stronger safety net**, and **policies targeting the more vulnerable** groups (e.g., in affected employment sectors)

Thank you!

What We Find (Preview)

- Higher macro uncertainty **reduces**, net of first moment expectations, the **spending** of households
 - Health and personal care products; recreation activities and entertainment; holidays and luxury goods
- Higher macro uncertainty **reduces propensity to invest in mutual funds** (and cryptocurrencies)
- Macro uncertainty induces **own income uncertainty**
- **Heterogeneity**: stronger effects of uncertainty on spending of households:
a) working in riskier **sectors**; b) exposed to **risky** financial assets

Literature

- **Modelling** channels through which uncertainty can affect decision-making (e.g., Leduc and Liu 2016, Basu and Bundick 2017)
- **Measuring** uncertainty and **quantifying** its effects on aggregate conditions (e.g., Bloom et al. 2018; Baker, Bloom and Davis 2016; Jurado, Ludvigson and Ng 2015; Berger, Dew-Becker and Giglio 2019)
- **Firms'** decisions: Guiso and Parigi 1999; Bloom, Bond and van Reenen 2007; Baker, Bloom and Davis 2016; Gulen and Ion 2016
- **Household** behaviour: Christelis, Georgarakos, Jappelli, van Rooij (2020); Ben-David et al. (2018)

- **Timing restrictions in VARs** (e.g., Caldara et al. 2016, Jurado, Ludvigson and Ng 2015, Bachmann, Elstner and Sims 2013)
- **Natural experiments** like political shocks or natural disasters (e.g., Baker, Bloom, and Terry 2020)
- This paper → **RCT**

Effects of 1st and 2nd moments about GDP Growth in EA on budget shares of nondurable consumption

	Food	Housing, utilities, furniture, home equipment	Clothing	Healthcare	Transport	Recreation	Education and other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Posterior: mean	0.02 (0.14)	-0.28* (0.17)	0.09* (0.05)	0.08 (0.07)	0.06 (0.06)	0.07 (0.07)	0.08 (0.09)
Posterior: uncertainty	0.38 (0.60)	-0.42 (0.80)	0.18 (0.23)	-0.71** (0.31)	0.32 (0.30)	-0.83** (0.32)	0.07 (0.35)
Observations	4,577	4,577	4,578	4,570	4,573	4,574	4,574
R-squared	0.10	0.05	0.03	0.08	0.05	0.05	0.03
1 st -stage F stat (mean)	127	127	128.6	125.7	126.7	126.8	126.7
1 st -stage F stat (uncertainty)	26.57	25.69	26.56	26.73	26.97	27.36	26.74

Effects of 1st and 2nd moments about GDP Growth in EA on propensity to invest in real assets

	Total sample	Home owners	Non-home owners
	(1)	(2)	(3)
Posterior: mean	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Posterior: uncertainty	-0.01 (0.03)	-0.03 (0.04)	0.01 (0.05)
Prior beliefs on investing in real estate	0.47*** (0.02)	0.49*** (0.02)	0.42*** (0.03)
Observations	4,619	2,990	1,629
R-squared	0.24	0.26	0.21
1st-stage F stat (mean)	129.5	97.51	37.71
1st-stage F stat (uncertainty)	28.19	18.30	11.98

Effects of 1st and 2nd moments about GDP Growth in EA on nondurable consumption by sector and portfolio riskiness

	'High Risk' Sector	'Low Risk' Sector	Retired	Portfolio incl. risky assets	Portfolio only in safe assets
	(1)	(2)	(3)	(4)	(5)
Posterior: mean	-0.58	-0.95	-0.52	-1.30	-0.53
	(1.02)	(0.73)	(1.47)	(1.07)	(0.68)
Posterior: uncertainty	-8.85**	2.48	-8.15	-14.15***	-1.06
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Effects of 1st and 2nd moments about GDP Growth in EA on nondurable consumption by geographic region

	One month after treatment			Four months after treatment		
	All countries	South IT/ES	North FR/DE/BE/NL	All countries	South IT/ES	North FR/DE/BE/NL
	(1)	(2)	(3)	(4)	(5)	(6)
Posterior: mean	-0.82	-0.12	-1.10*	-0.26	-0.14	0.15
	(0.52)	(0.87)	(0.67)	(0.49)	(0.90)	(0.62)
Posterior: uncertainty	-4.61**	-6.00	-3.28	-4.51**	-8.51**	-1.60
	(2.23)	(3.72)	(2.82)	(2.25)	(4.09)	(2.79)
Observations	4,572	1,691	2,881	4,113	1,588	2,525
R-squared	0.19	0.12	0.21	0.17	0.11	0.20
1 st -stage F stat (mean)	131.00	55.16	72.74	129.3	55.11	71.12
1 st -stage F stat (uncertainty)	28.68	17.86	15.98	25.60	15.38	14.44