NBER WORKING PAPER SERIES

THE LONG-LASTING EFFECTS OF LIVING UNDER COMMUNISM ON ATTITUDES TOWARDS FINANCIAL MARKETS

Christine Laudenbach
Ulrike Malmendier
Alexandra Niessen-Ruenzi

Working Paper 26818
http://www.nber.org/papers/w26818

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
March 2020

We would like to thank Nicola Fuchs-Schuendeln, Mariassunta Giannetti, Mark Grinblatt, Michael Haliassos, Rawley Heimer, Zwetelina Iliewa, Alex Wagner, and seminar and conference participants at the Universities of Bonn, Berkeley, Chicago, Columbia, Frankfurt, Harvard, MIT, Stanford, UCLA, Wharton, the 4nations cup conference, the Helsinki Finance Summit, the NBER Summer Institute in Political Economy 2019, the Sloan-NOMIS Workshop at NYU, the Tinbergen Institute, and the International Conference on Household Finances 2018 for helpful comments. All errors are our own. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

The Long-lasting Effects of Living under Communism on Attitudes towards Financial Markets
Christine Laudenbach, Ulrike Malmendier, and Alexandra Niessen-Ruenzi
NBER Working Paper No. 26818
March 2020
JEL No. D03,D14,D83,D84,E21,G11

ABSTRACT

We analyze the long-term effects of living under communism and its anticapitalist doctrine on households' financial investment decisions and attitudes towards financial markets. Utilizing comprehensive German brokerage data and bank data, we show that, decades after Reunification, East Germans still invest significantly less in the stock market than West Germans. Consistent with communist friends-and-foes propaganda, East Germans are more likely to hold stocks of companies from communist countries (China, Russia, Vietnam) and of state-owned companies, and are unlikely to invest in American companies and the financial industry. Effects are stronger for individuals exposed to positive "emotional tagging," e.g., those living in celebrated showcase cities. Effects reverse for individuals with negative experiences, e.g., environmental pollution, religious oppression, or lack of (Western) TV entertainment. Election years trigger further divergence of East and West Germans. We provide evidence of negative welfare consequences due to less diversified portfolios, higher-fee products, and lower risk-adjusted returns.

Christine Laudenbach
Goethe University Frankfurt
60629 Frankfurt am Main
Germany
laudenbach@finance.uni-frankfurt.de

Ulrike Malmendier
Department of Economics
549 Evans Hall # 3880
University of California, Berkeley
Berkeley, CA 94720-3880
and NBER
ulrike@econ.berkeley.edu

Alexandra Niessen-Ruenzi
University of Mannheim
Business School
L 5, 5 68161
Mannheim
Germany
niessen@bwl.uni-mannheim.de

A data appendix is available at http://www.nber.org/data-appendix/w26818

1 Introduction

Almost 30 years after Germany's Reunification, the persistent differences in beliefs, attitudes, and decision-making between East and West Germans remain striking. Whether we measure the presence of women in the workplace or xenophobia, preferences for state interventions or spending habits, the corresponding statistical maps of Germany clearly delineate the former border. As echoed in the international media covering East and West Germans three decades after the fall of the Berlin wall, why do "walls in their heads" remain?[1]

One important difference that has received less attention concerns attitudes towards capital markets and financial investment. East Germans are lagging behind in wealth accumulation far more than lower income levels and higher unemployment rates can explain.[2] These differences are strongly correlated with differences in financial investment, in particular stock-market participation.

In this paper, we analyze to what extent the persistent differences in financial decision-making are explained by the extent of individuals' prior exposure to communism, in particular how positively or negatively an individual has experienced living under communism. We document large and persistent differences in stock-market and other financial investment not only between East and West Germans, but also within East Germany and across different types of stocks: While stock-market investment is significantly lower in East Germany, stocks from communist countries attract significantly *more* East German ownership, and stocks of American companies and the financial industry significantly *less*. Moreover, the decision to abstain from investing in the stock market is coupled with negative attitudes towards financial markets. Within East Germany, those with relatively positive experiences, such as living in one of the celebrated "showcase cities," continue to shy away from capital markets, while those with relatively negative experiences, such as environmental pollution, religious oppression, or lack of access to Western TV entertainment, embrace the stock market significantly more. These differences in financial decisions have significant implications for individual wealth build-up.

[1] See New York Times, 2/13/2018, "Germans Quietly Pass an Equinox of Unity, but the Walls Remain", or Washington Post, 10/3/2016, "Germany reunified 26 years ago, but some divisions are still strong."

[2] Median net wealth is EUR 24,800 in the East, but ranges from EUR 55,700 to EUR 112,500 in similar-sized regions in the West according to a 2018 survey of 45,000 Germans, conducted by the German online bank Comdirect, cf. Sueddeutsche Zeitung, August 1, 2018, "Wo Deutschland wieder geteilt ist."

What explains the persistent negative attitude of East Germans towards stock-market investment, on average, as well as the significant correlation with positive and negative past experiences? Prior research has found personal lifetime experience to be an important driver of financial risk taking. In the stock market, for example, investment is strongly influenced by market returns experienced over one's lifetime so far, both on the extensive and the intensive margin.[3] In our setting, however, East Germans had virtually *no* experience with the stock market prior to Reunification. Their investment choices were limited to a savings account, a type of fixed-income security, and a form of (life) insurance savings account. As far as capital markets are concerned, East Germans were exposed only to the communist doctrine, including highly negative views of stock markets as "the root of all evil".[4]

We build on the concept of "emotional tagging" to explain the persistent imprint, and directional differences, generated by exposure to a communist system. Prior cognitive-science literature documents the long-term effects of ideological and emotional priming on behavior (Richter-Levin and Akirav (2003)). As also argued in memory research (Kahana (2012), Wachter and Kahana (2019)), an important predictor of decision-making is its "context." If a decision is similar to a previous situation it will trigger recall of this previous experience and its context, and the corresponding behavior. The context of a decision includes the time and location, in which a decision is made (cf. Bordalo, Gennaioli, and Shleifer (2019)), but also the "internal states" of the agent, such as emotions and concerns that form the "cognitive milieu" in which the agent is learning and making financial decisions (cf. Wachter and Kahana (2019)).

Here, we argue that communist messaging and the negative or positive emotional context of living under communism have a lasting influence on citizens. Specifically, we link the experience with the anti-capitalist (communist) regime of the GDR to individuals' long-term willingness to invest in capital markets and investigate variation by intensity and direction of exposure. Consistent with Laudenbach, Malmendier, and Niessen-Ruenzi (2019), we argue that the negative or positive

[3] See, e. g., Malmendier and Nagel (2011) and Malmendier, Pouzo, and Vanasco (2019). Similarly, personal investment outcomes (e. g., Strahilevitz, Odean, and Barber (2011), Kaustia and Knüpfer (2008)) or the local environment (e.g., Laudenbach, Loos, and Pirschel (2017), Kaustia and Knüpfer (2012)) also affect investment in the corresponding asset market.

[4] See, e. g., Handelsblatt, 11/08/2014, "Millionaires not wanted."

emotional context of living under communism is an important contextual dimension shaping episodic memory.

Germany is a unique testing ground for long-lasting exposure effects since it was divided into two parts, a capitalist and a communist system, after World War II, but reunified almost 30 years ago. People in the Western part lived in a capitalist system, where the German Exchange in Frankfurt re-opened under American protectorate in 1945. People in East Germany (the former GDR), instead, lived in a communist system, were excluded from stock-market participation, and were exposed to strongly negative views about capitalism in general, and the stock market in particular. Relative to other communist countries, the GDR stood out in its intense propagation of the communist doctrine, arguably because it could not legitimize itself as a "national state" like the other communist regimes (Haury (2004)): Germans were living on both sides of the border, and West Germany publicly claimed to represent all Germans. As we will show later, survey results suggest that exposure to the communist doctrine matters even today: Significantly more East than West Germans think that investing in the stock market is simply immoral.

We first develop a theoretical framework to illustrate how past exposure may shape long-lasting attitudes towards the stock market. In the model, West Germans learn about the stock market from their direct observations. East Germans have no direct experience with the stock market, and learn about the stock market through signals from the government, such as doctrine or ideology. Due to this learning process, beliefs towards the stock market are different at Reunification and continue to differ afterwards, even as East and West Germans receive the same signals. That is, our model captures the observed slow adjustment and convergence. The framework also highlights the potential drivers of heterogeneity within East Germany. These include intensity of exposure to government signals prior to Reunification, emotional tagging of the government's signals, and the effect of a resurgence of pro-communist signals during election years (triggers).

We test these predictions on both brokerage and bank data, augmented by numerous other data sources. The core data is a novel and comprehensive data set from the brokerage entity of a large German branch bank. It provides detailed holding, transaction, and demographic information for about 200,000 clients from 2004 to 2012. The data is thus larger than most of the data sets in the

household finance literature.[5] The size of the data matters in our context as we aim to analyze not only East-West but also within-East differences. Only 20% of the German population live in East Germany. Identification requires enough investors in each geographic region, e. g., to use regional proxies for emotional tagging. Taking the parent company of the broker together with the bank data, our analysis uses data from financial institutions that command a 50% market share in Germany. Importantly, this share does not remarkably differ between East and West.

Our first main result is that East Germans exhibit a significantly lower willingness to take stock-market risk, both at the extensive and the intensive margin. Even though East Germans face the same investment universe and the same legal and regulatory framework as West Germans, their stock-market participation is 15.6 pp lower and, conditional on participating, they hold 7.2 pp less stocks in their portfolios.

We replicate these findings on data from a large private bank, that also includes individuals' cash holdings and further wealth controls. Both in terms of statistical significance and in terms of economic magnitude, the estimated effects are very similar across those data sets. We also find significant differences in participation for the (arguably more homogeneous) subset of investors living in East and West Berlin, and for a subset of individuals living in two comparable, similar-size cities closely located on each side of the former border.

We also show that East-West differences in wealth and income, both at the individual and aggregate level, are unable to account for the stock-market participation gap. First, we control for investors' income, savings, and portfolio values through flexible functional forms. The point estimates for the stock-market participation gap remains virtually unaffected. Second, we show that individuals who moved from the former GDR to West Germany after Reunification invest significantly less than West Germans even though they share the same aggregate economic environment, and self-selected into it.

Furthermore, we demonstrate that potential differences in trust, risk tolerance, familiarity with stocks, and financial literacy are unable to account for much of the stock-market participation

[5] For comparison, the well-known Odean (1999) data comprises 78,000 individual investors. Other examples include Hoechle, Ruenzi, Schaub, and Schmid (2018) (40,000 clients of a Swiss retail bank), Laudenbach, Loos, and Pirschel (2017) (50,000 investors), and Meyer and Pagel (2019) (103,000 clients of an online bank).

gap. East and West German investors even hold similar stock-market expectations, ruling out that potentially more pessimistic expectations among East Germans drive our results.

Having addressed these traditional determinants of stock-market participation, we turn to our research hypothesis that the observed differences might constitute the long-lasting effects of living under Communism earlier in life. We first present results of a survey we fielded in July 2018. Survey results show that East German investors display a higher propensity to express pro-communist attitudes. Furthermore, survey respondents' pro-communist attitudes are strongly associated with abstinence from the stock market. Relatedly, results from our broker data show that East Germans invest significantly less than West Germans in firms perceived as particularly capitalist, namely financial institutions or firms located in the US, but *more* in firms located in (formerly) communist countries, as well as formerly state-owned German companies.

With these correlations at hand, we test whether the intensity of exposure to communist signals is reflected in differences in investors' stock-market participation within East Germany. We exploit both temporal and spatial variation in the exposure to communism. In line with prior findings in Fuchs-Schündeln and Masella (2016) that the length of exposure to a communist system matters for the strength of its impact, we show that the stock-market participation gap between East and West is larger for older individuals who were exposed to the communist doctrine of the GDR for a longer time. In terms of geographic variation, we exploit the fact that West Germans that lived close to the former inner-German border had the opportunity to visit relatives in the East who also lived close to the border. This so-called "Kleine Grenzverkehr" ('small border traffic') led East Germans in those areas to receive potentially countervailing signals. Indeed, we find that for East Germans living close to the inner-German border, the stock market participation gap is smaller, while it is bigger for those living further away from the border.

The core of our research question lies in exploring not only the exposure to communism itself, but on *how* an individual has experienced the communist system. As discussed earlier, the emotional context of an experience determines how it is anchored in memory. According to the emotional-tagging concept, emotionally arousing events are not only remembered *better* (since emotionally dependent information is modulated into enhanced memory, Richter-Levin and Akirav (2003)), but it also matters whether an experience is tagged with positive or negative emotions, as the affective

system determines which components from the collection of processed information are preserved in memory (Bergado, Lucas, and Richter-Levin (2011)).[6]

We test whether citizens with plausibly more negative experiences under the communist system exhibit weaker exposure effects, and whether those with plausibly more positive experiences exhibit stronger exposure effects. First, we use environmental pollution as a proxy for a more negative experience of living under communism. In spite of the communist regime's claim to protect the environment in the interest of peoples' well-being, the GDR had the highest levels of dust and sulfur dioxide emissions across all European countries (Petschow, Meyerhoff, and Thomasberger (1990)). Air pollution was both high on average and varied across the GDR. In the "air-hygienic heavily polluted territories," almost every second child suffered from respiratory diseases.[7] Thus, East Germans living in highly polluted areas should be more likely to have negative emotions tagged to their experience with communism. Correspondingly, we find that the stock-market participation gap is significantly less pronounced in areas that were highly polluted during GDR times.

Second, we utilize religious oppression. As common in communist systems, religious life was heavily suppressed in the GDR (Müller, Pollack, and Pickel (2013)). We conjecture that religious people are likely to form negative views about the communist system and hold more positive views about Western countries, which honor the freedom of religion. Consistently, we find that differences between East and West German stock-market investment are significantly mitigated in counties with high levels of religiosity: East Germans embrace capital markets more.

Third, we exploit exogenous variation in access to West German TV. Previous literature has shown that resistance to the communist system was higher in regions of the GDR that did *not* have access to West TV, which may at first seem surprising. As has been documented, though, West TV was a major source of entertainment for East Germans, the lack of which resulted in lower satisfaction with the GDR and hence a higher resistance to the political system (Kern and Hainmueller, 2009).[8] Access to West TV depended on the area of living; for example, TV signals

[6] Building on an older literature on mood congruence and state dependence in the 1970s and 1980s (e.g., Weingartner, Miller, and Murphy (1977), Isen et al (1978), Blaney (1986)), modern neurological foundations of mood and memory emphasize the role of the amygdala in reconsolidating emotional memory traces (Dolan (2002), Richter-Levin and Akirav (2003), LaBar and Cabeza (2006)).

[7] Cf. www.bundesregierung.de/breg-de/aktuelles/wahrheit-ueber-verschmutzung-der-umwelt-336222.

[8] Exposure to West German TV in the East has also been linked to consumption of advertised goods (Bursztyn and Cantoni, 2016), aspirations (Hyll and Schneider, 2013), fertility rates (Bönisch and Hyll, 2015), entrepreneurship

from the West could not be received in some low valleys. Since access to West TV is exogenous to other potentially confounding variables, we follow Bursztyn and Cantoni (2016) and use it as a natural experiment to examine whether our main result is weaker for investors living in these areas without access to Western TV entertainment. We find this to be the case.

Vice versa, we investigate whether our results are stronger for individuals whose experience with the communist system was likely tagged with positive emotions. A first example is the experience of living in one of the GDR's "showcase" cities. Those cites were renamed with communist names under the GDR regime, and the act of renaming was accompanied by festivals, significant press coverage, and visits of domestic and foreign politicians. These celebrations and expressions of national pride likely tagged the communist experience of residents in renamed cities with positive emotions. For example, the administration of the city of Chemnitz, which was renamed to "Karl-Marx-Stadt," had a flagship role in promoting communist ideology and a very high number of voluntary state-security collaborators (Horsch (1997)). In our analyses, we confirm that our results are more pronounced for investors living in renamed cities.

Variation in the support for the secret surveillance system (STASI) is interesting in and of itself. Extensive research has documented that the dominant motivation for serving as a voluntary, unofficial collaborator (Inoffizieller Mitarbeiter, IM) was political ideology, rather than other plausible reasons such as monetary incentives or extortion (Mueller-Enbergs, 1995). We show that our baseline results are stronger for regions with a high number of voluntary state-security collaborators. In addition, we use data from a survey conducted in 2014 on how positive individuals view the former political GDR system. Again, we find lower levels of stock-market participation in regions with a more positive attitude towards the former GDR.

Lastly, the GDR regime saw sports as a means to transport communist ideology and demonstrate the superiority of socialism over the capitalist system. The Olympic games in particular were used to evoke a feeling of "us against them," and Olympic winners were celebrated as national heroes. With this in mind, we use an alternative proxy for positive emotional tagging of communist experience: living in the same municipality as an Olympic champion. In line with our conjecture, our baseline effect is indeed stronger for individuals in the same municipality as an Olympic champion.

(Slavtchev and Wyrwich, 2017), beliefs about the determinants of success (Hennighausen, 2015), and crime (Friehe, Müller, and Neumeier, 2017).

Next, we test the conjecture that the long-term effect of emotional tagging is stronger when anti-capitalist messages sent by left-wing political parties are more salient. According to salience theory (Bordalo, Gennaioli, and Shleifer (2012)), limited attention prevents decision makers from considering all relevant information, and salient aspects are overweighed. We postulate that anti-capitalist messages are more salient in years of federal elections, when public attention is focused on political topics and pre-election debates provide a forum for anti-capitalist messaging. Consistent with salience theory, we find a significantly higher reluctance of East Germans to invest in the stock market in election years.

Finally, we provide evidence that the differences in financial investment are costly to East Germans. Their portfolios are less diversified, their portfolio returns are lower, and a higher share of their liquid funds are invested in high-fee products of the bank.

Overall, our findings suggest a long-lasting effect of exposure to the communist doctrine on financial decision-making even decades later, and in particular of emotionally tagged experiences. Individuals living in regions with pro-communist views are particularly averse to participate in the stock market, and pay a high price in terms of foregone wealth accumulation, lack of diversification, and excess fees.

Our paper contributes to several strands of research. In addition to the literature on memory, experience effects, and salience cited above, our analysis closely relates to a literature in political economy and labor economics suggests that political and labor-market experiences have long-lasting effects through different channels, such as the formation of preferences and norms, or due to frictions in post-experience adjustment (Alesina and Fuchs-Schündeln (2007), Lichter, Löffler, and Siegloch (2019)). Fuchs-Schuendeln and Schuendeln (2015), for example, argue that the time a person has lived under a democratic system determines her political preferences for democracy. Our analysis of the long-term effects of experiencing communism and its emotional tagging combines the thrust of the finance literature and the political economy literature on experience effects. It further sheds light on the deeper underlying debate on how experiences are weighted and suggests that experiences tagged with strongly positive or negative emotions are most relevant for behavior.

2 Theoretical Framework

We first present a theoretical framework to relate past experiences of living in East versus West Germany to persistent differences in attitudes toward the stock market, decades after Reunification. Building on the prior literature on experience effects, we model long-lasting exposure effects through a beliefs channel. As in prior research, we note that preference might also be influenced by experiences. In fact, the distinction is fluid: Agents appear to act as if their beliefs were overly determined by personal exposure; but this is just one way to capture the (re-)wiring (synaptic tagging effects) generated by previous experiences.

Setup. Agents are learning about the value of investing in the stock market, which is either good (G) or bad (B). We can interpret these states of the world either in terms of monetary value and expected returns, or in terms of the ideologically shaped social value of investing in the stock market. Here, we do not differentiate between these dimensions, but we do so in our empirical analysis, where we analyze along which dimension East and West Germans hold systematically different beliefs.

We assume that the true state is G, and all agents start with a prior $P(G) = P(B) = 0.5$.

Before Reunification, West Germans receive signals $\sigma_t \in \{g, b\}$ in each period t about the true state from their observation of the stock market, with $p(\sigma_t = g|G) = p(\sigma_t = b|B) = \theta$, $\theta \in (0.5, 1]$. East Germans, in contrast, have no access to the stock market. They receive government signals $s_t \in \{g, b\}$, which may be distorted by the communist doctrine. For simplicity, we model the East German government as sending only b signals.

We assume that East Germans believe a fraction $q \in [0, 1]$ of government signals to be true, and a fraction $1 - q$ to have no information value. Varying q we can increase or decrease East Germans' propensity to believe in government signals. In the empirical analysis, we will show that the inclination to subscribe to the government's messaging about the stock market is related to past lifetime experiences under the communist system. The more positive personal circumstances have been, the higher is the likelihood to endorse the government views and incorporate its signals. We label this effect as emotional coloring (or, emotional tagging). In the theoretical analysis, we simply assume that a fraction q of signals are incorporated in East Germans' belief updating, and a fraction $1 - q$ is disregarded.

After Reunification, both formerly-East and West Germans have exposure to the stock market, and receive the true signals σ_t. When receiving a (trusted) signal σ_t at time t, individuals update beliefs applying Bayes' rule to their prior P_{t-1} to form the posterior:

$$P_t(B|\sigma_t, P_{t-1}(B)) = \frac{p(\sigma_t|B)P_{t-1}(B)}{p(\sigma_t|B)P_{t-1}(B) + p(\sigma_t|G)(1 - P_{t-1}(B))}.$$

East vs. West Germany. Given differences in observed signals, we can characterize the beliefs of East and West Germans at the time of Reunification. Assume there are n_1 periods pre-Reunification, in which East Germans receive only bad (government) signals, while West Germans receive g_1 good and b_1 bad signals, with $n_1 = g_1 + b_1$ and $g_1 > b_1$. Then, beliefs of East Germans, $P_{R,\text{East}}$, and beliefs of West Germans, $P_{R,\text{West}}$, at Reunification are

$$\begin{aligned} P_{R,\text{East}}(B) &= \frac{\theta^{qn_1}}{\theta^{qn_1} + (1-\theta)^{qn_1}} && \geq 0.5, \\ P_{R,\text{West}}(B) &= \frac{(1-\theta)^{g_1-b_1}}{\theta^{g_1-b_1} + (1-\theta)^{g_1-b_1}} && < 0.5. \end{aligned} \tag{1}$$

Result 1 *At Reunification, there is a wedge in beliefs about the value of investing in the stock market, with West Germans having more favorable views than East Germans.*

The framework further captures why East and West Germans continue to have differing beliefs post-Reunification. As they start off from different beliefs at Reunification, they do not instantly converge to the same belief. Assume that there are n_2 periods post-Reunification, in which all Germans receive g_2 good signals and b_2 bad signals, with $g_2 > b_2$. Then beliefs in East and West Germany are

$$\begin{aligned} P_{R+n_2,\text{East}}(B) &= \frac{\theta^{qn_1+b_2-g_2}}{\theta^{qn_1+b_2-g_2} + (1-\theta)^{qn_1+b_2-g_2}} \\ P_{R+n_2,\text{West}}(B) &= \frac{(1-\theta)^{(g_1+g_2)-(b_1+b_2)}}{\theta^{(g_1+g_2)-(b_1+b_2)} + (1-\theta)^{(g_1+g_2)-(b_1+b_2)}} \end{aligned}$$

While the posteriors of both West Germans and East Germans become more positive ($P_{R+n_2,\text{West}}(B) < P_{R,\text{West}}(B)$ and $P_{R+n_2,\text{East}}(B) < P_{R,\text{East}}(B)$), it is also straightforward to show that $P_{R+n_2,\text{East}}(B) > P_{R+n_2,\text{West}}(B)$:

Result 2 *After Reunification, there continues to be a wedge in beliefs between East and West Germans.*

We establish this baseline result empirically in Section 4.

In the following, we extend the model to discuss heterogeneity in (i) the intensity of exposure to government signals, (ii) the inclination to believe government signals (emotional tagging), and (iii) trigger points (resurgence of anti-capitalist signals after Reunification).

Intensity of Exposure. We derive comparative statics for citizens with more or less exposure to signals prior to Reunification by varying the size of n_1. If we scale the number of signals prior to Reunification by a factor of $\alpha > 1$, West Germans receive on net $(\alpha - 1)(g_1 - b_1)$ additional positive signals and their beliefs move towards G:

$$\frac{(1-\theta)^{(\alpha g_1+g_2)-(\alpha b_1+b_2)}}{\theta^{(\alpha g_1+g_2)-(\alpha b_1+b_2)} + (1-\theta)^{(\alpha g_1+g_2)-(\alpha b_1+b_2)}} < P_{R+n_2,\text{West}}(B).$$

East Germans instead receive $\alpha - 1$ additional b signals, and their beliefs move towards B:

$$\frac{\theta^{(\alpha q n_1+b_2)-g_2}}{\theta^{(\alpha q n_1+b_2)-g_2} + (1-\theta)^{(\alpha q n_1+b_2)-g_2}} \geq P_{R+n_2,\text{East}}(B).$$

Hence, more pre-unification signals result in a larger East-West gap after Reunification.

Result 3 *The wedge in post-Reunification beliefs between East and West is increasing in exposure n_1 to signals pre-Reunification.*

In Section 5.1, we will use variation in age as a proxy for exposure to pre-unification signals.

Emotional Tagging. Next, we analyze comparative statics with respect to East German's inclination to believe in government signals q:

$$\frac{d}{dq}[P_{R+n_2,\text{East}}(B) - P_{R+n_2,\text{West}}(B)] = \frac{\log\left(\frac{(1-\theta)}{\theta}\right) n_1 \frac{1-\theta}{\theta}^{q n_1+b_2-g_2}}{\left(1+\frac{1-\theta}{\theta}^{q n_1+b_2-g_2}\right)^2} < 0$$

Result 4 *The wedge in post-Reunification beliefs between East and West is increasing in East Germans' inclination to believe in government signals pre-Reunification (q).*

Whether an East German citizen subscribes to the government's messaging depends on several factors. Our main emphasis here is the role of prior lifetime experiences, and in particular its emotional tagging. In the empirical analysis (Section 5.2), we exploit variation in the exposure to good experiences (e.g., living in a renamed "showcase" city) and bad experiences (e.g., religious oppression, air pollution, no access to Western TV entertainment) to show that the post-Reunification gap in stock-market investment is indeed larger for East Germans whose experience under communism was likely tagged more positively, and smaller for those who likely had more negative emotions tagged to their experiences.

Trigger Points. So far, we have assumed that after Reunification all citizens receive true signals σ_t from their observations of the stock market in all periods t; the (distorted) messaging of the communist government disappears.

We now consider the possibility that there may be times when anti-capital-markets messaging resurges. Specifically, during election years, media outlets give space to the messaging of all political parties including the successor of the former ruling party in the East, the Socialist Unity Party of Germany (SED). While both East and West Germans are exposed to those (say, via discussion rounds on TV), the communist party tended to target the East. Moreover, East Germans will plausibly overweigh the communist doctrine, compared to West Germans, as it is part of their memory database (Bordalo, Gennaioli, and Shleifer (2012)). As a result, East Germans might incorporate such messaging, when it resurges, more than West Germans.

Consider the scenario that, after n_1 periods pre-reunification and n_2 periods post-reunification, there is an election year, in which the communist party sends an additional b signal. We assume that East Germans incorporate the signal with probability q, while West Germans disregard it:

$$P_{R+n_2,\text{East}}(B|b_{R+n_2},\sigma_{R+n_2}) = \frac{\theta^{(qn_1+b_2+q)-g_2}}{\theta^{(qn_1+b_2+q)-g_2}+(1-\theta)^{(qn_1+b_2+q)-g_2}} > P_{R+n_2,\text{East}}(B|\sigma_{R+n_2}).$$

Result 5 *In post-Reunification election years, when an additional $s_t = b$ signal is sent, the East-West gap in beliefs becomes larger than in a non-election year.*

In Section 5.3, we find that the East-West gap becomes larger in federal election years.

3 Data and summary statistics

3.1 Brokerage data

For our main analysis, we obtain security holdings and demographic information on a representative sample of 230,229 retail investor accounts from June 2004 to December 2012. Data are provided by a German brokerage associated with a large bank present in almost all counties of Germany. The data include investor characteristics like age, gender, marital status, a client's zip code, and account-related data such as the date the account was open or closed (if applicable). Figure 1 displays the distribution of investors in our sample across Germany. The sample closely matches population densities across the country, including highly populated areas such as the Ruhr Valley. We typically exclude 1,179 investors living in the city of Berlin, which originally had an Eastern and a Western part, but use these clients for a robustness test later. Our final sample consists of 192,606 clients, for whom all personal as well as regional control variables are available.

Summary statistics of our brokerage data are displayed in Panel A.1 of Table 1. 20.4% of clients in our sample live in East Germany (the former GDR). 52.6% of investors are male, 58.2% are married, and the average age is 60 years. The average account has been open for six years and two months, and has a portfolio value of EUR 25,965. Stock-market participation (stocks and equity funds) is high, at 82%, because most brokerage accounts are opened with the purpose to trade stocks or hold equity in retirement savings plans. The fraction of stocks held among stock-market participants is 73%. Investors hold on average 14.7% bonds (of which roughly 65% are government and public bonds, and 35% corporate bonds). Only 3.8% of the sample observations involve clients holding passive investments such as index funds or ETFs. A detailed description of all variables contained in the brokerage data set is provided in Appendix-Table A1, Panel B.

Panel B.1 of Table 1 reports differences between East and West German investors. The raw differences in investment behavior are striking: East Germans participate significantly less in the stock market than West Germans (61% vs. 87%), hold a significantly lower fraction of stocks conditional on stock-market participation (67% vs. 74%), and hold significantly more bonds (30% vs. 11%). However, we also observe that East and West German investors differ in characteristics that are related to stock-market participation. For example, West German investors hold significantly

larger portfolios, live in counties with higher GDP per capita and higher real estate wealth, and receive higher income. Our main analysis tests whether the differences in stock-market participation between East and West Germans holds controlling for systematically differing factors relevant for stock-market participation.

3.2 Supplemental data

We use numerous additional sources of data, listed in Appendix-Table A1, Panel A, in order to account for other factors that influence stock-market participation. We use investors' zip code to merge these data. Thus, investors living in the same zip code area are linked to the same geographical factors, such as the number of local firms, or county-level real-estate wealth obtained from the SAVE survey.

In addition, we fielded two waves of a representative survey via the polling firm NorStat, in July and December 2018. The survey data are used to asses East and West Germans' stock-market expectations, as well as their attitudes towards capital markets and the economic system.

4 Stock-market participation in East and West Germany

One characteristic of the communist doctrine is that it aims to induce negative views on competing economic systems. For example, Lenin (1919) emphasized the "necessity of a relentless war on the capitalists." In his supplement to Marx's third volume of "The Capital", Friedrich Engels characterized the stock exchange as "the most prominent representative of capitalist production itself" where "the capitalists take away each other's accumulated capital, and which directly concerned the workers only as new proof of the demoralizing general effect of capitalist economy." (Marx (1894)). In Panel A of Figure 2, we show various example of this type of propaganda.

In this section, we test whether individuals who lived under the GDR regime and were exposed to its anti-capitalist propaganda formed negative attitudes towards the stock market, and whether these attitudes result in lower stock-market participation even three decades later.

4.1 Baseline result

To examine differences in stock-market participation between East and West German investors, we estimate the following logit regression:

$$P(y_{it} = 1|East_i, x_{it}, z_{c(i),t}, \nu_t) = \Phi(\alpha + \beta East_i + \gamma' x_{it} + \delta' z_{c(i),t} + \nu_t), \tag{2}$$

where the indicator y_{it} equals 1 if investor i holds stocks or equity funds in her portfolio in year t. Our main independent variable, $East_i$, is a dummy variable equal to one if an investor lives in East Germany.[9] The estimation controls for individual-level characteristics x_{it}, including gender, age, marital status, the number of months an account has been open, and the value of an investor's portfolio as a proxy for wealth. We also control for proxies of local economic activities $z_{c(i),t}$. The latter includes the number of banks in an investor's county (to rule out supply-side effects), and the number of people living in a given municipality (to capture differences between urban and rural areas). It also includes real-estate wealth at the county level, the fraction of inhabitants in a county with a high-school degree, the county's GDP, and the number of local firms per zip-code area (to capture differences in local economic development, education, and wealth). Finally, ν_t are year fixed effects. We calculate robust standard errors, clustered by municipality.

Average marginal effects are reported in column (1) of Table 2. We find that East German investors are 15.6 pp less likely than West German investors to participate in the stock market. The difference is significant at the 1% level and economically meaningful. Given an average stock-market participation rate of 81.9% in the brokerage sample, living in East Germany is associated with a 19% lower probability of investing in the stock market. In robustness checks, we find that the effect is robust and significant for each year in our sample.

Among the control variables, a few estimates are worth emphasizing. Consistent with prior literature, we find that female investors are less likely to participate in the stock market. The same is true for older investors, which likely reflects generational differences. Longer client relationships (measured by the time of opening of the account) predict higher participation in the stock market. The one estimate that seems at first puzzling is the negative coefficient of portfolio size. That is,

[9] This information is available as of the time the account is opened. For a subset of investors, examined in a later analysis, we observe whether they have moved from East to West Germany.

wealthier investors appear to be less likely to participate in the stock market. However, subsampling by portfolio size, we find that this estimate is driven by a specific form of retirement savings common in Germany, where investors deduct a small amount of money from their earnings and invest it in just one broadly diversified equity fund every month. Many investors in our sample opened their brokerage account for retirement saving purposes and appear to follow such a monthly savings plan. If we drop small portfolio values below 5,000 Euro, the coefficient turns significantly positive, while the coefficient of interest is unaffected. Overall, being from East Germany is a stronger predictor of stock-market participation than most of the other control variables, including gender and portfolio value.

Turning to the intensive margin, we examine the amount invested in the stock market conditional on participation. We estimate the following OLS regression:

$$y_{it} = \alpha + \beta East_i + \gamma' x_{it} + \delta' z_{c(i),t} + \nu_t + \varepsilon_{it}, \tag{3}$$

where y_{it} now refers to the portfolio share invested in stock or equity funds. We include the same vectors of control variables x_{it} and $z_{c(i),t}$ as in equation 2. Results in column (2) of Table 2 show that, conditional on stock-market participation, East Germans hold significantly fewer stocks in their portfolios (-7.2 pp) than West Germans. This translates into a 9.9% difference relative to the average fraction of stocks in investors' portfolios. In column (1) of Appendix-Table A2, we show that this difference persists also unconditional on stock-market participation.

Finally, we turn to bond investment. We re-estimate equation (3) with the fraction of bonds held in an investor's portfolio as the dependent variable. Bonds in our sample are 65% government bonds and 35% corporate bonds. As shown in column (3) of Table 2, we find that the fraction of bonds is 16.0 pp higher in East German portfolios than among West German investors. Compared to the mean among West German investors, East Germans hold more than twice as many bonds in their portfolios. One possible explanation is that the fixed-income feature of bonds makes them more similar to the mortgage-backed assets and life-insurance savings account that were available to investors in the former GDR, and are thus less stigmatized for representing capitalism. In line with this conjecture, we find in unreported results that East Germans, conditional on investing in

bonds, hold a significantly lower fraction of corporate bonds (25%) compared to West Germans (30%), and a higher fraction of government bonds (75% vs. 70%, respectively).

We perform several robustness checks that aim at further ensuring a similar institutional environment for the East and West Germans compared in the analysis.

Berlin as a case study. First, we restrict the sample to individuals living in Berlin, which was split into two parts after World War II. While East Berlin belonged to the GDR, West Berlin was part of the Federal Republic of Germany. The two parts of the city were separated by the Berlin Wall, and inhabitants had no regular access to the other part of the city. Thus, the Berlin serves as a suitable testing ground for our main hypothesis.

We define a new dummy variable, East Berlin, which is equal to one if an individual lives in East Berlin. We then run the same regressions as in Table 2 on the subsample of individuals living in Berlin.[10] Results are reported in Appendix-Table A3 and confirm the stock-market participation gap between East and West Germans. Specifically, investors from East Berlin are 5.4 pp less likely to participate in the stock-market. Relative to the average stock-market participation of brokerage-account holders in Berlin (90%), this difference amounts to 6%. Thus, the economic magnitude of the effect is less pronounced than for the entire country. This is not surprising given that many parts of East Berlin (for example, Prenzlauer Berg and Friedrichshain) are nowadays inhabited by many West Germans. We do not find that people in East Berlin hold significantly smaller fractions of stocks conditional on participating in the stock market (column 2), but that the fraction of bonds in their portfolios is 2.3 pp higher (column 3).

Two matched cities as a case study. As an alternative to comparing East and West Berlin, we identify two "matched cities" of comparable size, Eisenach and Bad Hersfeld, that are located at similar distances to the former West German border. The city of Eisenach is located in East Germany with a distance of 29.8 kilometers to the former inner-German border. It has about 43,000 inhabitants, and 224 observations from this city are included in our database. The city of Bad Hersfeld is located in West Germany with a distance of 30.8 kilometers to the former border. It

[10]Note that we cannot include control variables like GDP per capita, real-estate wealth, and high-school degree, available only at the county level. At the same time, these controls are less important given the restriction to Berlin.

has about 30,000 inhabitants, and 350 observations from this city are included in our database. The distance between the two cities is 59.8 kilometers, a 40 minute drive. Both cities are well-known tourist destinations and have comparable industry structures, dominated by medium-sized businesses. (Eisenach has a focus on automotives, Bad Hersfeld on textiles and logistics.)

We re-estimate the regression from Appendix-Table A3 on the restricted sample of individuals living in either Eisenach or Bad Hersfeld. Even though this regression is only based on 574 observations, we still observe significantly lower stock-market participation in East Germany (average marginal effect: -0.129, t-statistic: -3.25). Eisenach investors also hold a smaller fraction of stocks in their portfolios conditional on participating in the stock market (coefficient: -0.136, t-statistic: -1.80), and a larger fraction of bonds (coefficient: 0.167, t-statistic: 3.68).

Selection. Next, we perform several robustness tests to address selection concerns.

A first concern is possible differential selection into the brokerage firm among East and West German clients. To carefully address this concern, we obtain access to a panel data set on brand usage, brand perception, and brand satisfaction provided by the international data and analytics group YouGov. The panel consists of over 70,000 respondents, who are asked about their residence (state), their perception of different banks and brands (including the bank of our brokerage entity) as well as the name of the bank where they hold their main account. This allows us to assess the bank-brand perception in East and West Germany and additionally look at answers for a group of East and West German respondents who are clients at our brokerage bank.

Figure 3 depicts the results. Generally, the market share of our bank is not significantly different between East and West German respondents (p-value for current customers: 0.21; p-value for former customers: 0.92). East and West German respondents do not differ in brand and advertisement awareness of the bank either: In both parts of the country, 88-89% generally know the bank and 25% report to have seen advertisements in the last two weeks. A slightly higher fraction of East Germans than West Germans (24% compared to 21%) report to have talked to friends and family about the bank. The general evaluation of the bank brand on a five point scale (I hate it, I do not like it, it's ok, I like it, I love it) among bank clients also does not differ significantly ($p = 0.40$).

A second concern regarding the brokerage data is that we only observe stock-market participation conditional on having an online brokerage account. The gap in stock-market participation may be

different in the overall population, when including individuals who do not invest at all and only hold cash. To address this concern, we make use of an additional data set of 6,903 randomly drawn clients from a large German bank from June 2017. This data set includes investors who have not opened a brokerage account and only hold cash on a regular savings account.[11] Summary statistics on the bank data set are provided in Appendix-Table A4. 18.0% of clients live in East Germany. Stock-market participation is only 12.5% on average. Partly, the low rate reflects that, in this sample, we define participation as the percentage of clients holding any single stocks; the data does not allow us to define a precise equity measure including funds and other assets. If clients participate in the stock market, they hold 71% stocks in their portfolios.

To assess the differences between East and West Germans, we again estimate a logit regression where the dependent variable is equal to one if an investor participates in the stock market (independent of having opened a portfolio). Standard errors are clustered at the county level, since information on a more granular place of residence is not available. Results are reported in Table 3.

Column (1) of Table 3 shows that the average East German investor is 5.5 pp less likely to participate in the stock market than a West German investor. The difference is significant at the 1% level and economically meaningful: Given a 12.5% stock-market participation in our bank sample, living in East Germany is associated with a 44% lower probability to be invested in the stock market. In column (2), we use a specification which is directly comparable to our brokerage data. Conditional on having a portfolio, East German clients in this data set are 14.5 pp less likely to participate in the stock market, which corresponds to a 20.4% lower participation rate relative to the baseline probability of 71% in this sample. This magnitude is very similar to the one in our brokerage data (19%). Finally, column (3) shows that, conditional on having a portfolio and being a participant, the fraction of stocks is 15.4 pp lower for clients in East Germany than clients in West Germany. In column (2) of Appendix-Table A2, we show that this difference holds also unconditional on stock-market participation. We do not observe bond holdings in the bank data and thus cannot examine differences in the fraction of bonds held by East and West German investors.

Taken together, in both data sets, we find pronounced differences in stock market participation between East and West Germans almost 30 years after Reunification. In economic terms, the coef-

[11] In addition, we have access to the respective monthly average account balances from January 2016 to August 2017. We use the annual average of these monthly account balance snapshots in our later analysis.

ficient estimates suggest a gap of about 19% (brokerage data) to 20% (bank data) after including control variables.

4.2 Potential Mechanisms

What explains the persistent gap in stock-market participation between East and West Germany? In the following we consider several distinct mechanisms: (i) differences in wealth and income, (ii) differences in trust, familiarity, risk tolerance and financial literacy, (iii) and differences in stock-market expectations as well as attitudes towards the economic system.

Wealth and income. Although the above analysis includes a large set of individual- and geographic control variables, one might hypothesize that the stock-market participation gap between East and West Germans can be accounted for by further (unobserved) differences in wealth and income. Such differences might reflect aggregate economic conditions or individual-level differences.

We provide two additional pieces of evidence to assess this hypothesis.

First, in terms of aggregate economic conditions, we use survey data on a subset of investors that allows us to identify individuals who moved from East to West Germany after the fall of the Berlin Wall in 1989. These individuals are currently exposed to the same economic environment as West Germans, but experienced a different economic system in the past.

Average marginal effects for the bank data set are reported in Table 4. Column (1) shows that movers from East Germany are 35.1 pp less likely to invest in the stock market compared to West Germans. In column (2), we exclude all East Germans and only compare West Germans to East Germans who have moved and now live in West Germany. These movers are 12.4 pp less likely to participate in the stock market. In columns (3), we refine our mover variable and identify investors who have lived in West Germany for a minimum of twenty years, i.e., they moved at or shortly after German Reunification. We find a stock-market participation gap of 21.4 pp.

Our second piece of evidence targets individual-level differences rather than aggregate economic conditions: We leverage the bank data and include refined proxies of investors' income, savings, and portfolio values. In Appendix-Table A5, we re-run the same regressions as in Table 3, but additionally include squared and cubic terms of investors' income, savings, and portfolio values.[12]

[12]The latter can only be included in columns (4) and (5), which conditions on investors having a portfolio.

The point estimates in columns (2) and (3) are remarkably robust. We still observe East Germans to participate significantly less in the stock market, with point estimates similar in magnitude to those in Table 3. Similarly, conditional on participation, the fraction of stocks held by East Germans is significantly higher and the fraction of bonds significantly lower than among West Germans.

Relatedly, we also run a placebo test on the differences between North and South German investors, excluding East Germany. Since wealth and income is higher in Southern Germany (i. e., Bavaria and Baden-Wuerttemberg) than in the North,[13] similar to the East-West difference, we would expect North Germans to participate less in the stock market than South Germans if unobserved wealth or income were the main driver of stock-market participation in Germany. We do not find this to be the case (coefficient on the placebo dummy: -0.001, z-statistic: -0.01).

We conclude that East-West differences in stock-market participation cannot plausibly be accounted for by differences in income and wealth.

Trust, risk tolerance, familiarity and financial literacy. Next, we investigate whether differences in trust, risk tolerance, familiarity, and financial literacy might explain the significant differences between East and West Germans' investment behavior. For simplicity, we focus on stock-market participation in the following analyses, but report all results for the fraction of stocks and bonds in the Appendix of this paper as well.

Risk tolerance and trust are known to exert significant influence on investment behavior (Guiso, Sapienza, and Zingales (2006)), and prior research has found East Germans to be more risk averse and to trust others less than West Germans (Heineck and Süssmuth (2013); Fuchs-Schuendeln and Haliassos (2015)). To test whether risk tolerance and trust drive the stock-market participation gap between East and West Germans, we consider the following two proxies: First, the brokerage firm assesses the risk attitude of their clients when they open their account, on a scale ranging from 1 (conservative) to 3 (speculative). We obtain these data for a sub-sample of 48,123 investors.[14] Second, we use a measure of trust in the stock market, measured on a 7-point Likert scale, in a survey obtained from the bank data (see Appendix-Table A1, Panel B).

[13] See http://www.bhls.eu/vergleich-norddeutschland-sueddeutschland.html.

[14] Univariate statistics in Panel B of Table 1 show that West Germans are significantly more risk tolerant than East Germans (1.74 versus 1.49 on average), confirming our survey results reported below.

In columns (1) and (2) of Table 5, we add the controls for risk tolerance and trust to our baseline specification. Risk tolerance has the expected positive influence on stock-market participation, but we still observe a significant stock-market participation gap between East and West German investors of 17.2 pp. Similarly, trust positively predicts stock-market participation, but the estimated gap between East and West Germans still amounts to 20.2 pp after including the corresponding control. Appendix-Table A6 shows that, conditional on these controls, East German investors also hold a lower fraction of stocks in their portfolios, while they hold a higher fraction of bonds.

Next we address whether differences in familiarity or financial literacy might explain the results. People in East Germany were not exposed to financial markets for 40 years and thus, after Reunification, they were not familiar with most of the financial products offered to West German investors (Fuchs-Schuendeln and Haliassos (2015)). We investigate whether differences in familiarity with stocks as well as differences in financial literacy between East and West Germans potentially account for the stock market participation gap. In columns (3) and (4) of Table 5, we include survey-based measures of familiarity ("The stock market is a closed book to me") and the basic financial literacy score of van Rooij, Lusardi, and Alessie (2011) as additional control variables. Both variables are aggregated at the county level. We still observe a stock-market participation gap of 18.6 to 19.2 pp between East and West German investors that is not explained by the addition of these variables. On the intensive margin, East German investors hold about 9 pp fewer stocks and about 20 pp more bonds in their portfolios conditional on these controls (Appendix-Table A6).[15]

Finally, we add data on net-income brackets, as assessed by the brokerage firm at account opening, as a further (complementary) control. Brackets range from 1 (below 1,000 Euro per month) to 4 (above 3,000 Euro per month), and are available for a sub-sample of 48,123 investors. For comparison, in our bank data the median income is 1,326 Euro; so the lower three income bins should capture typical income levels. As shown in column (5) of Table 5, East German investors are estimated to be 23.2 pp less likely to participate in the stock market than West German investors even after controlling for income differentials. They also hold 15.2 pp fewer stocks in their portfolios, and 20.6 pp more bonds conditional on this additional control (Appendix-Table A6).

[15]Relatedly, we have also considered differences in the access to the stock market, for example through employee stocks. While we do not have information on whether investors in our sample hold employee stocks, data from the German stock institute (DAI) suggest that the fraction of employee stock holders in East and West Germany does not differ much between 1997 and 2016 (22% vs. 20%).

In column (6) of Table 5, we include all additional controls at the same time. Even though the resulting intersection of observations drops to 117,288, we still estimate a significant stock-market participation gap of 12.8 pp between East and West German investors, which amounts to 24.5% relative to the mean stock-market participation in this sample. Similarly, also the results on the intensive margin hold up when all additional variables are included (see Appendix-Table A6).

Stock-market expectations and attitudes towards capital markets. Given that differences in wealth and income, trust, risk tolerance, familiarity, and financial literacy fail to account for much of the stock-market participation gap, we return to the explanation proposed in our model – differences in beliefs about the value of investing in the stock market. Such differences in beliefs may be twofold: East and West Germans might have different expectations about the return to investing in the stock market. Alternatively, they might differ in their ideological attitudes towards the economic system and thus in their beliefs about the social value of investing in the stock market.

To systematically test for these two mechanisms, we conducted a representative survey among 1,598 Germans in July 2018 with the German polling institute NorStat. For consistency, we exclude 69 survey respondents living in Berlin and our final sample consists of 1,529 survey respondents. Reassuringly, 24.4% of West Germans, and 18.7% of East Germans responded that they have invested or are currently invested in the stock market. The difference between East and West Germans is statistically significant (p-value 0.054). In economic terms, the corresponding participation gap is 24.2%, in line with our estimates from both of the other databases in the previous section.

Regarding stock-market expectations, we ask three questions. First, we elicit the expected development of stock values over the next months. Second, we ask whether respondents think the stock market is currently over-, under-, or correctly valued. For both questions, we do not detect significant differences between East and West Germans. Finally, we ask what average annual return a respondent would expect if he had invested in the stock market for 30 years. East Germans expect an average of 11.9%, while West Germans expect an average of 13.5%. The difference is not statistically significant.

To corroborate these results, we use data of 1,872 respondents in a stock-market sentiment survey run by the German market research institute Sentix Behavioral Indices.[16] Respondents are asked whether their midterm (6 months) return expectations about the DAX are bullish (-1), neutral (0), or bearish (1). We construct monthly averages, separately for East and West Germans, from September 2016 to August 2018.[17] Figure 4 depicts the results: Stock-market expectations of East and West Germans are very similar. Results from a two-sided t-test do not reveal any significant differences in stock-market expectations between East and West Germans (p-value: 0.31).

In sum, we do not find systematic differences between East and West Germans with regards to their stock-market expectations. This is in line with the same findings in Goldfayn and Wohlfahrt (2019) based on the PHF survey of the Deutsche Bundesbank.

We also note that the realized returns of the German stock market after reunification were very positive: An investor who invested in the German stock-market index DAX in 1990 and held the index until 2018 earned a return of 7.5% p.a.[18] Hence, East Germans' lower willingness to invest in the stock market is also unlikely to be driven by bad experiences they made in the stock market after Reunification.

With neither expected nor realized returns able to account for differences in stock-market participation between West and East Germans, we next consider whether attitudes towards the economic system and towards the stock market can explain these differences. In the NorStat survey described above, we also included a battery of survey questions measuring anti-capitalist attitudes (anti-stock market attitudes) among East and West Germans. In Panel A of Figure 5, we show the fraction of survey respondents agreeing with each of the following statements, separately for East and West Germany.[19] The statements are: (i) "In a capitalistic system, the rich get richer and the poor become poorer." (ii) "Capitalism creates coldness among people." (iii) "Capitalism should be restricted." (iv) "If the communist ideal was realizable, I would prefer it." (v) "Investing in the stock market is immoral." (vi) "I generally reject investing in the stocks market."

[16] The survey is conducted weekly among more than 4,000 respondents, including institutional and private investors, but the place of residence is known for only 1,899 respondents. We hand collected corresponding zip codes to assign them to East (8% of respondents) or West Germany. An unambiguous assignment was possible for 1,872 respondents.

[17] The data set includes 84,785 estimates. Monthly averages are calculated based on all estimates within a given month. Results are robust to using only the first wave at the beginning of the month.

[18] See DAI return triangles (2019) on www.dai.de/en/what-we-offer/studies-and-statistics/return-triangles.

[19] We continue to exclude participants from Berlin who might either live in the former East or West.

The figure indicates that East Germans consistently show a higher propensity to express anti-capitalist, anti-stockmarket or pro-communist attitudes. For instance, while only 40% of West Germans agree with the statement that "Capitalism should be restricted," 51% agree in East Germany. The results are indicative that differences in anti-capitalist and pro-communist attitudes are prevailing between East and West Germany.

Attitudes towards capital markets and stock-market investment. To further assess whether these attitudes can account for the absence of East Germans investing in the stock market, we launched a second survey with NorStat in December 2018, this time exclusively in a representative sample of 1,600 East Germans. The additional observations from East Germany permit a refined analysis on differences within East Germany. We include a battery of questions capturing respondents' attitudes towards capitalism and communism on either a 4- or 5-point Likert scale, and elicit again stock-market participation. (All statements are spelled out in Panel B of Appendix-Table A7.) In Panel B of Figure 5, we assess for East Germans the link between stock-market participation and pro-communist attitudes. The figure plots average marginal effects on the standardized survey responses from logit regressions with stock-market participation as the dependent variable and a rich set of demographic controls including gender, age, income brackets, education, employment status, and state fixed effects. The figure reveals that stronger pro-communist and anti-capitalist attitudes predict stock-market participation within East Germany. We calculate robust standard errors. The relationship is strong and significant for each of the statements. In other words, the communist ideology, which was strongly promoted via political propaganda in East Germany, appears to have a long-lasting impact on how East Germans think about the economic system and on their decision to invest in the stock market.

Preferences for type of stocks. The communist ideology of the GDR aimed at legitimizing and differentiating itself from Western Germany. It sought to strengthen communist views and criticized the economic system of capitalist countries such as the US. Panel A of Figure 2 shows some examples of the posters and propaganda material criticizing the US and capitalism. In addition, the GDR authorities conveyed positive views about other communist countries, such as Russia, China, or

Vietnam. Panel B of Figure 2 displays some of the posters demonstrating friendship with the communist allies.

As a further indication of the GDR regime's success in priming communist views on its people and its long-lasting impact on household investment, we show that these views are reflected in the *types* of stocks, in which East and West Germans invest in today. Appendix-Table A8 lists the top ten stocks, in terms of holdings in our data, of US stocks, finance stocks, and Russian, Chinese, and Vietnamese shares. Among the "capitalist stocks," the top ten US stocks are well-known companies like Microsoft or Apple. The top ten stocks belonging to the financial industry are predominantly major German banks, financial advisory firms, and insurance companies. With respect to Russian and Chinese firms, the top ten holdings are predominantly stocks of state-owned companies belonging to the energy or basic materials sector.[20] Overall, stocks of communist countries are held by 4,812 investors (3%) in our sample. Investments in stocks of firms in these countries are often conducted via American or Global Depository Receipts (ADRs or GDRs). Given the prevalence of state-owned firms in this subset, we also consider German state-owned companies more broadly as a proxy for "less capitalist" investment.

Table 6 shows results from regressions of the fraction of stocks held in "capitalist" (US, finance) or "anti-capitalist"(communist countries, state-owned enterprises) stocks on the East dummy and our usual set of controls. We find that, conditional on stock-market participation, East German investors hold a 7.6 pp lower share of financial companies and a 4.8 pp lower share of US firms than investors from West Germany. At the same time, they hold a 10.4 pp *higher* share of stocks of companies located in Russia, China, or Vietnam, and a 4.1 pp *higher* share of stocks of (formerly) state-owned German companies. All differences between East and West German investors are statistically significant at the 1% level.[21] In other words, we detect a long-lasting influence of the anti-capitalism message even in the choice of stocks among East Germans, conditional on them participating in the stock market. The reversal of sign for the more "communist" stocks, which East

[20]There is only one Vietnamese stock in our sample. It belongs to an asset management company that invests in previously state owned firms in Vietnam. This stock is held by 68 different customers in our sample.

[21]To mitigate concerns that differences in risk-aversion rather than exposure to propaganda drive our results, we re-estimate all regressions and include county-level risk aversion as an additional control variable. Results (not reported) are robust.

Germans are more likely to invest in, is particularly interesting and helpful in addressing remaining concerns about unobservables inducing a uniformly lower inclination to invest in stocks.

5 Exposure to Communist Ideology

Our baseline results show that East German investors express a lower willingness to invest in the stock-market, both on the extensive and on the intensive margin, and especially with respect to more capitalist stocks (US, finance). They also display a higher willingness to invest in communist-country or state-owned companies, paired with attitudes that are generally more pro-communism.

The emphasis of this study lies, however, not only on the exposure to communism itself, but on differences among East Germans. We argue that it is crucial *how* an individual has experienced the communist system—how intensely, and whether positive or negative emotions are associated with it. First, we will show that East Germans who were more exposed to anti-capitalist GDR propaganda (timewise or due to geographic differences) are even less willing to take stock-market risk. Second, we will show that the stock-market gap diminishes when the experience of the communist system is tagged with negative emotions, e. g., due to religious oppression or severe air pollution experienced while living in the GDR. Vice versa, the gap is stronger among East German investors who plausibly had more positive experiences, like those living in a "renamed" (showcase) city.

Appendix-Table A9 shows the cross-correlations of the various measures of exposure to communist ideology that we will introduce in this section, and the low values reveal that our measures capture different aspects of communist experience. For example, we calculate a correlation of -0.015 between living in a religious area and a celebrated showcase city. The differences in exposure also break the link between experiences in the former GDR and the economic situation today, as Appendix-Table A9 also reveals. For example, the correlation between living in an area with high GDP per capita and in a renamed city is only 0.03, and the correlation with living in an area where a high fraction of people are religious is only -0.02.

5.1 Intensity of exposure

We test for heterogeneous effects due to variation in the intensity of exposure to the communist system (corresponding to the theoretical Result 3 in Section 2) along two margins: temporal and

geographical. For simplicity, we focus on stock-market participation, but report results for the fractions of stocks and bonds in Appendix-Table A10.

On the temporal dimension, we hypothesize that our results will be stronger for East Germans who have lived in the GDR for a longer time and who thus have had more exposure to its communist ideology. In Table 7, we re-estimate our baseline model (2) of stock-market participation, but include an interaction between the East dummy and an indicator for individuals who have experienced the GDR system for longer, proxied for by being 50 years old or older. The estimated coefficient of the interaction term indicates that the baseline effect is indeed more pronounced for older East Germans. They are 17.1 pp less likely to participate in the stock market than their counterparts from West Germany, controlling for age. In an alternative specification, we have also run the main regression model separately for different age brackets. Coefficients on the East dummy are always negative and statistically significant. We also find that the differences in the amount of stock and bond holdings are more pronounced for older East Germans, amounting to 9 pp for stock holdings and 18 pp for bond holdings (Appendix-Table A10).

On the geographic dimension, we exploit the 1972 "Kleiner Grenzverkehr" (Small Border Traffic) travel agreement between the GDR and the FRG. The agreement allowed West Germans from areas close to the border to visit GDR areas close to the border for up to 30 days a year (9 days a quarter, one day at a time) to visit relatives, as well as for touristic reasons. The "border circle" regions belonging to the travel agreement are displayed in Figure 6. The radius of this circle was approximately 100 kilometers. East Germans living close to the former border to West Germany were thus more exposed to West German influences from relatives and other travelers. In fact, it is welld-documented that the GDR closely monitored the "border circle" for potential threats to the political stability. According to regular reports by the secret police (STASI) on the "political and ideological situation at the border," negative opinions on the GDR system were expressed more frequently, which the GDR attributed to "hostile attempts of manipulation by relatives and friends from West Germany, [...] leading to negative sentiment in these areas [...] and eventually attempts to escape" (Ministry of State Security (1961), GDR Borderpolice (1960)).

Returning to the relation between exposure intensity and stock-market attitudes, we conjecture that the non-participation results are weaker for investors living close to the border to West Ger-

many, as they are more likely to have experienced both the political propaganda of the GDR as well as countervailing influences from West Germany. Or, to frame it in terms of our theoretical model in Section 2, we consider East Germans outside the "small border traffic" as being exposed to relatively more signals from the GDR prior to Reunification than East Germans inside the border region.

To test this hypothesis, we re-estimate our baseline model (2) but include an additional interaction between the East dummy and an indicator equal to one for all investors living outside the border circle area, i.e., more than 100 kilometers away from the former border to West Germany. Results are presented in column (2) of Table 7. We find that our main results are indeed more pronounced for East Germans living further away from the West German border: they are less likely to participate in the stock market at both, the extensive and intensive margin and the fraction of bonds in their portfolios is larger (see also Appendix-Table A10).

In column (3) of Table 7, we include all interactions as well as the baseline variable differentiating between East and West German investors. We find that both interaction coefficients remain significant – the baseline stock-market gap remains stronger for older East Germans and those living further away from the former border to West Germany.

5.2 Emotional tagging of communist experience

The most novel contribution of this study to the literature on memory and experience effects is that we develop and test the "emotional tagging" hypothesis. This hypothesis builds on the literature in cognitive sciences that shows that emotions determine how strongly an experience is anchored in memory (Dolan (2002), Richter-Levin and Akirav (2003), LaBar and Cabeza (2006)). In our context, we test whether the emotional tagging of past experiences matters for their encoding and hence their long-run impact. If so, then the impact of communist propaganda on stock-market investment today will be affected not only by its intensity, but also by *how* the communist system was experienced. That is, two East Germans exposed to the communist system may respond with different behaviors, depending on whether their experience was tagged with positive or negative emotions. In our theoretical framework in Section 2, positive emotions towards the GDR translate into a higher

propensity to believe in the government's anti-capitalist signals (higher q) and hence amplify the stock-market participation gap. Vice versa, negative emotions attenuate the participation gap.

Negative emotional tagging: We consider three sources of negative emotional tagging.

The first source is air pollution. The GDR had the highest levels of dust and sulfur dioxide emissions among all European countries, resulting in significant increases of respiratory diseases and skin problems like eczema, with children being particularly affected (Petschow, Meyerhoff, and Thomasberger (1990)). After the German Reunification in 1990, the German Ministry of Environmental Affairs issued a press release that identified 18 environmental emergency projects to stop environmental pollution in 16 GDR municipalities that needed immediate action because of out-aged power plants, filter plants, or chemical plants. We investigate whether East Germans living in these heavily polluted municipalities, who may have more more negative associations with communism, display a *higher* willingness to invest in the stock market than other East Germans.

The second source of plausibly negative emotions towards the communist doctrine is religious suppression. As common in communist systems, religion was viewed as a tool of the ruling class to oppress the working class – "Religion is the opium of the people" (Marx, 1843). While religious groups were not entirely outlawed, religious property was frequently confiscated and believers harassed. We conjecture that East Germans in more religious areas are more likely to have had a negative experience with the communist system. We investigate heterogeneity of our main effect by the fraction of catholic and protestant citizens in a county.

Third, we employ a measure of negative experience derived from differential access to West German television. This measure exploits that some regions in the GDR were either too distant from the Western border and from the television tower in West Berlin to receive Western TV signals, or were located in low valleys or valleys behind mountains that blocked TV broadcasting signals. A famous example is the district of Dresden, situated in the Elbe valley, which became known as the "valley of the clueless" (Stiehler, 2001). Prior literature has documented that the quasi-exogenous access to Western TV induced higher awareness of Western brands and consumption goods among East Germans (Bursztyn and Cantoni, 2016), but also, maybe more surprisingly, higher satisfaction with their lives, a reduction in the number of applications to emigrate, and fewer attempts to escape the GDR (Kern and Hainmueller, 2009). The latter results may at first seem counter-

intuitive: Shouldn't Western TV to induce *pro*-capitalism and *pro*-Western attitudes? The reason for the increased satisfaction with life in the GDR twofold: First, a typical East German consumer of Western TV tuned into entertainment, such as crime shows, to relax after work, rather than political news (Bösch and Classen, 2015). Second, the German TV channels did not aim to expose East Germans to pro-Western political opinions, differently from, say, American radio projects such as "Voice of America" or "Radio Liberty" (Uttaro, 1982). As a result, the availability of such entertainment after a day of work in the (state-guaranteed) job increased consumers' satisfaction with their work-life balance in the GDR, rather than their skepticism towards the political system (Kern and Hainmueller, 2009).[22] In fact, Chen and Yang (2019) document the same media consumption pattern in communist China: When provided with free access to uncensored internet, students go to entertainment websites rather than acquiring political information from foreign news outlets.

Regardless of the reason, what matters for our analysis is that the data shows that East Germans with access to Western TV were *more* satisfied with the political system of the GDR. Vice versa, not having access to Western TV predicts less satisfaction and a lower willingness to follow the communist doctrine. We investigate heterogeneity of our main effect by an indicator for municipalities in the East that did not receive signals from Western TV stations.

Panel A of Table 8 shows the estimated effects of these three types of variation in exposure. In each column, we interact one of the three indicators of negative emotional tagging with the East dummy. The estimate in column (1) reveals that the stock-market participation gap of East Germans is 6.8 pp smaller in heavily polluted counties. Similarly, East Germans in more religious areas (column 2) and those without access to West TV (column 3) also exhibit a significantly smaller participation gap. These results support the view that East Germans who plausibly experienced communism more negatively are more positively inclined towards capital markets and, as a result, are more open to investing in the stock market than other East Germans.[23]

[22] In addition, Meyen (2003) argues that exposure to Western TV, including its entertainment, increased the awareness of the dark side of capitalism by making the potential downside of a capitalistic society with high levels of crime, homelessness, or unemployment more salient.

[23] Results on the fractions of stocks and bonds in Appendix-Table A11 portray a similar, albeit weaker picture.

Positive emotional tagging: We identify four sources of positive emotional tagging of the GDR system, i. e., of positive GDR experiences that might have increased East Germans' susceptibility to communist propaganda and hence would amplify our main result.

First, we consider living in one of the GDR's celebrated and "renamed" showcase cities. When the communists assumed power in the newly founded GDR, they renamed numerous squares, streets, football stadiums, and steel works to immortalize communist heroes. One of the most prominent acts, however, was to rename an entire city.[24] The act of renaming a city was celebrated publicly with thousands of workers participating in marches and getting together on the big squares of the city. The celebrations and expressions of national pride likely tagged the experience with communism positively for East Germans in the five renamed cities.[25]

Our second and third proxies of positive emotional tagging are somewhat different in nature. The second measure is the fraction of voluntary state-security collaborators in a county. It is well-documented that the dominant motivation for serving as a collaborator was political and ideological, rather than monetary or extortionary (Mueller-Enbergs, 1995). Hence, we hypothesize that, in counties with a high number of voluntary STASI collaborators, particularly many citizens identified with the communist doctrine. Naturally, it is possible that this proxy is also correlated with negative experiences (for those who were policed). Lichter, Löffler, and Siegloch (2019) show, for example, that a higher spy density has negative long-term effects on trust, political participation and, ultimately, economic performance (income). The prediction is thus less clear ex ante.

Our third proxy exploits regional variation in contemporary perceptions about the GDR's political strengths. In 2014, the German polling institute "Infratest" conducted a survey asking: "If you compare today's social and political conditions to those in the former GDR, do you think the political system of the GDR had unique strengths?" (Options were "yes," "no," or "I do not know.") The fraction of respondents in a county who answered "yes" provides a revealed measure of positive past experiences associated with the GDR system.

[24]The cities were selected by a central committee of politicians. For example, Chemnitz was renamed "Karl Marx Stadt" to celebrate the 135^{th} anniversary of Karl Marx. Originally, this name had been assigned to Eisenhüttenstadt; but after Stalin's death in 1953, Eisenhüttenstadt was spontaneously renamed Stalinstadt, and then Chemnitz was given the name "Karl Marx Stadt".

[25]The five renamed cities are Chemnitz, Eisenhüttenstadt, Kriegsdorf, Neuhardenberg, and Werminghoff.

Finally, we consider the experience of sports-related celebrations. For the GDR's political leadership, athletic prowess was an important tool to prove their system's superiority to Western liberalism and promote national pride. According to Wiese (2007), "the GDR and the FRG not only competed for medals, but also fought a battle of ideologies in the Olympic arena." The general strategy to concentrate on specific disciplines proved successful since East German athletes won a total of 192 gold medals between 1968 and 1989 compared to 67 for West Germany. We conjecture that people living in a place that produced an Olympic champion were particularly proud and positive about the GDR. Therefore, we collect zip-code level data on the place of birth of all GDR Olympic champions in the Wikipedia lists for Olympic summer and winter games. We define a dummy variable indicating if an investor is from the same birth place (i.e., municipality) than an Olympic champion of the GDR, and zero otherwise. We multiply the dummy variable with an inverse population rank, because we expect the pride effect to form more strongly in smaller communities, where being an Olympic champion stood out even more.

In Panel B of Table 8, columns (1) to (4), we include all four proxies separately in our regression, interacted with the East dummy. The estimates reveal that East Germans living in a renamed city show significantly lower stock-market participation (13.2 pp less) than other East Germans. Moreover, stock market participation is also significantly lower for East Germans in counties with a higher fraction of STASI volunteers and those that exhibit a more positive perception of the GDR system today. We also find that investors living in municipalities of Olympic champions exhibit lower stock market participation. Results are similar for stock and bond holdings (see Appendix-Table A11), with three out of four proxies being also statistically significant.

5.3 Trigger points: Election years

In this section, we examine time-series variation in the stock-market participation gap between East and West Germans. As discussed in our theoretical framework in Section 2, a resurgence in anti-stock market signals might increase the gap in beliefs between East and West. This prediction builds on salience theories (e. g., Bordalo, Gennaioli, and Shleifer (2012)), according to which limited cognitive resources lead to decision makers overweighting particularly salient aspects of the decision problem. In our context, we ask whether there are times in which East Germans' memories of the

communist system are particularly salient and trigger their reluctance to invest in the stock market more than at other times, when other topics dominate the public debate.

We hypothesize that years of federal elections fall into this category. They are a time when political attitudes are most salient and public attention is devoted to who should govern and run the country. Consistent with the framework and concepts of salience in Bordalo, Gennaioli, and Shleifer (2019), elections may provide cues that trigger automatic retrieval of past experiences with political systems. That is, East Germans may receive (or pay attention to) more signals from pro-communist politicians, family, and friends, while West Germans retrieve their past experiences with the capitalist system of the FRG.

To test whether the stock-market participation gap between East and West Germans is larger in election years, we interact the East dummy with an indicator for federal election years in our sample (i.e., 2005 and 2009). We then estimate the same regression as in Table 2, but additionally include this interaction term. (Note that the level effect of election years is incorporated into the year fixed effects). Result are reported in Table 9. They show that our baseline effect is indeed amplified in election years, with the interaction term being statistically significant at the 1% level. We also tested and confirmed that the results hold if we consider the first election year, i.e. 2005, separately to mitigate concerns that effects in 2009 may be confounded by the financial crisis.

In unreported results, we also find that the effect of positive emotional tagging on stock-market participation (see Table 8) is significantly amplified in election years. This result is in line with the view that elections trigger recall of the GDR's communist ideology, which is then followed by East Germans with positive experience. Following the doctrine by not investing in the stock market thus appears to happen because (i) communist ideology is now more salient (Bordalo, Gennaioli, and Shleifer (2012)), and (ii) because it is in line with the positive tagging of experiences with the GDR (Bordalo, Gennaioli, and Shleifer (2019)).[26]

[26]We also find that the negative emotional tagging effect is weakened in election years. If elections indeed trigger the recall of communist norms, there may be a stronger neglect of signals that are contrary to them and, as a result, a smaller stock market participation gap between East and West Germans.

6 Financial implications: Portfolio returns, fees, and diversification

Finally, we provide several pieces of evidence that East German investors' exposure to communist ideology and their resulting reluctance to invest in the stock market is costly. Lower life-time investment in the stock market should generally lead to lower financial wealth as investors forgo the equity risk premium. Thus, the differences in stock-market investment that we document on the micro level may partly explain why there are still such large large wealth differences between East and West Germans on the macro level, with East Germans' total wealth being less than half that of West Germans (Grabka (2014)).

In our data, we are able to estimate several aspects of differences in returns and costs between East and West German investors. First, we compare monthly portfolio returns. We obtain monthly return data (including dividends) from Thomson Reuters Datastream. We calculate monthly portfolio returns on holdings derived from the monthly position statements on a security-by-security level for each investor. For each month in our sample, we calculate both equal- and value-weighted returns for all investors belonging to the "East German portfolio" or the "West German portfolio," respectively. We then compute the difference return of a portfolio that is long in the East-German portfolio and short in the West-German portfolio less the risk-free rate and regress it on the excess market return, the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model. In our regressions, we use the global risk factors obtained from Kenneth French's data library.[27] Alternatively, we use German risk factors developed by the Center for Financial Research in Cologne. [28] We observe that East Germans earn significantly lower returns than West Germans, irrespective of whether portfolios are equal- or value weighted (Panel A, Table 10). Monthly performance alphas vary between –0.07% and –0.11%.

In the next step, we examine other differences in portfolio characteristics between East and West-German investors. First, we analyze whether an investor holds passive investments, i.e., index funds and/or ETFs in her portfolio, as these assets generally have lower fees compared to actively managed funds. Second, we examine how many different assets East and West German investors

[27]The global risk factors are from `mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html`.
[28]The German risk factors can be obtained here: `https://www.cfr-cologne.de/`. Our results are robust.

hold in their portfolios (diversification). Third, we calculate the average fund fees an investors pays for all-equity funds in her portfolio in a given year. To further capture the extent of portfolio diversification, we compute the Herfindahl index of all stock holdings in a given portfolio. Finally, we compute the fraction of bank-owned products included in an investor's portfolio, which are typically associated with a higher total expense ratio (Bucher-Koenen, Hackethal, Koenen, and Laudenbach, 2018).We then run the same regressions as before and use one of these portfolio characteristics as the dependent variable. Results are presented in Panel B of Table 10.

Results in column (1) show that East German investors are significantly less likely to hold index funds or exchange traded funds. The economic magnitude is large: East German investors are 26.32% less likely to hold passive investments. We also find that, relative to the average number of assets in our sample, East Germans hold 33.07% fewer assets in their portfolios (column 2). In addition, East German investors hold more expensive funds. Relative to the mean fee in our sample (1.375%), they pay 3.71% higher fees on their equity funds (column 3). With respect to portfolio diversification, we find that the Herfindahl index for stock holdings is significantly higher for East German investors' portfolios, indicating that these portfolios are less diversified (column 4). Finally, we find that investors in East Germany are 7.45% more likely to hold bank-owned products than investors in West Germany.

7 Discussion and Conclusion

Our analysis shows that East Germans, who have lived under the communist system, have a persistently lower willingness to take stock-market risk, even almost 30 years after Reunification. An exception are stocks of companies from communist countries and of other state-owned companies. The results are particularly strong for those East Germans whose experiences with the communist system of the GDR are associated with positive emotions, and are significantly weaker if not reversed for those with negative experiences under the communist system. Experiences with a communist system are costly: East German investors earn lower returns, hold less diversified portfolios, more expensive equity funds, and fewer passively managed assets. These results provide a micro-level foundation for macroeconomic growth differentials between East and West Germany.

An interesting question that arises from our findings is how individuals in other transition economies responded to the introduction of a stock market. Does experience with a communist system always negatively affect people's willingness to participate in the stock market? What happens if the communist party reverses its own course and promotes (their version of) the stock market, as was the case in China?

In the GDR, the party's communist doctrine never fundamentally changed. After Reunification, the capitalist system of the FRG including its stock market, legislation, and governance system were immediately established. For our empirical analysis, this is essential, as it rules out that weaker investor protection or governance standards drive lower stock market participation in East Germany.

In other communist countries, change happened more gradually and within the system. For example, in China, the communist regime remained in place and transformed the economy stepwise to "state capitalism", thus, the Party's doctrine changed over time. The Party itself established a stock market in 1990. About 60% of the average Chinese company's shares are nontradable shares held by the government itself (Pistor and Xu (2005)). In addition, the Chinese government created incentives for firms to raise equity capital via IPOs, thus signaling that it does not condemn stock markets or investing in shares of companies. As a result, Chinese people do not face a conflict between political ideology and investing in stocks. Indeed, they have more positive views on the stock market, although participation is still very low and amounts to 8-9% (Lucarelli and Palomba (2007), Liang and Guo (2015)). This may be due to weak shareholder-rights protection and corporate-governance (Goetzmann and Koell (2005).

In contrast, the transition in Russia resembled more closely the case of the GDR. After the fall of the iron curtain, Russia quickly abolished price controls and interest-rate controls. Many firms were privatized in the 1990s, and the proceeds accrued to a small number of oligarchs. As a result, Russians perceived "capitalism just how the Soviets had warned, with a few people requisitioning all the ladders and the vast majority left to be devoured by snakes."[29] Russia's stock market was established in 1992, but even in 2015, stock-market participation of the general population reached only 0.8% (Bank of Russia (2015)).

[29]https://www.theguardian.com/inequality/2017/apr/25/unequal-russia-is-anger-stirring-in-the-global-capital-of-inequality

Comparing these transition economies, it appears that quick changes from a planned to a market-based economy lead to large adaption problems. Since the new system contradicts the values and experiences that people acquired, they seem reluctant to accept the new system and its rules for decades to come, with adverse effects on people's financial well-being. Establishing these differences systematically is a promising area of future research.

References

Alesina, A., and N. Fuchs-Schündeln, 2007, "Goodbye Lenin (or Not?): The Effect of Communism on People's Preferences," *American Economic Review*, 97(4), 1507–1528.

Bank of Russia, 2015, "Guidelines for the Development of the Russian Financial Market 2016-2018," Report.

Bergado, J. A., M. Lucas, and G. Richter-Levin, 2011, "Emotional Tagging - A simple hypothesis in a complex reality.," *Progress in Neurobiology*, 94, 64–76.

Bönisch, P., and W. Hyll, 2015, "Television role models and fertility: Evidence from a natural experiment," Working paper.

Bordalo, P., N. Gennaioli, and A. Shleifer, 2012, "Salience Theory of Choice under Risk," *Quarterly Journal of Economics*, 127, 1243–1285.

——— , 2019, "Memory, Attention, and Choice," Working Paper.

Bösch, F., and C. Classen, 2015, *Bridge over troubled water? Deutsch-deutsche Massenmedien*. Vandenhoeck & Ruprecht GmbH.

Bucher-Koenen, T., A. Hackethal, J. Koenen, and C. Laudenbach, 2018, "Do Seemingly Smarter Consumers Get Better Advice?," Working Paper.

Bursztyn, L., and D. Cantoni, 2016, "A Tear in the Iron Curtain: The Impact of Western Television on Consumption Behavior," *The Review of Economics and Statistics*, 98, 25–41.

Carhart, M. M., 1997, "On Persistence in Mutual Fund Performance," *Journal of Finance*, 52(1), 57–82.

Chen, Y., and D. Y. Yang, 2019, "The Impact of Media Censorship: 1984 or Brave New World?," *American Economic Review*, 109, 2294–2332.

Dolan, R. J., 2002, "Emotions, Cognition, and Behavior," *Science*, 298, 1191–1194.

Fama, E. F., and K. French, 1993, "Common risk factors in the returns on stocks and bonds," *Journal of Financial Economics*, 33(1), 3–56.

Friehe, T., H. Müller, and F. Neumeier, 2017, "The effect of Western TV on crime: Evidence form East Germany," Working paper.

Fuchs-Schuendeln, N., and M. Haliassos, 2015, "Does product familiarity matter for participation?," Working paper.

Fuchs-Schuendeln, N., and M. Schuendeln, 2015, "On the endogeneity of political preferences: Evidence from individual experience with democracy," *Science*, 347(6226), 1145–1148.

Fuchs-Schündeln, N., and P. Masella, 2016, "Long-Lasting Effects of Socialist Education," *Review of Economics and Statistics*, 98, 428–441.

GDR Borderpolice, 1960, "Bericht über die Lage in der Landwirtschaft im Grenzgebiet an der Staatsgrenze West der DDR," Report.

German Ministry of Environmental Affairs, 1990, "Verträge für 18 DDR-Umweltschutzprojekte unter Dach und Fach - Töpfer erwartet schnell wirksame Verbesserungen.," Press Release.

Goetzmann, W. N., and E. Koell, 2005, "The History of Corporate Ownership in China: State Patronage, Company Legislation, and the Issue of Control," NBER Working paper.

Goldfayn, O., and J. Wohlfahrt, 2019, "Expectation Formation in a New Environment: Evidence from the German Reunification," *Journal of Monetary Economics*, forthcoming.

Grabka, M. M., 2014, "Private Vermögen in Ost- und West- deutschland gleichen sich nur langsam an," DIW Working Paper No. 40/201.

Guiso, L., P. Sapienza, and L. Zingales, 2006, "Does Culture Affect Economic Outcomes?," *Journal of Economic Perspectives*, 20(2), 23–48.

Haury, T., 2004, "Von ‚den Finanzkapitalisten' zu ‚den Zionisten' - das "werktätige Volk" und seine Feinde," *Unsere Feinde - Konstruktion des Anderen im Sozialismus*, pp. 107–126.

Heineck, G., and B. Süssmuth, 2013, "A different look at Lenin's legacy: Social capital and risk taking in the Two Germanies," *Journal of Comparative Economics*, 41, 789–803.

Hennighausen, T., 2015, "Exposure to television and individual beliefs: Evidence from a natural experiment," *Journal of Comparative Economics*, 43(4), 956–980.

Hoechle, D., S. Ruenzi, N. Schaub, and M. Schmid, 2018, "Financial Advice and Bank Profits," *Review of Financial Studies*, 31, 4447–4492.

Horsch, H., 1997, "Hat nicht wenigstens die Stasi die Stimmung im Land erkannt? MfS und SED im Bezirk Karl-Marx-Stadt," Working paper.

Hyll, W., and L. Schneider, 2013, "The causal effect of watching TV on material aspirations: Evidence from the "valley of the innocent"," *Journal of Economic Behavior & Organization*, 86, 37–51.

Kahana, M. J., 2012, *Foundations of Human Memory*. New York, NY: Oxford University Press.

Kaustia, M., and S. Knüpfer, 2008, "Do investors overweight personal experience? Evidence from IPO subscriptions," *Journal of Finance*, 63(6), 2679–2702.

——— , 2012, "Peer performance and stock market entry," *Journal of Financial Economics*, 104(2), 321–338.

Kern, H. L., and J. Hainmueller, 2009, "Opium for the Masses: How Foreign Media Can Stabilize Authoritarian Regimes," *Political Analysis*, 17, 377–399.

LaBar, K. S., and R. Cabeza, 2006, "Cognitive neuroscience of emotional memory," *Nature*, 7, 54–64.

Laudenbach, C., B. Loos, and J. Pirschel, 2017, "Recent Experiences and Risk Taking: Trading Responses to Changes in the Local Environment," Working Paper.

Laudenbach, C., U. Malmendier, and A. Niessen-Ruenzi, 2019, "Emotional Tagging and Belief Formation - The Long-Lasting Effects of Experiencing Communism," *American Economic Journal: Papers & Proceedings*, 109, 567–571.

Lenin, W. I., 1919, *The State: A Lecture Delivered at the Sverdlov University*. Progress Publishers, Moscow.

Liang, P., and S. Guo, 2015, "Social interaction, Internet access and stock market participation - An empirical study in China," *Journal of Comparative Economics*, 43, 883–901.

Lichter, A., M. Löffler, and S. Siegloch, 2019, "The Long-Term Costs of Government Surveillance: Insights from Stasi Spying in East Germany," *Journal of the European Economic Association, forthcoming*.

Lucarelli, C., and G. Palomba, 2007, "Investor's Behaviour in the Chinese Stock Exchanges: Empirical Evidence in a Systemic Approach," Working paper.

Malmendier, U., and S. Nagel, 2011, "Depression Babies: Do Macroeconomic Experiences Affect Risk Taking?," *Quarterly Journal of Economics*, 126(1), 373–416.

Malmendier, U., D. Pouzo, and V. Vanasco, 2019, "Investor Experiences and Financial Market Dynamics," *Journal of Financial Economics*, forthcoming.

Marx, K., 1843, *Critique of Hegel's Philosophy of Right*. Deutsch–Französische Jahrbücher.

——— , 1894, *Das Kapital. Kritik der politischen Ökonomie. Buch III, erster Theil. Herausgegeben von Friedrich Engels*. Verlag von Otto Meissner, Hamburg.

Meyen, M., 2003, *Denver Clan und Neues Deutschland. Mediennutzung in der DDR*. Berlin: Ch. LinksVerlag.

Meyer, S., and M. Pagel, 2019, "Fully Closed: Individual Responses to Realized Capital Gains and Losses," Working paper.

Ministry of State Security, G., 1961, "Bericht über die politisch-ideologische Lage im Grenzgebiet," Report.

Mueller-Enbergs, H., 1995, "Warum wird einer IM? Zur Motivation bei der inoffiziellen Zusammenarbeit mit dem Staatssicherheitsdienst," in: Zersetzung der Seele. Psychologie und Psychotherapie im Dienste der Stasi. CEP Europäische Verlagsanstalt.

Müller, O., D. Pollack, and G. Pickel, 2013, *Religiös-konfessionelle Kultur und individuelle Religiosität: Ein Vergleich zwischen West- und Ostdeutschland*. Springer Verlag.

Odean, T., 1999, "Do Investors Trade Too Much?," *American Economic Review*, 89(5), 1279–1298.

Petschow, U., J. Meyerhoff, and C. Thomasberger, 1990, *Umweltreport DDR. Bilanz der Zerstörung. Kosten der Sanierung. Strategien für den Ökologischen Umbau.* Frankfurt am Main.

Pistor, K., and C. Xu, 2005, "Governing Stock Markets in Transition Economies: Lessons from China," *American Law and Economics Review*, 7, 184–210.

Richter-Levin, G., and I. Akirav, 2003, "Emotional Tagging of memory formation - in the search for neural mechanisms.," *Brain Research Reviews*, 43, 247–256.

Slavtchev, V., and M. Wyrwich, 2017, "TV and Entrepreneurship," IWH Discussion Papers.

Stiehler, H. J., 2001, *Leben ohne Westfernsehen: Studien zur Medienwirkung und Mediennutzung in der Region Dresden in den 80er Jahren*. Leipziger Universitätsverlag.

Strahilevitz, M., T. Odean, and B. Barber, 2011, "Once Burned, Twice Shy: How Naïve Learning, Counterfactuals, and Regret Affect the Repurchase of Stocks Previously Sold," *Journal of Marketing Research*, 48, 102–120.

Uttaro, R. A., 1982, "The Voices of America in International Radio Propaganda," *Law and Contemporary Problems*, 45(1), 103–122.

van Rooij, M., A. Lusardi, and R. Alessie, 2011, "Financial Literacy and Stock Market Participation," *Journal of Financial Economics*, 101, 449–472.

Wachter, J. A., and M. J. Kahana, 2019, "A retrieved-context theory of financial decisions," Working paper.

Wiese, R., 2007, "Sport, a state secret - shielding of the competitive sports system in the GDR," *Historical Social Research*, 32(1), 154–171.

Figure 1: Distribution of Investors across Germany

The figure shows the number of brokerage clients per zip-code area. The sample period is June 2004 to December 2012.

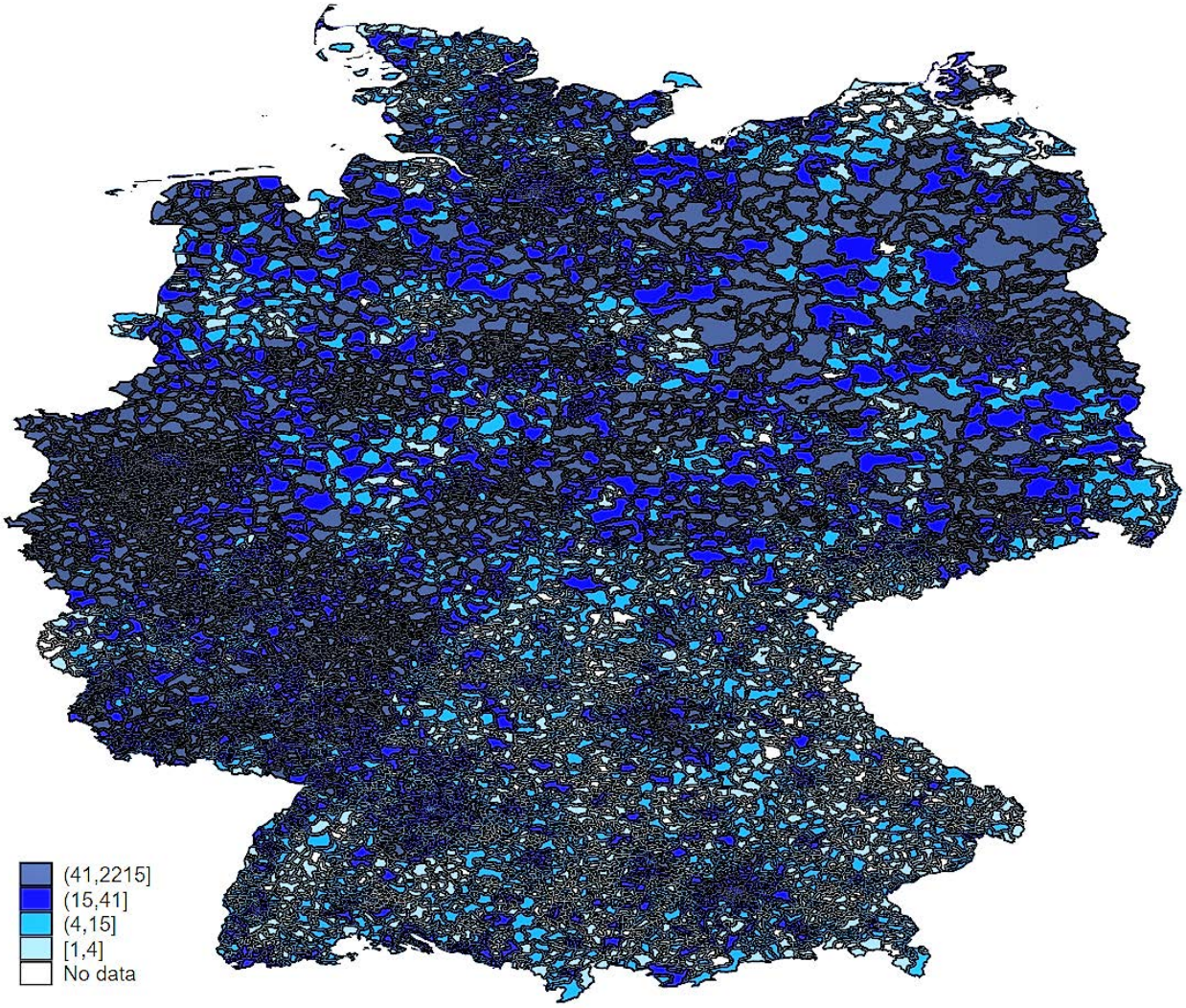
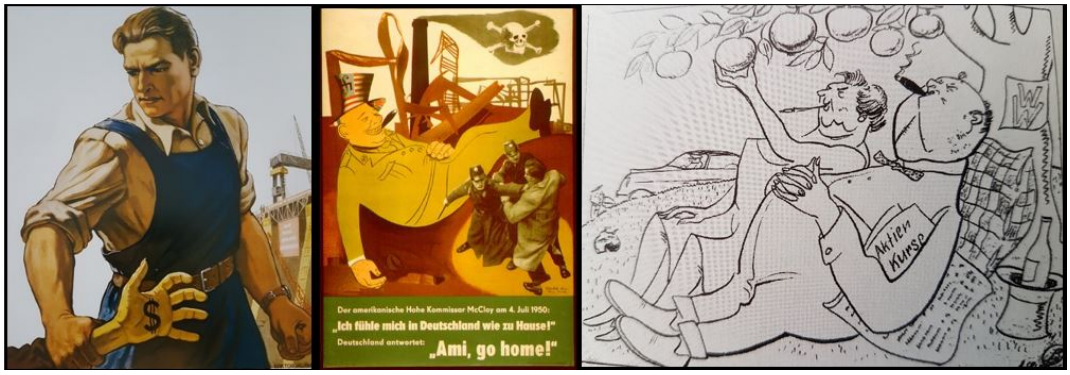


Figure 2: The Art of Propaganda

This figure shows propaganda posters that were used by the communist regimes to promote anti-capitalist, anti-American, pro-Russian, and pro-Vietnamese attitudes.

Panel A: Communist Propaganda against the Stock Market

Source: V. Ivanov, Vigilance is our weapon, Moscow 1953. Artur Grimmer 1955 in Monika Gibas (2004)



Panel B: Communist Propaganda pro Allies

Source: Landesarchiv Baden-Württemberg, Deutsches Historisches Museum, Stadtgeschichtliches Museum Leipzig

Figure 3: Sample Selection (Brokerage Bank)

This figure shows survey results provided by the international data and analytics group YouGov regarding the bank to which the sample brokerage belongs. Respondents state whether (a) they are customers of the bank, (b) they are former customers of the bank, (c) they generally know this bank, (d) they have seen advertisements of this bank within the last two weeks, (e) they have talked to a friend or family member about this bank (f) they generally like this bank. Answers to (f) are given on a 1 ("I hate it") to 5 ("I love it") scale. In this figure, answers are shown separately for respondents in East and West Germany. None of the answers differ significantly between East and West Germans.

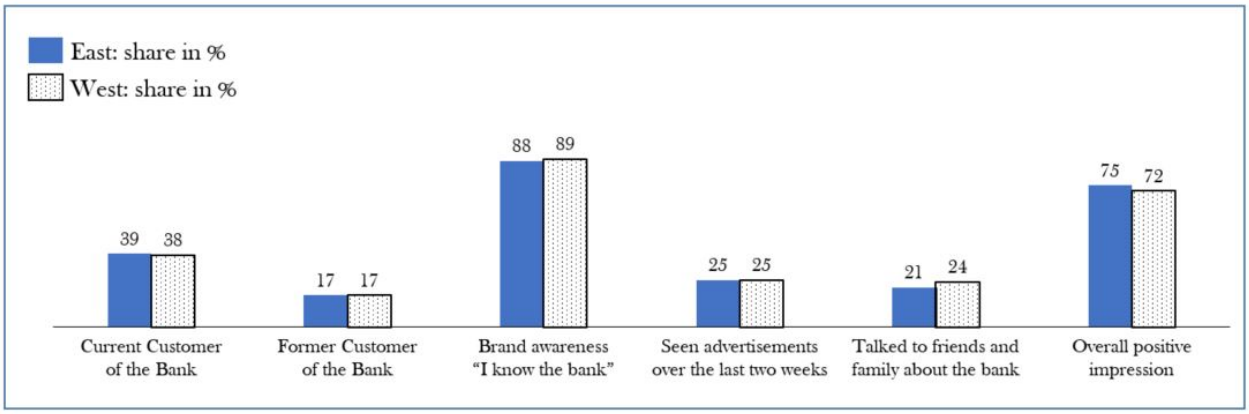


Figure 4: Stock-Market Return Expectations

The figure shows average German Stock Index (DAX) return expectations over the next six months, separately for East (N=148) and West German (N=1,724) respondents, based on answers to a survey conducted by the market research firm Sentix Behavioral Indices GbR. Respondents are asked about their midterm (6 months) return expectations about the DAX being bullish (-1), neutral (0), or bearish (1). Places of residence for respondents are available since September 2016. Monthly averages are constructed for East and West Germany separately based on all responses (four waves) within a given month.

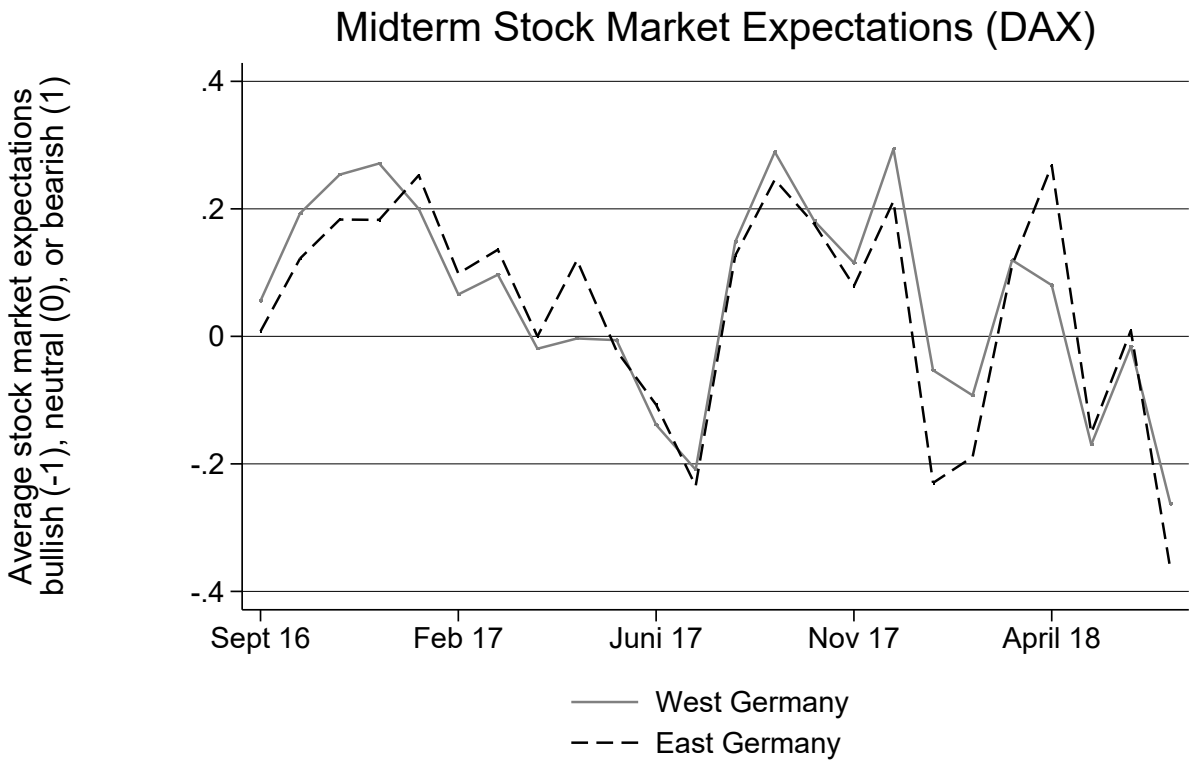


Figure 5: Attitudes towards Economic Systems and Stock-Market Participation

Panel A indicates attitudes towards economic systems in a survey of 1,529 Germans (1,283 West Germans and 246 East Germans) conducted by the opinion-poll institute Norstat in July 2018. The figure shows the fraction of people agreeing to the statements listed on the horizontal axis. Panel B shows average marginal effects on pro-communist attitudes in logit regressions with stock market participation as the dependent variable. The sample includes 1600 East Germans surveyed by Norstat in December 2018. The independent variables are standardized survey responses capturing attitudes towards communism. Survey responses were elicited on a 4-point or 5-point Likert scale. The controls are gender, a categorical variable for age (6 groups), a categorical variable for income bracket (10 groups), a categorical variable for education (7 groups), a categorical variable for employment status (9 groups), and state fixed effects. The precise wording of the questions for both panels is in Appendix-Table A7.

Panel A: Agreement to statements on socialism, capitalism and stock markets

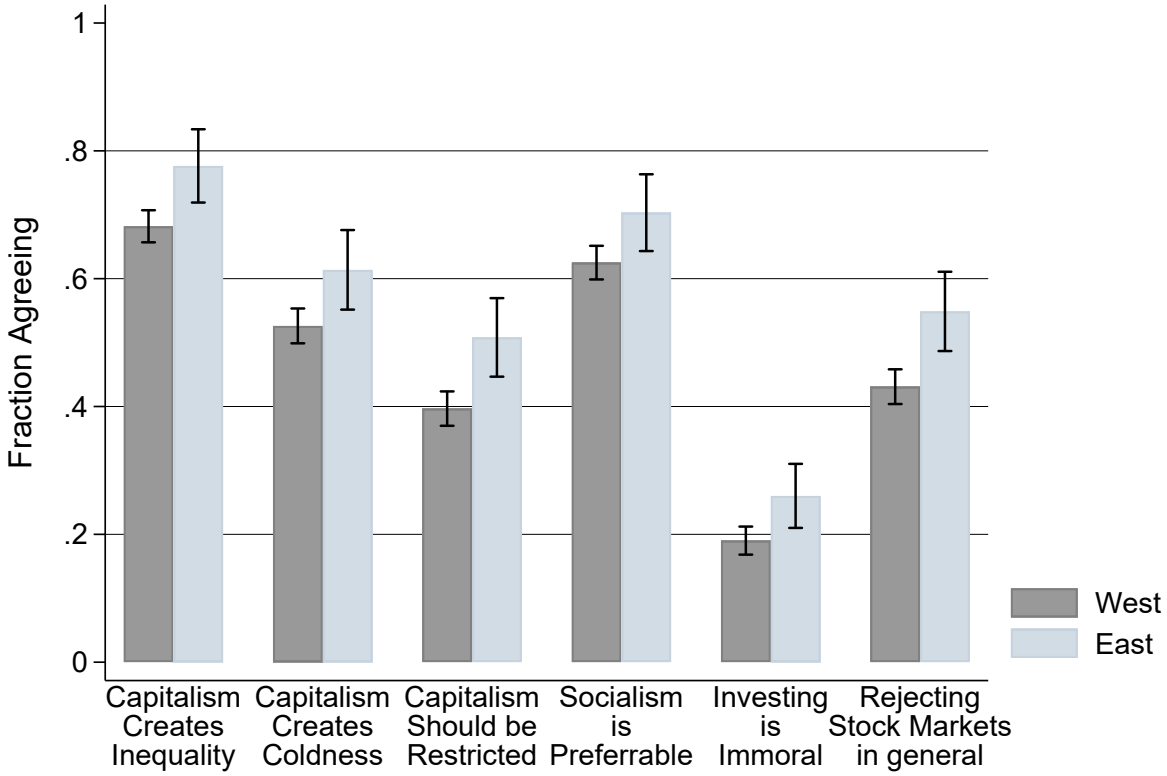


Figure 5: cont'd

Panel B: Stock market participation and pro-communist attitudes

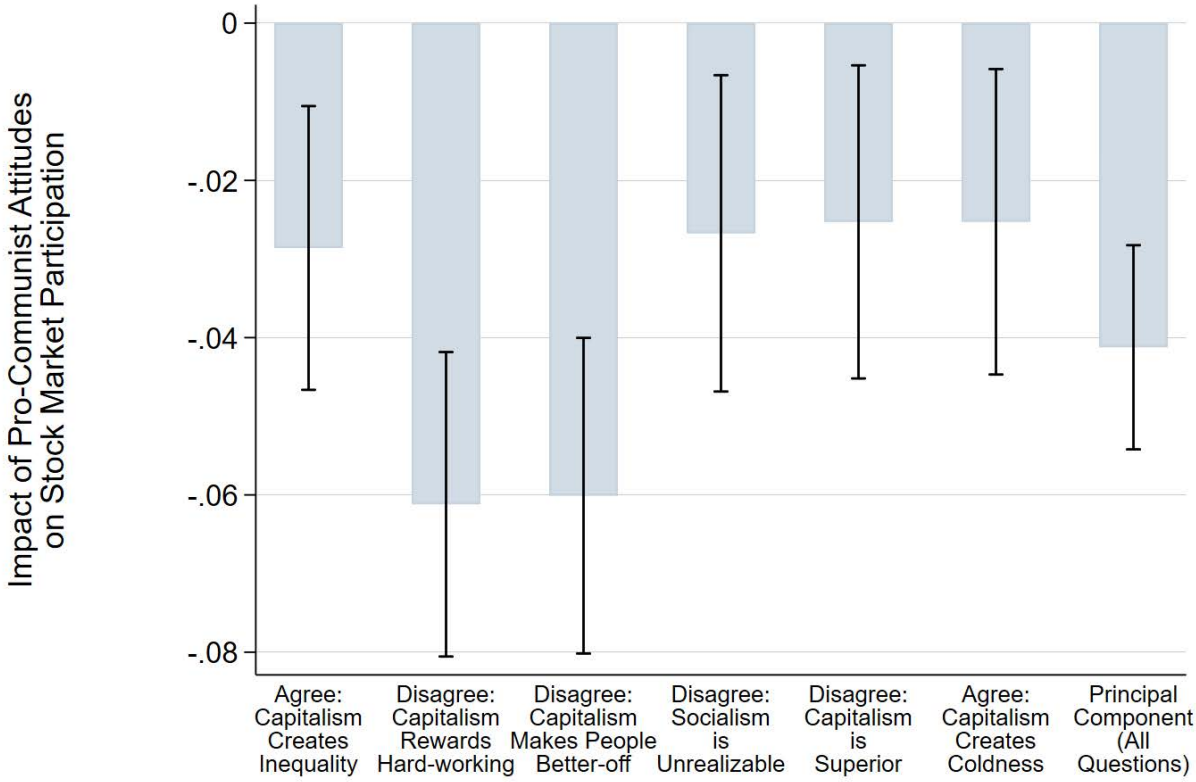


Figure 6: Small Border Traffic Zone

This figure shows the areas of East and West Germany that belonged to the "Kleiner Grenzverkehr", i.e., the "small border traffic" zone. FRG residents living in cities and districts listed as "close to the border" could visit areas listed as part of the "border circle of the GDR". Source: Ministry of Intra-German Relations (Bundesministerium für innerdeutsche Beziehungen).

Table 1: Summary Statistics (Brokerage Sample)

Panel A shows the number of observations, mean, standard deviation (sd), median (p50), 1^{st} percentile (p1), and 99^{th} percentile (p99) of all variables in the brokerage sample. The sample period is 2004-2012. Panel B shows East and West averages, the differences, and the corresponding p-values. All variables are defined in Appendix-Table A1, Panel B.

Panel A: Summary statistics						
	Obs. (1)	Mean (2)	sd (3)	p50 (4)	p1 (5)	p99 (6)
1. Brokerage account data (individual-level)						
East	839,680	0.204	0.403	0.000	0.000	1.000
Gender (1=male)	839,680	0.526	0.499	1.000	0.000	1.000
Investor age (in years)	839,680	59.56	15.64	59.00	23.00	94.00
Married (1=yes)	839,680	0.582	0.493	1.000	0.000	1.000
Time account is open (in months)	839,680	74.223	32.576	74.000	7.000	137.00
Portfolio value (in Euro)	839,680	25,965	132,268	4,923.47	0.000	304,837
Stock-market participation (1=yes)	839,680	0.819	0.385	1.000	0.000	1.000
Fraction of stocks if participant	687,464	0.725	0.391	1.000	0.000	1.000
Fraction of bonds	839,272	0.147	0.328	0.000	0.000	1.000
Passive investments (1=yes)	515,856	0.038	0.192	0.000	0.000	1.000
N. of assets in portfolio	839,680	4.442	6.921	2.000	1.000	31.000
Income (1=low, 4=high)	170,824	2.399	0.929	2.000	1.000	4.000
Risk tolerance (1=low, 3=high)	176,270	1.683	0.557	2.000	1.000	3.000
Fund fees (in %)	60,690	1.375	0.495	1.500	0.070	2.400
Portfolio concentration (Herfindahl)	622,777	0.689	0.331	0.815	0.070	1.000
Fraction of bank-owned products	90,215	0.416	0.375	0.285	0.000	1.000
2. Geographic controls						
Real-estate wealth (in Euro)	839,680	152,667	153,658	132,773	0.000	767,913
Number of local banks	839,680	95.067	54.157	87.000	25.000	330.00
Total population	839,680	125,258	231,429	32,468	1,105	1,353,186
GDP per capita	839,680	26,927	11,031	23,919	14,649	69,566
Number of local firms	839,680	906.577	620.185	779.000	55.000	2,866
High-school degree	839,680	0.160	0.060	0.146	0.076	0.363
Trust (1=low, 7=high)	684,441	3.221	0.710	3.143	1.500	5.500
Familiarity (1=high, 7=low)	699,126	3.583	1.161	3.438	1.000	7.000
Financial literacy (0=low, 3=high)	698,373	2.679	0.327	2.750	1.000	3.000

Table 1: cont'd

Panel B: Differences	East German (1)	West German (2)	Difference (3)	p-value (4)
1. Brokerage account data				
Gender (1=male)	0.395	0.587	-0.191	0.000
Investor age (in years)	62.532	56.348	6.184	0.000
Married (1=yes)	0.601	0.577	0.024	0.000
Time account is open (in months)	69.124	75.531	-6.407	0.000
Income (1=low, 4=high)	2.109	2.516	-.407	0.000
Risk tolerance (1=low, 3=high)	1.494	1.744	-.249	0.000
Portfolio value (in Euro)	20,248.83	27,431.85	-7,183.02	0.000
Stock-market participation (1=yes)	0.609	0.873	-0.264	0.000
Fraction of stocks if participant	0.671	0.735	-0.063	0.000
Fraction of bonds	0.304	0.107	0.197	0.000
Passive investments (1=yes)	0.018	0.043	-0.025	0.000
N. of assets in portfolio	3.185	4.764	-1.579	0.000
Fund fees (in %)	1.450	1.363	0.087	0.000
Portfolio concentration (Herfindahl)	0.738	0.681	0.057	0.000
Fraction of bank-owned products	0.440	0.412	0.028	0.009
2. Geographic controls				
Real-estate wealth (in Euro)	92,850.15	168,012.30	-75,162.17	0.000
GDP per capita	19,698.93	28,933.56	-9,234.63	0.000
Number of local firms	949.47	893.18	56.29	0.480
High-school degree	0.137	0.165	-0.028	0.000
Trust (1=low, 7=high)	3.005	3.260	–0.255	0.000
Familiarity (1=high, 7=low)	3.783	3.546	0.237	0.020
Financial literacy (0=low, 3=high)	2.609	2.692	-0.083	0.237

Table 2: Differences in Investment Behavior (Brokerage Sample)

All estimations use the brokerage data from June 2004 to December 2012. The coefficients are average marginal effects from a logit regression in column 1, and OLS estimates in columns 2 and 3. Stock-market participation (in column 1) is an indicator equal to one if an investor holds stocks or equity funds in her portfolio in a given year. Fraction of stocks (in column 2) is conditional on stock-market participation. In column (3), the sample is restricted to accounts with bond holding information. East is an indicator equal to one if an investor lives in East Germany. All variables are described in detail in Appendix-Table A1, Panel B. The z-statistics (in column 1) and the t-statistics (in columns 2 and 3) are based on standard errors clustered by municipality.

Sample:	Brokerage Sample		
Dependent Variable:	Stock-market participation	Fraction of stocks if participant	Fraction of bonds
	(1)	(2)	(3)
East	–0.156***	–0.072***	0.160***
	(–13.47)	(–7.80)	(9.77)
Gender (1=male)	0.073***	0.051***	–0.081***
	(22.76)	(16.08)	(–22.14)
Investor age	–0.110***	0.029***	0.141***
	(–19.05)	(3.25)	(15.71)
Married (1=yes)	0.042***	0.026***	–0.041***
	(19.26)	(8.14)	(–12.79)
Ln(Portfolio value)	–0.011***	0.042***	0.034***
	(–8.37)	(33.83)	(21.92)
Ln(Number of local banks)	0.007	–0.019**	0.020**
	(0.81)	(–2.56)	(2.43)
Ln(Total population)	0.008	0.005	–0.010***
	(1.63)	(1.64)	(–2.85)
Time account is open	0.124***	–0.021***	–0.096***
	(38.70)	(–6.84)	(–19.01)
Ln(Real estate wealth)	–0.009***	–0.002	0.003***
	(–6.65)	(–1.47)	(3.55)
High-school degree	0.133	0.013	–0.232***
	(1.23)	(0.22)	(–2.61)
Ln(GDP per capita)	0.029*	–0.014	0.023
	(1.90)	(–1.08)	(1.62)
Ln(Number of local firms)	0.004	–0.006*	–0.004
	(0.83)	(–1.74)	(–0.79)
Year FE	yes	yes	yes
Pseudo/Adj. R^2	0.19	0.09	0.25
West mean	0.873	0.735	0.107
Observations	839,680	687,464	839,272

Table 3: Differences in Investment Behavior (Bank Sample)

Results in this table are based on cross-sectional bank data from June 2017. We report average marginal effects from logit regressions in columns (1) and (2), and OLS estimates in column (3). Stock-market participation is an indicator equal to one if an investor holds stocks in her portfolio in a given year. Stock-market participation in column (2) is conditional on having a portfolio, and fraction of stocks in column (3) is further conditional on stock-market participation. Information on bond holdings are not available in the bank sample. East is an indicator equal to one if an investor lives in East Germany. All variables are described in detail in Appendix-Table A1, Panel B. z-statistics (columns (1)&(2)) and t-statistics (column (3)) are based on standard errors clustered by county.

Sample:	Bank Sample		
Dependent Variable:	Stock-market participation (1)	Participation if portfolio (2)	Fraction stocks if participant (3)
East	-0.055***	-0.145***	-0.154***
	(-4.08)	(-4.23)	(-4.80)
Gender (1=male)	0.075***	0.126***	0.154***
	(9.11)	(4.52)	(6.10)
Investor age	0.007***	0.017***	0.010**
	(3.39)	(3.75)	(2.59)
Investor age squared	-0.000**	-0.000***	-0.000***
	(-2.55)	(-3.44)	(-2.44)
Married (1=yes)	-0.003	-0.016	-0.010
	(-0.46)	(-0.61)	(-0.39)
Employed (1=yes)	0.013*	-0.017	-0.030
	(1.69)	(-0.62)	(-1.15)
Trainee (1=yes)	-0.055**	-0.028	-0.090*
	(-2.47)	(-0.49)	(-1.75)
Retiree (1=yes)	-0.024	0.058	-0.039
	(-1.15)	(-0.97)	(-0.70)
Online banking (1=yes)	0.145***	0.180***	0.211***
	(10.82)	(5.34)	(6.54)
Mortgage (1=yes)	-0.033**	-0.103**	-0.111**
	(-2.08)	(-2.27)	(-2.49)
Relationship with bank	-0.001	-0.004***	-0.005***
	(-1.64)	(-2.89)	(-4.50)
Credit score	-2.519***	-1.733	-0.884
	(-3.27)	(-2.01)	(-1.04)
Ln(Income)	-0.013***	-0.000	-0.011***
	(-9.93)	(0.919)	(-3.05)
Ln(Savings)	0.026***	0.004	-0.001
	(15.07)	(0.76)	(-0.25)
Ln(Portfolio value)		0.039***	0.013***
		(9.07)	(3.54)
Pseudo/Adj. R^2	0.157	0.143	0.148
Observations	6,903	1,445	1,340

Table 4: Movers

All estimations use the bank data and survey results obtained from the same bank. The coefficients are average marginal effects from logit regressions, with stock-market participation as the dependent variable. Stock-market participation is an indicator equal to one if an investor holds stocks in her portfolio in a given year. East is an indicator equal to one if an investor lives in East Germany. Mover is an indicator equal to one if an investor has moved from East to West Germany. Moved 20 years ago is an indicator equal to one if an investor has moved from East to West Germany at least 20 years ago. In column (2), we exclude all East Germans and only compare West Germans to former East German investors who have moved to and now live in West Germany. In column (3), we additionally exclude all East Germans who moved to West Germany later than 20 years ago. We include the same set of control variables as in Table 3. All variables are described in detail in Appendix-Table A1, Panel B. The z-statistics are based on standard errors clustered by county.

Dependent Variable:	Stock-market participation		
Sample:	Bank Sample	Bank Sample: West Germans Only	
	(1)	(2)	(3)
East	-0.244***		
	(-2.12)		
Mover	-0.107*	-0.124**	
	(-1.78)	(-1.83)	
Moved 20 years ago			-0.214**
			(-2.36)
Control variables	yes	yes	yes
Pseudo R^2	0.354	0.333	0.327
Observations	241	198	175

Table 5: Alternative Explanations

All estimations use the brokerage data from June 2004 to December 2012. The coefficients are average marginal effects from logit regressions, with stock-market participation as the dependent variable. The corresponding results for the fractions of stocks and bonds are reported in Appendix-Table A6. Stock-market participation is an indicator equal to one if an investor holds stocks or equity funds in her portfolio in a given year. East is an indicator equal to one if an investor lives in East Germany. We include the same set of control variables as in Table 2, and in addition risk tolerance, ranging from 1 (conservative) to 3 (speculative), in column 1; trust, ranging from 1 (low) to 7 (high), in column 2; familiarity with the stock market, ranging from 1 (high) to 7 (low), in column 3; financial literacy ranging from 0 (low) to 3 (high) in column 4; or income ranging from 1 (below 1,000 Euro per month) to 4 (above 3,000 Euro per month) in column 5, as well as all additional variables jointly in column 6. Risk tolerance and income are measured at the investor level, and trust, familiarity, and financial literacy at the county level. All variables are described in detail in Appendix-Table A1, Panel B. The z-statistics are based on standard errors clustered by municipality.

Dependent Variable:	Stock-market participation					
Sample:	Brokerage Sample					
	(1)	(2)	(3)	(4)	(5)	(6)
East	–0.172***	–0.202***	–0.192***	–0.186***	–0.232***	–0.128***
	(–9.29)	(–14.24)	(–13.20)	(–12.88)	(–9.91)	(–5.46)
Risk tolerance	0.307***					0.296***
	(52.56)					(51.28)
Trust		0.016**				0.065***
		(2.13)				(3.60)
Familiarity			–0.008			0.045***
			(–1.53)			(4.52)
Financial literacy				0.052***		0.124***
				(4.08)		(5.25)
Income					0.072***	0.046***
					(20.43)	(12.05)
Control variables	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes
Pseudo R^2	0.20	0.21	0.20	0.21	0.10	0.22
West Mean	0.621	0.880	0.880	0.880	0.621	0.607
Observations	176,270	684,441	699,126	698,373	170,824	117,288

Table 6: Capitalist versus Communist Stocks

All estimations use the brokerage data from June 2004 to December 2012. The coefficient estimates are from tobit regressions where the dependent variable is the fraction of financial companies (column 1), the fraction of US companies (column 2), the fraction of Chinese, Russian, or Vietnamese companies (column 3), and the fraction of (formerly) state-owned companies (column 4) in an investor's portfolio. East is an indicator equal to one if an investor lives in East Germany. We include the same control variables as in Table 2. All variables are described in detail in Appendix-Table A1, Panel B. The t-statistics are based on standard errors clustered by municipality level.

	Financial firms	US firms	Chinese, Russian, or Vietn. firms	State-owned firms
	(1)	(2)	(3)	(4)
East	–0.076***	–0.048***	0.104***	0.041***
	(–4.74)	(–2.71)	(4.21)	(3.11)
Gender (1=male)	0.083***	0.125***	0.143***	–0.047***
	(14.47)	(18.56)	(9.40)	(–14.37)
Investor age	–0.279***	–0.265***	–0.190***	0.066***
	(–22.49)	(–15.93)	(–6.52)	(8.08)
Married (1=yes)	0.024***	–0.002	–0.003	–0.001
	(4.11)	(–0.31)	(–0.21)	(–0.34)
Portfolio value	0.119***	0.066***	0.137***	0.002**
	(59.71)	(27.16)	(35.63)	(1.96)
Ln(N. of local banks)	0.002	0.015	–0.008	–0.022***
	(0.16)	(1.40)	(–0.46)	(–3.27)
Ln(Total population)	0.004	–0.006	0.007	–0.006**
	(0.99)	(–1.21)	(1.00)	(–2.30)
Time account is open	–0.034***	0.097***	0.060***	–0.040***
	(–7.49)	(14.27)	(4.56)	(–13.28)
Ln(Real-estate wealth)	–0.003	–0.005***	–0.005*	0.003*
	(–1.10)	(–2.69)	(–1.65)	(1.84)
High-school degree	0.198**	0.028	–0.371**	0.034
	(2.16)	(0.27)	(–2.08)	(0.46)
Ln(GDP per capita)	0.004	0.067***	0.095***	–0.040**
	(0.18)	(3.06)	(2.82)	(–2.51)
Ln(N. of local firms)	0.023***	0.012*	0.002	–0.001
	(4.15)	(1.85)	(0.18)	(–0.39)
Year FE	yes	yes	yes	yes
Pseudo R^2	0.096	0.036	0.088	0.019
West Mean	0.102	0.061	0.005	0.188
Observations	622,777	622,777	622,777	551,624

Table 7: Intensity of Exposure

All estimations use the brokerage data from June 2004 to December 2012. The coefficients are average marginal effects from logit regressions, with stock-market participation as the dependent variable. The corresponding results for the fractions of stocks and bonds are reported in Appendix-Table A10. Stock-market participation is an indicator equal to one if an investor holds stocks or equity funds in her portfolio in a given year. East is an indicator equal to one if an investor lives in East Germany. In addition to the full set of control variables from Table 2, we include interactions of the East dummy with an indicator for being 50 years of age or older (in column 1), with an indicator for locations outside the "Small Border Traffic" zone (Kleiner Grenzverkehr) (in column 2). In column 3, we include both interactions. In columns 2 and 3, we also add the baseline indicator for being age 50 and above. z-stats based on standard errors clustered by municipality are presented in parentheses.

Dependent Variable:	Stock-market participation		
	Age interaction (1)	Distance interaction (2)	All interactions (3)
East	–0.092***	–0.120***	–0.060***
	(–7.96)	(–6.51)	(–3.41)
East × Above 50	–0.079***		–0.076***
	(–11.32)		(–10.73)
East × Distance		–0.054**	–0.052**
		(–2.52)	(–2.47)
Above 50	0.036***		0.034***
	(7.96)		(7.74)
Control variables	yes	yes	yes
Year FE	yes	yes	yes
Pseudo R^2	0.19	0.19	0.20
West Mean	0.873	0.873	0.873
Observations	839,680	837,121	837,121

Table 8: Emotional Tagging

All estimations use the brokerage data from June 2004 to December 2012. The coefficients are average marginal effects from logit regressions, with stock-market participation as the dependent variable. The corresponding results for the fractions of stocks and bonds are reported in Appendix-Table A11. Stock-market participation is an indicator equal to one if an investor holds stocks or equity funds in her portfolio in a given year. East is an indicator equal to one if an investor lives in East Germany. In addition to the full set of control variables from Table 2, we include interactions of the East dummy with different proxies for negative (Panel A) or positive (Panel B) emotional tagging. In Panel A, these proxies are: an indicator for heavily polluted GDR counties according to the 1990 report of the German ministry of environmental affairs (in column 1), the fraction of Catholics and Protestants in a county according to the 2011 census (in column 2), and an indicator for counties in the former GDR that did not receive West German TV signals (in column 3). In Panel B, the proxies are: an indicator for cities that were renamed during the GDR regime (in column 1), namely, Chemnitz (Karl-Marx-Stadt), Kriegsdorf (Friedensdorf), Neuhardenberg (Marxwalde), Werminghoff (Knappenrode), and Eisenhüttenstadt (Stalinstadt); the fraction of voluntary STASI participation in county during the GDR regime (column 2), the fraction of survey respondents in a county who state that the former political system of the GDR had many positive aspects (column 3), and an indicator equal to one if an Olympic medal winner as of the Wikipedia list of the GDR's Olympic champions was born in the same municipality than an East German investor (column 4). We multiply the Olympic medal indicator with the inverse population ratio to account for higher visibility in smaller areas. All variables are described in detail in Appendix-Table A1, Panel B. z-stats based on standard errors clustered by municipality are presented in parentheses.

Panel A: Negative Emotional Tagging

Dependent Variable:	Stock-market participation		
	Pollution (1)	Religion (2)	No West-TV (3)
East	–0.162***	–0.274***	–0.159***
	(–13.52)	(–7.31)	(–13.42)
East × Pollution	0.068**		
	(2.00)		
East × Religion		0.006***	
		(3.74)	
East × No West TV			0.094***
			(3.37)
Control variables	yes	yes	yes
Year FE	yes	yes	yes
Pseudo R^2	0.19	0.20	0.19
West Mean	0.873	0.873	0.873
Observations	839,680	839,680	839,680

Table 8: cont'd

Panel B: Positive Emotional Tagging

Dependent Variable:	Stock-market participation			
	Renamed city (1)	Voluntary STASI (2)	Liked GDR (3)	Olympic champion (4)
East	–0.150***	–0.121***	–0.101***	–0.152***
	(–13.67)	(–7.29)	(–7.56)	(—13.77)
East × Renamed city	–0.132***			
	(–3.83)			
East × STASI		–0.085**		
		(–2.55)		
East × Liked GDR politics			–0.231***	
			(–5.82)	
East × Olympic champion				–0.118*
				(–1.80)
Control variables	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Pseudo R^2	0.19	0.19	0.20	0.19
West Mean	0.873	0.873	0.873	0.873
Observations	839,680	839,680	839,461	839,680

Table 9: Trigger Points: Election Years

All estimations use the brokerage data from June 2004 to December 2012. The coefficients are average marginal effects from a logit regression in column (1), and OLS estimates in columns (2) and (3). Stock-market participation (in column 1) is an indicator equal to one if an investor holds stocks or equity funds in her portfolio in a given year. Fraction of stocks (in column 2) is conditional on stock-market participation. East is an indicator equal to one if an investor lives in East Germany. In addition to the full set of control variables from Table 2, we include interactions of the East dummy with an indicator for federal election years (2005 and 2009 in our sample). All variables are described in detail in Appendix-Table A1, Panel B. The z-statistics (in column 1) and t-statistics (in columns 2 and 3) are based on standard errors clustered by municipality.

Dependent Variable:	Stock-market participation	Fraction of stocks if participant	Fraction of bonds
	(1)	(2)	(3)
East	–0.151***	–0.073***	0.153***
	(–13.09)	(–8.00)	(9.47)
East × Election year	–0.019***	0.004	0.025***
	(–8.16)	(0.92)	(4.96)
Control variables	yes	yes	yes
Year FE	yes	yes	yes
Pseudo/Adj. R^2	0.19	0.09	0.25
West Mean	0.873	0.735	0.107
Observations	839,680	687,464	839,272

Table 10: Are Anti-Capitalist Attitudes Costly?

All estimations use the brokerage data from June 2004 to December 2012. In Panel A, we use equal- or value-weighted returns, respectively, of a difference portfolio that is long in East German investors' stock holdings and short in West German investors' stock holdings as dependent variables. Performance alphas are calculated using the Global CAPM market factor in columns (1) and (4), the Global Fama and French (1993) factors in columns (2) and (5), and the Global Carhart (1997) four-factor model in columns (3) and (6). Global risk factors are from Kenneth French's website. Panel B shows average marginal effects from a logit regression in column (1), and OLS estimates in columns (2) to (5). The dependent variables are: an indicator equal to one if an investor holds index funds or ETFs (in column 1), the number of assets in an investor's portfolio (in column 2), the average fund fees an investor pays her all-equity funds (in column 3), the Herfindahl index of an investor's stock holdings (in column 4), and the fraction of bank-owned products an investor holds in her portfolio (in column 5). We regress the dependent variables on the East German dummy variable and the same set of control variables as in Table 2. The t-stats are calculated from standard errors clustered by municipality.

Panel A: Monthly performance alphas

	Equal weighted			Value weighted		
	CAPM_t^{E-W}	3-Factor_t^{E-W}	4-Factor_t^{E-W}	CAPM_t^{E-W}	3-Factor_t^{E-W}	4-Factor_t^{E-W}
	(1)	(2)	(3)	(4)	(5)	(6)
Performance $\text{alpha}_t^{East-West}$	-0.080**	-0.073**	-0.076**	-0.109**	-0.107**	-0.101**
	(-2.04)	(-2.00)	(-2.08)	(-2.36)	(-2.32)	(-2.18)
MKTRF^{Global}	-0.030***	-0.023***	-0.022***	0.018*	0.020*	0.017
	(-4.59)	(-4.03)	(-3.77)	(1.79)	(1.98)	(1.57)
SMB^{Global}		-0.086***	-0.087***		-0.033	-0.031
		(-3.41)	(-3.49)		(-1.19)	(-1.10)
HML^{Global}		-0.026	-0.022		-0.004	-0.011
		(-1.34)	(-1.08)		(-0.10)	(-0.31)
WML^{Global}			0.008			-0.014
			(0.91)			(-1.04)
Adj. R^2	0.133	0.216	0.212	0.032	0.023	0.025
Observations	92	92	92	92	92	92

Table 10: cont'd

Panel B: Other costs					
	Passive investments (1)	# of assets (2)	Fund fees (3)	Herfindahl index (4)	Bank owned products (5)
East	–0.017***	–1.509***	0.051***	0.038***	0.031*
	(–4.47)	(–4.74)	(4.71)	(2.72)	(1.73)
Gender (1=male)	0.014***	1.023***	–0.002	–0.036***	–0.060***
	(13.99)	(15.61)	(–0.38)	(–14.28)	(–12.93)
Investor age	–0.044***	–0.196	0.059***	0.043***	0.045***
	(–23.50)	(–1.01)	(4.13)	(4.77)	(4.35)
Married (1=yes)	0.007***	0.314***	–0.002	–0.003	–0.025***
	(6.08)	(5.41)	(–0.28)	(–1.33)	(–5.65)
Ln(Portfolio value)	0.010***	1.137***	–0.011***	–0.075***	–0.090***
	(24.63)	(31.79)	(–6.44)	(–80.25)	(–72.80)
Ln(N. of local banks)	0.004**	0.239	–0.017**	–0.003	0.010
	(2.18)	(1.44)	(–2.42)	(–0.50)	(1.10)
Ln(Total population)	–0.000	0.059	0.000	–0.002	0.003
	(–0.27)	(1.06)	(0.15)	(–1.09)	(0.98)
Time account is open	0.008***	1.798***	–0.000	–0.050***	–0.122***
	(6.33)	(17.41)	(–0.03)	(–13.20)	(–16.91)
Real-estate wealth	–0.001***	–0.073***	0.003*	0.002*	–0.002
	(–3.72)	(–3.13)	(1.89)	(1.69)	(–1.36)
High-school degree	0.061***	2.149	–0.207**	–0.019	–0.087
	(2.81)	(1.16)	(–2.54)	(–0.31)	(–0.86)
Ln(GDP per capita)	0.012***	0.524**	–0.011	–0.010	–0.012
	(2.85)	(2.22)	(–0.68)	(–0.90)	(–0.53)
Ln(N. of local firms)	0.003***	0.157*	–0.012***	–0.005	0.002
	(3.01)	(1.85)	(–2.66)	(–1.53)	(0.43)
Year FE	yes	yes	yes	yes	yes
Pseudo/Adj. R^2	0.11	0.20	0.08	0.34	0.36
Observations	515,856	839,680	60,690	622,777	90,215