

How Do Consumers Adapt to a New Environment in their Economic Forecasting? Evidence from the German Reunification

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Motivation

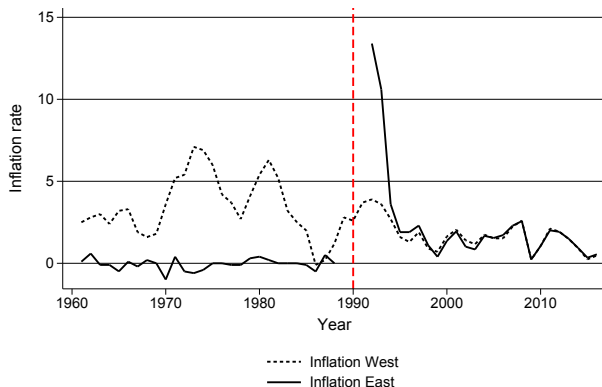
- **Expectations** about macroeconomic variables are important for households and policy-makers:
 - Influence consumption and portfolio choice (Armantier et al., 2015; Crump et al., 2015; D'Acunto et al., 2018a; Malmendier and Nagel, 2016).
 - Transmission and tool of monetary policy (Coibion et al., 2018).
- Forecasting macroeconomic variables is a **complex task**:
 - Systematic disagreement between consumers and professional forecasters (Das et al., 2017; Mankiw et al., 2003).
 - Use of imprecise and incomplete sources of information (Cavallo et al., 2017; Malmendier and Nagel, 2016).
- Individuals face large **shifts in environment** (Brexit, revocation of free-trade agreements, migration)
 - Forecasting macroeconomic variables becomes even more complex.

Research questions

- Do consumers adjust (quickly) to a new economic environment in their forecasting?
- Which factors matter for how well consumers adjust to a new environment?
 - Opportunity to learn about the expectation formation process more generally.

This paper

- We study this question using the natural experiment of the **German Reunification**.
- We use survey data from 2000 onward to examine **convergence** of inflation expectations of East German consumers to West Germans.



This paper

Setting has several advantages:

- Unexpected and exogenous.
- Perceived as permanent.
- Little concern regarding selection.
- West Germans as a control group.

Preview of results

- East Germans expect **higher inflation** than West Germans even decades after reunification.
- Cannot be explained by differences in financial illiteracy, risk aversion, perceived current inflation or consumption baskets.
- Likely a persistent effect of the interaction of the **old norm and the initial inflation shock** after reunification
- Larger differences in expectations when current inflation is higher, consistent with **associative recall**.
- Inflation expectations of East Germans meaningfully correlate with their behavior.

Literature

- Literature using **survey data** to study the expectation formation process (Bailey et al., 2017a,b; Coibion and Gorodnichenko, 2015a,b; Coibion et al., 2017; Manski, 2017; Mian et al., 2018):
 - Evidence of large information rigidities in consumer expectations (Armantier et al., 2016; Coibion and Gorodnichenko, 2012; D'Acunto et al., 2018b).
 - Household expectations only partially in line with theoretical relationships between macroeconomic variables (Carvalho and Nechio, 2014; Dräger et al., 2016).
 - Consumers understand the direction of true patterns in the DGP, but imperfect understanding of their quantitative importance (Armona et al., 2018; Roth and Wohlfart, 2018).
- Literature on the role of **experiences** in belief formation (Greenwood and Shleifer, 2014; Kuchler and Zafar, 2017; Madeira and Zafar, 2015; Malmendier and Nagel, 2011, 2016).

Outline of talk

- 1 Data
- 2 Main Results
- 3 Mechanisms
- 4 Additional results
- 5 Conclusion

Panel of Household Finance (PHF)

- German Bundesbank survey, two waves 2011 and 2014; n=6,500, records place of residence in 1989.
- We consider individuals born 1982 or earlier.
- **Quantitative measure** of inflation expectations (2014):
By what percent will the general price level rise/fall in the next 12 months?
- **Qualitative measure** of inflation expectations (2011 and 2014):
Will the general price level change in the next 12 months? Rise significantly; rise somewhat; stay the same; fall somewhat; fall significantly.
 - **Expect high inflation:** Dummy for expecting prices to increase significantly.

GfK Consumer Climate Survey

- Repeated monthly cross-sections, years 2000-2016, n=332,599, consider individuals born 1982 or earlier;
- **Quantitative measure** of inflation expectations (2008-2017):
By how many percent do you expect consumer prices to go up/down in the next 12 months?
- **Qualitative measure** of inflation expectations (2000-2017):
How will consumer prices evolve during the next 12 months compared to the previous 12 months? Increase more; Increase the same; Increase less; Stay the same; Decrease; Don't know.
 - **Expect inflation to increase:** Dummy variable for expecting prices to increase more than over the previous year.

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Empirical Specification

- Effect of having lived in East Germany:

$$y_{i,t} = \beta_0 + \beta_1 \text{East}_i + \mathbf{\Pi}^T \mathbf{X}_{i,t} + \text{wave}_t + \varepsilon_{i,t}$$

- We control for gender, an age polynomial, labor market status, marital status, education, income, wealth, size of community.
- We report robust standard errors.

Main Results: PHF

| | Expected inflation rate | | Expect high inflation | | Exp real inc incr | Exp job loss |
|--------------------|-------------------------|---------------------|-----------------------|--------------------|----------------------|------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| East in 1989 | 1.038*** (0.184) | 0.901*** (0.250) | 0.086*** (0.017) | 0.051** (0.025) | -0.037*** (0.010) | 0.024 (0.015) |
| Observations | 3312 | 3312 | 6466 | 6466 | 6413 | 3095 |
| R-squared | .085 | .086 | .158 | .159 | .052 | .032 |
| Sample | 2014 | 2014 | Full | Full | Full | Full |
| Household controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Current region FE | No | Yes | No | Yes | No | No |
| Time FE | No | No | Yes | Yes | Yes | Yes |

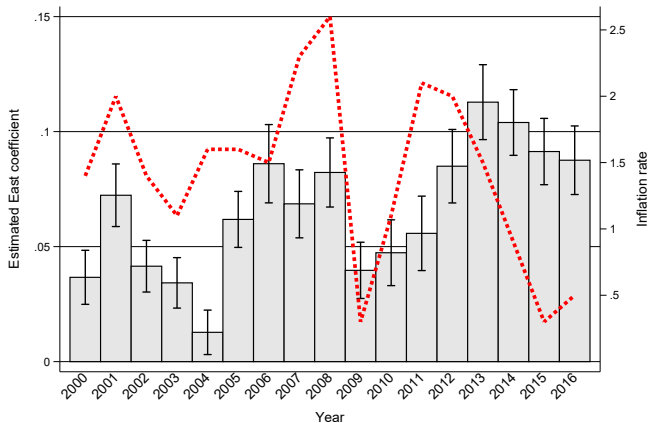
Main Results: GfK Survey

| | Expected inflation rate | | Exp. infl. rate mult. of 5 | |
|------------------------------|----------------------------|---------------------|-------------------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| East | 0.834*** (0.043) | 0.435*** (0.024) | 0.043*** (0.004) | 0.024*** (0.003) |
| Perceived current infl. rate | | 0.785*** (0.004) | | |
| Perc. infl. rate mult. of 5 | | | | 0.639*** (0.003) |
| Observations | 93104 | 87677 | 93104 | 87677 |
| R-squared | .099 | .724 | .134 | .73 |
| Household controls | Yes | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes | Yes |

► Expectations Disagreement

East effect over time (GfK)

Coefficients on East dummy are estimated separately for each year.



Robustness

All findings are robust to a large range of adjustments:

- Dropping younger cohorts.
- Demographic sub-samples.
- County of residence FE.
- Sampling weights.
- Winsorizing instead of dropping top and bottom percentiles.
- Separate dummies for each East German state.
- Controlling for general outlook.
- Controlling for home ownership.
- Controlling for recent changes in own situation.
- Ordered Probit.

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Different consumption baskets?

Findings are unlikely due to different consumption baskets:

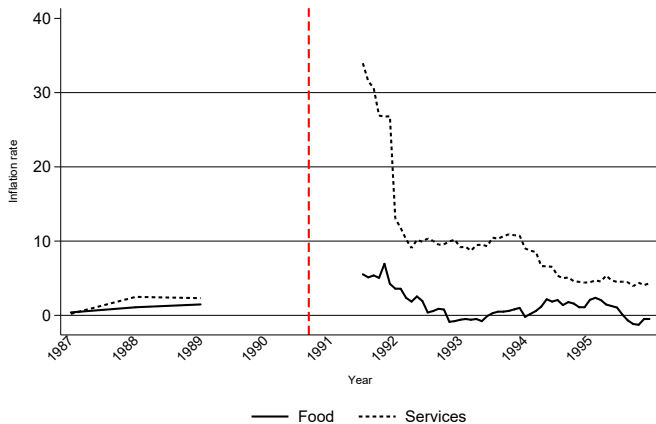
- Official inflation rates in East and West calculated accounting for differences in spending patterns.
- Spending patterns had almost converged by 2000 (Statistisches Bundesamt, 2003).
- Most of the effect does not operate through perceived current inflation.

Financial illiteracy, risk aversion or lack of trust?

| | Expected inflation rate | | | | |
|---------------------------------|-------------------------|----------------------|---------------------|----------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) |
| East in 1989 | 1.040*** (0.184) | 1.028*** (0.186) | 1.039*** (0.184) | 1.001*** (0.185) | 0.997*** (0.187) |
| Fin. lit.: Interest compounding | | -0.680*** (0.257) | | | -0.652** (0.255) |
| Fin. lit.: Inflation | | 0.382 (0.304) | | | 0.431 (0.303) |
| Fin. lit.: Diversification | | -0.046 (0.155) | | | -0.057 (0.155) |
| Risk aversion | | | 0.060** (0.029) | | 0.045 (0.030) |
| Generalized trust | | | | -0.105*** (0.033) | -0.088** (0.035) |
| Observations | 3312 | 3267 | 3309 | 3305 | 3260 |
| R-squared | .085 | .087 | .086 | .089 | .091 |
| Household controls | Yes | Yes | Yes | Yes | Yes |

Old norms and initial shocks in new environment

- Food price inflation vs Services price inflation.



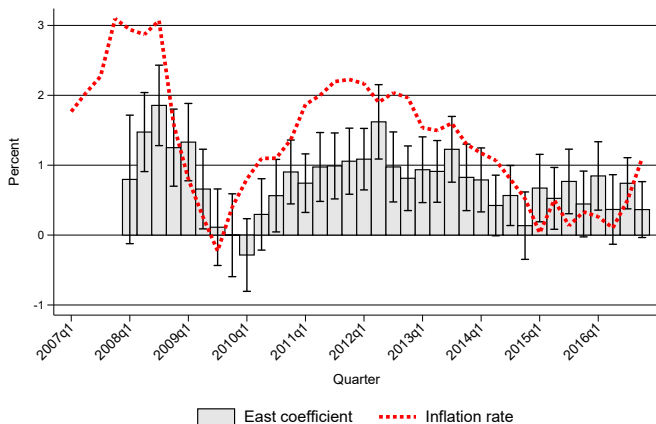
Old norms and initial shocks in new environment

| | Expect high inflation | Expect high food price inflation | Expect high services price inflation | Expected stock return | Expected interest rate | Expect incr. unemployment |
|--------------------|--------------------------|--|--|--------------------------|---------------------------|------------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| East in 1989 | 0.086*** (0.017) | 0.041** (0.017) | 0.171*** (0.026) | -0.128 (0.299) | 0.027 (0.037) | 0.082*** (0.002) |
| Observations | 6466 | 2164 | 2164 | 2429 | 3216 | 342900 |
| R-squared | .158 | .031 | .065 | .012 | .049 | .149 |
| Dataset | PHF | PHF | PHF | PHF | PHF | GfK |
| Sample | Full | 2016 | 2016 | 2014 | 2014 | Full |
| Household controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Time FE | Yes | No | No | No | No | Yes |

► Cohort Effects

Associative recall

Inflation expectations: estimated East coefficient over time, quarterly.
(GfK)



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Inflation expectations and propensity to buy

| | Good time to buy durable goods | | |
|------------------------------|--------------------------------|----------------------|----------------------|
| | (1) | (2) | (3) |
| Expect inflation to increase | 0.053*** (0.002) | 0.054*** (0.003) | 0.051*** (0.004) |
| Perc. high current inflation | -0.041*** (0.002) | -0.046*** (0.002) | -0.018*** (0.004) |
| Observations | 299670 | 238293 | 61377 |
| R-squared | .057 | .059 | .068 |
| Sample | All | West | East |
| Household controls | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes |

Inflation expectations and bondholdings

| | Bonds > 0 | | | Log (Bonds) | | |
|--|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Quantitative expectations (2014 sample) | | | | | | |
| Expected inflation rate | -0.003*** (0.001) | | -0.003** (0.001) | -0.033** (0.013) | | -0.028** (0.013) |
| East in 1989 | | -0.040*** (0.012) | -0.037*** (0.012) | | -0.433*** (0.120) | -0.406*** (0.120) |
| Observations | 3180 | 3180 | 3180 | 3180 | 3180 | 3180 |
| R-squared | .075 | .076 | .076 | .085 | .086 | .087 |

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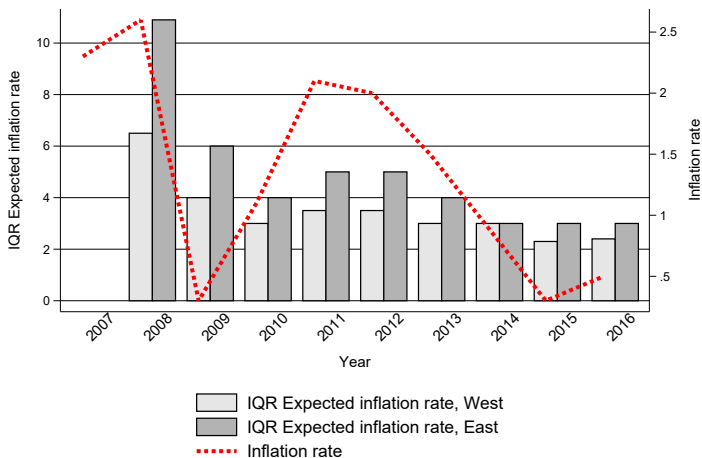
Conclusion

- East Germans expect higher inflation than West Germans even decades after reunification.
- Findings likely reflect the persistent effect of the initial inflation shock after reunification combined with the strong norm of zero inflation in the old environment.

Implications

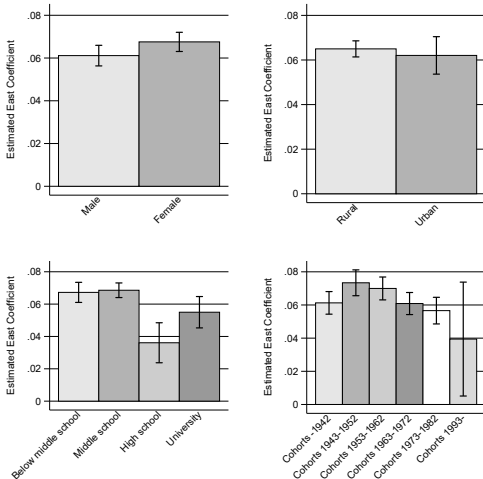
- Consumers find it difficult to adjust to a new economic environment in their forecasting.
- Extreme macroeconomic experiences can have a long-lasting effect.
- Memories of extreme macroeconomic events may be activated by current economic conditions.

Disagreement in Expected Inflation Rates among East Germans and West Germans (GfK)



East effect heterogeneity (GfK)

Estimated effects for demographic subgroups.



► Back to mechanism

► Back to robustness

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