Consumer memory, inflation expectations and the interpretation of shocks

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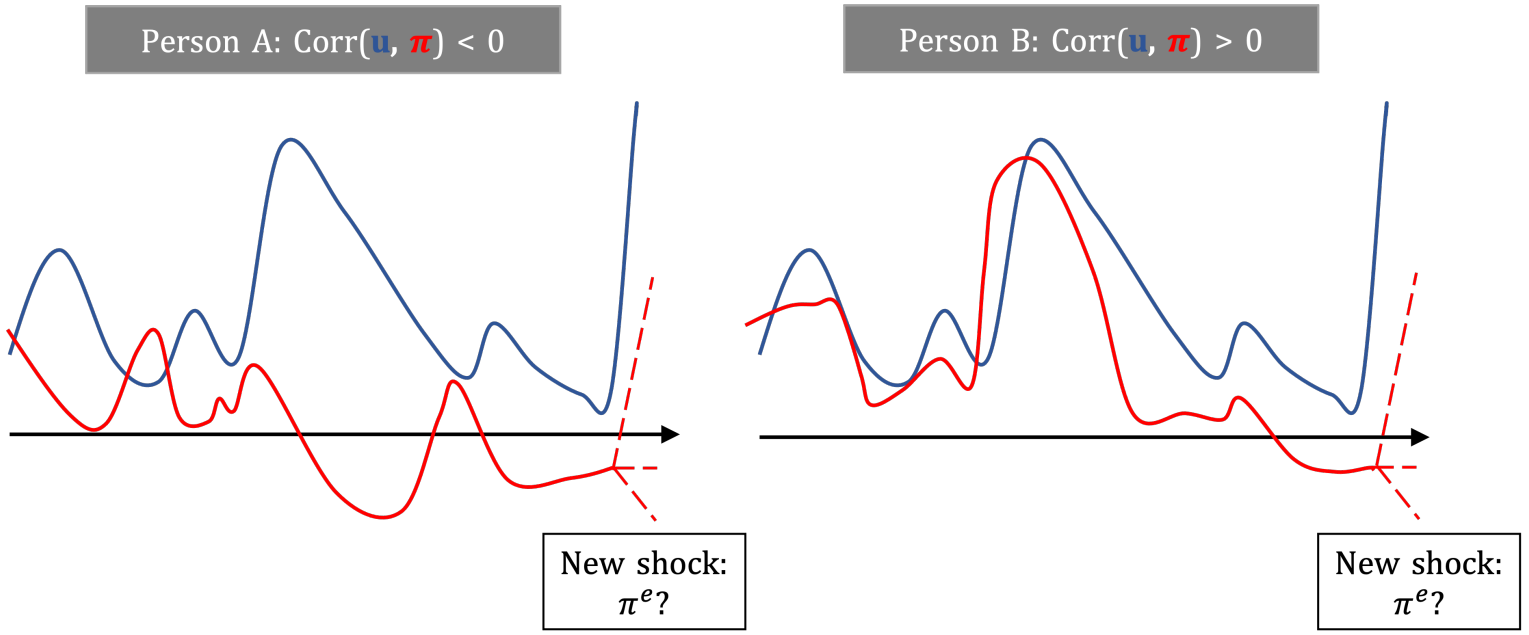
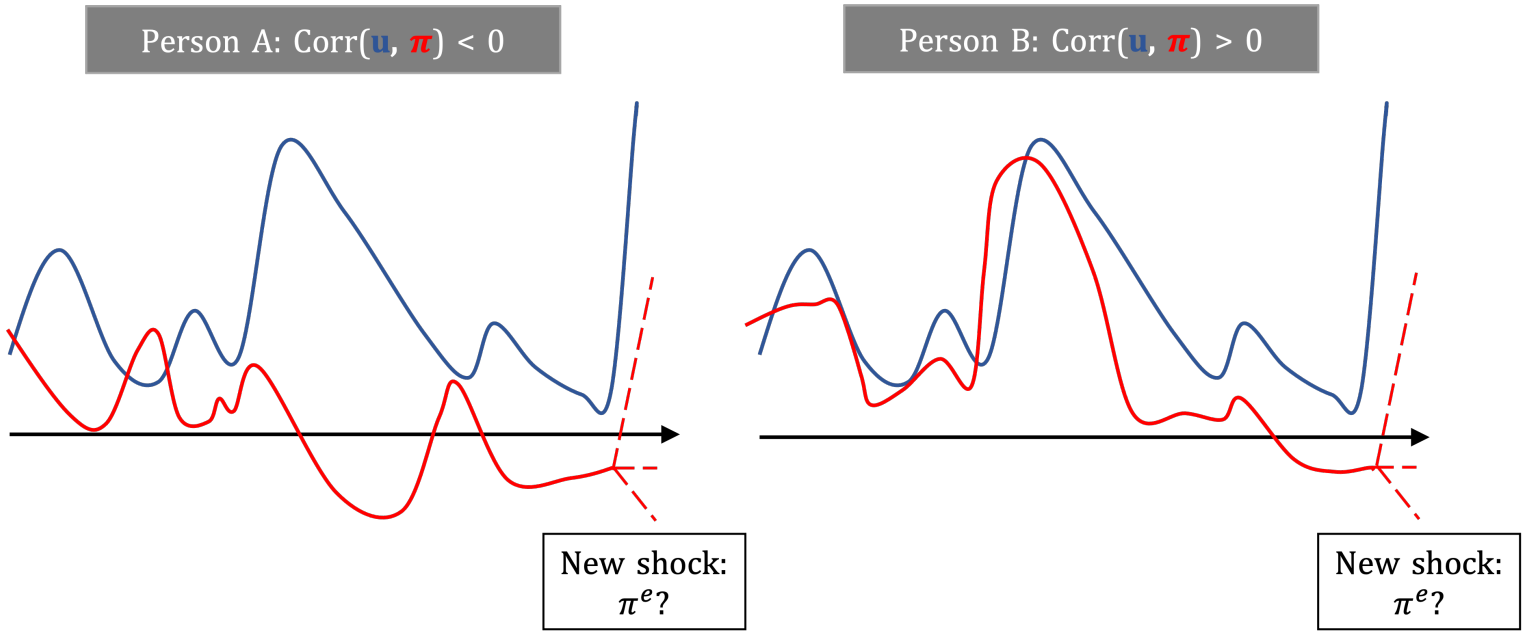
*The views and conclusions stated are my own and do not necessarily reflect the views of the Swiss National Bank. All remaining errors are my own.

Question



→ Question: Based on past business cycle experiences, do consumers react differently to new macroeconomic shocks? Why?

Question



→ Question: Based on past business cycle experiences, do consumers react differently to new macroeconomic shocks? Why?

→ Answer: **Yes.**

→ Policy relevance: 1. π^e determine real stance of monetary policy, 2. Heterogeneous reactions to monetary policy shocks

Strategy and outline

Exploit panel structure of **40 years of survey data**:

- to construct **individual** changes of inflation expectations

Outline:

1. Background
2. Inflation expectations and shocks

$$\pi^e_{it} - \pi^e_{i,t-6} = \beta \sum_{j=1}^{6} \varepsilon_{t-j} + u_{it}$$

Strategy and outline

Exploit panel structure of **40 years of survey data**:

- to construct **individual** changes of inflation expectations
- to exploit that across time, people of similar demographic characteristics have **different business cycle experiences**

Outline:

1. Background
2. Inflation expectations and shocks
3. **Memory**

$$\pi^e_{it} - \pi^e_{i,t-6} = \beta \sum_{j=1}^{6} \varepsilon_{t-j} + \beta_{\mathcal{M}} \left(\sum_{j=1}^{6} \varepsilon_{t-j} \times \mathcal{M}_{a(i),t} \right) + u_{it}$$

Strategy and outline

Exploit panel structure of **40 years of survey data**:

- to construct **individual** changes of inflation expectations
- to exploit that across time, people of similar demographic characteristics have **different business cycle experiences**

Outline:

1. Background
2. Inflation expectations and shocks
3. Memory
4. **Monetary policy**
5. **Application: Covid-19**

$$\pi^e_{it} - \pi^e_{i,t-6} = \beta \sum_{j=1}^{6} \varepsilon_{t-j} + \beta_{\mathcal{M}} \left(\sum_{j=1}^{6} \varepsilon_{t-j} \times \mathcal{M}_{a(i),t} \right) + u_{it}$$

Background

Expectation formation: Deviations from FIRE, e.g.

- Experience/memory matters *in the level* of inflation expectations (Malmendier & Nagel, 2016; Malmendier et al., 2021; Conrad et al., 2022)
- Personal shopping experience (D'Acunto et al., 2021)
- but new information matters (e.g. Coibion & Gorodnichenko, 2015; Bordalo et al., 2020; Roth & Wohlfart, 2020)

Attention limited, information processing costly:

- Attention to what is familiar (Bordalo et al., 2020) can lead to subjective models of the macroeconomy (Andre et al., forthcoming)
- but **supply-side narrative** ($\text{Corr}(u, \pi) > 0$) have positive correlation) dominant (Ehrmann et al., 2017; Kamdar, 2019)

Expectations and actions

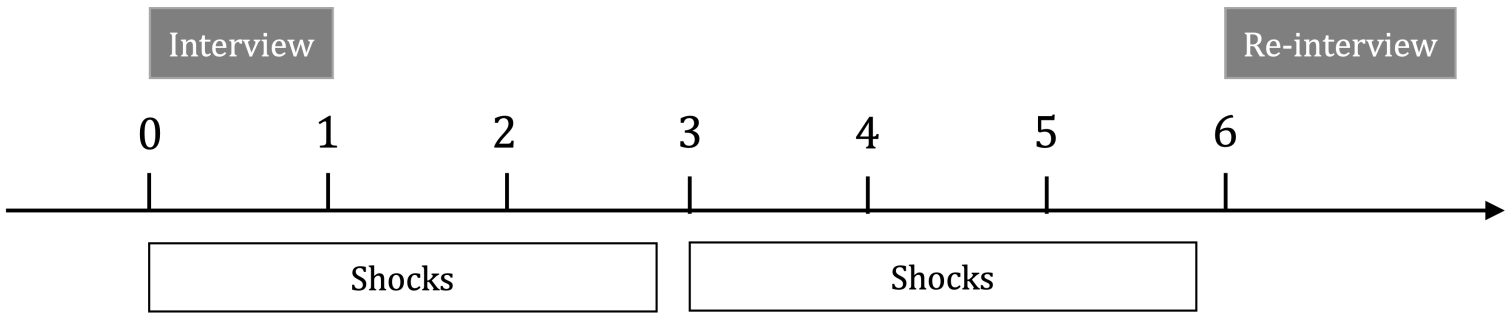
- Intertemporal consumption allocation and understanding/effects of monetary policy (Bachmann et al., 2015; Dräger & Nghiem, 2021; Coibion et al., forthcoming; Crump et al., forthcoming)

Inflation expectations and shocks

Inflation expectations: Data

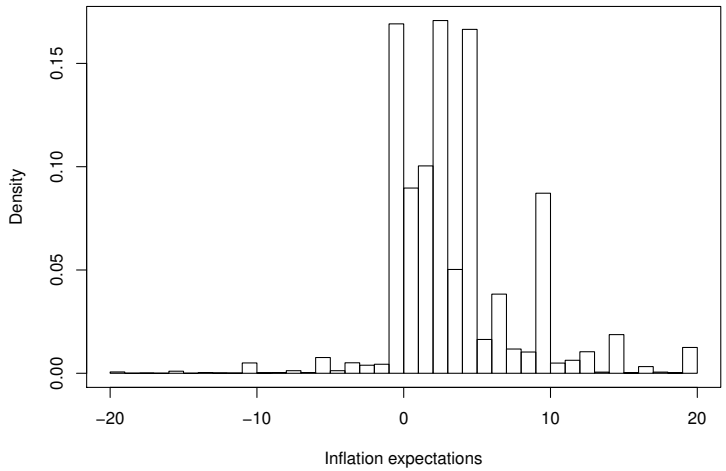
Michigan Survey of Consumers (MSC): "By about what percent do you expect prices to go (up/down) on the average, during the next 12 months?" $= \pi^e_{it}$

600 interviews/months, 33-50% repeated after 6 months starting in 1981

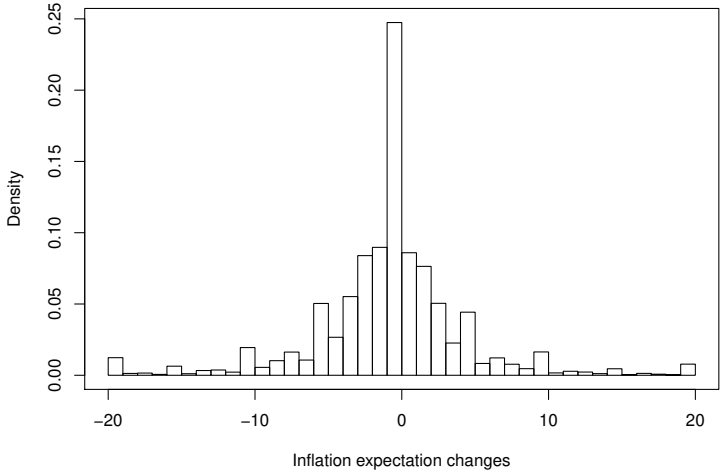


Inflation expectations: Data

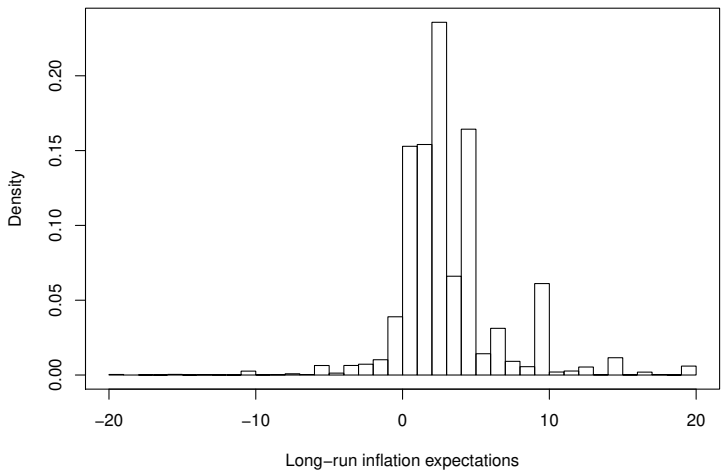
(a) π^e_{it}



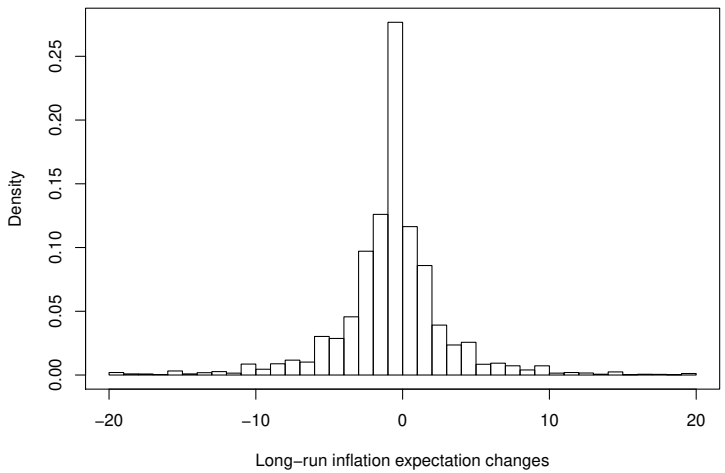
(b) $\pi^e_{it} - \pi^e_{i,t-6}$



(c) $\pi^{e,5Y}_{it}$



(d) $\pi^{e,5Y}_{it} - \pi^{e,5Y}_{i,t-6}$



Macroeconomic shocks

Series of **demand, supply and monetary policy** disturbances:

- from a 3-variable BVAR featuring quarterly unemployment, inflation and nominal interest rate
- over more than 100 years ▸ Details
- featuring stochastic volatility ▸ Details
- structural shocks ε from identifying assumptions on sign of IRF (Fry & Pagan, 2011)

		Structural shock		
		Demand (ε^D)	Supply (ε^S)	Mon. pol. (ε^M)
Effect on	Unemployment	$-$	$+$	$+$
	Inflation	$+$	$+$	$-$
	Nom. int. rate	$+$	$+$	$+$

▸ Impulse response functions ▸ Historical contributions to inflation

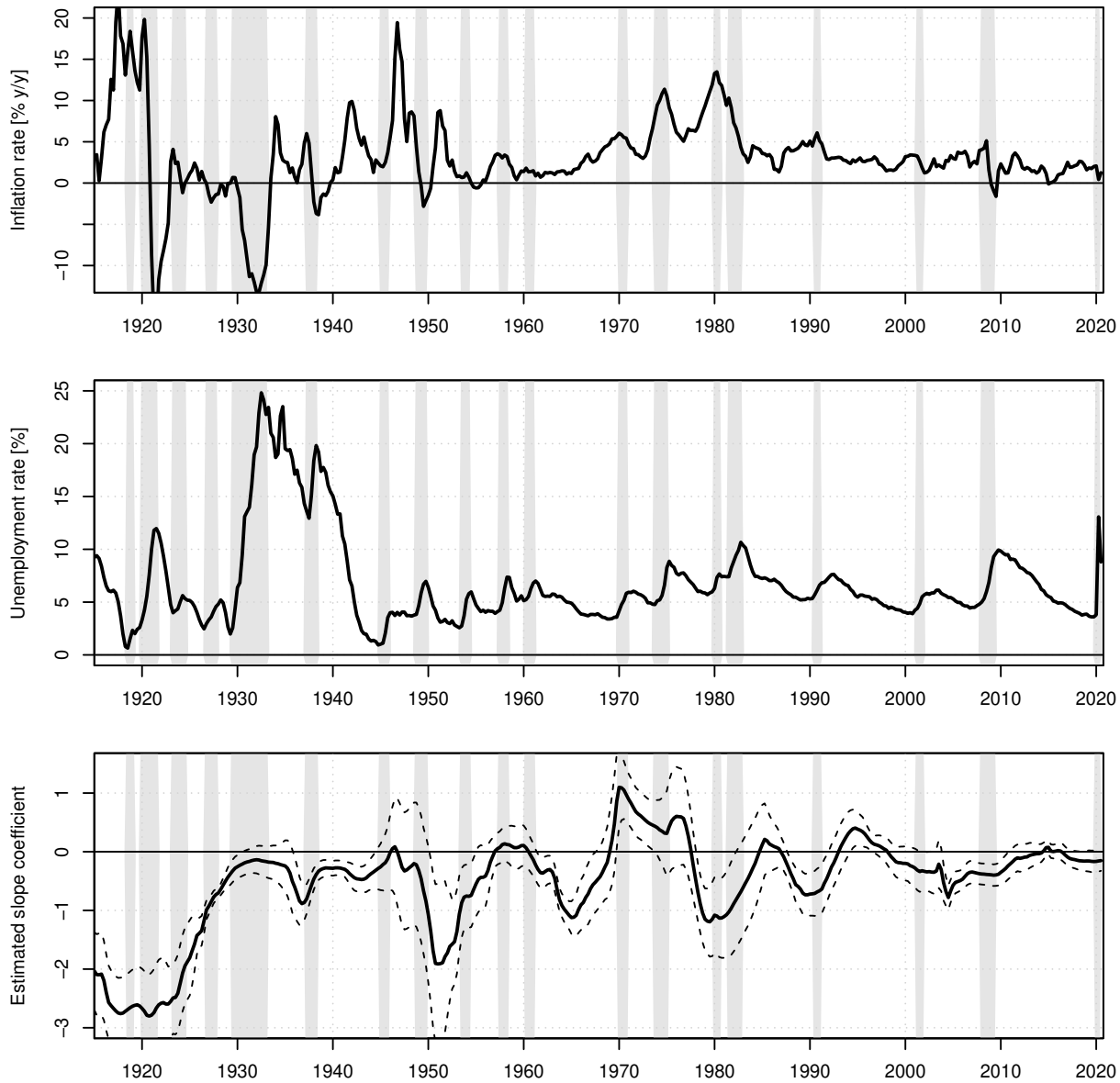
How inflation expectations react to shocks

$$\Delta\pi_{it}^{e} = \alpha + \beta_D\,\hat{\varepsilon}_t^{D} + \beta_S\,\hat{\varepsilon}_t^{S} + \beta_M\,\hat{\varepsilon}_t^{M} + u_{it}$$

	(1) 1981-2019	(2) 1981-2019	(3) 1984-2006
$\pi_{t-1} - \pi_{t-7}$		0.091***	0.079
		(0.027)	(0.049)
Demand shocks	0.398***	0.311***	0.269***
	(0.028)	(0.038)	(0.075)
Supply shocks	0.532***	0.438***	0.227***
	(0.040)	(0.049)	(0.083)
Monetary policy shocks	-0.567***	-0.441***	-0.315***
	(0.030)	(0.048)	(0.089)
Observations	76.737	76.737	45.575
St.dev.(Demand shocks)	1.05	1.05	0.72
St.dev.(Supply shocks)	0.71	0.71	0.51
St.dev.(Mon. pol. shocks)	1.12	1.12	0.67

Shock memory

Time-varying co-movement of π and u



Measurement

Over the course of a person's lifetime, how did unemployment and inflation co-move? 4 definitions of **"shock memory"** $\mathcal{M}^X$:

1. $\mathcal{M}^{\text{I}}$: Average $\Delta\pi$ during lifetime recessions ▸ Details
2. $\mathcal{M}^{\text{II}}$: ditto, account for fading memory using weights from decreasing learning gain ▸ Details
3. $\mathcal{M}^{\text{III}}$: slope of reduced-form Phillips curve over lifetime
4. $\mathcal{M}^{\text{IV}}$: Correlation between historical supply shock contributions and actual inflation from VAR ▸ Details ▸ Illustration

Augment benchmark regression with standardized memory (positive = **supply shock narrative**)

$$\begin{aligned}\Delta\pi^e_{it} = \alpha &+ \beta_D\,\hat{\varepsilon}^D_t + \beta_{D\times\mathcal{M}^x}(\hat{\varepsilon}^D_t \times \mathcal{M}^X_{a(i),t}) \\ &+ \beta_S\,\hat{\varepsilon}^S_t + \beta_{S\times\mathcal{M}^x}(\hat{\varepsilon}^S_t \times \mathcal{M}^X_{a(i),t}) \\ &+ \beta_M\,\hat{\varepsilon}^M_t + \beta_{M\times\mathcal{M}}(\hat{\varepsilon}^M_t \times \mathcal{M}^X_{a(i),t}) + u_{it}\end{aligned}$$

Main result

	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Demand shocks	0.414***	0.390***	0.385***	0.426***
	(0.029)	(0.031)	(0.029)	(0.031)
— × Memory	0.034	0.042	0.010	-0.087**
	(0.028)	(0.027)	(0.024)	(0.035)
Supply shocks	0.545***	0.552***	0.507***	0.517***
	(0.041)	(0.041)	(0.040)	(0.041)
— × Memory	0.107**	0.103**	0.248***	0.124***
	(0.043)	(0.047)	(0.044)	(0.046)
Mon. policy shocks	-0.561***	-0.530***	-0.523***	-0.568***
	(0.031)	(0.032)	(0.032)	(0.030)
— × Memory	-0.132***	-0.127***	-0.172***	-0.075**
	(0.029)	(0.027)	(0.027)	(0.034)
Observations	72.867	76.737	76.737	76.737
$H_0 : \beta_{—\times\mathcal{M}} = 0$, F(p)	7.25(0.00)	8.11(0.00)	15.79(0.00)	9.83(0.00)

▸ Great Moderation subsample ▸ control for other lifetime experience ▸ control for other age effects ▸ by education

▸ long-run expectations

Monetary policy

Alternative monetary policy shocks

Romer & Romer (2004) shocks
updated by Wieland & Yang (2020), 1981-2007

	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Mon. policy shocks	-0.508***	-0.477***	-0.473***	-0.519***
	(0.057)	(0.057)	(0.056)	(0.055)
— × Memory	-0.105***	-0.089***	-0.158***	-0.085**
	(0.037)	(0.029)	(0.034)	(0.034)
Observations	53.017	56.130	56.130	56.130

▸ Jarociński & Karadi (2020) shocks

Perceived interest rates and consumption attitudes

MSC: "Do you think now is a good or a bad time for people to **buy major household items?**"

$$\begin{aligned}\ln \frac{Pr(D_{it}=1)}{1-Pr(D_{it}=1)} = \alpha &+ \beta_D\, \hat{\varepsilon}_t^D + \beta_{D\times\mathcal{M}}(\hat{\varepsilon}_t^D \times \mathcal{M}_{a(i),t}^X) \\ &+ \beta_S\, \hat{\varepsilon}_t^S + \beta_{S\times\mathcal{M}}(\hat{\varepsilon}_t^S \times \mathcal{M}_{a(i),t}^X) \\ &+ \beta_M\, \hat{\varepsilon}_t^M + \beta_{M\times\mathcal{M}}(\hat{\varepsilon}_t^M \times \mathcal{M}_{a(i),t}^X) + u_{it}\end{aligned}$$

Marginal effect of $\hat{\varepsilon}^M$ at different levels of memory:

	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Monetary policy shocks				
at $\mathcal{M} = 0$	-1.06***	-0.44**	-1.25***	-1.93***
	(0.22)	(0.22)	(0.23)	(0.22)
at $\mathcal{M} = 1$	-3.33***	-3.30***	-2.33***	-0.88***
	(0.28)	(0.26)	(0.25)	(0.29)
Observations	70.463	74.243	74.243	74.243

Perceived interest rates and consumption attitudes

MSC: "Why do you say so?" (e.g. "credit/financing hard to get", "interest rates will fall later")

$$\begin{aligned}\ln \frac{Pr(D_{it}=1)}{1-Pr(D_{it}=1)} = \alpha &+ \beta_D\, \hat{\varepsilon}_t^D + \beta_{D\times\mathcal{M}}(\hat{\varepsilon}_t^D \times \mathcal{M}_{a(i),t}^X) \\ &+ \beta_S\, \hat{\varepsilon}_t^S + \beta_{S\times\mathcal{M}}(\hat{\varepsilon}_t^S \times \mathcal{M}_{a(i),t}^X) \\ &+ \beta_M\, \hat{\varepsilon}_t^M + \beta_{M\times\mathcal{M}}(\hat{\varepsilon}_t^M \times \mathcal{M}_{a(i),t}^X) + u_{it}\end{aligned}$$

Marginal effect of $\hat{\varepsilon}^M$ on **perceiving interest rates as high**: ▸ low

	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Monetary policy shocks				
at $\mathcal{M} = 0$	0.91***	0.57***	0.78***	1.80***
	(0.13)	(0.14)	(0.13)	(0.12)
at $\mathcal{M} = 1$	3.11***	2.52***	2.26***	2.03**
	(0.16)	(0.15)	(0.13)	(0.16)
Observations	72.867	76.737	76.737	76.737

Interpretation

- Households with experience of co-movement implied by supply shocks are more responsive to a new supply-side shock (**"recall"**)
- NOT: simple good/bad shock heuristic
- Their inflation expectations respond **more negatively to monetary policy** shocks
- NOT: respond more forcefully to all shocks

$\Rightarrow$ More awareness of changes in interest rates and higher sensitivity of consumption, making monetary policy more effective

Application: Covid-19

Covid-19 as a natural experiment

Case study of changes in inflation expectations around **March 2020**:

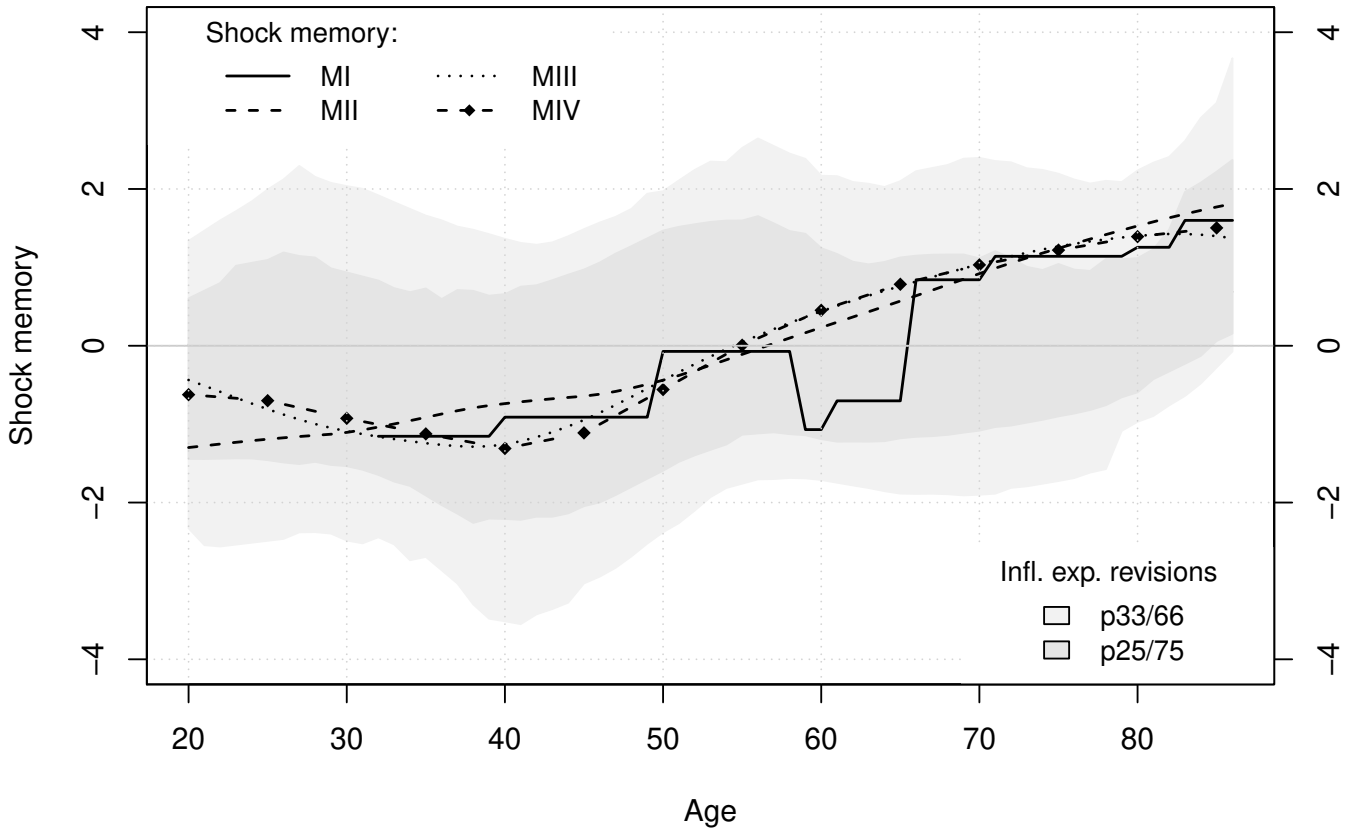
- large shock drawing everyone's attention
- elements of both demand- and supply-side shock, with opposing effects on inflation (e.g. Meier & Pinto, 2020; Baqaee & Farhi, forthcoming)
- no knowledge of pandemic shock in living memory

Change in π^e during 6-month window before/after characterized by **locally linear quantile regressions in age**, controlling for:

- demographic variables (gender, homeownership, income, etc.)
- age- and income-specific consumption baskets
- level and change of outlook on economy and personal finances

Covid-19 as a natural experiment

Comparison of quantile regression fits to $\mathcal{M}^x$:



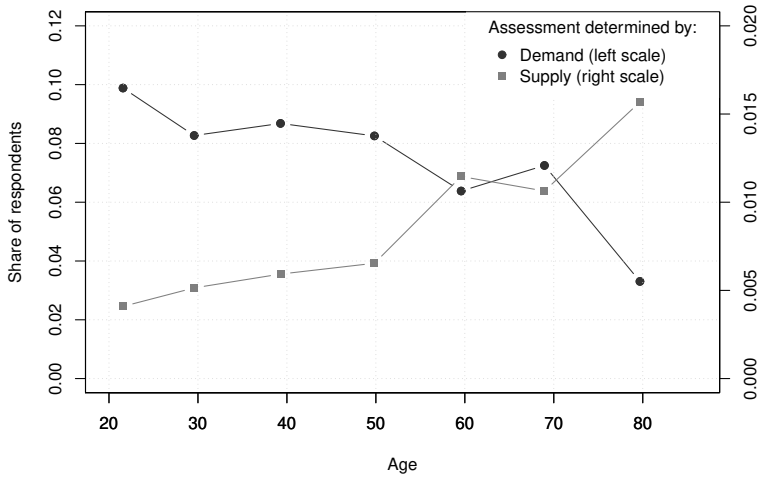
▸ NY Fed Survey of Consumer Expectations ▸ Bank of England

Narratives and attention

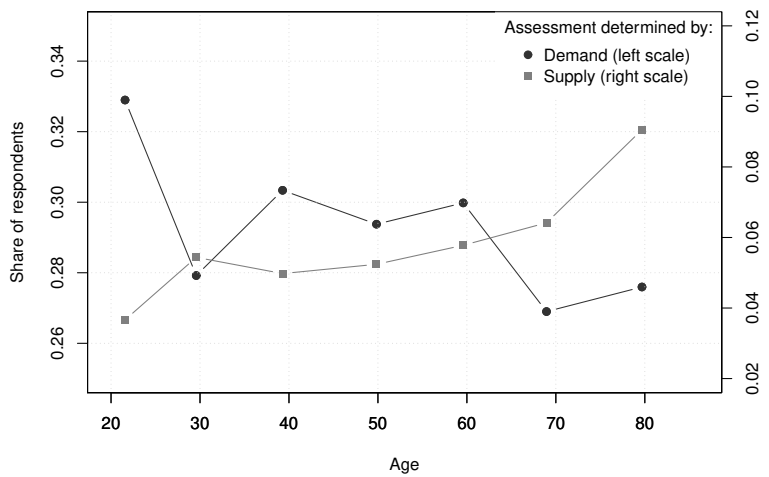
MSC: "During the last few months, have you heard of any favorable or unfavorable changes in business conditions? What did you hear?"

- **demand** narrative: "consumer/auto demand high/low"
- **supply** narrative: "profits too high", "energy crisis/pollution/less natural resources"

(a) Business news



(b) Home buying attitudes



Conclusions

- Households with experience of co-movement implied by supply shocks are more likely to increase their inflation expectations with new supply-side disruptions
- They have a supply-side **narrative of business cycles**.
- Their consumption attitudes react more to monetary policy shocks because they pay more attention to central bank communication.
  $\rightarrow$ **time-varying effectiveness of monetary policy**

Thank you!

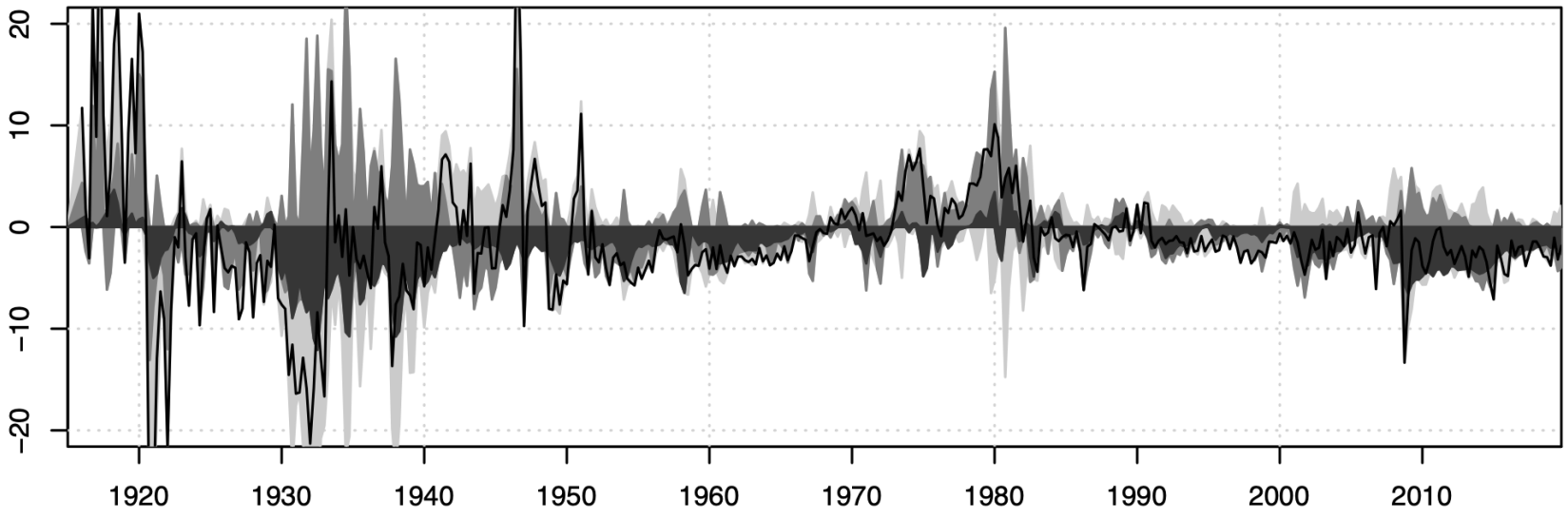
VAR details

- from a 3-variable VAR: $\Pi(L)Y_t = u_t$
  $E(u_t) = 0, E(u_t u_t') = \Sigma_t$
- with stochastic volatility: $\Sigma_t = F\Lambda_t F'$
  $\text{diag}(\Lambda_t) = (\bar{s}_1 \exp(\lambda_{1t}), ..., \bar{s}_3 \exp(\lambda_{3t})), \lambda_{it} = \gamma\lambda_{i,t-1} + \nu_{it}$
  $E(\nu_{it}) = 0, E(\nu_{it}\nu_{it}') = \phi$
- Estimation: Independence between Π, f (elements of F) and λ.
  Priors:
  - Π: Normal (Minnesota type)
  - F^{-1}: Multivariate normal (diffuse)
  - $p(\lambda_i|\phi_i)$: Normal
  - $p(\phi_i)$: Inverse gamma

The reduced-form residuals reflect a linear combination of the structural shocks ε_t, $\varepsilon_t = (SQ)^{-1}u_t$.

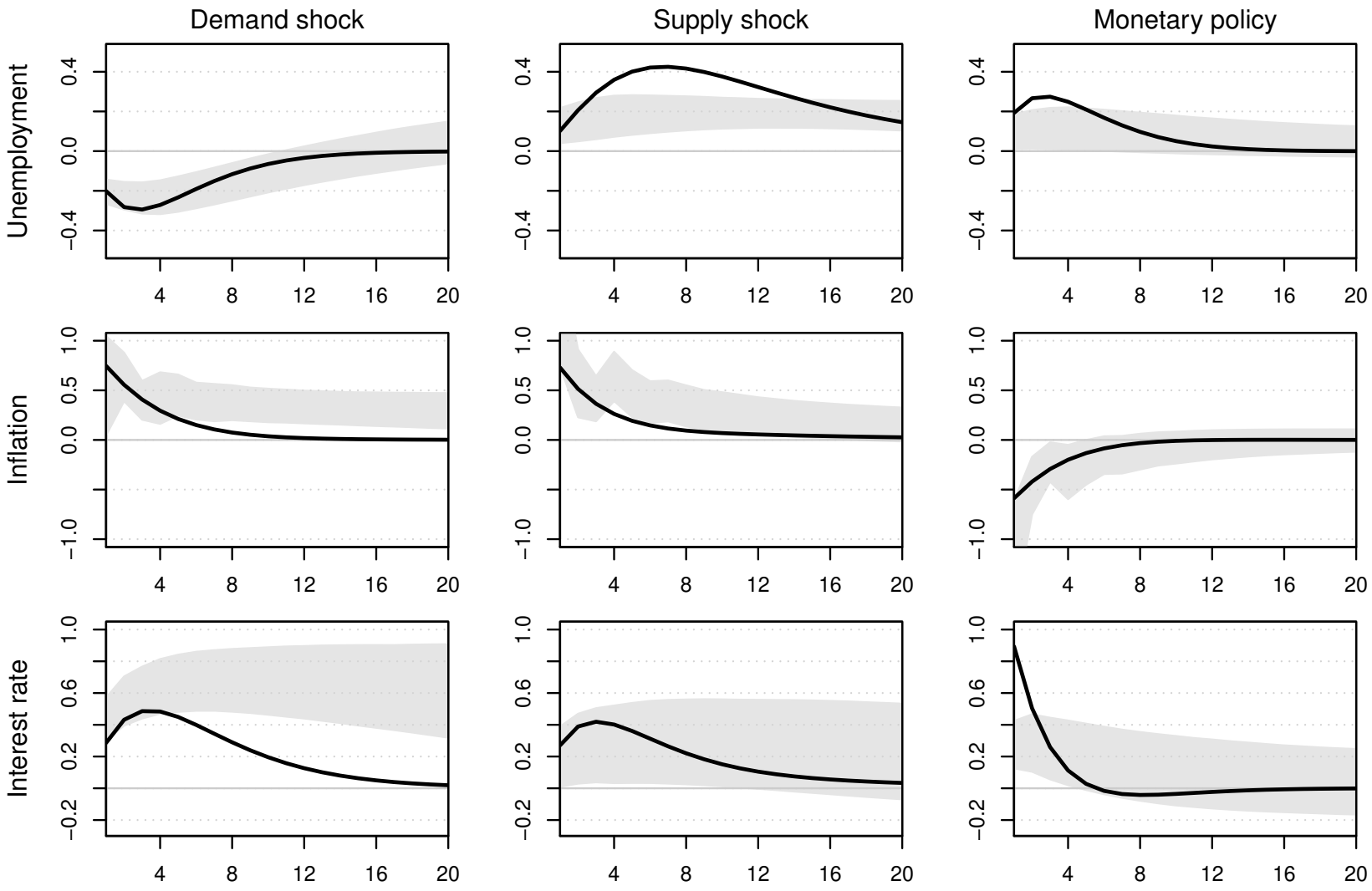
▸ Back

Historical contributions to inflation



▸ Back to macro shocks ▸ Back to memory definitions

Impulse response functions



▸ Back to macro shocks

Recessions

Start	End	Narrative explanation	$\Delta\pi$	Δu	$\frac{\Delta\pi}{\Delta u}$
1918-09	1919-03	war- to peacetime adj., Spanish flu	2.91	1.5	1.89
1920-02	1921-07	war- to peacetime adj. (fisc. tightening), union strikes, mon. tightening	-29.40	9.4	-3.13
1923-06	1924-07	"break" from Roaring 20s	-2.60	0.6	-4.50
1926-11	1927-11	temporary Ford factory conversions	-1.87	2.1	-0.89
1929-09	1933-03	financial crisis, monetary tightening (gold standard), trade barriers	-9.88	20.8	-0.47
1937-06	1938-06	fiscal and monetary tightening	-8.46	5.5	-1.54
1945-03	1945-10	war- to peacetime adjust.	1.26	2.6	0.49
1948-12	1949-10	monetary tightening	-7.33	4.1	-1.79
1953-08	1954-05	monetary tightening	0.45	3.3	0.14
1957-09	1958-04	monetary tightening	0.06	3.3	0.02
1960-05	1961-02	monetary tightening	-0.46	1.7	-0.27
1970-01	1970-11	fiscal and monetary tightening	-0.28	2.4	-0.12
1973-12	1975-03	oil price shock	2.02	3.8	0.53
1980-02	1980-07	oil price shock, monetary tightening	-0.63	1.5	-0.42
1981-08	1982-11	monetary tightening	-5.85	3.6	-1.63
1990-08	1991-03	oil price shock, monetary tightening	0.00	1.3	0.00
2001-04	2001-11	dot-com bubble	-1.06	1.2	-0.88
2008-01	2009-06	housing bubble, global fin. crisis,	-5.26	4.5	-1.17
2020-03	2020-04	Covid-19 pandemic	-1.95	11.3	-0.17

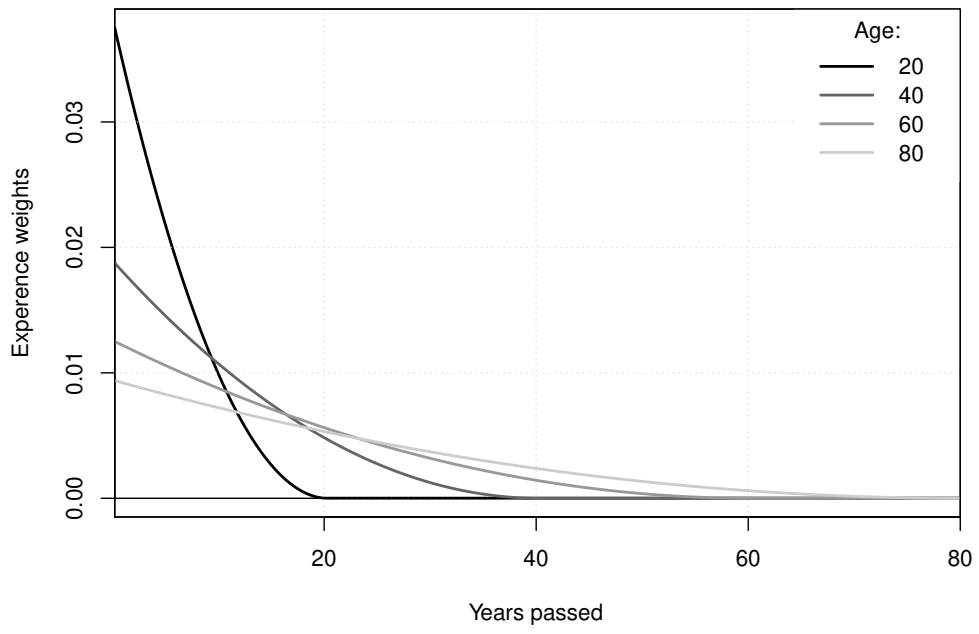
Back

Memory weights

Learning gain $\gamma = \frac{\theta}{t-s}$ if $t - s \geq \theta$, $\theta = 3$ (Malmendier & Nagel, 2016)

Implied memory weights of new observation

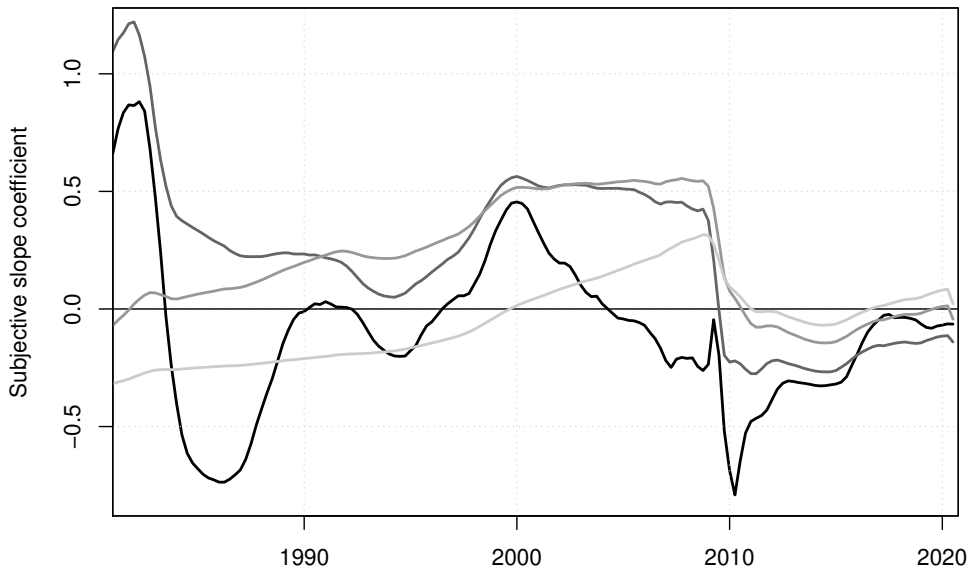
- decreasing in time
- decreasing in age



▸ Back to memory definitions

Memory: Example

$\mathcal{M}^{\text{III}}$ for different age groups over time (subjective slope of reduced-form Phillips curve)



▸ Back to memory definitions

Great Moderation subsample

	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Demand shocks	0.386***	0.357***	0.373***	0.380***
	(0.052)	(0.052)	(0.052)	(0.056)
— × Memory	-0.044	0.042	-0.060	0.070
	(0.053)	(0.055)	(0.054)	(0.045)
Supply shocks	0.306***	0.324***	0.342***	0.344***
	(0.066)	(0.066)	(0.066)	(0.068)
— × Memory	0.101	0.072	0.317***	0.129**
	(0.065)	(0.065)	(0.071)	(0.060)
Monetary policy shocks	-0.440***	-0.426***	-0.443***	-0.455***
	(0.062)	(0.062)	(0.062)	(0.065)
— × Memory	0.040	-0.035	-0.104*	-0.124**
	(0.063)	(0.067)	(0.062)	(0.057)
Observations	42.826	45.575	45.575	45.575
$H_0 : \beta_{—\times\mathcal{M}} = 0$, F(p)	1.68(0.17)	0.99(0.39)	6.78(0.00)	2.53(0.06)

▸ Back

Control for other cohort experiences

Full sample (1981-2021):	(1) Memory $\mathcal{M}^{I}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{II}$ (—, weighted)	(3) Memory $\mathcal{M}^{III}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{IV}$ (Corr. o. supply+infl.)
Demand shocks × Memory	0.015	0.032	0.023	-0.059
	(0.032)	(0.038)	(0.027)	(0.039)
Supply shocks × Memory	0.200***	0.351***	0.255***	0.062
	(0.047)	(0.059)	(0.045)	(0.049)
MP shocks × Memory	-0.165***	-0.285***	-0.206***	-0.093**
	(0.036)	(0.043)	(0.031)	(0.037)
Demand, supply, MP shocks			Yes	
— × Avg. infl.			Yes	
— × Lifetime infl. vol.			Yes	
Observations	72.867	76.737	76.737	76.737
$H_0 : \beta_{—\times \text{Mem}} = 0$, F(p)	8.96(0.00)	17.61(0.00)	17.04(0.00)	9.03(0.00)

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Control for other age effects

Full sample (1981-2021):	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Demand shocks × Memory	0.024	0.041	0.002	-0.143***
	(0.029)	(0.027)	(0.026)	(0.039)
Supply shocks × Memory	0.143***	0.129***	0.276***	0.116**
	(0.046)	(0.048)	(0.047)	(0.048)
MP shocks × Memory	-0.130***	-0.141***	-0.153***	-0.035
	(0.031)	(0.027)	(0.029)	(0.036)
Demand shocks × Age grp.			Yes	
Supply shocks × Age group			Yes	
MP shocks × Age group			Yes	
Observations	72.867	76.737	76.737	76.737
$H_0 : \beta_{—\times\mathcal{M}} = 0$, F(p)	6.55(0.00)	9.36(0.00)	13.28(0.00)	9.17(0.00)

Back

Subsample: No college education

	(1) Memory $\mathcal{M}^{I}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{II}$ (—, weighted)	(3) Memory $\mathcal{M}^{III}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{IV}$ (Corr. o. supply+infl.)
Demand shocks	0.363***	0.368***	0.364***	0.366***
	(0.044)	(0.048)	(0.046)	(0.042)
— × Memory	0.022	-0.023	-0.025	-0.023
	(0.041)	(0.039)	(0.034)	(0.050)
Supply shocks	0.487***	0.499***	0.465***	0.495***
	(0.062)	(0.062)	(0.062)	(0.062)
— × Memory	0.133**	0.164**	0.264***	0.095***
	(0.066)	(0.069)	(0.066)	(0.072)
Monetary policy shocks	-0.498***	-0.490***	-0.491***	-0.504***
	(0.049)	(0.051)	(0.049)	(0.046)
— × Memory	-0.110**	-0.090**	-0.120***	-0.087
	(0.046)	(0.041)	(0.039)	(0.053)
Observations	40.155	43.288	43.288	43.288

Back

Subsample: College education

	(1) Memory $\mathcal{M}^{I}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{II}$ (—, weighted)	(3) Memory $\mathcal{M}^{III}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{IV}$ (Corr. o. supply+infl.)
Demand shocks	0.501***	0.462***	0.433***	0.574***
	(0.036)	(0.038)	(0.041)	(0.040)
— × Memory	0.047	0.154***	0.053	-0.260***
	(0.035)	(0.036)	(0.033)	(0.047)
Supply shocks	0.576***	0.556***	0.524***	0.497***
	(0.050)	(0.051)	(0.049)	(0.050)
— × Memory	0.081	0.010	0.234***	0.173***
	(0.053)	(0.060)	(0.054)	(0.053)
Monetary policy shocks	-0.633***	-0.592***	-0.550***	-0.653***
	(0.037)	(0.037)	(0.038)	(0.037)
— × Memory	-0.167***	-0.197***	-0.240***	-0.028
	(0.036)	(0.034)	(0.034)	(0.040)
Observations	32.529	33.254	33.254	33.254

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Long-run expectations

	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Demand shocks	0.048*	0.049*	0.022	0.050*
	(0.028)	(0.029)	(0.031)	(0.030)
— × Memory	0.004	0.037	0.009	-0.068*
	(0.028)	(0.029)	(0.027)	(0.035)
Supply shocks	0.169***	0.187***	0.142***	0.146***
	(0.039)	(0.040)	(0.039)	(0.039)
— × Memory	-0.004	0.056	-0.029	-0.054
	(0.044)	(0.053)	(0.044)	(0.042)
Monetary policy shocks	-0.090***	-0.104***	-0.098***	-0.112***
	(0.030)	(0.031)	(0.030)	(0.030)
— × Memory	-0.078**	-0.129***	-0.013	-0.007
	(0.032)	(0.033)	(0.030)	(0.033)
Observations	53.528	56.186	56.186	56.186
$H_0 : \beta_{—\times\mathcal{M}} = 0$, F(p)	6.42(0.00)	9.48(0.00)	0.75(0.52)	5.75(0.00)

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Alternative monetary policy shocks

Jarociński & Karadi (2020) HFI shocks cleaned for information effects, 1990-2016

	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Mon. policy shocks	-0.428*	-0.404*	-0.497**	-0.351
	(0.231)	(0.241)	(0.240)	(0.236)
— × Memory	-0.302	-0.430*	-1.014***	-0.644**
	(0.193)	(0.236)	(0.220)	(0.244)
CBI shocks	1.528***	1.653***	1.248***	1.632***
	(0.329)	(0.335)	(0.329)	(0.328)
— × Memory	-0.372	-0.034	-0.930***	-0.965***
	(0.296)	(0.342)	(0.318)	(0.337)
Observations	43.370	45.315	45.315	45.315

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Perceived interest rates and consumption attitudes

MSC: "Why do you say so?" (e.g. "interest rates low")

$$\ln \frac{Pr(D_{it}=1)}{1-Pr(D_{it}=1)} = \alpha + \beta_D \hat{\varepsilon}_t^D + \beta_{D\times\mathcal{M}}(\hat{\varepsilon}_t^D \times \mathcal{M}_{a(i),t}) + \beta_S \hat{\varepsilon}_t^S + \beta_{S\times\mathcal{M}}(\hat{\varepsilon}_t^S \times \mathcal{M}_{a(i),t}) + \beta_M \hat{\varepsilon}_t^M + \beta_{M\times\mathcal{M}}(\hat{\varepsilon}_t^M \times \mathcal{M}_{a(i),t}) + u_{it}$$

Marginal effect of $\hat{\varepsilon}^M$ on perceiving interest rates as **low**:

	(1) Memory $\mathcal{M}^{\text{I}}$ (Infl. during recessions)	(2) Memory $\mathcal{M}^{\text{II}}$ (—, weighted)	(3) Memory $\mathcal{M}^{\text{III}}$ (Red. form PC slope)	(4) Memory $\mathcal{M}^{\text{IV}}$ (Corr. o. supply+infl.)
Monetary policy shocks				
at $\mathcal{M} = 0$	-0.85***	-0.46**	-0.59**	-1.04***
	(0.22)	(0.21)	(0.22)	(0.21)
at $\mathcal{M} = 1$	-2.40***	-2.60***	-1.92***	-1.39***
	(0.29)	(0.28)	(0.26)	(0.30)
Observations	72.867	76.737	76.737	76.737

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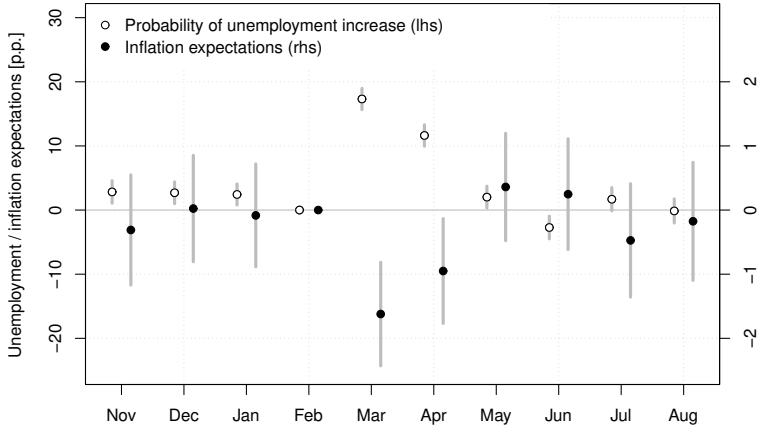
Robustness from a different survey

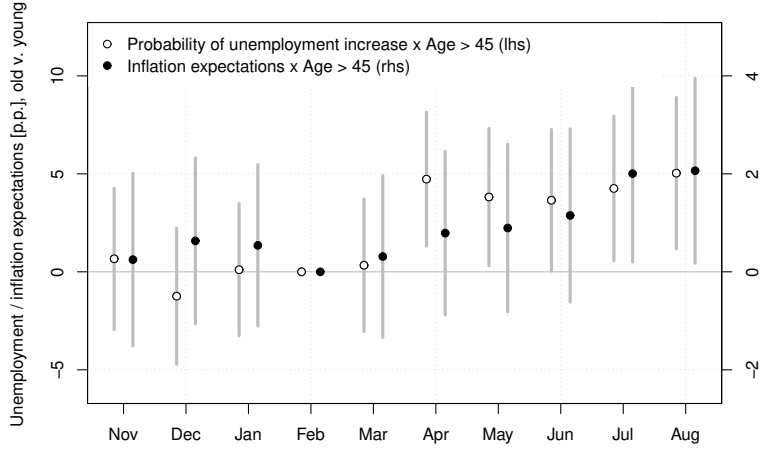
NY Fed Survey of Consumer Expectations: larger panel, but oversampling of working age population

$$\pi_{it}^{e} = \sum_{\substack{s=t-3 \\ s\neq 0}}^{t+6} \beta_s \, 1[t=s] + \sum_{\substack{s=t-3 \\ s\neq 0}}^{t+6} \beta_{s,45+} \, 1[t=s] \times 1[a_{it} > 45] + \gamma_i + u_{it}$$

(a) Expectations



(b) Diff. between old and young



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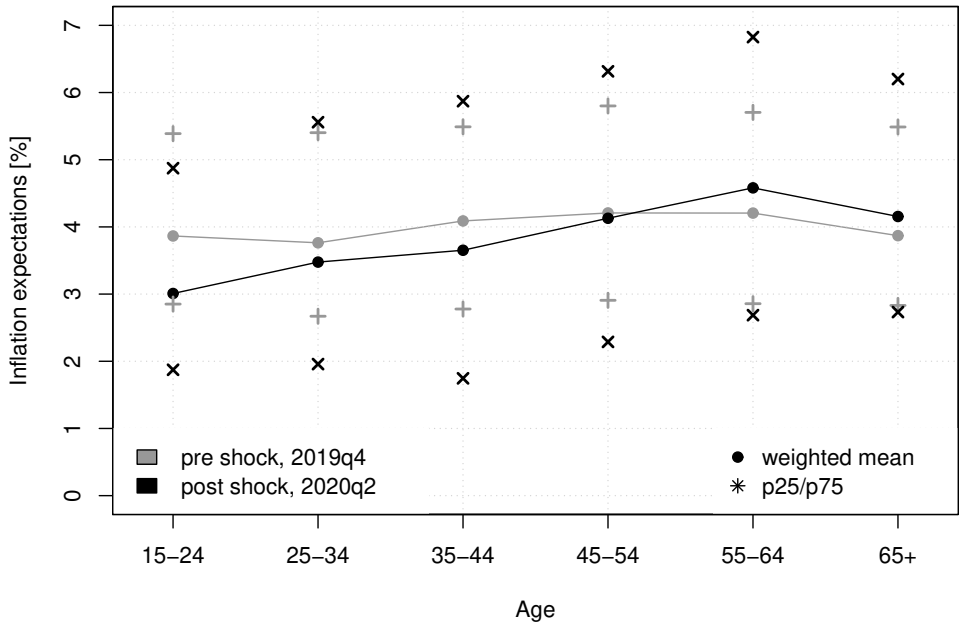
Robustness from yet another survey

Bank of England quarterly survey: repeated cross-section



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