

# Managing Household Expectations with Unconventional Policies

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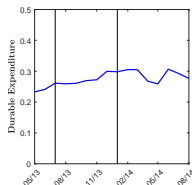
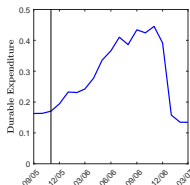
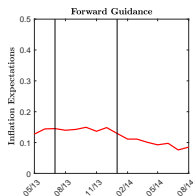
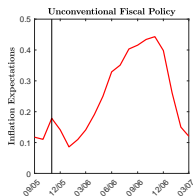
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# Motivation

- During liquidity trap increased use of unconventional policies
- Policy assumes households understand economic incentives fully
  - Forward guidance  
Eggertsson & Woodford (2003)
  - Unconventional fiscal policies  
D'Acunto, Hoang, & Weber (2018)
  - Conventional fiscal policies  
Farhi & Werning (2017)
- **BUT** policies often less effective: e.g., *forward guidance puzzle*  
Del Negro, Giannoni, & Patterson (2015)
- Recent theory literature: heterogeneous agents & uninsurable shocks  
McKay, Nakamura, & Steinsson (2016); Kaplan, Moll, & Violante (2018); Hagedorn et al (2018)

# Simple Policies vs Complex Policies



- Pre-announced VAT increases (left) stimulate inflation expectations and spending
- ECB fwd guidance announcements (right) do not move expectations and choice
- Both policies theoretically operate through identical channel: Euler equation

## Research Question

- Do policies that theoretically work through Euler equation work?
- Higher inflation expectations  $\rightarrow$  higher consumption?
- Higher inflation expectations lower real interest rates with binding ZLB
- Fiscal multipliers increase with higher inflation when ZLB binds
- **But:** precautionary savings channel, preference assumptions, inflation tax on liquid asset, income effects, etc.

Inflation expectations  $\Leftrightarrow$  consumption (open) empirical question

# This Paper

- Inflation expectations  $\Leftrightarrow$  willingness to purchase durables

- **Identification: Difference-in-Differences**

Novel German household data between Jan 2000 to Feb 2016

Unexpected rise in VAT and forward guidance announcements of ECB

Match German & foreign households in DiD design

- **Main finding**

HH inflation expectations  $\uparrow \rightarrow$  durables purchases  $\uparrow$  before VAT hike

Homogeneous effect across whole population

No effect for forward guidance

# Data Sources

- European harmonized survey on consumption climate
- 2,000 representative German households every months
- Questions about aggregate and personal economic expectations
- Sample period: January 2000 to February 2016
- Rich demographics (age, income, marital status, city size, kids, job)
- Macro aggregates (unemployment, uncertainty, Dax, interest rates)

# Survey Questions I

## Question 8

*Given the current economic situation, do you think it's a good time to buy larger items such as furniture, electronic items, etc.?*

Answer choices: "it's neither good nor bad time," "it's bad time," or "it's a good time."

## Survey Questions II

### Question 3

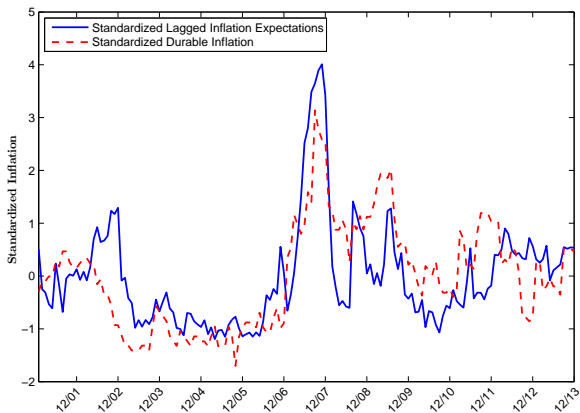
*How will consumer prices evolve during the next twelve months compared to the previous twelve months?*

Answer choices: “prices will increase more,” “prices will increase by the same,” “prices will increase less,” “prices will stay the same,” or “prices will decrease.”

Create a dummy that equals 1 when households answer “prices will increase more.”

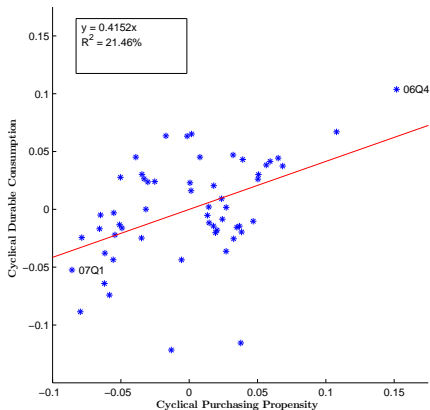


# Lagged Durable Inflation and Inflation Expectations



- Increase in CPI inflation in 2007 driven by durable goods inflation subject to VAT increase
- Lagged inflation expectations and standardized durable inflation highly correlated

# Readiness to Spend and Real Durable Consumption



- Positive correlation between purchasing propensity and actual purchases
- Most positive observation in last quarter before VAT increase
- Large negative observation in quarter of increase

## Baseline Specification: Multinomial Logit

- Assume survey answer is random variable  $y$
- Define the response probabilities as  $P(y = t|X)$
- Assume the distribution of the response probabilities is

$$P(y = t|X) = \frac{e^{X\beta_t}}{1 + \sum_{z=1,2} e^{X\beta_z}},$$

- Estimate  $\beta_t$  via maximum likelihood
- Marginal effect: derivative of  $P(y = t|x)$  with respect to  $x$
- Empirically: define “it’s neither good nor bad time” as baseline

## Baseline Specification

$$\text{Marginal Effects: } \frac{\partial P(y = t|x)}{\partial x} = P(y = t|x) \left[ \beta_{tx} - \sum_{z=0,1,2} P(y = z|x) \beta_{zx} \right]$$

Good time to buy		
Inflation Increase	6.24*** (1.62)	7.49*** (1.52)
Past Inflation		-3.42*** (0.28)
N. obs	326,011	321,496

Households which expect inflation to increase

- 7% more likely to answer “good time to purchase durables”

# Demographics, Expectations, and Macro Aggregates

- HH characteristics shape purchasing propensities (age, income, ...)
  - Characteristics might be systematically related to inflation expectations
- Economic outlook can affect cross-sectional relationship
  - Optimistic households might expect high growth and low inflation
- Household might be bullish or bearish about the economy
  - w/ Philips curve in mind: answer high growth and high inflation

Control for **Demographics**, Outlook, and Macro-aggregates

$$\text{Marginal Effects: } \frac{\partial P(y = t|x)}{\partial x} = P(y = t|x) \left[ \beta_{tx} - \sum_{z=0,1,2} P(y = z|x) \beta_{zx} \right]$$

	Good time	Good time	Good time
Inflation increase	<b>7.55***</b> (1.56)	8.88*** (1.60)	8.75*** (1.16)
Demographics	X	X	X
Individual expectations		X	X
Macro Aggregates			X
Nobs	244,497	219,799	219,799

- **8%** more likely to answer “good time to purchase”

## Control for Demographics, Outlook, and Macro-aggregates

$$\text{Marginal Effects: } \frac{\partial P(y = t|x)}{\partial x} = P(y = t|x) \left[ \beta_{tx} - \sum_{z=0,1,2} P(y = z|x) \beta_{zx} \right]$$

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Demographics	X	X	X
Individual expectations		X	X
Macro Aggregates			X
Pseudo R <sup>2</sup>	0.0292	0.0654	0.0762
Nobs	244,497	219,799	219,799

- 9% more likely to answer “good time to purchase”

## Control for Demographics, Outlook, and Macro-aggregates

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# Household Heterogeneity

Effect of inflation expectations on willingness to spend higher for

- More educated households
- High income households
- Urban households
- Unconstrained households

## VAT Experiment of 2007 I

- Pre-election 2005: promise not to increase VAT
- Nov 2005: new government announces increase in VAT by 3%
- Jan 2007: entry into force of VAT increase
- VAT increase legislated to consolidate budget
- Not related to prospective economic conditions
- Exogenous tax change acc to Romer and Romer nomenclature

## VAT Experiment of 2007 II

- Inflation expectations build up during 2006
- Germany part of Euro zone and no independent monetary policy
- Nominal rate did not increase to offset inflation expectations
- Experiment resembles unconventional fiscal policy described in Correira, Fahri, Nicolini, Teles (2013)
- Feldstein (2002) proposition for Japan: Pre-announced VAT increases
- Stimulate inflation expectations & private spending

## Forward Guidance Announcements by ECB I

- First announcement by former ECB President Draghi on 7/4/2013:

“The Governing Council has taken the unprecedented step of giving forward guidance in a rather more specific way than it ever has done in the past. In my statement, I said “The Governing Council expects the key ...” - i.e. all interest rates - “... ECB interest rates to remain at present or lower levels for an extended period of time.” It is the first time that the Governing Council has said something like this.”

- “Firmly reiterate(d)” on 1/9/2014 which serves as second event date
- NK model: promises to keep rates at 0 until end of liquidity trap
- Inflationary in future → hence agents update expectations today

## Forward Guidance Announcements by ECB II

- Lack of credible? Professional forecasters revised expectations

Andrade & Ferroni (2018)

- Lack of credibility more plausible for sophisticated agents: test in XS

- Forward guidance through financial markets?

- Households react to lower long-term rates and take out more loans?

- Many households do not adjust propensity to take out loans to  $\Delta r$

D'Acunto, Hoang Paloviita, Weber (2020)

- No delayed effect on durable purchases in data

- Odyssean vs Delphic Forward Guidance? Odyssean in our sample

Andrade & Ferroni (2018)

## Difference-in-Differences Matching Estimator

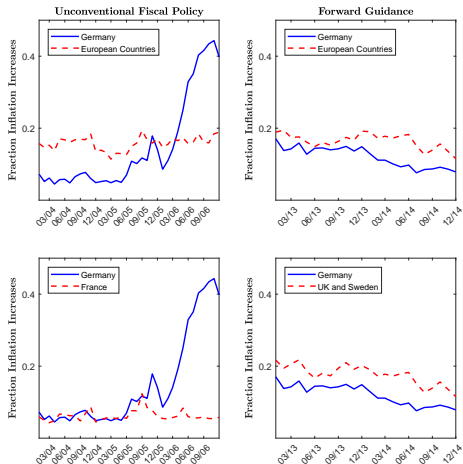
- All Germans treated by VAT and Forward Guidance announcements
- Micro data for France, UK, Sweden from EU harmonized survey
- Match German & foreign households with nearest-neighbor algorithm
- Matching categories: gender, age, education, income, social status
- Estimate Average Treatment Effect of VAT shock:

$$(\overline{Dur}_{German,post} - \overline{Dur}_{German,pre}) - (\overline{Dur}_{foreign,post} - \overline{Dur}_{foreign,pre})$$

## Parallel-Trends Identifying Assumption I

- Control group behaves similarly to Germans *before* VAT shock
- Behavior of control group *after* shock how Germans behaved absent of it

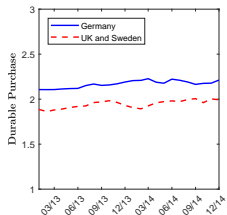
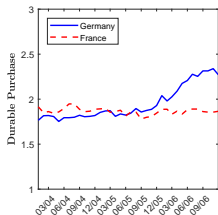
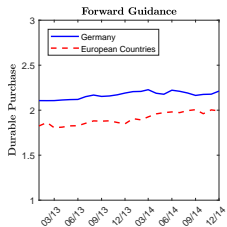
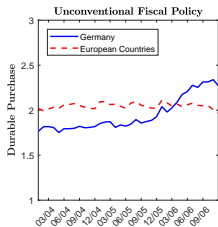
# Parallel-Trends Identifying Assumption II



Parallel trends in inflation expectations *before* the announcement



# Parallel-Trends Identifying Assumption III



Parallel trends in durable propensity *before* the announcement

## Further Identifying Assumptions

- Balanced households' characteristics after matching ( )
- Treated and control households distributed across full distribution ( )
- Positive effect of inflation expectations on consumption expenditure at micro level for all countries ( )

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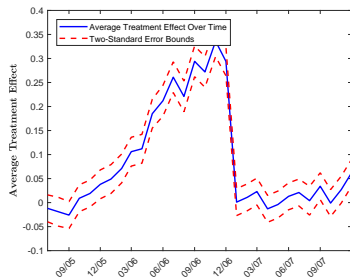
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# Average Treatment Effect of VAT shock

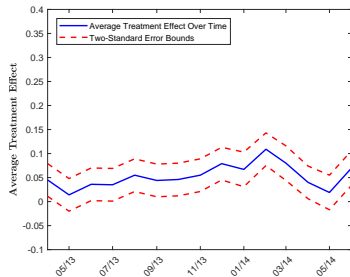
$$(\overline{Dur}_{German,post} - \overline{Dur}_{German,pre}) - (\overline{Dur}_{foreign,post} - \overline{Dur}_{foreign,pre})$$



- German and foreign households behave similarly before shock
- Immediate increase of purchasing behavior of Germans after shock
- Effect builds up during 2006
- Reversion to normal after actual VAT increase

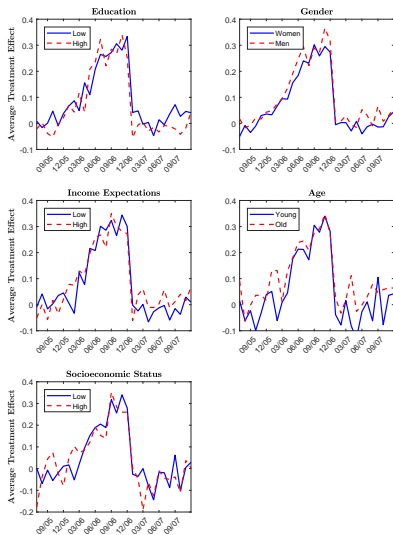
# Average Treatment Effect of Forward Guidance

$$(\overline{Dur}_{German,post} - \overline{Dur}_{German,pre}) - (\overline{Dur}_{foreign,post} - \overline{Dur}_{foreign,pre})$$



- German and foreign households behave similarly before shock
- No impact reaction to either announcement
- No delayed reaction questions indirect effect through financial markets

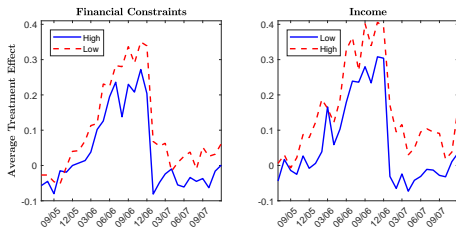
# Heterogeneity of VAT Shock: Sophistication & Demos



- Homogeneous effect across demographics and proxies for sophistication

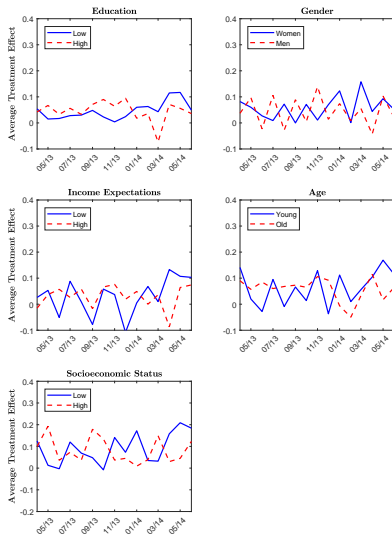


# Heterogeneity of VAT Shock: Financial Constraints



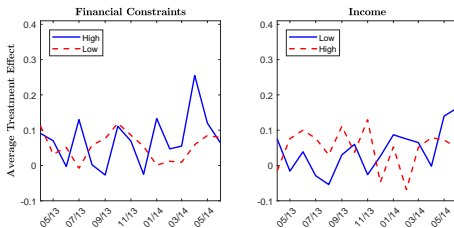
- Muted reaction for more constrained households

# Heterogeneity of Fwd Guidance: Sophistication & Demos



- No immediate or delayed reactions across demographic splits
- Non-response for highly sophisticated questions lack of credibility as explanation

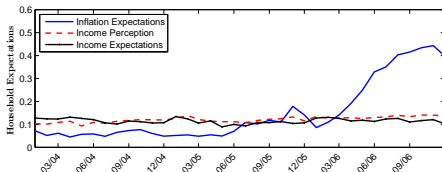
# Heterogeneity of Fwd Guidance: Financial Constraints



- No heterogeneous response by fin constraints for forward guidance announcements

## Income Effects?

$$(\overline{Dur}_{German,post} - \overline{Dur}_{German,pre}) - (\overline{Dur}_{foreign,post} - \overline{Dur}_{foreign,pre})$$



- Perceptions of current income do not move around VAT announcements
- Income expectations don't move either
- Questions relevance of indirect effects in HANK models for unconventional fiscal policy

# Taking Stock

- Unconventional fiscal policy is salient, easy to understand
- Reaction across cuts of the data by income, education, age, etc
- But: low reaction to “complex” policies: e.g., *forward guidance puzzle*
- Do cognitive abilities limit the effectiveness of economic policies?

D'Acunto, Hoang, Paloviita, Weber (2020):

**Human Frictions to the Transmission of Economic Policies**  
**IQ, Expectations, and Choice**

## Conclusion

- Households expecting higher inflation want to purchase more durables
- Discretionary fiscal policy in recessions: series of pre-announced VAT increases and a simultaneous reduction in income tax rates
- Transmission of fwd guidance through household expectations muted
- Scope for increased economic literacy, policy transparency, & salience