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Conference Paper

How Do Consumers Adapt to a New Environment in their economic forecasting? Evidence from the German Reunification.

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2019: 30 Jahre Mauerfall - Demokratie und Marktwirtschaft - Session: Consumption and Household Economics, No. A20-V3

Provided in Cooperation with:
Verein für Socialpolitik / German Economic Association

Suggested Citation: Goldfayn-Frank, Olga; Wohlfart, Johannes (2019) : How Do Consumers Adapt to a New Environment in their economic forecasting? Evidence from the German Reunification., Beiträge zur Jahrestagung des Vereins für Socialpolitik 2019: 30 Jahre Mauerfall - Demokratie und Marktwirtschaft - Session: Consumption and Household Economics, No. A20-V3, ZBW - Leibniz-Informationszentrum Wirtschaft, Kiel, Hamburg

This Version is available at:
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How Do Consumers Adapt to a New Environment in their Economic Forecasting? Evidence from the German Reunification*

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September 17, 2018

Exploiting the natural experiment of the German reunification, we examine how consumers adapt to a new environment in their macroeconomic forecasting. We document that East Germans expect higher inflation and make larger forecast errors than West Germans even decades after reunification. Differences in consumption baskets, financial literacy, risk aversion or trust in the central bank cannot fully account for these patterns. We find most support for the explanation that East Germans, who were used to a strong norm of zero inflation, persistently overadjusted the level of their expectations in the face of the initial inflation shock in reunified Germany. Our findings suggest that large changes in the economic environment can permanently impede people's ability to form accurate macroeconomic expectations, with an important role for the interaction of old norms and new experiences around the event.

JEL Classification: D12, D14, D83, D84, G11

Keywords: Expectation Formation, Inflation, Natural Experiment, German Reunification, Macroeconomic Experiences.

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*This project was conducted with confidential access to microdata from surveys conducted by the Gesellschaft für Konsumforschung (GfK). The views expressed in this paper only reflect views of the authors and not of GfK. We thank Rolf Bürkl for invaluable help with the GfK data and the Bundesbank Research and Data Service Center (RDSC) team as well as Tobias Schmidt for generous help with the PHF data. We would like to thank Martin Brown, Enzo Cerletti, Nicola Fuchs-Schündeln, Dimitris Georgarakos, Michalis Haliassos, Lena Jaroszek, Christine Laudenbach, Lu Liu, Spyros Palligkinis, Yuri Pettinicchi, Chris Roth, Sonja Settele, Michael Weber as well as conference participants at the 2017/18 RES PhD Meetings (London) and the 2018 RES Annual Conference (Sussex) and seminar participants in Frankfurt for helpful comments.

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1 Introduction

Expectations about macroeconomic variables play a central role in models of household consumption and portfolio choice. For instance, the expected rate of inflation should affect people's consumption growth through the real interest rate, influence the timing of durable good purchases, and shape portfolio choice by reducing the relative return on bonds. Previous literature has found empirical support for these predictions (Armantier et al., 2015; Crump et al., 2015; D'Acunto et al., 2018a; Malmendier and Nagel, 2016; Vellekoop and Wiederholt, 2017).[1] Expectations about future inflation are also an important determinant of actual inflation in New-Keynesian macroeconomic models. In addition, households' ability to form accurate macroeconomic expectations has major implications for the effectiveness of fiscal and monetary policy (Coibion et al., 2018).

However, forecasting macroeconomic variables is a complex task: There is large heterogeneity in consumer expectations about the macroeconomy, and consumer expectations differ systematically from those of professional forecasters (Mankiw et al., 2003; Das et al., 2017). Moreover, people resort to imprecise and incomplete sources of information such as their personal shopping experiences (Cavallo et al., 2017; D'Acunto et al., 2017) or realizations of macroeconomic variables over their lifetimes (Malmendier and Nagel, 2016) when forming their expectations. Forecasting macroeconomic variables should become even more difficult when individuals are confronted with large changes in the economic environment, as they occurred frequently in industrialized countries during the last years. Current events such as Brexit, the revocation of free trade agreements, and the large waves of migration, among others, imply that many individuals are exposed to substantial changes in the economic environment. Do consumers quickly adjust to a new economic environment in their macroeconomic forecasting or do such changes permanently impede their expectation formation? Which factors matter for how well people adjust to a new environment? Answering these question has important implications for policy and provides insights on the expectation formation process more generally.

[1] However, the existing evidence on the effect of inflation expectations on consumption behavior is mixed. For instance, Bachmann et al. (2015) and Burke and Ozdagli (2013) do not find a strong association between inflation expectations and spending.

In this paper we study these questions using the natural experiment of the German reunification which transformed the economic system in East Germany from a centrally planned economy into a market economy. Specifically, inflation had been close to zero in the German Democratic Republic (GDR) due to price controls. In the years after reunification, inflation spiked in East Germany, while it remained modest in West Germany. Convergence of inflation rates in East and West was achieved by 1994, five years after the fall of the Berlin Wall (Figure 1). We use survey data on consumer expectations regarding inflation from the year 2000 onward to examine whether East Germans' inflation expectations have converged to the expectations of their West German counterparts who had lived in a market economy for decades at the time of reunification, and whose expectations we take as a benchmark.[2]

Since East Germans transitioned from one economic system to another, the German reunification presents a specific case of change in the economic environment. However, there are several advantages that make the German reunification a unique setting to study how consumers adapt to a new economic environment in their expectation formation. First, the event was unexpected and exogenous. Second, the reunification was perceived as permanent, so there is no concern that consumers did not adapt because they expected it to be reversed. Third, there is little concern regarding selection. Finally, unlike economic changes that affect an entire country, our setting offers West Germans as a control group who did not experience the change in the economic system.[3]

We find that East Germans expect higher inflation than West Germans even decades after reunification. Using our main source of data, the Bundesbank's Panel of Household Finances (PHF), we document that having lived in the GDR increases expected inflation in 2014 by one percentage point. This implies that East Germans overpredicted inflation by even more than West Germans, who expected inflation to be 2.6 percent at the time

[2]Next to the convergence of actual inflation rates and the importance of inflation expectations for policymakers and macroeconomic models, focusing on inflation expectations has advantages in terms of data availability.

[3]Among others, the natural experiment of the German reunification has been used to study the formation of political preferences (Alesina and Fuchs-Schündeln, 2007), savings and financial behavior (Fuchs-Schündeln and Schündeln, 2005; Fuchs-Schündeln, 2008; Fuchs-Schündeln and Haliassos, 2015), consumption behavior (Friehe and Mechtel, 2014; Bursztyn and Cantoni, 2016), firm expectations (Triebs and Tumlinson, 2017) and the economic effects of surveillance (Lichter et al., 2016).

of the survey while realized inflation was below 1 percent. Even East Germans who have moved to West Germany since 1989 hold significantly higher inflation expectations than West Germans. This implies that our findings are not driven by unobserved differences in the economic environment between East and West Germany.

We confirm these results using quantitative and qualitative measures of inflation expectations over a longer time period from the GfK Consumer Climate Survey. In each year, East Germans on average expect between 0.7 and 1.1 percentage points higher inflation and make larger forecast errors than West Germans (Figure 2). These differences remain statistically and economically significant after controlling for time fixed effects and a wide range of household characteristics. While part of the effect seems to operate through higher perceived current inflation among East Germans, the major part of the effect is due to East Germans expecting a larger increase in inflation. Moreover, there is little evidence that East Germans' forecasts improve with the time spent in the new environment. East Germans also seem to be more uncertain about future inflation than West Germans and there is more disagreement in expectations among East Germans, consistent with larger information rigidities in East Germany (Coibion and Gorodnichenko, 2012). Taken together, we find that East Germans have not adjusted to West Germans in their inflation expectations even decades after reunification, and that they seem to put higher probability on substantial increases in inflation.

What explains differences in expectations between East and West Germans? We argue that differences in consumption baskets cannot account for our findings. Similarly, we show that our results are unlikely to be driven by differences in financial literacy or risk aversion. We use data from the Eurobarometer surveys to show that lower trust in the central bank, which could translate into higher expected inflation (Christelis et al., 2016), cannot fully account for differences in expectations between East and West Germans.

Finally, the inflation shock of the early 1990s, which contrasted strongly with the norm of zero inflation in the old environment, could have led East Germans to persistently overadjust the level of their expectations to the new norm of rising prices. We provide evidence consistent with this channel by highlighting that there is a much stronger East

effect on expected services price inflation than on expected food price inflation. While the inflation shock of the early 1990s was moderate for food, it was substantial for services. Moreover, East and West Germans do not display significantly different expectations regarding interest rates on savings accounts which were similar in the GDR and in the early 1990s in reunified Germany. We also find no East effect on expected stock returns, in line with the idea that there was no strong norm regarding stock returns in the minds of East Germans at the time of the reunification. At the same time, East Germans are more likely than West Germans to expect an increase in aggregate unemployment, which had spiked similarly as inflation in East Germany after reunification. Finally, East Germans overpredict inflation by more following high realizations of inflation. One interpretation of this finding is that high realizations trigger associative recall of the inflation shock after reunification (Kahana, 2012; Bordalo et al., 2017). Combined, these points support the idea that the interaction of the old norm of zero inflation and the initial inflation shock are driving the persistently higher inflation expectations among East Germans.

Does the association between inflation expectations and behavior differ between East and West Germans? We document that there is an equally strong positive relationship between inflation expectations and the tendency to agree that it is a good time to buy large ticket items for East Germans as for West Germans. Thus, even though East Germans have not adjusted to West Germans in the level of their inflation expectations, they have adjusted to an environment of rising prices in the way they use their inflation expectations to smooth consumption. Finally, we show that differences in inflation expectations are reflected in a lower tendency to invest in bonds among East Germans.

We contribute to a literature that uses survey data to study the formation of consumer expectations about macroeconomic variables (Coibion and Gorodnichenko, 2015a,b; Coibion et al., 2017; Manski, 2017; Bailey et al., 2017a,b). This literature has found evidence of large information rigidities in consumer expectations (Armantier et al., 2016; Coibion and Gorodnichenko, 2012; Binder and Rodrigue, 2017). Some papers document that consumers only partially form their expectations in line with theoretical relationships between macroeconomic variables (Carvalho and Nechio, 2014; Dräger et al., 2016). Moreover, ex-

perimental evidence indicates that consumers understand the direction of true patterns in the data-generating process, but have an imperfect understanding of their quantitative importance (Armona et al., 2018; Roth and Wohlfart, 2018b). D'Acunto et al. (2018b) document that especially individuals who score low in standard IQ tests hold imprecise inflation expectations. We contribute to this research effort by providing field evidence that consumers have difficulties to adapt to a new economic environment in their forecasting, and that such changes can permanently impede their expectation formation.

Our paper is related to the literature on the role of experiences in the formation of people's macroeconomic expectations (Greenwood and Shleifer, 2014; Malmendier and Nagel, 2011, 2016; Madeira and Zafar, 2015; Kuchler and Zafar, 2017). Previous papers examine how macroeconomic expectations reflect cohort differences in inflation experiences (Malmendier and Nagel, 2016) or local differences in experienced house price growth (Kuchler and Zafar, 2017) within the US, and document recency bias in the effect of macroeconomic experiences on people's expectations. Our findings highlight how large economic changes can have permanent effects on people's expectations through the interaction of norms in an old environment and initial experiences in a new environment. Moreover, our results suggest that the strength of extreme macroeconomic experiences may not diminish over time but may be activated by current economic conditions.[4]

The rest of this paper is organized as follows. Section 2 describes the setting and research deesign. Section 3 describes the three datasets used in this study. In section 4 we present the main results on differences in inflation expectations between East and West Germans. Section 5 discusses potential explanations for these differences, while section 6 examines effects on people's behavior. Section 7 concludes.

2 Setting

In this section we provide some background on the economic transition in East Germany and our research design.

[4]Beyond affecting economic expectations, macroeconomic experiences have been shown to matter for risk-taking (Malmendier and Nagel, 2011; Ampudia and Ehrmann, 2017; Knüpfer et al., 2017) and the formation of political preferences (Giuliano and Spilimbergo, 2014; Roth and Wohlfart, 2018a).

2.1 Economic Transition in East Germany

In 1949 the Federal Republic of Germany (FRG) was founded in the area that comprised the American, British and French occupation zones and the German Democrat Republic (GDR) was founded on the territory of the Soviet occupation zone. While a capitalist market economy was introduced in the FRG, a Soviet-style centrally planned economy was installed in the GDR. Prices and wages were allowed to adjust freely in the FRG, resulting in fluctuations in the rate of inflation up until seven percent during the oil price crisis in 1973 (Figure 1). In the FRG, an independent central bank – the "Bank deutscher Länder" from 1948 until 1957, and the Bundesbank from 1957 onwards – put a strong emphasis on ensuring price stability and was quite successful at that in comparison with other Western economies. In contrast, price and wage controls ensured that there was essentially zero inflation in the GDR. Prices were set by a government agency, the "Amt für Preise", since 1965 and there was no independent monetary policy by the central bank, the "Deutsche Notenbank der DDR".

From the 1950s until reunification the East German state subsidized most of the basic consumption goods and services. As a result, these goods were not only cheaper than in West Germany, but also their prices remained almost constant over time. Possession of West German currency was forbidden until 1974, when East Germans were allowed to use West German mark to purchase Western goods in the state-owned Intershops. However, this channel of exposure to West German goods and money was limited, as on the one hand it was very difficult to obtain West German mark other than through transfers from relatives in the FRG, and on the other hand most of the goods sold in Intershops were extremely expensive, even by Western standards (Zatlin, 2009). Exposure to West German goods traded on the black market remained limited for similar reasons. Overall, East Germans experienced zero inflation of the prices of frequently purchased goods, and the exposure to rising prices of Western goods was likely minor.

The GDR joined the FRG in 1990, one year after the fall of the Berlin Wall in 1989. The economic system in the GDR was transformed into a market economy and price and wage controls were abandoned. The Deutsche mark was introduced as currency on 1st

July 1990, and East Germans could convert their holdings of East mark at a rate of one to one, which was in line with the relative purchasing power of the two currencies (Sinn and Sinn, 1993).[5] In the years from 1990 until 1993, East Germany experienced a sharp spike in inflation. Prices increased at an annualized rate of 24 percent in the first months after monetary union (Sinn and Sinn, 1993) and inflation was at 13.4 percent in 1992, the first year an official inflation rate was published. Inflation in West Germany remained relatively modest at 3.9 percent.

Inflation rates in East and West Germany converged in 1994 and remained nearly identical after that. Importantly, the two price indices were calculated based on consumption baskets that took into account compositional differences in spending between East and West Germans, such as higher consumption of status goods among East Germans (Friehe and Mechtel, 2014). This implies that differences in inflation expectations between East and West should not be driven by different consumption baskets. Moreover, consumption patterns in East and West had largely converged by the year 2000 (Statistisches Bundesamt, 2003). Consequently, from the year 2000 onward, only one official inflation rate, based on a common consumption basket, was published for Germany. In addition, by the year 2006 also price *levels* in East and West Germany were almost equalized, with West German prices being 6 percent higher, mostly due to higher rents (Bundesinstitut für Bau-, Stadt- und Raumforschung, 2009).[6]

Both East and West Germans experienced a change in the monetary regime with the introduction of the euro as official currency in 1999 and as means of transaction in 2002 and the transfer of monetary authority to the European Central Bank (ECB). The ECB is designed along the lines of the Bundesbank, with a high degree of independence and a strong focus on price stability.[7]

[5]This exchange rate applied up until a threshold of 4,000 East German mark, while savings exceeding this threshold were converted at a rate of two to one.

[6]For a comprehensive discussion of the development of price levels in East and West Germany, see Vortmann et al. (2013).

[7]See also the discussion in Berlemann and Enkelmann (2014) who examine differences in inflation aversion within Germany.

2.2 Control Group and Validity of Exogeneity Assumption

We use the natural experiment of the German reunification to study how well economic agents learn to forecast inflation when they find themselves in a new economic environment. Since East Germans transitioned from a centrally planned economy to a market economy, the German reunification represents a specific case of change in the economic environment. One could therefore worry about the extent to which one can learn from the German reunification about how economic agents react to other large changes in the economic environment. We note that this criticism applies to any large shift in the economic environment that could be used to examine how economic agents adapt to a new environment. Moreover, several features of the German reunification make it a unique setting to study our research question.

First, the German reunification was an unexpected event and exogenous to the individual. By contrast, an alternative research design studying the macroeconomic expectations of immigrants would pose the problem that immigrants *choose* to enter a new environment and may do so for specific reasons. Second, economic agents may not adapt to changes in the economic environment that are perceived as transitory. However, it was clear by the early 1990s that the German reunification would not be reversed, so the shift in the economic environment was perceived as permanent by economic agents. Third, we compare the expectations of East Germans after reunification to the expectations of West Germans. At the time of reunification West Germans had lived under a market economy with an independent central bank for decades, so it seems natural to take their inflation expectations as a benchmark. The availability of a control group is a key advantage of our research design relative to large economic changes affecting an entire country. Finally, there is little concern regarding selection. For instance, a research design studying the macroeconomic expectations of immigrants may run into the problem that immigrants with a particular skill set or with ties to the new country select themselves into the "treatment".

In order to assess the causal effect of having lived in the GDR on inflation expectations in reunified Germany one needs to assume exogeneity of the East dummy conditional on

controls. First, this requires that East and West Germans were similar before the division of Germany in 1949. Alesina and Fuchs-Schündeln (2007) provide evidence that regions that became part of the GDR and FRG were similar in terms of per capita income and shares of employees working in different industries before World War II. Second, moving activity could lead to a selection problem in our analysis. Around 3 million individuals emigrated from East to West between 1949 and the building of the Berlin Wall in 1961. A large share of these migrants were intellectuals and entrepreneurs (Heidemeyer, 1994), which could explain the more accurate inflation forecasts among people who lived in West Germany at the time of reunification. Our findings are robust to controlling for the respondent's levels of education and financial literacy, so we believe that this is unlikely to be a concern in our analysis. Migration was very modest between 1961 and the reunification (Schumann et al., 1996; Münz and Ulrich, 1997).

In addition, two of our datasets, the GfK Consumer Climate Survey and the Eurobarometer, do not provide information on the respondents' place of residence in 1989, but only on current place of residence. Migration between East and West Germany since 1989 could therefore lead to a mis-classification of people as having lived under the communist regime or not. Fuchs-Schündeln and Schündeln (2009) document that 2.45 million Germans migrated from East to West and around 1.45 million individuals moved in the opposite direction between 1991 and 2006, but a large share of these reflect individuals moving back and forth. While random migration would give rise to a downward bias of our estimates, selective migration could lead to a bias with a sign that is unclear ex-ante. However, movers should only account for small fractions of our samples. In addition, our main source of data, the Panel of Household Finances, contains information on the respondents' place of residence in 1989.

3 Data

3.1 Panel of Household Finances

Our main dataset is the Bundesbank's Panel of Household Finances (PHF). The PHF is the German section of the ECB's Household Finance and Consumption Survey (HFCS) and so far has been conducted twice, in 2011 and in 2014. Around two thirds of the 3,565 households that responded to the first wave of the survey also participated in the second wave. In addition, a refreshment sample of around 2,300 new households was added to the survey in 2014. We use data from both waves in our analysis.

Importantly, the PHF contains information on the place of residence in 1989, before the fall of the Berlin Wall. Both waves of the PHF contain categorical measures of respondents' inflation expectations, which we use to generate a dummy that takes value one if the respondent thinks that prices will increase significantly, and zero otherwise.[8] In addition, the second wave contains the respondents' quantitative point forecasts of inflation, stock returns and interest rates. The specific wording of the outcome variables from the different datasets used in the analysis is described in section A in the online Appendix. We set to missing the top and bottom percentiles of all quantitative measures of expectations.[9] East Germans expect higher inflation on average than West Germans according to both quantitative and qualitative measures (Figures A.1 and A.2).

In our estimations on the PHF and on all other datasets we focus on individuals born in 1982 or earlier. We are interested in how economic agents adapt to a new economic environment, so we require that the individuals in our sample have spent some time of their lives in the GDR.[10] In addition, we exclude immigrants as well as individuals who

[8]Individuals are asked: "What do you think, will the general price level change in the next twelve months?" Individuals select one of the following answer options: "Increase significantly," "Increase somewhat," "Stay approximately the same," "Fall somewhat," "Fall significantly."

[9]Throughout, we obtain very similar results if we use different cutoffs or winsorize the variables instead.

[10]By including individuals who were only eight years old at the time of reunification we follow Malmendier and Nagel (2016) who assume that inflation experiences matter from birth onward, as well as other literature using the German reunification as a natural experiment (Alesina and Fuchs-Schündeln, 2007; Fuchs-Schündeln and Haliassos, 2015; Friehe and Mechtel, 2014). Our results are robust to restricting the age range further.

were living in a third country in 1989.[11] These restrictions leave us with a sample of 6,466 observations from 4,620 households. The summary statistics are shown in Table 1.

The PHF deals with item non-response and otherwise missing values by providing five implicates of imputed data. Having more than one implicate for each observation allows us to account for the additional variation introduced by using imputed data. We work with these data using Rubin's method (Rubin, 1987).[12]

3.2 GfK Consumer Climate Survey

While the PHF provides information on place of residence before reunification, it is relatively small and covers only two years, 2011 and 2014. We therefore also make use of the GfK Consumer Climate Survey, which has been used in previous research on the expectations formation process of households (D'Acunto et al., 2018a). The survey is part of a harmonized EU survey program on consumer confidence coordinated by the Directorate General for Economic and Financial Affairs. Monthly interviews of repeated cross-sections of 2,000-3,000 consumers have been conducted since 1985. We obtain access to the confidential microdata from January 2000 until December 2016.[13] The large size of this dataset enables us to examine heterogeneity of the effect across demographic groups and to study how differences in inflation expectations between East and West Germans evolve over time. We use current place of residence as proxy for place of residence before reunification, which is not reported in the survey.

The GfK Consumer Climate Survey contains qualitative and quantitative questions on perceived current inflation and expected future inflation. D'Acunto et al. (2018a) demonstrate that the inflation expectations households report in the GfK survey match up well with movements in actual inflation, suggesting that the expectations data in

[11] We cannot identify such individuals in our other two datasets, the GfK Consumer Climate Survey and the Eurobarometer surveys.

[12] Specifically, we estimate each of our specifications separately for each of the five datasets and calculate the average over the five coefficient estimates as $\bar{b} = \frac{1}{5}\sum_{m=1}^{5} b_m$. The covariance matrix is obtained by averaging over the covariance matrices obtained from estimations on the five datasets, $\bar{V} = \frac{1}{5}\sum_{m=1}^{5} V_m$, and adjusting for the between-implicate variance, $Q = \frac{1}{5-1}\sum_{m=1}^{5}(b_m - \bar{b})(b_m - \bar{b})$, to obtain $\Omega = \bar{V} + \left(1 + \frac{1}{5}\right) Q$ (see the description in Malmendier and Nagel (2011)).

[13] Unfortunately, the microdata from earlier waves are unavailable to researchers.

the GfK survey are of high quality. In every survey round people are asked whether they expect prices to change more or less strongly over the next 12 months compared to the previous 12 months. We construct a dummy variable that takes value one if the respondent expects prices to increase by more, and zero otherwise.[14] From March 2008 onward, the dataset also contains quantitative measures of perceived inflation over the last year and expected inflation over the next year. We set these variables to missing for all observations in the top two and bottom two percentiles, due to more extreme outliers than in the PHF data. East Germans expect higher inflation than West Germans according to both measures (Figures A.3 and A.4). We use the quantitative inflation expectations to construct a measure of the absolute forecast error of respondent i surveyed at date t about inflation over the 12 months following the interview:

$$\text{forecasterror}_{i,t,t+12} = |\text{inflation}_{t,t+12} - \mathbb{E}_{i,t}[\text{inflation}_{t,t+12}]|$$

We compute absolute backcast errors correspondingly. Both East and West Germans display a substantial upward bias in their inflation expectations. Overprediction of actual inflation is a common feature of consumer surveys on inflation expectations (Bruine de Bruin et al., 2010).

We drop individuals living in Berlin, as we cannot distinguish between respondents from East Berlin and West Berlin during most of our sample period. Table 2 shows summary statistics for our working sample of 332,599 respondents without missing information in the variables we use in our analysis.

3.3 Eurobarometer

We examine the mechanisms behind our findings using data from the German subsample of the Eurobarometer surveys, which have been conducted since the early 1970s by the Commission of the European Union for all member countries. Twice per year, representative cross-sections of respondents are interviewed on topics such as general policy

[14] The answer options include "Prices will increase more," "Prices will increase by the same," "Prices will increase less," "Prices will stay the same," and "Prices will decrease." We obtain very similar results if we define the outcome variable differently, for instance as "increase by at least as much".

preferences and attitudes towards European integration. Among others, respondents are asked whether they tend to trust the ECB, or whether they tend not to trust the ECB. We generate a dummy variable that equals one if the respondent trusts the ECB, and zero otherwise. As in the GfK survey, we use currently living in East Germany as proxy for having lived in East Germany before reunification. We use data from the waves conducted between 2002 and 2016, in line with the period in which the euro has been the single means of transaction in Germany. Table A1 displays summary statistics for our main working sample of 41,148 respondents from the Eurobarometer.

4 Main Results: Differences in Inflation Expectations

4.1 Empirical Specification

We examine the medium- to long-run effect of having lived in East Germany on people's macroeconomic expectations in reunified Germany by estimating the following equation using OLS:

$$y_{i,t} = \beta_0 + \beta_1 \text{East}_i + \mathbf{\Pi}^T \mathbf{X}_{i,t} + \text{wave}_t + \varepsilon_{i,t} \tag{1}$$

where $y_{i,t}$ is expected inflation or the forecast error of respondent i in year t, East_i is a dummy for being East German, $\mathbf{X}_{i,t}$ is a vector of individual-level controls, and wave_t is a vector of survey wave fixed effects. Specifically, we control for gender, age, education, labor market status, size of the community of residence, income and wealth. The set of included controls differs slightly across datasets, as described in section A in the online Appendix. We report robust standard errors throughout the paper.[15]

[15] We obtain very similar results if we instead estimate probit models and ordered probit models that explicitly account for the categorical nature of some of our outcome variables. Tables A4 and A6 display ordered probit estimates of the East effect on expected inflation.

4.2 Main Results

The results from the PHF are shown in Table 3. Conditional on covariates, East Germans expect more than 1 percentage point higher inflation than West Germans in 2014 (column 1) and are 8.6 percentage points more likely than West Germans to predict that prices will increase considerably across both waves (column 3). The effect of being East German on people's expected inflation rate is larger than the effect of moving from educational attainment below middle school to having a university degree (-0.82 percentage points) or the effect of being female (0.68 percentage points).[16] The average expected inflation rate among West Germans is 2.6 percent, while realized inflation over the twelve months after the surveys was between 0 and 0.7 percent. Therefore, while also West Germans overpredicted inflation substantially, East Germans did so more strongly.

Inflation rates in East and West Germany converged in 1994 (Figure 1), suggesting that our findings are not driven by differences in actual inflation rates between East and West. To provide an additional robustness check against this possibility, we re-run our estimations including three dummies for current region of residence (North, West and East, with South being the omitted category). Identification of the coefficient on the East dummy in these specifications comes from differences in expectations between West Germans and East Germans who have moved to West Germany since 1989, as well as from differences between East Germans and West Germans living in East Germany. The effects slightly decrease in size, but remain large and statistically significant in these estimations (columns 2 and 4), suggesting that unobserved regional differences in the current economic environment are not driving our findings. Finally, higher expected inflation among East Germans is reflected in a lower expected real income growth (column 5), which does not seem to be driven by lower perceived job security among East Germans (column 6). This also suggests that our results do not purely reflect generally greater pessimism among East Germans.

The results from the GfK Consumer Climate survey, which covers the longer time period 2000-2016, are shown in Table 4.[17] We estimate an East effect on the expected

[16] In Table A2 in the online Appendix we display coefficient estimates on key control variables.

[17] Table A3 in the online Appendix reproduces Table 4 showing coefficient estimates on key control

inflation rate of 0.83 percentage points (column 1), similar to our findings from the PHF. When we control for the respondent's perceived inflation rate over the 12 months before the survey, the effect is reduced in size by around 40 percent but remains economically and statistically significant (column 2). There are two potential explanations for the reduction in size: On the one hand, part of the differences in expectations about the future could be due to East Germans genuinely perceiving higher current inflation. On the other hand, East Germans could have a worse understanding of the concept of inflation and therefore report higher expectations and perceptions. Controlling for perceived current inflation accounts for genuine differences in perceptions as well as differential conceptual understanding. However, the major part of the effect is not driven by perceived past inflation, indicating that East Germans expect a higher *increase* in inflation than West Germans.[18]

In columns 3 and 4 we show that these findings translate into larger absolute forecast errors among East Germans. We find similar results using a dummy variable indicating whether the respondent expects inflation to increase which is available for a much larger sample (columns 5 and 6). Moreover, we find a significantly positive East effect for almost every quarter in separate estimations of specification 1 (Figures 3 and A.5). The effect seems to become stronger following high realizations of inflation, and there is no tendency for the effect to decline. This provides strong evidence that East Germans did not become better in forecasting inflation with time spent in the new economic environment, but continue to overpredict inflation relative to West Germans.

Are East Germans more uncertain about future inflation than West Germans? None of our datasets elicits direct measures of inflation uncertainty. However, Binder (2017) documents that more uncertain respondents to the New York Fed's Survey of Consumer Expectations are more likely to report rounded expectations. We find that East Germans are significantly more likely than West Germans to report point forecasts of inflation that are multiples of five (column 7). This suggests that East Germans are also more uncertain

variables.

[18]Interestingly, the higher inflation expectations among women and individuals with lower education can be explained entirely by higher perceptions of current inflation within these groups (Table A3).

about future inflation than West Germans. The effect remains large and significant when we control for whether the respondent reported a perceived past inflation rate that is a multiple of five (column 8), indicating that uncertainty about future inflation is not purely driven by a noisier perception of current inflation. Finally, we find higher disagreement in inflation expectations among East Germans than among West Germans (Figure A.7). This is consistent with a stronger degree of information rigidities in East Germany, for instance due to less frequent updating of information sets or due to higher perceived noise in signals about the economy (Coibion and Gorodnichenko, 2012). Taken together, we find that East Germans have not adjusted to West Germans in their inflation expectations even decades after reunification, and that they seem to put higher probability on large increases in inflation.

4.3 Robustness Checks

Our findings are robust to a wide range of adjustments.[19] Table A5 displays robustness checks for the baseline specification on the PHF sample from Table 3 column 1. Specifically, our results are robust to further restricting the age range to individuals born in 1972 or earlier (column 2), to using sampling weights (column 3), and to winsorizing expected inflation at the top and bottom percentile instead of setting these observations to missing (column 4). The results are unaffected by controlling for homeownership, which suggests that the findings are not driven by differences in rental markets within Germany (column 5). In addition, we obtain very similar results if we include fixed effects for the current county of residence (column 6). The identifying variation in these estimations comes from individuals born in East and West Germany who currently live in the same county, providing additional evidence that our findings are not driven by unobserved differences in the economic environment. Finally, the effect is present for each East German state, even though these coefficients are less precisely estimated (column 7).

Table A7 shows a sensitivity analysis for our baseline specification from the GfK

[19] We only report robustness checks for our main finding on differences in the expected level of inflation. Our findings on inflation uncertainty and disagreement are robust to the same set of adjustments, but the results are omitted for brevity.

as displayed in column 2 of Table 4. Our results are robust to restricting the sample to household heads (column 2) or to people born in 1972 or earlier (column 3). We find a much smaller and insignificant East effect for individuals born after 1993, who did not experience the change in the economic system and subsequent convergence in inflation rates (column 4). Moreover, our results are not affected by using sampling weights (column 5), by winsorizing expected inflation instead of dropping observations in the top and bottom two percentiles (column 6) or by controlling for homeownership (column 7). We provide evidence that our results are not driven by general economic pessimism among East Germans by controlling for the respondent's general economic outlook (column 8). Similarly, our findings persist when we control for recent changes in the respondent's personal economic situation, which could affect expectations about aggregate outcomes (Kuchler and Zafar, 2017) (column 9).[20] Moreover, we obtain very similar results when we replace the East dummy with separate dummies for the different East German states (column 10).

Finally, the specifications in Table 3 columns 3 and 4 (PHF) and Table 4 columns 5 and 6 (GfK) are linear probability models based on 5-point categorical variables that have been recoded to dummy variables. We confirm our main results estimating ordered probit models that use all the available information in the 5-point scales of these survey questions, and that account for the categorical nature of the variables (Tables A4 and A6).

5 Potential Explanations

In the previous section we have provided robust evidence that East Germans forecast substantially higher inflation, make larger forecast errors and seem to be more uncertain about future inflation than West Germans 10 to 25 years after reunification, using both qualitative and quantitative measures of inflation expectations, and that these differences

[20] In the corresponding survey questions the respondents are asked how they expect the general economic situation in the country to develop over the next 12 months, and how the financial situation of their household has changed over the last 12 months, respectively. Respondents face five answer options ranging from "get/got a lot better" to "get/got a lot worse".

are not driven by general economic pessimism or recent personal economic experiences. Taken together, these results suggest that consumers have difficulty to adapt to a new economic environment in their forecasting. Why do East Germans still hold higher inflation expectations than West Germans? In this section, we examine whether differences in consumption baskets, financial illiteracy, risk aversion, distrust in the institutions of the new system or overadjustment to an environment of rising prices in the face of the inflation shock in the early 1990s can explain our findings.

5.1 Consumption baskets

There is considerable heterogeneity in consumption baskets across households, which is reflected in heterogeneity in household-level inflation rates (Kaplan and Schulhofer-Wohl, 2017). Since people's shopping experiences affect their inflation expectations (Cavallo et al., 2017; D'Acunto et al., 2017), differences in consumption patterns between East and West Germans could be driving our findings. However, we think that this is unlikely for several reasons. First, official inflation rates for East and West Germany, which account for differences in consumption baskets, have been almost identical since 1994. Second, differences in consumption patterns themselves, such as a stronger preference for status goods among East Germans (Friehe and Mechtel, 2014), had largely converged by the year 2000 (Statistisches Bundesamt, 2003). Finally, household-level consumption baskets should affect inflation expectations through their effects on perceived current inflation. However, the major part of the East effect on inflation expectations is due to East Germans expecting a larger increase in inflation. Combined, these facts suggest that our findings are not driven by differences in consumption patterns between East and West Germans.

5.2 Financial Illiteracy

Bruine de Bruin et al. (2010) document that less financially literate individuals report higher expected inflation. Moreover, Bucher-Koenen and Lamla (2017) show that there remains a persistent gap in financial literacy between East and West Germans even 20

years after reunification. This suggests that East Germans make larger forecast errors than West Germans due to a lack of understanding of the economic and financial concepts that are important for predicting inflation in the new environment. Respondents in the PHF are asked the three questions on interest compounding, inflation and risk diversification that by now have become standard to measure financial literacy (Lusardi and Mitchell, 2014). We re-estimate our main specification from Table 3 column 1 controlling for dummies indicating correct answers to the three questions. The estimated coefficient on the East dummy barely changes in size and significance (Table 5 column 2). Interestingly, individuals who give the correct answer to the question on interest compounding expect significantly lower inflation, while none of the other dimensions of financial literacy seem to matter. Moreover, the East effect is slightly weaker but still large and significant for respondents with high education (see section 5.4). Taken together, this suggests that our findings are not driven by a lack of financial literacy among East Germans.

5.3 Risk Aversion and Forecasting under Asymmetric Loss

Capistrán and Timmermann (2009) propose a model of forecasting under asymmetric loss, in which agents receive a higher penalty for underpredicting inflation than for overpredicting inflation. Armantier et al. (2016) provide evidence of forecasting under asymmetric loss among consumers in the US. After transitioning to the new environment, East Germans could be more risk averse than West Germans, and forecasting under asymmetric loss could lead them to report higher point predictions of inflation. We shed light on this mechanism by re-estimating our main specification from the PHF controlling for the respondent's self-reported risk aversion, which is measured on a 10-point scale reaching from "very happy to take risks" to "highly risk averse". Controlling for risk aversion leaves the estimated East coefficient unchanged in size and significance, indicating that our findings are not driven by differences in risk aversion (Table 5 column 3). Interestingly, more risk averse individuals expect significantly higher inflation, in line with forecasting under asymmetric loss.

5.4 Distrust in the New Institutions

East Germans could have lower trust in institutions of the new environment such as the central bank. Recent evidence suggests that lack of trust in the central bank can lead households to expect higher inflation (Christelis et al., 2016). Estimating our main specification on data from the Eurobarometer, we find that being East German significantly reduces the likelihood to trust the ECB by 5.2 percentage points, corresponding to 11 percent of the cross-sectional mean of 47 percent (Table A9 column 1). Can these differences in trust in the ECB explain differences in inflation expectations? We examine whether heterogeneities in the East effect across subgroups are similar for the two outcomes. Specifically, we estimate the following specification using the data from the GfK or the Eurobarometer:

$$y_{i,t} = \beta_0 + \beta_1 \text{East}_i + \beta_2 \text{East}_i \times \text{interact}_{i,t} + \beta_3 \text{interact}_{i,t} + \mathbf{\Pi}^T \mathbf{X}_{i,t} + \text{wave}_t + \varepsilon_{i,t} \quad (2)$$

where $y_{i,t}$ either refers to inflation expectations or to trust in the ECB, and $\text{interact}_{i,t}$ refers to the dimension of heterogeneity of interest. The results are illustrated in Figure 4 and shown in Tables A8 and A9. The East effects on inflation expectations and trust in the ECB are both weaker for younger cohorts who spent less of their lifetimes in the GDR. However, while the East effect on inflation expectations is similar across genders and stronger for individuals with lower education and for individuals living in rural areas, we find opposite patterns for the effect on trust in the ECB. Finally, the evolution over time of the East effect on trust in the ECB differs from the evolution of the effect on inflation expectations (Figure A.8).[21]

While the PHF contains no direct measure of trust in the ECB, it elicits people's generalized trust, which should explain part of an individual's trust in the central bank (Christelis et al., 2016). We re-estimate our main specification from the PHF controlling for the respondent's self-reported level of trust.[22] Respondents with a higher level of generalized trust expect significantly lower inflation, potentially through its effect on

[21] Interestingly, the financial crisis in 2008 seems to have triggered a relative erosion of trust in the ECB among East Germans.

[22] This is measured on a 10-point scale reaching from "I do not trust others at all" to "I trust others completely".

trust in the central bank. However, the estimated coefficient on the East dummy is reduced in size only slightly, suggesting that the generalized trust component of trust in the ECB can only explain a small fraction of our findings (Table 5 column 4).

There are three more facts that cast doubt on the explanation that lack of trust in the new institutions is the main driver of our results. First, as shown in columns 2 and 4 of Table 3, we find almost equally large differences in inflation expectations between East and West Germans living in the same part of Germany. East Germans who have moved to West Germany since reunification have been shown to differ less in their preferences and beliefs from West Germans, either due to self-selection or due to stronger exposure, so they should have higher trust in the new institutions (Alesina and Fuchs-Schündeln, 2007). Second, lack of trust in new institutions should be reflected in generally more pessimistic expectations. However, we find no comparable effect of having lived under the communist regime on people's expectations regarding stock returns (Table 6 column 4). Finally, Christelis et al. (2016) document that moving from the highest to the lowest self-reported level of trust in the ECB in their survey of Dutch households is associated with an increase in expected inflation by 0.55 percentage points. Our estimated East effect is almost twice as large. Taken together, East Germans display significantly lower levels of trust in the ECB than West Germans, but these differences are unlikely to fully account for differences in inflation expectations between East and West Germans.

5.5 Norms in the Old Environment and Initial Inflation Shock in the New Environment

Price stability, especially for basic goods and services such as food, was an important goal of the government in the GDR. This was often emphasized publicly and the government went to great lengths to keep prices constant. In order to guarantee price stability, the GDR received support from the Soviet Union and even purchased basic goods from Western countries during times of scarcity (Landsman, 2005). Thus, East Germans were used to a strong norm of stable prices at the time of reunification. The norm in the new environment, by contrast, were positive inflation rates also for the most basic goods

and services. This new norm was felt particularly strongly by East Germans during the first years after reunification, when inflation reached very high levels in East Germany, while inflation in West Germany remained modest (Figure 1). The initial inflation shock after reunification may have led East Germans to persistently overadjust the level of their expectations to the norm of rising prices in the new environment. Our finding that East Germans expect a larger *increase* in inflation and seem to be more uncertain about future inflation than West Germans is consistent with a role for the initial inflation shock in driving the higher expectations among East Germans. In this section we provide more evidence on this mechanism, among others by examining good-specific inflation expectations and expectations about other macroeconomic variables.

First, we examine differences between East and West Germans' expectations about price changes of specific categories of goods. While the initial inflation shock after reunification was moderate for food (inflation reached values up to 7 percent during 1991), it was substantial for services (inflation of up to 33 percent, see Figure 5). There was a strong norm of price stability for both categories of goods in the GDR, and both categories contain goods with a high frequency of purchase. Moreover, actual inflation rates of goods and services in East Germany were nearly identical to inflation rates in West Germany from the year 1994 onward.[23] If overadjustment to rising prices due to the initial inflation shock was driving our findings, we would therefore expect the East effect on expectations about price changes of services to be larger than the East effect on expectations about food price inflation. We examine this hypothesis using unique qualitative measures of good category-specific inflation expectations that were collected during a pre-test interview of members of the PHF in 2016 prior to the fielding of the third wave of the survey in 2017.[24] Conditional on control variables, East Germans are significantly more likely than West Germans to expect significant price increases of both food and services (Table

[23]In addition, an advantage relative to price expectations related to housing and rents is that those could be affected by current differences in renting markets within Germany.

[24]For data confidentiality reasons we were not allowed to access these data ourselves and the regressions were run by Bundesbank staff. The variables are coded in the same way as the variable on qualitative inflation expectations, i.e. as dummy variables taking value one if the respondent expects prices to increase significantly and zero otherwise. We provide details on the wording of the underlying survey questions in Appendix A.

6 columns 2 and 3). However, in line with differences in the initial inflation shock, the effect is significantly larger for services ($p<0.00001$).

Second, we compare East Germans' expectations about other macroeconomic variables with the expectations of West Germans. If the contrast between the norm in the old environment and the initial inflation shock was driving our results, we would expect no difference in expectations about macroeconomic variables for which East Germans did not have a strong norm in mind at the time of reunification. This should be the case for stock returns since there was no stock market in the GDR. Similarly, we would expect no East effect on expectations about variables for which initial realizations after reunification were in line with the norm in the GDR. This is the case for nominal interest rates on savings accounts, which had been fixed at 3.25 percent in the GDR since the 1970s (Melzer, 1987) and which were stable at 2.8 percent during the early 1990s in reunified Germany. In line with these ideas, we find no differences between East Germans' and West Germans' expectations regarding stock returns and nominal interest rates on savings accounts in the PHF (Table 6 columns 4 and 5).[25] Moreover, similarly to inflation, there was a norm of almost zero unemployment in the GDR, and a spike to an unemployment rate of 10.6 percent immediately after reunification. In line with this initial shock, East German respondents to the GfK survey are significantly more likely than West German respondents to expect the number of unemployed people in Germany overall to increase over the next year (Table 6 column 6 and Table A10). Thus, expectations about stock returns, interest rates and aggregate unemployment of East and West Germans support the hypothesis that the inflation shock after reunification combined with a strong norm of zero inflation in the GDR is driving our main findings (see Table 7 for an overview).

Third, the norm of stable prices should have been stronger for older cohorts who had already spent many years under zero inflation at the time of reunification. If the contrast between the initial inflation shock and the norm of stable prices in the GDR was driving our findings, we would therefore expect the effect to be stronger for older cohorts.

[25] In an unreported regression we confirm this finding using qualitative expectations on expected stock price changes that were elicited in the PHF pre-test interview in 2016. We find that East Germans are 2.15 percentage points *more likely* than West Germans to expect a high increase in stock prices, but this difference is statistically insignificant.

Consistent with this idea, the East effect is stronger for those cohorts who have spent more time under zero inflation (Table A8 column 5). There is similar heterogeneity across cohorts in the East effect on expected aggregate unemployment (Table A10 column 5).

Taken together, these findings are consistent with the idea that East Germans, who were used to a norm of stable prices, overadjusted their expectations to the new norm of rising prices in the face of the inflation shock after reunification. How do East Germans' react to fluctuations in actual inflation in reunified Germany? We estimate a stronger East effect on expected inflation and forecast errors following high realizations of inflation (Figures 3 and A.5 and Table A11). Thus, movements in recent past inflation are disproportionately reflected in East Germans' expectations about future inflation. A potential psychological mechanism behind this finding is associative recall, according to which exposure to a cue triggers memories that are similar to that cue (Kahana, 2012; Bordalo et al., 2017). Accordingly, higher current inflation could act as a cue that lets East Germans recall the memory of the inflation shock after reunification. Consistent with this idea, the stronger effect for older cohorts, for whom the contrast between old norm and initial shock should have been stronger, is fully driven by periods of high recent inflation (Table A11).[26]

The fact that macroeconomic experiences can have long-lasting effects on people's beliefs has been documented by previous literature (Malmendier and Nagel, 2011; Madeira and Zafar, 2015; Kuchler and Zafar, 2017). Most importantly in our context, Malmendier and Nagel (2016) show that individuals in the US who have experienced higher average inflation rates during their lives forecast higher inflation, and that more recent experiences receive higher weight. How do our findings relate to this literature? Table A12 shows average experienced inflation rates in the 2014 wave of the PHF calculated following the method of Malmendier and Nagel (2016).[27] Accordingly, East Germans have *lower* or at most similar inflation experiences relative to West Germans for realistic calibrations of the weighting parameter λ. Thus, models of belief formation in which the weight put

[26] Alternative explanations include that East Germans put higher weight on recent inflation because it is more costly for them to use other sources of information, or that East Germans perceive inflation to be more persistent than West Germans.

[27] Section B in the online Appendix describes how these weighted averages are constructed.

on past experiences solely depends on recency cannot explain differences in expectations between East and West Germans. However, a persistent effect of the inflation shock of the early 1990s after decades of zero inflation is consistent with a large literature in psychology which documents that, besides recency, the strength of memories depends on how extreme or surprising given events were (Brown and Kulik, 1977; Christianson and Loftus, 1987; Madan et al., 2017). Accordingly, because the inflation shock was extreme relative to East Germans' previous experiences, its effect on East Germans' expectations may not decline over time but instead fluctuate with current inflation. Moreover, our findings highlight how transitioning from one economic environment to another can have persistent effects on people's expectations through the interaction of norms in the old environment and initial experiences in the new environment.

6 Additional Results: Inflation Expectations and Behavior

6.1 Inflation Expectations and Consumption Behavior

Above we have shown that East Germans persistently expect higher inflation than West Germans. In this section we examine whether East Germans have adjusted to an environment of rising prices in the way they use their inflation expectations to smooth consumption. According to a standard Euler equation, an increase in expected inflation should reduce the perceived real interest rate and therefore lead individuals to increase current spending.

Replicating the estimation in D'Acunto et al. (2018a), we use the GfK data to regress people's opinion on whether it is a good time to buy large ticket items on a dummy indicating whether the respondent expects inflation to increase and a dummy for whether the respondent perceives high current inflation.[28] Individuals who expect increasing inflation are 5.4 percentage points more likely to agree that it is a good time to buy durables (Ta-

[28]We include the same set of controls as previously and additionally control for the respondent's expectations about own financial situation, general economic conditions and aggregate unemployment.

ble 8 column 1). Does the association between expectations and this proxy for spending differ between East and West Germans? In columns 2 and 3 of Table 8 we document that the effect of inflation expectations on durables spending is equally strong for East Germans as for West Germans (p=0.5579). This result suggest two things: First, while East Germans have not adjusted to West Germans in the way they form expectations, they have adjusted to an environment of rising prices in the way they use their expectations to smooth their consumption over time. Second, East Germans' inflation expectations do not purely reflect noise or measurement error but are related to East Germans' behavior in a meaningful way.

6.2 Inflation Expectations and Bond Holdings

The previous section documents that East Germans' inflation expectations are correlated with their consumption behavior. Are differences in inflation expectations reflected in differences in behavior between East and West Germans? Answering this question poses several challenges. First, East Germans may interpret "good time to buy durables" differently than West Germans.[29] We therefore turn to an outcome measure that is directly comparable between East and West Germans. Specifically, we use the PHF data to construct a dummy indicating whether the household holds any assets with a fixed nominal return including bonds, certificates and investment funds that predominantly invest in bonds.[30] Higher expected inflation should make assets with a fixed nominal rate of return less attractive. We would therefore expect East Germans to be less likely to invest in such assets. Second, subjective expectations are measured with error, while the dummy variable indicating whether the respondent lived in East Germany in 1989 should not be subject to major misreporting. The power of inflation expectations to account for differences between East and West Germans' bond holdings will therefore be underestimated in OLS regressions. Following Das et al. (2017) we address this problem using

[29]The question framing likely elicits people's perception of whether it is a good time to buy durables relative to other times. Thus, East and West Germans might disagree on what a "good time to buy durable goods" means. Directly comparing answers of East and West Germans to this question is therefore not meaningful.

[30]Focusing on the extensive margin avoids the problem that large outliers could be confounding our estimations. This could be particularly severe for holdings of bonds which are highly skewed.

instrumental variable estimations. Specifically, we instrument people's point forecast of inflation using a dummy variable indicating whether the respondent expects prices to increase significantly according to her qualitative inflation expectations. Finally, while East Germans expect higher inflation than West Germans, they may still differ along other dimensions that are relevant for their financial behavior. To account for such differences we add proxies for financial literacy, risk aversion and generalized trust to our set of control variables, which also includes income, wealth and individual characteristics.

The results are shown in Table 9. A one percentage point increase in expected inflation is associated with a decrease in the probability that a household invests in bonds of roughly 1 percentage point (column 1). This relationship is weaker and more noisily measured for East Germans than for West Germans (columns 2 and 3). Given the small size of the dataset, we are naturally much less powered in our estimations on the PHF than in our estimations on the GfK reported in the previous subsection. East Germans are substantially less likely to invest in bonds than West Germans (column 4). When jointly including the East dummy and the respondent's expected inflation rate, the estimated East coefficients is reduced in size by around 25 percent and becomes statistically insignificant (column 5). This indicates that roughly 25 percent of the lower tendency to hold bonds among East Germans can be explained by higher expected inflation. To the extent that the IV estimation does not fully account for measurement error, this corresponds to a lower bound on the actual effect.

7 Conclusion

We use the natural experiment of the German reunification to examine how well consumers adapt to a new economic environment in their forecasting of macroeconomic variables. We document that even 25 years after the fall of the Berlin Wall, East Germans expect significantly higher inflation, make larger forecast errors and seem to be more uncertain about future inflation than West Germans, with little sign of convergence. Differences in expectations seem to be due to East Germans putting a higher probability

on large increases in inflation. These patterns cannot be explained by differences in consumption baskets, financial literacy or risk aversion. While East Germans have lower trust in the central bank, this does not seem to fully explain our findings. We provide evidence consistent with the idea that East Germans, who were used to a norm of zero inflation, overadjusted to an environment of rising prices in the face of the initial inflation shock after reunification.

Our results suggest that consumers find it difficult to accurately forecast macroeconomic variables after large changes in the economic environment, and that such effects can persist even decades after the event. The interaction of norms in the old environment and initial experiences in the new environment seems to matter for how well people adjust to a new environment. Large economic changes could have long-run implications for people's economic behavior through their effect on expectations. Moreover, by reducing people's ability to form accurate macroeconomic expectations, large changes in the economic environment could permanently affect the effectiveness of fiscal and monetary policy. Finally, our findings suggest that the strength of macroeconomic experiences in shaping people's beliefs may not only depend on recency but also on how extreme or surprising given events were. Memories of such extreme events may not become weaker over time but may instead be triggered by changes in current economic conditions.

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Main Tables

Table 1: Summary Statistics: Panel of Household Finances (PHF)

	West			East		
	Mean	SD	N	Mean	SD	N
Female	0.41	0.49	5447	0.51	0.50	1019
Age	58.56	14.01	5447	55.35	14.91	1019
Below middle school	0.29	0.45	5447	0.22	0.42	1019
Middle school	0.27	0.44	5447	0.49	0.50	1019
High school	0.12	0.33	5447	0.09	0.28	1019
University	0.31	0.46	5447	0.20	0.40	1019
Still in education	0.00	0.06	5447	0.00	0.03	1019
Education: Other	0.00	0.06	5447	0.00	0.04	1019
Single	0.11	0.32	5447	0.15	0.36	1019
Married	0.68	0.47	5447	0.58	0.49	1019
Separated	0.02	0.13	5447	0.02	0.14	1019
Divorced	0.10	0.30	5447	0.14	0.35	1019
Widowed	0.08	0.28	5447	0.11	0.31	1019
Employed full-time	0.37	0.48	5447	0.41	0.49	1019
Employed part-time	0.13	0.34	5447	0.10	0.30	1019
On leave	0.01	0.11	5447	0.03	0.16	1019
Unemployed	0.02	0.15	5447	0.09	0.28	1019
Full-time education	0.00	0.06	5447	0.00	0.06	1019
Retired	0.39	0.49	5447	0.32	0.47	1019
Disabled	0.03	0.16	5447	0.05	0.22	1019
Housekeeping	0.04	0.19	5447	0.01	0.09	1019
Employment: Other	0.00	0.05	5447	0.00	0.03	1019
Number of adults	2.01	0.81	5447	1.85	0.69	1019
Number of children	0.28	0.69	5447	0.32	0.72	1019
Urban (City size > 100,000)	0.36	0.48	5447	0.34	0.47	1019
Net monthly household income	3316.77	2062.98	5447	2183.35	1285.58	1019
Net household wealth	332406.54	469073.77	5447	83909.75	135189.40	1019
Bonds: Any	0.16	0.37	5447	0.07	0.25	1019
Owner	0.67	0.47	5447	0.46	0.50	1019
Renter	0.30	0.46	5447	0.49	0.50	1019
Tenancy status: Other	0.03	0.18	5447	0.05	0.21	1019
Risk aversion	6.16	2.23	5444	6.41	2.35	1019
Trust	5.51	1.99	5437	5.06	2.12	1019
Patience	5.34	2.45	5444	5.40	2.52	1018
Financial literacy: Number correct	2.63	0.65	5349	2.46	0.78	1013
Expect high inflation next year	0.29	0.45	5447	0.42	0.49	1019
Expect high food price inflation	0.04	0.20	1816	0.10	0.30	348
Expect high services price inflation	0.08	0.27	1816	0.26	0.44	348
Expected inflation rate next year	2.60	3.08	2785	3.96	3.89	527
Expected stock return next year	1.04	5.13	2070	0.87	4.66	312
Expected interest rate next year	0.73	0.65	2668	0.80	0.74	491
Expect real income decrease next year	0.53	0.50	5387	0.52	0.50	1005
Expect job loss next three years	0.05	0.21	2617	0.09	0.29	470

Notes: This table displays summary statistics for our main working sample from the Panel of Household Finances (PHF). All monetary variables are adjusted to 2010 euros.

Table 2: Summary Statistics: GfK Consumer Climate Survey

	West			East		
	Mean	SD	N	Mean	SD	N
Female	0.55	0.50	263165	0.54	0.50	69434
Age	50.32	15.21	263165	51.45	15.32	69434
Below middle school	0.49	0.50	263165	0.25	0.43	69434
Middle school	0.33	0.47	263165	0.57	0.49	69434
High school	0.10	0.30	263165	0.05	0.22	69434
University	0.08	0.27	263165	0.12	0.33	69434
Single	0.14	0.34	263165	0.12	0.33	69434
Married or living with partner	0.68	0.47	263165	0.69	0.46	69434
Divorced or widowed	0.18	0.38	263165	0.19	0.39	69434
Employed full-time	0.36	0.48	263165	0.38	0.49	69434
Employed part-time	0.15	0.35	263165	0.09	0.29	69434
Self-employed	0.08	0.28	263165	0.06	0.25	69434
Unemployed	0.05	0.21	263165	0.12	0.33	69434
Full-time education	0.02	0.14	263165	0.02	0.12	69434
Retired	0.25	0.43	263165	0.31	0.46	69434
Housekeeping	0.09	0.29	263165	0.02	0.13	69434
Number of children	0.48	0.83	228414	0.35	0.69	60571
Urban (City size > 100,000)	0.20	0.40	263165	0.14	0.34	69434
Net monthly household income	2388.87	1034.80	199984	1919.26	884.09	56161
Owner	0.55	0.50	263165	0.44	0.50	69434
Renter	0.45	0.50	263165	0.56	0.50	69434
Expect higher inflation next year	0.13	0.33	263165	0.19	0.40	69434
Expected inflation rate next year	5.17	5.00	70694	6.08	5.51	22410
Perceived current inflation rate	5.32	5.32	84496	6.16	5.73	25118
Expected infl. rate mult. of 5	0.28	0.45	70694	0.32	0.47	22410
Perceived infl. rate mult. of 5	0.28	0.45	84496	0.32	0.47	25118
Expect higher unemployment next year	0.44	0.50	257570	0.53	0.50	67962
Good time to buy durables	0.23	0.42	248003	0.20	0.40	63693

Notes: This table displays summary statistics for our main working sample from the GfK Consumer Climate Survey. All monetary variables are adjusted to 2010 euros.

Table 3: Main Results: Inflation Expectations (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***	0.901***	0.086***	0.051**	-0.037***	0.024
	(0.184)	(0.250)	(0.017)	(0.025)	(0.010)	(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

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of net total household income, the log of total net wealth, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table 4: Main Results: Inflation Expectations (GfK)

	Expected inflation rate		Absolute forecast error		Expect inflation to increase		Exp. infl. rate mult. of 5	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
East	0.834***	0.435***	0.806***	0.412***	0.065***	0.056***	0.043***	0.024***
	(0.043)	(0.024)	(0.042)	(0.024)	(0.002)	(0.002)	(0.004)	(0.003)
Perceived current infl. rate		0.785***						
		(0.004)						
Absolute nowcast error				0.780***				
				(0.004)				
Prices increased strongly						0.107***		
						(0.005)		
Prices increased moderately						0.054***		
						(0.004)		
Prices increased a little						-0.004		
						(0.004)		
Prices remained the same						-0.004		
						(0.004)		
Perc. infl. rate mult. of 5								0.639***
								(0.003)
Observations	93104	87677	93104	87677	332599	331323	93104	87677
R-squared	.099	.724	.134	.73	.053	.07	.048	.442
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table 5: Mechanisms: Additional Controls (PHF)

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

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of net total household income, the log of total net wealth, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table 6: Mechanisms: Other Expectations (PHF and GfK)

	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***	0.041**	0.171***	-0.128	0.027	0.082***
	(0.017)	(0.017)	(0.026)	(0.299)	(0.037)	(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

Notes: The estimations in columns 2 and 3 were run by Bundesbank staff on data from a pretest interview conducted in 2016 prior to the fielding of the third wave of the survey. All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of net total household income, and dummies for municipality size. The specifications using the PHF sample additionally control for the log of total net wealth. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table 7: Mechanisms: Old Norms and Initial Shock

	Strong norm in old environment	Initial shock in new environment	Persistent East effect on expectations
Inflation	Yes	Yes	Yes
Food price inflation	Yes	Moderate	Moderate
Services price inflation	Yes	Strong	Strong
Stock returns	No	(No)	No
Interest rates on savings accounts	Yes	No	No
Aggregate unemployment	Yes	Yes	Yes

Notes: This table provides an overview of norms in the old environment, whether there was an initial shock in the new environment, and whether there is a significant difference in expectations between East and West Germans for different macroeconomic variables. The German stock market went up 33.7 percent during 1989 when the Berlin wall fell, but dropped by 21.9 percent in 1990, the year of the reunification. This was in line with fluctuations in German stock returns before and after reunification.

Table 8: Additional Results: Inflation Expectations and Consumption Behavior (GfK)

	Good time to buy durable goods		
	(1)	(2)	(3)
Expect inflation to increase	0.053***	0.054***	0.051***
	(0.002)	(0.003)	(0.004)
Perc. high current inflation	-0.041***	-0.046***	-0.018***
	(0.002)	(0.002)	(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

Notes: All specifications control for the respondent's outlook about the household's financial situation, expected general economic conditions, expected change in aggregate unemployment, gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table 9: Additional Results: Inflation Expectations and Bond Holdings (PHF)

	Bonds>0				
	(1)	(2)	(3)	(4)	(5)
Expected inflation rate	-0.010*	-0.013*	-0.004		-0.010*
	(0.005)	(0.007)	(0.010)		(0.006)
East in 1989				-0.033*	-0.025
				(0.018)	(0.019)
Observations	2199	1910	289	2199	2199
R-squared	.088	.084	.148	.092	.088
First-stage F-stat	175.719	134.433	32.144		170.942
Sample	All	West	East	All	All
Household controls	Yes	Yes	Yes	Yes	Yes

Notes: All specifications control for risk aversion, generalized trust, financial literacy, expected stock returns, gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of net total household income, the log of total net wealth, and dummies for municipality size. Quantitative inflation expectations are instrumented by qualitative inflation expectations, namely a dummy indicating whether the respondent expects high inflation. The reported first-stage F-statistic is the Sanderson-Windmeijer F-statistic (Sanderson and Windmeijer, 2016). Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Main Figures

Figure 1: Inflation in East and West Germany

Notes: This figure displays the evolution of CPI inflation rates in East and West Germany after reunification. Official separate inflation rates for East and West Germany are unavailable from 2000 onward. We calculate weighted averages of state-level (Bundesland-level) inflation rates for these years. We exclude Berlin because no separate inflation rates for East Berlin and West Berlin are available. We exclude Hamburg and Schleswig-Holstein when calculating West German inflation rates because these states do not publish their own CPIs. Sources: Federal Statistical Office of Germany and "Statistisches Jahrbuch der Deutschen Demokratischen Republik".

Figure 2: Expected Inflation Rate in East and West Germany over Time (GfK)

Notes: This figure displays average expected inflation rates among East Germans and among West Germans, as well as actual CPI inflation rates in Germany overall. Sources: Federal Statistical Office of Germany and GfK Consumer Climate Survey.

Figure 3: Estimated East Coefficient over Time (GfK): Absolute Forecast Errors

Notes: This figure plots the estimated East effect on the absolute forecast error obtained from estimating equation 1 separately for each quarter (bars, left y-axis), as well as actual CPI inflation rates in Germany overall (dotted line, right y-axis). All specifications control for perceived past inflation, gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Sources: Federal Statistical Office of Germany and GfK Consumer Climate Survey. 95-percent confidence bands are shown in brackets.

Figure 4: Estimated East Effects across Groups (Eurobarometer and GfK): Trust in the ECB and Expected Inflation Rate

Notes: This figure plots the estimated East effect on the expected inflation rate against the estimated East effect on trust in the ECB for different groups. All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, dummies for municipality size, and time fixed effects. The specifications on the expected inflation rate on the GfK sample in addition control for the log of total net household income. The size of the dots is proportional to the square root of the product of the sample sizes for the two outcomes. Since the subgroups are partially overlapping, the linear fit should not be interpreted as the best linear fit in the population.

Figure 5: Inflation of Prices of Food and Services in East Germany around Reunification

Notes: This figure displays the evolution of year-on-year inflation rates for food and services in East Germany around reunification. Sources: Federal Statistical Office of Germany and "Statistisches Jahrbuch der Deutschen Demokratischen Republik".

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

Olga Goldfayn-Frank and Johannes Wohlfart

A Variable Descriptions

A.1 Panel of Household Finances

The wording of the outcome questions we use in our estimations on the PHF is as follows:

- **Qualitative inflation expectations**: How do you think the general price level will develop over the next 12 months? Rise significantly; Rise somewhat; Stay approximately the same; Fall somewhat; Fall significantly.
- **Expected inflation rate**: What do you think, by what percentage will the general price level (rise/fall) in the next 12 months?
- **Expected stock return**: What do you think, by what percentage will stock prices (rise/fall) over the next 12 months?
- **Expected interest rate**: What do you think, how high will interest rates in your savings accounts be over the next 12 months on average?
- **Qualitative job loss expectations**: Do you expect that you could be affected by an undesirable change at work over the next three years, e.g. loss of job or short-time work? Yes; No. What could it be? Job loss; Short-term work; Undesirable change of job content; Undesirable change of job location; Other.
- **Qualitative real income expectations**: What do you think, will the income of your household rise faster or slower in the next twelve months than the cost of living or approximately as much as the cost of living? Will rise more than the cost

of living; Will rise about as much as the cost of living; Will rise less than the cost of living.

- **Qualitative food price inflation expectations**: In your view, how will the prices of the following goods and services change in the next 12 months? The prices of food. Rise significantly; Rise somewhat; Stay approximately the same; Fall somewhat; Fall significantly.

- **Qualitative services price inflation expectations**: In your view, how will the prices of the following goods and services change in the next 12 months? The prices of services (e.g. hairdresser, dry cleaning). Rise significantly; Rise somewhat; Stay approximately the same; Fall somewhat; Fall significantly.

We include the following control variables: a dummy for females; a polynomial in age; dummies for educational attainment, indicating educational attainment of middle school, high school, university, other educational attainment, still in education (below middle school being the omitted category); dummies for marital status, namely married, separated, divorced, widowed (single being the omitted category); dummies for employment status, specifically employed part-time, on leave, unemployed, in full-time education, retired, disabled, housekeeping, other employment status (employed full-time being the omitted category); log net monthly household income and log net wealth (using inverse hyperbolic sine transformations); and dummies for municipality size (5,000-20,000; 20,000-100,000; 100,000-500,000; more than 500,000, with below 5,000 being omitted).

A.2 GfK Consumer Climate Survey

The wording of the outcome questions we use in our estimations on the GfK Survey are as follows:

- **Qualitative inflation expectations**: 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.

- **Expected inflation rate**: By how many percent do you expect consumer prices to go up/down in the next 12 months? Consumer prices will increase by _,_%/decrease by _,_%.

- **Qualitative perceived past inflation**: In your opinion, how did consumer prices evolve during the past 12 months? Increased strongly; Increased moderately; Increased slightly; Stayed the same; Decreased.

- **Perceived current inflation rate**: By how many percent in your opinion did the consumer prices go up/down in the past 12 months? Consumer prices increased by _,_%/decreased by _,_%.

- **Qualitative aggregate unemployment expectations**: How do you expect the number of people unemployed in Germany will change over the next 12 months? Increase sharply; Increase slightly; Remain the same; Fall slightly; Fall sharply.

- **Good time to buy**: Given the current economic situation, do you think it's a good time to buy larger items such as furniture, electronic items etc? Yes, it's a good time; The time is neither good nor bad; No, it's a bad time.

We include the following control variables: a dummy for females; a polynomial in age, dummies for educational attainment, indicating educational attainment of middle school, high school, university (below middle school being the omitted category); dummies for marital status, namely married, living as couple, separated, divorced, widowed (single being the omitted category); dummies for employment status, specifically employed part-time, self-employed, unemployed, in full-time education, retired, housekeeping (in paid full-time employment being the omitted category); log net monthly household income (using an inverse hyperbolic sine transformation) as well as a dummy variable for missing income information (income is set to zero in these cases); as well as dummies for municipality size (5,000-20,000; 20,000-100,000; 100,000-500,000; more than 500,000, with below 5,000 being the omitted category).

A.3 Eurobarometer

The wording of the question on trust in the ECB in the Eurobarometer is as follows:

- **Trust ECB**: For each of the following European institutions, please tell me if you tend to trust it or tend not to trust it? Tend to trust; Tend not to trust.

We include the following control variables: a dummy for females; a polynomial in age; dummies that proxy for educational attainment, constructed from a variable indicating the age at which the respondent has completed full-time education, specifically middle school (completed full-time education between age 16 and 18), high school (completed full-time education between age 19 and 22), university (completed full-time education at age 23 or older), still in education, with below middle school being the omitted category; dummies for marital status, specifically married, single with partner, divorced, widowed, other marital status (single without partner being the omitted category); dummies for employment status, specifically self-employed, house keeping, unemployed, retired, student (in paid employment being the omitted category); and dummies for living in a small or middle size town and for living in a large town (living in a rural town being omitted).

B Construction of Experience-based Inflation Forecasts

As in Malmendier and Nagel (2016), we construct a weighted average of experienced past inflation rates for each individual i in year t, using a specification of weights that introduces merely one additional parameter to measure past experiences:

$$\pi_{it}(\lambda) = \sum_{k=1}^{age_{it}-1} w_{it}(k,\lambda)\pi_{t-k} \tag{3}$$

where

$$w_{it}(k,\lambda) = \frac{(age_{it}-k)^{\lambda}}{\sum_{k=1}^{age_{it}-1}(age_{it}-k)^{\lambda}} \tag{4}$$

where π_{t-k} is the inflation rate in East or West Germany in year t-k. Following Malmendier and Nagel (2016) we assume that experiences matter from the year of birth onward.

The weight $w_{it}(k, \lambda)$ is a function of k, i.e. how distant the inflation rate was experienced relative to the individual's age at time t, and of the weighting parameter λ. Higher values of λ indicate a greater relative importance of more recent experiences compared to more distant experiences. In line with the findings in Malmendier and Nagel (2016), we calculate average experienced inflation rates using weights of $\lambda = 1$, $\lambda = 2$ and $\lambda = 3$ which give rise to weights that decrease when one moves further into the past from the survey year.[1]

[1] A weight of $\lambda = 0$ would give equal importance to all experienced inflation rates, while negative values of λ would attach greater importance to more distant experiences than to more recent experiences.

C Additional Tables

Table A1: Summary Statistics: Eurobarometer

	West			East		
	Mean	SD	N	Mean	SD	N
Female	0.51	0.50	25826	0.52	0.50	15322
Age	54.06	15.85	25826	53.86	15.99	15322
Below middle school	0.28	0.45	25826	0.21	0.41	15322
Middle school	0.39	0.49	25826	0.48	0.50	15322
High school	0.15	0.36	25826	0.16	0.36	15322
University	0.18	0.38	25826	0.15	0.36	15322
Single	0.12	0.32	25826	0.14	0.35	15322
Single living with partner	0.07	0.25	25826	0.08	0.28	15322
Married	0.62	0.48	25826	0.53	0.50	15322
Divorced or separated	0.09	0.29	25826	0.12	0.32	15322
Widowed	0.10	0.29	25826	0.12	0.32	15322
Marital status: Other	0.01	0.07	25826	0.01	0.07	15322
Employed	0.44	0.50	25826	0.38	0.48	15322
Self-employed	0.06	0.25	25826	0.07	0.25	15322
Unemployed	0.05	0.22	25826	0.14	0.34	15322
Student	0.01	0.11	25826	0.02	0.12	15322
Retired	0.35	0.48	25826	0.38	0.49	15322
Housekeeping	0.08	0.28	25826	0.02	0.14	15322
Number of adults	1.99	0.87	21137	1.83	0.78	10734
Number of children	0.38	0.85	21137	0.24	0.69	10734
Urban	0.24	0.43	25826	0.30	0.46	15322
Tend to trust ECB	0.48	0.50	25826	0.44	0.50	15322
Tend not to trust ECB	0.37	0.48	25826	0.42	0.49	15322

Notes: This table displays summary statistics for our main working sample from the Eurobarometer.

Table A2: Main Results showing Key Controls: Inflation Expectations (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***	0.901***	0.086***	0.051**	-0.037***	0.024
	(0.184)	(0.250)	(0.017)	(0.025)	(0.010)	(0.015)
Female	0.682***	0.677***	0.046***	0.045***	-0.029***	-0.002
	(0.143)	(0.143)	(0.013)	(0.013)	(0.008)	(0.010)
Age	0.008	0.007	0.014***	0.014***	-0.007***	0.000
	(0.035)	(0.035)	(0.003)	(0.003)	(0.002)	(0.004)
Age squared	-0.000	-0.000	-0.000***	-0.000***	0.000**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Middle school	-0.334*	-0.340*	0.002	-0.000	0.004	-0.008
	(0.177)	(0.178)	(0.016)	(0.016)	(0.009)	(0.014)
High school	-0.916***	-0.910***	-0.044**	-0.044**	0.042***	-0.020
	(0.190)	(0.190)	(0.021)	(0.021)	(0.015)	(0.016)
University	-0.822***	-0.831***	-0.062***	-0.064***	0.043***	-0.024*
	(0.166)	(0.166)	(0.017)	(0.017)	(0.011)	(0.013)
Married	-0.194	-0.190	0.050**	0.049**	0.013	-0.005
	(0.225)	(0.226)	(0.020)	(0.020)	(0.014)	(0.014)
Separated	-0.989**	-0.981**	-0.061	-0.062	0.072**	0.038
	(0.453)	(0.455)	(0.046)	(0.046)	(0.036)	(0.037)
Divorced	-0.121	-0.102	0.038	0.039	0.028	-0.030*
	(0.303)	(0.304)	(0.025)	(0.025)	(0.017)	(0.018)
Widowed	-0.601*	-0.589*	0.002	0.003	0.031*	-0.030
	(0.316)	(0.316)	(0.029)	(0.029)	(0.017)	(0.026)
Unemployed	0.922*	0.917*	0.046	0.045	-0.018	
	(0.545)	(0.545)	(0.037)	(0.037)	(0.020)	
Retired	0.148	0.145	0.006	0.006	-0.027**	0.036
	(0.207)	(0.207)	(0.021)	(0.021)	(0.013)	(0.046)
Housekeeping	-0.081	-0.047	-0.036	-0.033	0.008	0.182
	(0.483)	(0.484)	(0.033)	(0.033)	(0.023)	(0.217)
Log (Income)	-0.238**	-0.237**	-0.025**	-0.024**	0.022**	-0.035***
	(0.113)	(0.113)	(0.011)	(0.011)	(0.009)	(0.009)
Log (Wealth)	-0.075***	-0.076***	-0.014***	-0.014***	-0.000	-0.001
	(0.021)	(0.021)	(0.002)	(0.002)	(0.001)	(0.002)
Pop 5,000-20,000	0.322*	0.309*	0.005	0.005	-0.009	0.010
	(0.177)	(0.177)	(0.017)	(0.017)	(0.011)	(0.012)
Pop 20,000-100,000	0.250	0.311*	0.014	0.021	-0.018	0.016
	(0.168)	(0.173)	(0.017)	(0.018)	(0.011)	(0.012)
Pop 100,000-500,000	0.546***	0.630***	0.040**	0.050**	0.011	0.041**
	(0.201)	(0.212)	(0.020)	(0.020)	(0.013)	(0.016)
Pop >500,000	0.022	0.024	-0.004	-0.010	0.000	0.024*
	(0.170)	(0.180)	(0.019)	(0.020)	(0.013)	(0.014)
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

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of net total household income, the log of total net wealth, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A3: Main Results showing Key Controls: Inflation Expectations (GfK)

	Expected inflation rate		Absolute forecast errors		Expect inflation to increase		Exp. infl. rate mult. of 5	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
East	0.834***	0.435***	0.806***	0.412***	0.065***	0.056***	0.043***	0.024***
	(0.043)	(0.024)	(0.042)	(0.024)	(0.002)	(0.002)	(0.004)	(0.003)
Perceived current infl. rate		0.785***						
		(0.004)						
Absolute nowcast error				0.780***				
				(0.004)				
Prices increased strongly						0.107***		
						(0.005)		
Prices increased moderately						0.054***		
						(0.004)		
Prices increased a little						-0.004		
						(0.004)		
Prices remained the same						-0.004		
						(0.004)		
Perc. infl. rate mult. of 5								0.639***
								(0.003)
Female	0.330***	-0.001	0.325***	0.003	-0.009***	-0.010***	0.029***	0.008***
	(0.036)	(0.020)	(0.036)	(0.020)	(0.001)	(0.001)	(0.003)	(0.003)
Age	-0.005	0.010*	-0.004	0.010**	0.002***	0.002***	-0.003***	-0.001
	(0.009)	(0.005)	(0.009)	(0.005)	(0.000)	(0.000)	(0.001)	(0.001)
Age squared	-0.000**	-0.000**	-0.000**	-0.000**	-0.000***	-0.000***	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Continued next page ...

Table A3 continued: Main Results showing Key Controls: Inflation Expectations (GfK)

	Expected inflation rate		Absolute forecast errors		Expect inflation to increase		Exp. infl. rate mult. of 5	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Married	0.237***	-0.054	0.230***	-0.063*	0.000	-0.003	0.012**	0.003
	(0.061)	(0.034)	(0.061)	(0.034)	(0.002)	(0.002)	(0.005)	(0.004)
Divorced/widowed/separated	0.054	-0.042	0.046	-0.059	0.002	-0.001	0.007	0.000
	(0.067)	(0.038)	(0.066)	(0.038)	(0.002)	(0.002)	(0.006)	(0.005)
Middle school	-0.162***	-0.027	-0.152***	-0.025	0.004**	0.008***	-0.014***	0.003
	(0.041)	(0.022)	(0.040)	(0.022)	(0.001)	(0.001)	(0.004)	(0.003)
High school	-0.467***	0.003	-0.451***	0.007	0.006**	0.011***	-0.027***	0.001
	(0.059)	(0.035)	(0.059)	(0.035)	(0.002)	(0.002)	(0.006)	(0.005)
University	-0.623***	-0.016	-0.608***	-0.018	0.023***	0.031***	-0.059***	-0.017***
	(0.054)	(0.031)	(0.054)	(0.031)	(0.002)	(0.002)	(0.005)	(0.004)
Unemployed	0.557***	0.223***	0.536***	0.206***	0.016***	0.012***	0.029***	0.004
	(0.092)	(0.051)	(0.091)	(0.051)	(0.003)	(0.003)	(0.008)	(0.006)
Retired	0.336***	0.089***	0.326***	0.083**	0.004*	0.005*	0.025***	0.010**
	(0.061)	(0.033)	(0.061)	(0.033)	(0.002)	(0.002)	(0.006)	(0.004)
Housekeeping	0.247***	0.080*	0.237***	0.072	0.010***	0.011***	0.020***	0.007
	(0.084)	(0.047)	(0.083)	(0.047)	(0.003)	(0.003)	(0.007)	(0.006)
Log (Income)	-1.176***	-0.074**	-1.158***	-0.068**	-0.013***	-0.008***	-0.085***	-0.026***
	(0.055)	(0.031)	(0.054)	(0.031)	(0.002)	(0.002)	(0.004)	(0.004)
Observations	93104	87677	93104	87677	332599	331323	93104	87677
R-squared	.099	.724	.134	.73	.053	.07	.048	.442
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A4: Ordered Probit: Inflation Expectations (PHF)

	Ordered probit	Average marginal effects				
	(1) Latent variable	(2) Exp. high deflation	(3) Exp. some deflation	(4) Exp. no inflation	(5) Exp. some inflation	(6) Exp. high inflation
East in 1989	.1728***	-.0015***	-.0056***	-.0384***	-.0351***	.0806***
	(.0344)	(.0005)	(.0012)	(.0068)	(.0062)	(.0141)
μ_1	-3.3129***					
	(.3456)					
μ_2	-2.6623***					
	(.3362)					
μ_3	-1.4782***					
	(.3311)					
μ_4	.4034					
	(.3302)					
Observations	6466					
Pseudo R-squared	.0883					
Cohorts in sample	<1983	<1983	<1983	<1983	<1983	<1983
Household controls	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Column 1 displays the ordered probit estimates, while columns 2 to 6 calculate average marginal effects of the East dummy on the five different outcomes. μ_1 to μ_4 are the estimated cutoffs of the latent variable. The estimation controls for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of net total household income, the log of total net wealth, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A5: Robustness: Inflation Expectations (PHF)

	Base-line	Born <1973	Sampling weights	Winsor. exp.	Control for homeownership	County FE	State dummies
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
East in 1989	1.040***	1.181***	0.644**	1.069***	1.037***	0.854**	
	(0.184)	(0.209)	(0.260)	(0.205)	(0.185)	(0.347)	
East Berlin							0.814
							(0.609)
Mecklenburg - W.P.							0.956*
							(0.493)
Saxony-Anhalt							1.376**
							(0.545)
Brandenburg							1.004
							(0.811)
Thuringia							0.752**
							(0.362)
Saxony							1.119***
							(0.275)
Observations	3312	2938	3312	3370	3312	3312	3064
R-squared	.085	.086	.086	.094	.085	.162	.085
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of net total household income, the log of total net wealth, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A6: Ordered Probit: Inflation Expectations (GfK)

	Ordered probit	Average marginal effects				
	(1) Latent variable	(2) Exp. deflation	(3) Exp. zero inflation	(4) Exp. lower inflation	(5) Exp. same inflation	(6) Exp. higher inflation
East	.2757***	-.0061***	-.0734***	-.0222***	.0379***	.0639***
	(.0047)	(.0001)	(.0012)	(.0004)	(.0006)	(.0012)
μ_1	-2.6524***					
	(.0472)					
μ_2	-.9504***					
	(.0466)					
μ_3	-.4467***					
	(.0466)					
μ_4	.878***					
	(.0466)					
Observations	348293					
Pseudo R-squared	.0293					
Cohorts in sample	<1983	<1983	<1983	<1983	<1983	<1983
Household controls	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Column 1 displays the ordered probit estimates, while columns 2 to 6 calculate average marginal effects of the East dummy on the five different outcomes. μ_1 to μ_4 are the estimated cutoffs of the latent variable. The estimation controls for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A7: Robustness: Inflation Expectations (GfK)

	Base-line	HH heads only	Born <1973	Born >1993	Sampling weights	Winsor. exp.	Control for homeownership	Control for exp. econ. cond.	Control for fin. situation	Eastern state dummies
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
East	0.435***	0.436***	0.460***	0.269	0.433***	0.454***	0.435***	0.405***	0.435***	
	(0.024)	(0.029)	(0.026)	(0.256)	(0.026)	(0.025)	(0.024)	(0.024)	(0.024)	
Perceived current infl. rate	0.785***	0.785***	0.788***	0.804***	0.781***	0.793***	0.785***	0.775***	0.781***	0.785***
	(0.004)	(0.005)	(0.004)	(0.036)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Mecklenburg - W. P.										0.049
										(0.062)
Saxony-Anhalt										0.498***
										(0.051)
Brandenburg										0.540***
										(0.051)
Thuringia										0.884***
										(0.044)
Saxony										0.231***
										(0.034)
Observations	87677	58172	73717	1239	87677	89006	87677	87677	87677	87677
R-squared	.724	.72	.727	.692	.724	.716	.724	.731	.725	.725
Household controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A8: Mechanisms: Heterogeneity (GfK)

	Expected inflation rate				
	(1)	(2)	(3)	(4)	(5)
East	0.435***	0.466***	0.609***	0.459***	0.243***
	(0.024)	(0.033)	(0.048)	(0.026)	(0.073)
Perceived current infl. rate	0.785***	0.785***	0.785***	0.785***	0.785***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
East x Female		-0.058			
		(0.043)			
East x Middle School			-0.225***		
			(0.056)		
East x High School			-0.320***		
			(0.101)		
East x University			-0.205***		
			(0.070)		
East x Urban				-0.138**	
				(0.059)	
East x Cohorts -1930					0.405**
					(0.163)
East x Cohorts 1931-1945					0.337***
					(0.086)
East x Cohorts 1946-1960					0.181**
					(0.082)
East x Cohorts 1961-1975					0.154*
					(0.083)
Observations	87677	87677	87677	87677	87677
R-squared	.724	.724	.724	.724	.724
Household controls	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A9: Mechanisms: Trust in the Central Bank (Eurobarometer)

	Trust ECB				
	(1)	(2)	(3)	(4)	(5)
East	-0.052***	-0.067***	-0.028***	-0.044***	-0.009
	(0.005)	(0.007)	(0.010)	(0.006)	(0.015)
East x Female		0.030***			
		(0.010)			
East x Middle School			-0.023*		
			(0.013)		
East x High School			-0.036**		
			(0.016)		
East x University			-0.049***		
			(0.016)		
East x Urban				-0.028**	
				(0.011)	
East x Cohorts -1930					-0.086***
					(0.025)
East x Cohorts 1931-1945					-0.041**
					(0.018)
East x Cohorts 1946-1960					-0.053***
					(0.018)
East x Cohorts 1961-1975					-0.042**
					(0.018)
Observations	41148	41148	41148	41148	41148
R-squared	.069	.069	.069	.069	.07
Household controls	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A10: Mechanisms: Aggregate Unemployment Expectations (GfK)

	Expect unemployment to increase				
	(1)	(2)	(3)	(4)	(5)
East	0.082***	0.076***	0.080***	0.092***	0.070***
	(0.002)	(0.003)	(0.004)	(0.002)	(0.006)
East x Female		0.012***			
		(0.004)			
East x Middle School			0.007		
			(0.005)		
East x High School			-0.022**		
			(0.009)		
East x University			0.003		
			(0.007)		
East x Urban				-0.065***	
				(0.006)	
East x Cohorts -1930					-0.006
					(0.011)
East x Cohorts 1931-1945					0.011
					(0.007)
East x Cohorts 1946-1960					0.020***
					(0.007)
East x Cohorts 1961-1975					0.012*
					(0.007)
Observations	342900	342900	342900	342900	342900
R-squared	.149	.149	.149	.149	.149
Household controls	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A11: Mechanisms: Role of Current Inflation (GfK)

	Absolute forecast errors	
	(1)	(2)
East	0.267***	0.244***
	(0.030)	(0.044)
East x Dummy (infl.>1.5 pct.)	0.291***	0.184***
	(0.043)	(0.064)
East x Cohorts -1960		0.045
		(0.054)
East x Cohorts -1960 x Dummy (infl.>1.5 pct.)		0.182**
		(0.078)
Perceived current infl. rate	0.772***	0.772***
	(0.004)	(0.004)
Observations	87677	87677
R-squared	.731	.731
Household controls	Yes	Yes
Time FE	Yes	Yes

Notes: All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, and dummies for municipality size. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A12: Mechanisms: Experience-based Inflation Forecasts in 2014 (PHF)

	West Mean	East Mean
Average experienced inflation ($\lambda = 1$)	2.31	1.83
Average experienced inflation ($\lambda = 2$)	2.06	1.99
Average experienced inflation ($\lambda = 3$)	1.89	1.98

Notes: Experience-based inflation forecasts are calculated as weighted averages of experienced inflation rates over respondents' lifetimes as described in section B in the online Appendix. The sample is the working sample from the 2014 wave of the PHF. Missing inflation rates were imputed using linear interpolation.

D Additional Figures

Figure A.1: Distribution of Expected Inflation Rates in 2014 (PHF)

Notes: This figure plots the distributions of the expected inflation rate over the next 12 months in the 2014 PHF sample in West (left panel) and East (right panel). Quantitative inflation expectations are not available for the 2011 wave of the PHF.

Figure A.2: Distribution of Expected Price Changes in 2011 and 2014 (PHF)

Notes: This figure plots the distributions of the categorical expected price changes over the next 12 months in the full PHF sample for West and East German respondents. The outcome variable "Expect high inflation" in the main analysis takes value one if the respondent expects prices to rise significantly and zero otherwise.

Figure A.3: Distribution of Expected Inflation Rates 2008-2016 (GfK)

Notes: This figure plots the distributions of the expected inflation rate over the next 12 months during the period 2008-2016 in the GfK sample in West (left panel) and East (right panel). Quantitative inflation expectations are not available for the period 2000-2007 in the GfK.

Figure A.4: Distribution of Expected Inflation 2000-2016 (GfK)

Notes: This figure plots the distributions of responses to the questions on expected inflation over the next 12 months compared to the previous 12 months in the GfK sample for West and East German respondents.

Figure A.5: Estimated East Effects over Time (GfK): Expect Increasing Inflation

Notes: This figure plots the estimated East effect on a dummy indicating whether the respondent expects inflation to increase obtained from estimating equation 1 separately for each year (bars, left y-axis), as well as actual CPI inflation rates in Germany overall (dotted line, right y-axis). All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, the log of total net household income, dummies for municipality size, and month of interview fixed effects. Sources: Federal Statistical Office of Germany and GfK Consumer Climate Survey. 95-percent confidence bands are shown in brackets.

Figure A.6: Qualitative Inflation Expectations in East and West Germany over Time (GfK)

Notes: This figure illustrates the share of respondents to the GfK Survey in East and West Germany expecting inflation to increase (left y-axis), as well as actual CPI inflation rates in Germany overall (right y-axis). Sources: Federal Statistical Office of Germany and GfK Consumer Climate Survey.

Figure A.7: Disagreement in Expected Inflation Rates among East Germans and among West Germans (GfK)

Notes: This figure illustrates the interquartile range (IQR) of quantitative inflation expectations reported in the GfK Survey among East Germans and among West Germans (left y-axis), as well as actual inflation rates in Germany overall (right y-axis). Sources: Federal Statistical Office of Germany and GfK Consumer Climate Survey.

Figure A.8: Estimated East Effects over Time (Eurobarometer and GfK): Trust in the ECB and Qualitative Inflation Expectations

Notes: This figure plots the estimated effects of the East dummy on trust in the ECB and on the tendency to expect increasing inflation obtained from estimating equation 1 separately for each year. All specifications control for gender, a polynomial in age, dummies for the respondent's educational attainment, dummies for marital status, dummies for employment status, and dummies for municipality size. The specifications on expected inflation using the GfK sample additionally control for the log of total net household income. 95-percent confidence bands are shown in brackets.