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# State Coercion and Control Aversion: Evidence from an Internet Study in East and West Germany\*

Katrin Schmelz<sup>†</sup> and Anthony Ziegelmeyer<sup>‡</sup>

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## Abstract

Do politico-economic systems influence how control affects motivation? We hypothesize that control aversion has evolved less under the coercive regime of East Germany than under the liberal regime of West Germany. We test this hypothesis in a large-scale internet experiment with subjects of different generations. The core of our study is a repeated principal-agent game where the principal can control the agent by implementing a minimal effort requirement before the agent chooses an effort costly to her but beneficial to the principal. In this setting, control aversion is captured by crowding-out of intrinsic motivation due to enforcement. We find that overall, control aversion is stronger among West than among East Germans. These differences converge quickly over generations as they are significant only for older Germans who differ in their regime experience, but not for younger ones who essentially grew up in reunified Germany. We conclude that control-related preferences are deeply affected by direct exposure to a politico-economic system, while they are hardly transmitted to younger generations.

KEYWORDS: institutions, culture, intrinsic motivation, control aversion, crowding-out, hidden costs of control, online experiment

JEL CLASSIFICATION: C81 C90 C91 C93 D02 M52

## 1 Introduction

Does the nature of the politico-economic system influence how control or its absence affect motivation? If so, do control-related preferences persist or change when institutions change?

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To answer these questions, we study reactions to control among East and West Germans of younger and older cohorts. We hypothesize that control aversion has evolved less under the coercive regime of East Germany than under the liberal regime of West Germany, and we test this hypothesis in a large-scale online study.

In East Germany, coercion was ubiquitous. The East German regime created a vast apparatus of surveillance and repression unprecedented in scale and depth. The dreaded State Security Police *Stasi* was by far the most extensive state security service in history with more spies than had any other totalitarian regime (Jacob and Tyrell, 2010). Restrictions and control invaded basically all areas of life. Values of conformity and obedience were instilled. At the same time, West Germany created a pluralist democracy where values of freedom, autonomy and individualism have been promoted. After nearly half a century, thanks to the German reunification in 1990, East and West Germans alike have been living in a liberal democracy. Does the experience of such different regimes affect reactions to control?

Reunified Germany offers a valuable opportunity to study the impact of politico-economic systems on control-related preferences as both parts of Germany are similar with respect to their basic culture but they have experienced different degrees of political control in the past. Making use of Germany’s ‘naturalistic’ quasi-experiment allows us to claim a causal link and to isolate the impact of a politico-economic system from other variables. Arguably, before 1945, East and West Germany experienced the same history and politico-economic systems.<sup>1</sup> From 1945 to 1990, East Germany was ruled by a coercive and West Germany by a liberal regime. Since 1990, the liberal regime of West Germany has been ruling both parts. Our East German participants born before 1980 were quasi ‘randomly assigned’ to the ‘treatment group’ of a coercive regime, while younger East Germans born in the ’80s or later were assigned to the ‘treatment group’ of a liberal regime but raised by a generation who experienced a coercive regime. All West Germans were ‘randomly assigned’ to the ‘control group’ living under a liberal regime. Comparing younger and older generations in East and West Germany allows us to separate the direct impact of politico-economic systems and vertical or oblique transmission of this impact from mere generation effects. Moreover, even if one might doubt that the two parts of Germany were comparable before German division, our cohort approach controls for potential deeper confounds.

Thanks to the very influential study by Falk and Kosfeld (2006), control aversion has received a lot of attention in the recent years. Indeed, the phenomenon is of high relevance as it challenges the core assumption of economics that people respond positively to incentives. Control aversion implies that principals suffer hidden costs of control because some agents reduce their work motivation when facing enforcement. Different shares of control averse people have been documented in a few studies conducted in laboratories of different countries, yielding mixed evidence on whether motivation crowding-out effects are substantial enough to significantly undermine the effectiveness of control, or whether benefits of control dominate hidden costs (Falk and Kosfeld, 2006; Ziegelmeyer et al., 2012; Burdin et al., 2018). These mixed findings from different countries suggest that institutions might affect reactions to control, though systematic evidence is missing. Our experiment sheds light on the relationship between institutions and control-related preferences.

This paper provides evidence on the (in)stability of control-related preferences following institutional turnover and therefore makes a novel contribution to the literature on cultural persistence and change (Bowles, 1998; Alesina and Fuchs-Schündeln, 2007; Giuliano, 2007; Guiso et al., 2008; Nunn and Wantchekon, 2011; Alesina et al., 2013; Fernandez, 2013; Giuliano and Spilimbergo, 2014). Giavazzi et al. (2019) review the literature on the evolution of a wide range

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<sup>1</sup> An emerging recent literature points out differences between the Eastern and Western parts of Germany before 1945 (Becker et al., 2019; Wyrwich, 2019). However, we argue that all people in the German Reich were exposed to similar degrees of institutional control. All Germans have experienced two world wars and it is unlikely that control aversion was wide-spread under these conditions and in a time where conservative values including obedience were much more common than today.

of cultural values and conclude that there is substantial heterogeneity across traits with respect to the speed at which they evolve across generations. However, control aversion has not been considered yet.

Understanding how institutions affect the interaction between control and motivation is not only interesting for fundamental research but it is also of applied value. Firms who operate across countries and impose the same management strategy everywhere might face different reactions to employees' empowerment or managerial control (Chua and Iyengar, 2006). Anticipating how their citizens respond to enforcement is also crucial for governments when designing incentives for desirable citizens' behavior like paying taxes, protecting the environment or engaging in social activities.<sup>2</sup>

Guiso et al. (2006) show that culture directly shapes beliefs and preferences, which in turn affect economic outcomes. Accordingly, different reactions to (the absence of) control in East and West might partly explain the still different economic outcomes in the two parts of Germany. For example, East Germany's unemployment rate is still about one third higher than the unemployment rate of West Germany whereas the GDP per capita in the East is only about two thirds of the GDP per capita in the West (The Economist, 2015). Socialist education discouraging individual initiative has been shown to lower participation in the labor market and effort in the workplace as captured by working hours (Fuchs-Schündeln and Masella, 2016). Labor productivity in East Germany continues to lag behind West Germany by about 20 percent, which is particularly interesting as some Eastern regions were among the most productive in Germany before the Second World War. Little startup activity and low concentration of managers in the East have been found to help explain the puzzle (Burda and Severgnini, 2018). Lichter et al. (forthc.) find long-lasting negative effects of Stasi surveillance on income, employment rates, and self-employment. Moreover, higher Stasi informer density is associated with lower electoral turnout, less organizational involvement, and less organ donations within East Germany (Jacob and Tyrell, 2010). Such economic outcomes might potentially originate from control-related preferences, including components like motivation in the absence of control.

The workhorse of this study is a principal-agent game where the principal can control the agent by imposing either a low or a medium effort level before the agent chooses an effort costly to her but beneficial to the principal. Thus, in our setting, control aversion corresponds to crowding-out of intrinsic motivation due to enforcement. Our principal-agent game is an extension of the laboratory game used by Falk and Kosfeld (2006) in their main treatments as detailed in Schmelz and Ziegelmeyer (2019). We investigate the influence of state coercion on control aversion with the help of a large sample of 721 East and West Germans from the working population.

Our main results provide evidence on the endogenous formation of control-related preferences. Overall, control aversion is stronger among West Germans than among East Germans. Analyzing younger and older cohorts separately reveals that East-West differences in control aversion converge over generations as they are significant only for older Germans (born before 1980) but not for the younger ones. Thus, our findings suggest that direct regime experience has a long-lasting impact on control-related preferences, which is also supported by migrants within Germany. Control aversion of older East and West German migrants never differs from their peers in the part of their origin, while migrants' control aversion always differs significantly from their peers in the part of their destination.<sup>3</sup>

Looking at the mechanism, to our surprise, we do not find differences in intrinsic motivation

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<sup>2</sup> Reviewing the literature on incentives and social preferences, Bowles and Polania-Reyes (2012) conclude that the separability assumption common to many economic models cannot be sustained. Instead, incentives and social preferences may be either substitutes or complements, which has important implications for institutions to well design incentives like fines or subsidies such that they complement with social preferences and minimize crowding out.

<sup>3</sup> Given the convergence of control-related preferences, it is unlikely that our results are confounded with potential differences between East and West existing before the German division.

between East and West as effort in the absence of control is very similar in both parts of Germany. However, our data suggest that West Germans punish control more than East Germans. Accordingly, the effectiveness of control is undermined by the presence of hidden costs of control which are stronger in the West than in the East. The difference between (older) East and West Germans is driven by more frequent control averse reactions in the West, while the strength of control averse reactions does not differ in the two parts of Germany. Finally, we study the impact of numerous additional explanatory factors (experimental variables, demographics other than regime experience, control-related attitudes, job characteristics) on control aversion. Our main results are robust to the inclusion of these alternative explanatory factors. In particular, none of the demographics or work-related variables affects control aversion significantly.

The remainder of the paper proceeds as follows. Section 2 discusses state coercion in East and West Germany and derives our hypotheses. Section 3 presents the design and practical procedures of our online experiment relying on East and West Germans of the working population with varying regime experience. Empirical tests on our hypotheses are provided in Section 4. Section 5 provides additional results to complete the picture, including an experiment on student samples in East and West Germany, addressing the robustness of our findings and some methodological aspects. Finally, Section 6 concludes.

## 2 State coercion and hypotheses

First, we give evidence that East and West Germany developed into rather different forms of society due to differences in economic and political structures. Second, we derive two research hypotheses from the outlined evidence and the literature.

### 2.1 State coercion in East and West Germany from 1945 to 1989

Germany was separated in 1945 at the end of World War II. In 1949, the Federal Republic of Germany (FRG) and the German Democratic Republic (GDR) were officially founded. The two Germanies celebrated their reunification on October 3, 1990. Since then, Germany has been a unified country with common administrative, education, legal and regulatory systems.

We illustrate below differences in political and economic organization between the two Germanies, and we conjecture how they might have affected reactions to control. Unless otherwise referenced, the summary of the two systems is based on Fulbrook (2008).

#### The coercive regime of East Germany

In East Germany, coercion was ubiquitous. The East German regime created a vast apparatus of surveillance and repression unprecedented in scale and depth. The dreaded State Security Police *Stasi* was by far the most extensive state security service in history with more spies than had any other totalitarian regime. Restrictions on travel, publications, assembly and denial of higher education and positions were just a normal part of everyday life. More intrusive techniques included shadowing suspects with bugs or cameras, and through telephone and postal surveillance. Torture and intimidation were used to mute dissent, and even death sentences were imposed until 1987. The failure to denounce a fellow citizen was a crime punishable by up to five years imprisonment. Accordingly, people who did not accept control suffered tremendous costs (see Jacob and Tyrell, 2010, and references therein).

In addition to altruistic values within the community of solidarity, conformity and obedience were instilled. The East German educational ethos was operating to produce obedient subjects rather than participatory citizens. Educating children to conform with their teachers' opinion was part of the political program. Pupils' performance was not only publicly evaluated in front of the whole class, but even at their parents' workplace, making them responsible for their childrens' potential failure or disobedience. Teaching materials and curricula were highly standardized and

teachers were required to strictly adhere to them (see Oettingen et al., 1994, and the references therein).

Political conformity was a prerequisite for career advancement. Those who in any way stepped out of line were denied entrance to university, however brilliant their performance at school might have been. Consequently, East German youth gained little experience of genuine debate. Employees in East Germany experienced little control over their work and low complexity in their jobs. Supervision was tight and management responses to initiative were typically negative (Frese et al., 1996). Though East German workers did not need to fear unemployment, they also had no right to strike. Many citizens grumbled about some aspects of the system, while agreeing with others, and learned over time to ‘play by the rule’. Instances where citizens were risking to suffer heavy punishment in order to express their dislike of control and fight for freedom were concealed to a great extent.

### **The liberal regime of West Germany**

West Germany created a pluralist democracy, where citizens were free to influence the democratic process, for example by voting independently, or by forming pressure groups. In this pluralistic political system, various ideologies and belief-systems could coexist peacefully. Moreover, the material success of West German capitalism created very comfortable living conditions. These circumstances offered considerably less reason for dissatisfaction than the political and economic conditions in East Germany, and dissent was largely captured by the political pluralism.

At the same time, values of freedom, autonomy and individualism have been promoted in West Germany. Pupils were encouraged to develop independent points of view, intellectual curiosity and the skill of debating. The educational philosophy avoided influencing children to adopt an absolute truth or directing their personalities into any state-defined value system. Performance feedback in front of the class was less relevant, and students’ performance records were kept in the schools. Teaching strategies were much less standardized and teachers were allowed to respect the individual needs of their students (Oettingen et al., 1994).

In the work context, there have been attempts to increase job discretion and to enhance employees’ control and responsibility for their jobs (Frese et al., 1996). The society was based explicitly on the principle of individual achievement, and educational qualifications served as credentials legitimizing inequality in social status. It has been possible for citizens to debate and argue in the interests of improving the state and society in which they lived. Thus, protest movements like the German student movement of 1968 as well as industrial strikes organized by labor unions were quite common in West Germany.

After nearly half a century of division, Germans in East and West had developed very different lifestyles, expectations and patterns of behavior. In particular, East Germans faced much more control and restrictions in their daily life than West Germans. We conjecture that the coercive regime in East Germany had undermined individuals’ sense of autonomy and eventually limited the acquisition of control-averse preferences among East Germans as compared to West Germans.

## **2.2 Hypotheses**

There is by now encompassing evidence that institutions affect cultural beliefs and values, and that institutional differences play a decisive role in the prevalence of various norms (e.g., Bowles, 1998; Henrich et al., 2005; Guiso et al., 2006; Gächter et al., 2010; Nunn and Wantchekon, 2011; Gächter and Schulz, 2016; Lowes et al., 2017). Instead of deeply rooted culture, we focus on the short-term impact of politico-economic systems. There is evidence that preferences can change over a rather short time period (e.g., Guiso et al., 2008; Fernandez, 2013; Acemoglu and Jackson, 2015). In their review on the relationship between culture and institutions, Alesina and Giuliano (2015) cite conclusive evidence that people internalize behavior that emerges from

specific circumstances like institutional shocks. Thus, it is conceivable that the different regimes in East and West Germany have affected the distributions of preferences.

Below we present our two hypotheses which are closely linked in the sense that Hypothesis 2 is a refinement of Hypothesis 1. We first discuss control aversion among East and West Germans in general (Hypothesis 1), before we conjecture how younger and older generations of East and West Germans might differ in their control aversion (Hypothesis 2).

### 2.2.1 Hypothesis 1: Control aversion among East and West Germans

We motivate our first hypothesis with three arguments all leading to the same prediction. First, we draw on a very powerful phenomenon from social psychology, namely the mere exposure effect (Zajonc, 1968, 2001), an approach to explain the formation of preferences. The mere repeated exposure to a stimulus is entirely sufficient to increase an individual's preference for that stimulus. In fact, the exposures can generate positive affects in response to similar stimuli, even though they were not previously exposed. The mere exposure effect implies that East Germans should be more inclined to accept control while West Germans should show a stronger preference for the absence of control, even in an artificial experimental setting.

Second, we refer to Hwang and Bowles (2011) who introduce a model of cultural evolution, based on the mechanisms of conformity and misperception. They assume a degree of conformist cultural transmission, meaning that the likelihood that an individual will adopt a particular preference varies with the prevalence of that preference in the population (Boyd and Richerson, 1985). We argue that the apparent prevalence of control-averse preferences in the population is reduced by the extent of state coercion (also relating to the concept of preference falsification, Kuran, 1987). The rationale is that if state coercion is ubiquitous and costs associated with insubordination are tremendous, individuals can hardly express their dislike of control publicly which may lead people to mistakenly underestimate the prevalence of control aversion and thus, they are less likely to adopt control-averse preferences. Our conjecture is therefore that control aversion is less prevalent among East than West Germans.

Third, we take a closer look at control aversion as captured in our experimental setup. Control aversion in our design is characterized by two components, *sufficient intrinsic motivation* and *reduced motivation under enforcement (crowding-out)*. The most prominent reasons for crowding-out of intrinsic motivation due to enforcement are negative reactions to perceived distrust or to restricted freedom of choice (Falk and Kosfeld, 2006; Rudolf et al., 2018b). Thus, we draw on the empirical literature on intrinsic motivation, trust and autonomy in East and West Germany. Concerning *intrinsic motivation*, Frese et al. (1996) document that East Germans show lower initiative at work than West Germans. More generally, workers in historically communist countries value intrinsic aspects of a job (i.e., the opportunity to use initiative) less than workers in other countries (Warr, 2008). Accordingly, we expect less intrinsic motivation among East compared to West Germans.

How do the different institutions affect *crowding-out of intrinsic motivation*, driven by negative reactions to restricted autonomy or distrust? With respect to autonomy, East Germans were used to limited freedom as they faced much more control and restrictions than West Germans. Lichter et al. (forthc.) show that a higher spy density caused lower self-employment rates after reunification, and those adverse effects of the regime still persist. Relatedly, East Germans state to be less self-reliant than West Germans (Bauernschuster et al., 2012). Thus, East Germans seem to value autonomy less and in turn, they might react less negatively to restrictions on their freedom of choice compared to West Germans. Concerning trust, the vast network of unofficial collaborators in East Germany nurtured ubiquitous uncertainty about being spied on and created a latent atmosphere of distrust (Gieseke, 2014). Heineck and Süßmuth (2013) show that East Germans state to trust less than West Germans. Lichter et al. (forthc.) find that higher levels of former surveillance resulted in lower levels of social capital (interpersonal and institutional trust) in the Eastern part of post-reunification Germany. We suspect that East Germans who

have been used to a culture of distrust might also react less negatively to experiencing distrust.

In sum, we expect control aversion to be weaker among East Germans than among West Germans. We conjecture that this difference is driven by less intrinsic motivation as well as less negative reactions to control in East Germany.

**Hypothesis 1:** Control aversion is weaker among East Germans than among West Germans.

### **2.2.2 Hypothesis 2: Control aversion among older and younger East and West Germans**

As older and younger East Germans only partly share the same regime experience, it seems however sensible to refine our first hypothesis. On the one hand, the impact of reunification on the motivations of older East Germans is likely to be rather modest. They grew up under oppression and the experience of a liberal regime in their adulthood is unlikely to make them abandon completely the preferences they acquired in early life.<sup>4</sup> On the other hand, East Germans who essentially grew up in unified Germany have been socialized under a liberal regime with much less direct exposure to control than older East Germans (mere exposure effect, Zajonc, 1968, 2001) and observing more control aversion when forming their preferences (cultural evolution based on conformity and misperception, Hwang and Bowles, 2011). Still, they have been raised by older East Germans and therefore, even younger generations of East Germans might exhibit less control aversion than West Germans of the same age.

Empirical evidence on the persistence or convergence of different values in reunified Germany is mixed. Alesina and Fuchs-Schündeln (2007) show that East Germans state stronger preferences for government intervention in private domains than West Germans, and these preferences are predicted to require one or two more generations to converge. Rainer and Siedler (2009) find that East Germans still state higher levels of social distrust than West Germans, while institutional trust converges. According to Sack (2017), East Germans favor equality, while West Germans rank individual freedom higher than distributive justice. Differences in those value orientations are converging for the younger generation.

Experimental studies comparing behavior of East and West Germans are rare. Ockenfels and Weimann (1999) document that 5 years after reunification, East German students were less prosocial in anonymous interactions than their peers in the West, and this difference still persists 20 years after reunification (Brosig-Koch et al., 2011). In an artefactual field experiment, Ariely et al. (2019) observe more cheating among East Berliners than among West Berliners. The longer people were exposed to socialism, the more likely they cheated. However, the authors failed to generalize this finding as East and West Germans from two other cities show no significant differences in cheating.

More generally, the literature on cultural persistence and change provides mixed evidence on the speed of evolution of preferences. There is a large literature showing that values and beliefs can be very persistent (e.g., Giuliano, 2007; Nunn and Wantchekon, 2011; Voigtländer and Voth, 2012; Alesina et al., 2013). However, there is also an important literature documenting that attitudes can change rather quickly in response to changes in institutions (e.g., Bowles, 1998; Alesina and Fuchs-Schündeln, 2007; Giuliano and Spilimbergo, 2014).

To explain the numerous examples on both sides of cultural persistence and change, Giuliano and Nunn (2017) identify the (in)stability of a society’s environment across generations as a powerful predictor. When environments are similar across generations, the traditions of the previous generation are likely to be useful for the current generation and ancestors attach great

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<sup>4</sup>Rudorf et al. (2018a) show that the heterogeneity in control aversion is reflected in systematic differences of the stable functional brain organization. They identify a neural trait underlying control-averse behavior, i.e., a task-independent neural measurement that is stable across time, similar to a neural fingerprint. According to this finding, it is unlikely that older East Germans completely change their control preferences due to the experience of liberalism.



importance to passing on traditions. In a very unstable environment where each generation faces different conditions, the beliefs and behavior of the previous generation are less relevant for the current generation. Therefore, behavior in stable societies is more persistent and unstable societies are more inclined to change. Applied to the German context, we argue that the political and economic environment has been highly unstable in the last century.<sup>5</sup> Thus, we expect older Germans to put rather little emphasis on transmitting their values to their offspring and consequentially, reactions to control are likely to change across generations of East Germans.

Giavazzi et al. (2019) explain slow- and fast-changing values theoretically by transaction gains. If economic benefits are high, values change rather quickly while they change slowly if economic benefits are small. The authors investigate the speed of evolution of a wide range of cultural attitudes of European immigrants to the US. In particular, faster convergence is observed for attitudes towards cooperation and trustworthiness as well as children’s autonomy. We argue that autonomy is an important quality to succeed in liberal Germany. Moreover, economic interactions are largely anonymous, based on trust and trustworthiness. Thus, there are strong incentives for younger East Germans to adopt these attitudes, which are driving forces for control aversion. If they value autonomy and trust more, they should be more likely to react negatively to restrictions on their freedom of choice or perceived distrust.

Yamagishi et al. (2008) show that cultural differences are not differences in preferences but differences in default strategies adopted to the incentive structure of the environment. Accordingly, older East Germans who have experienced a coercive regime should have developed an adaptive default strategy characterized by caution and distrust, little autonomy and acceptance of control. Potentially, they might even not have developed a default strategy for situations without control. On the contrary, younger East Germans are more likely to have acquired a default strategy characterized by values of autonomy and trust which yields high returns under the incentives of a liberal environment. Again, these values are likely to cause control aversion.

All in all, our second conjecture is that East-West differences in control aversion are stronger for older than for younger Germans. Still, even younger generations of East Germans might exhibit less control aversion than West Germans of the same age.

**Hypothesis 2:** The difference in control aversion between East and West Germans is larger for the older than for the younger generations. In particular, older East Germans are less control averse than younger East Germans and older West Germans.

### 3 Design and procedures

This section presents the online experiment designed to test our two hypotheses. As our experimental setting relates to control and motivation at the workplace, our interest is particularly in the working population. We rely on a sample of university graduates of various ages from both parts of Germany. We presume that this subpopulation has the cognitive abilities to grasp the instructions and the abstract experimental setting. Moreover, university graduates usually have jobs characterized by responsibility, complexity and leeway, three aspects that foster intrinsic motivation. Therefore, they are more likely to show the crowding out of intrinsic motivation that control strategies might generate.<sup>6</sup>

By conducting our experiment online, we gain access to a large sample of the German population with substantial heterogeneity in terms of age, regime experience, and place of living. From this sample, we create rather homogeneous subsamples of East and West Germans that

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<sup>5</sup>The ancestors of people experiencing German reunification have experienced World War I; followed by Germany’s first democracy in the Weimar Republic, comprising heavy inflation, economic boom in the Golden Twenties and the Great Depression; totalitarian power of the Nazis; World War II; and finally, the division of Germany.

<sup>6</sup>As crowding out of intrinsic motivation is more likely to occur in personal instead of anonymous interactions (Dickinson and Villeval, 2008), we would expect to observe more control aversion in the field, also among lower status groups.

are matched on a series of background variables (Rubin, 2006). We favor matched sampling over popular representative sampling because our aim is to isolate the effect of regime experience on behavior rather than to make inferences about the distribution of preferences in the general population, and also because differences in demographic structures might be confounded with the East-West dimension. Additionally, we do our best to carefully isolate the effect of control in a regime on control-related preferences from other explanatory variables. Therefore, we also elicit individual characteristics that could potentially be related to control-related preferences. Participants complete a survey in which they are asked about their socio-economic characteristics as well as their subjective attitudes to trust and control. Moreover, we elicit information about subjects’ job and their perceptions of control and freedom at their workplace.

### 3.1 The principal-agent interaction

West Germans experienced their right to freedom enshrined in the Basic Law to be taken very seriously. Instead, control in East Germany implied not only surveillance, but, in the first place, restrictions on freedom in various domains (e.g., restrictions on travel, access to information or freedom of expression). To study how East and West Germans react to restrictions of their freedom of choice, we capture control in our design by the possibility to rule out options as detailed below.

Consider an agent who chooses a productive activity which is costly to her but beneficial to the principal. Before the agent exerts effort, the principal can either decide to leave the agent’s effort set unrestricted by choosing “no control” ( $\underline{e} = 1$ ) or he can decide to restrict the agent’s effort set by choosing one of two control levels: “low control” ( $\underline{e} = 2$ ) or “medium control” ( $\underline{e} = 3$ ).<sup>7</sup> The agent then chooses an effort level  $e \in \{\underline{e}, \underline{e} + 1, \dots, 10\}$ . We employ the strategy method, meaning that the agent makes her choice for each of the three control levels before knowing the principal’s actual decision. Concretely, each agent is asked to choose a triplet of effort levels  $(e(1), e(2), e(3))$  where  $e(1) \in \{1, 2, \dots, 10\}$  is payoff-relevant in case the principal does not enforce a minimal effort,  $e(2) \in \{2, 3, \dots, 10\}$  is payoff-relevant in case the principal enforces a low effort and  $e(3) \in \{3, 4, \dots, 10\}$  is payoff-relevant in case the principal enforces a medium effort. Table 1 shows the monetary payoffs (in experimental currency units) where the fair and most efficient effort level locates slightly above the middle ( $e = 7$ ).

	Effort level									
	1	2	3	4	5	6	7	8	9	10
Agent’s monetary payoffs	99	98	96	93	89	83	75	65	51	35
Principal’s monetary payoffs	1	16	29	41	53	64	75	82	87	90

Table 1: Monetary payoffs by effort level.

Several considerations led to the players’ monetary payoffs shown in Table 1. First, exerting more effort than the minimal one is cheap for the agent and extremely beneficial for the principal. This feature of the monetary payoffs ensures that even agents with little intrinsic motivation can express their willingness to perform in the interest of the principal when control is absent ( $\underline{e} = 1$ ). Consequently, control aversion (i.e., the crowding out of intrinsic motivation when  $\underline{e} > 1$ ) is likely to prevail in our experiment. Second, effort costs are assumed to be convex since exerting low effort at work is usually not very costly but once the agent is working to capacity

<sup>7</sup>Typically, employers not only choose whether or not to control their employees, but they also choose to which extent they exert control. Our design innovates by allowing us to study both, reactions to the presence of control as well as reactions to the magnitude of control. In light of our research question, one might speculate that, for example, oppressive regimes mainly affect aversion to higher levels of control since basically all regimes impose mild control.

marginal effort costs become tremendous. Third, benefits from the agent’s effort are assumed to be concave which reflects productivity losses due to physical restrictions.

In a given session, each participant is assigned either the role of agent or the role of principal. Participants gain experience with the context and the behavior of other participants during 10 rounds of the interaction. Roles are kept constant over all rounds. The matching follows a “no-contagion” protocol which suppresses repeated-game effects.<sup>8</sup>

## Belief elicitation

Before they interact in the employment relationship, participants are asked to guess the average behavior of their counterpart. In each round, participants make three guesses. Principals are asked to guess, for each control level, the average effort that will be chosen by agents (since we employ the strategy method, for each control level *all* agents choose an effort). Each principal reports his guesses by keying in a vector  $(b_P(1), b_P(2), b_P(3))$  with  $\underline{e} \leq b_P(\underline{e}) \leq 10$ . Agents are asked to guess, for each control level, the natural frequency of principals that will choose the respective control level. Each agent reports her guesses by keying in a vector  $(b_A(1), b_A(2), b_A(3))$  with  $0 \leq b_A(\underline{e}) \leq 100$  and  $b_A(1) + b_A(2) + b_A(3) = 100$ .

We limit the possibility to learn about the choices of other subjects. Once all guesses and choices have been made in a given round, subjects are only informed about the behavior of their counterpart. Subjects do not learn about the correctness of their guesses during the experimental session.

## Payment scheme

To limit the costs of our large-scale experiment, we relied on a hybrid random incentive scheme (HRIS; Baltussen et al., 2012) where a randomly selected choice or belief is paid to only a randomly selected subset of participants. Paying out only a few randomly chosen participants has been shown to be an effective alternative to traditional payment schemes (e.g. Cubitt et al., 2011; Harrison et al., 2002). To account for the professional status of our participants, we aimed at rather high conditional payoffs and therefore, we chose a high conversion rate of 1 experimental currency unit to €5.

## 3.2 Practical procedures

The experiment was conducted in February 2011 with the help of an internet platform developed by the authors and detailed in Schmelz and Ziegelmeyer (2019).

The recruitment of our participants turned out to be challenging. Common difficulties to convince the general public of the integrity of an internet study with cash prizes at stake aside, our target group is probably the subpopulation with least leisure time and little need of extra money. Our recruitment strategy included: (i) Issuing a press release and contacting journalists of newspapers to report about a novel internet platform for interactive online experiments; (ii) Announcing the study in mailing lists of former students (in particular alumni lists of the Max Planck Society, of the German Up with People Alumni Association, and of a few universities who consented); (iii) Posting in social networks (facebook, twitter, maxNet); (iv) Advertising in a job newsletter for academic professionals (academics.de); (v) And finally, recruiting former students from subject pools of German experimental laboratories via ORSEE.<sup>9</sup>

<sup>8</sup>Concretely, assume that 12 agents and 12 principals take part in the session. In the first repetition, agent 1 interacts with principal 1, agent 2 interacts with principal 2, ..., and agent 12 interacts with principal 12. In the second repetition, agent 1 interacts with principal 2, agent 2 interacts with principal 3, ..., and agent 12 interacts with principal 1. And in the last repetition, agent 1 interacts with principal 10, agent 2 interacts with principal 11, ..., and agent 12 interacts with principal 9.

<sup>9</sup>We are grateful to the researchers in charge of the experimental laboratories in Bonn, Cologne, Duisburg-Essen, Erfurt, Heidelberg, Karlsruhe, Konstanz, Magdeburg, Mannheim, Munich and Oldenburg for allowing us

The domain “www.1fallvon3.de” (1caseof3) was publicly announced which directed to an information page preceding the registration pages.<sup>10</sup> On this page participants were informed about conditions of participation. Participants were aware that other participants also belonged to the German working population, but the distinction between East and West Germans was never mentioned. Before registering, participants were informed that 4 winners would be paid a minimum of 155 euros and a maximum of 645 euros and that all the other participants would not be paid. The number of participants was unrestricted.

The participation process was largely identical to the one explained in Schmelz and Ziegelmeyer (2019). For registration, participants had to enter some information. Each email address could register only once. All participants completed the survey and the experiment at their place of choice. Registered participants received a survey token via email. Answering the survey questions took on average 10 minutes and participants had a time frame of a few days to do so. Participants who completed the survey could register for an experimental session and received a personalized token to the experiment via email. To limit a potential impact of the survey on choices in the interactive part, experimental sessions were conducted on a later day. There was a prearranged start time for each experimental session, and participants had to log on not later than that time. As we were concerned that some participants might forward their token to another person, tokens were sent only one or two hours before the experiment started.

Each session took approximately one hour. Participants who completed an experimental session as well as participants who dropped for external reasons were eligible for payment.<sup>11</sup> A participant whose partner dropped (referred to as an orphan) was assigned an artificial partner with whom she interacted in all remaining rounds. The orphan was informed of the procedure whereas the session proceeded according to the regular protocol for all the other participants. The choice or belief that was selected for payment was determined at random according to the German official lottery numbers at a preannounced date in the future. When they were informed of final payoffs, participants also learned about average choices of the other role for each round of their session and the correctness of their guesses.

The payment procedures were as follows: Once the choice or belief relevant for payment was determined, participants received another email with a link. This link directed participants to a page showing their *potential* payoff followed by a page with lucky numbers between 000 and 999. Participants could select one lucky number, and each lucky number could only be selected once. In each lottery, two winners were those whose lucky numbers matched the last three digits (including the two decimal places) of the German stock market index DAX at the close of trading on two preannounced dates in the future, and a link to an official trading page where participants could track the DAX was provided. In case the realized numbers of the DAX at the preannounced dates were not assigned to a subject, we informed subjects that the DAX of the next day would be relevant to determine the winners. The two participants who interacted with the winners in the selected round also became winners. The earnings were transferred to the bank accounts of the winners after their eligibility was checked. The four winners earned on average 376.25 euros. Experimental screens including the instructions and decision screens are provided in Appendix A.

## 4 Main results

The core of this section are formal tests of our two hypotheses. In preparation for that, we first describe our sample, define control aversion, and present statistics on agents’ average efforts in response to each of the three control levels.

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to access their subject pools and sending invitations.

<sup>10</sup>We aimed at a neutral title which is still related to the study (principals choose one out of three options) and sufficiently catchy. The title refers to the popular German television series “Ein Fall für Zwei”, translated “A case for two”.

<sup>11</sup>The overall dropout rate was about 8 percent. See Appendix B.2 for details.

## 4.1 Sample

The data analyses reported to test our hypotheses are based on the sample of subjects who spent their childhood and adult lifetime either only in East Germany or only in West Germany. We refer to those subjects as non-migrants.<sup>12</sup> In the analysis relating to Hypothesis 2, we distinguish between Germans born in the 1980s, referred to as younger Germans, and those born before 1980, referred to as older Germans (see the beginning of Subsection 4.5 for details.).<sup>13</sup>

Table 2 shows basic characteristics of the subsamples we consider (agents and principals pooled). Despite a few exceptions, gender and educational background categories are well represented in the subsamples, and subjects in the matched East-West subsamples are of similar age. Not surprisingly, education in economics has been less popular in the East than in the West, while technical sciences are somewhat more represented among East Germans.

					Educational background				
	<i>N</i> (Round 1)	<i>Female</i>	<i>Age</i> mean ( <i>sd</i> )		<i>Studies_econ</i>	<i>Studies_social</i>	<i>Studies_human</i>	<i>Studies_tech</i>	<i>Studies_missing</i>
East Germans	191	59%	32.76 (8.50)		13%	34%	16%	37%	1%
West Germans	341	50%	32.96 (8.20)		30%	25%	16%	28%	1%
Younger East Germans	116	60%	27.61 (1.93)		13%	41%	14%	31%	2%
Younger West Germans	202	59%	27.90 (1.74)		35%	26%	16%	22%	1%
Older East Germans	75	56%	40.72 (8.59)		12%	24%	19%	45%	0%
Older West Germans	139	37%	40.31 (8.33)		23%	24%	15%	37%	1%

Table 2: Characteristics of non-migrants.

*Note:* These sample characteristics are based on all non-migrants who participated in at least round 1. The categories of educational background are as follows: *Studies\_econ* refers to “business administration & economics”; *Studies\_social* refers to “behavioral & social sciences except economics”; *Studies\_human* refers to “humanities”; and *Studies\_tech* refers to “engineering, life & natural sciences”.

Before registering for the study, we asked potential participants to only proceed if they were working at that time. In addition, participants were asked in the survey whether they have a *regular* job. Among young professionals, 81% and 90% of our subjects in East and West indicated that they have a regular job, while among older professionals, 92% and 94% in East and West had a regular job. Additional job-related questions were only asked to those subjects.

Table 3 provides work-related statistics for our non-migrant subjects who have a regular job (see Appendix B.1 for additional explanations). Apart from a few exceptions which are not surprising given the German labour statistics, our matched subsamples in East and West are similar with respect to their job characteristics. The large majority of our subjects works as employees. In line with the literature (Burda and Severgnini, 2018), we have more subjects who are self-employed or who have personnel responsibility among our elder professionals in the West than in the East. Young professionals are rarely self-employed and less often in charge of other employees than older professionals in East and West (see the columns *Self-employed* and *Leader* of Table 3). Most of our subjects have full-time jobs (column *Weekly hours*) and older West Germans tend to work more than older East Germans. Again, this difference is

<sup>12</sup>We also exclude the decisions which result from interactions with an artificial partner.

<sup>13</sup>As will be discussed at the end of Subsection 4.5 and Appendix C.8, our results are robust to alternative cutoff years.

in line with previous observations (Fuchs-Schündeln and Masella, 2016). Older East Germans have spent somewhat more time in their current job than older West Germans, which makes sense as job mobility was traditionally low in East Germany (column *Years in current job*). The representation of *Job sectors* is very similar for our matched subsamples with the exception that we have more older East Germans working in the health & social sector and more older West Germans working in private business. Finally, our subsamples are very comparable with respect to their *ISCO-08 Skill level*. As intended by our recruitment strategy, the large majority of our subjects are highly skilled professionals.<sup>14</sup>

To test Hypothesis 1, we pool younger and older non-migrants within East Germany and within West Germany. To test Hypothesis 2, we split the sample into younger and older subjects, and we compare these subsamples between East and West. Table 4 summarizes the number of subjects we rely on to test our hypotheses. Reasons for subjects' dropouts, as well as details about migrants are provided in Appendices B.2 and B.3.

## 4.2 Defining control aversion

A control averse agent chooses a higher effort in the absence of control than if controlled. Concretely, aversion to low control is expressed by  $e(1) > e(2)$  and aversion to medium control is expressed by  $e(1) > e(3)$ . To isolate the effects of control aversion from disciplining effects of control on the aggregate level, we have to rule out opportunistic choices in the effort distributions. Following the standard procedure in the literature on control aversion starting with Falk and Kosfeld (2006), any effort smaller than the enforced effort level  $e(1) < \underline{e} = 2$  and  $e(1) < \underline{e} = 3$  is shifted to the enforced effort level  $\underline{e}$ . This means that, in order to measure aversion to low (respectively medium) control, opportunistic effort choices under no control ( $e(1) = 1$ ) are set equal to 2 (respectively 3). Aversion to low control implies that the difference between efforts under low control and the shifted efforts under no control ( $e(2) - \max[e(1), 2]$ ) is negative and aversion to medium control implies that the difference between efforts under medium control and the shifted efforts under no control ( $e(3) - \max[e(1), 3]$ ) is negative.

## 4.3 Agents' efforts and control benefits

Table 5 shows agents' efforts as a function of the control level in East and West. In each panel the first row reports the average effort and the second row reports the standard deviation followed by the 1st quartile followed by the median followed by the 3rd quartile for each control level. As shown in the upper part of the table, and to our surprise, average effort in the absence of control is (almost) identical in both parts of Germany, while East Germans exert more effort than West Germans under low and medium control. Thus, average effort increases more with control in the East than in the West. The lower part of Table 5 shows summary statistics of agents' effort levels for younger and older Germans. The effects of control on effort are similar among younger East and West Germans. Older Germans react clearly differently to control in both parts of Germany. While control increases effort among older East Germans by about one effort level, control hardly affects average efforts among their peers in the West, suggesting substantial control aversion among older West Germans. Appendix C.1 shows the cumulative distributions of effort.

To compare effort levels, we rely on linear mixed models including random intercepts for agents and sessions. First, in the no-control condition, agents' average effort in both parts of Germany and for each of our subsamples is significantly greater than the minimal effort level

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<sup>14</sup>To extract the *ISCO-08 Skill level*, we first coded subjects' open answers with respect to their job title and job description according to the International Standard Classification of Occupations (ISCO-08), a hierarchically structured classification that captures all jobs in the world in more than 400 unit groups (International Labour Organization, 2012). This classification yields a four-digit code identifying a subject's occupation. From this code, we derived the ISCO-08 Skill level where skill is defined as the ability to carry out the tasks and duties of a given job.

							Job sector					ISCO-08 Skill level				
	<i>N</i> (Round 1)	Self-employed	Leader	Weekly hours	Years in current job		University	Health & Social	Public	Business	Missing	1 (Elementary)	2 (Workers)	3 (Technicians)	4 (Professionals)	Missing
East Germans	163	7%	12%	37.44 (10.25)	1.54 (0.56 ; 4.64)		30%	9%	18%	42%	1%	1%	12%	10%	76%	1%
West Germans	313	9%	19%	38.55 (10.99)	1.78 (0.80 ; 4.38)		28%	5%	18%	46%	3%	1%	9%	8%	79%	3%
Younger East Germans	94	4%	7%	37.33 (10.35)	1.02 (0.36 ; 1.87)		40%	4%	13%	41%	2%	1%	13%	11%	73%	2%
Younger West Germans	182	3%	13%	37.31 (11.69)	1.12 (0.46 ; 1.88)		35%	6%	15%	41%	3%	1%	11%	7%	78%	3%
Older East Germans	69	12%	19%	37.58 (10.19)	5.40 (1.53 ; >11.40)		16%	14%	25%	45%	0%	2%	10%	10%	78%	0%
Older West Germans	131	17%	26%	40.26 (9.74)	4.46 (2.26 ; 10.85)		18%	3%	22%	54%	3%	0%	5%	11%	81%	3%

Table 3: Characteristics of non-migrants with regular jobs.

*Notes:* These sample characteristics are based on all non-migrant Germans with a regular job who participated in at least round 1. *Leader* indicates whether a subject has personnel responsibility. The column *Weekly hours* shows means (sd). *Years in current job* refers to the subject's experience in the current job and the corresponding column shows medians (1st quartile ; 3rd quartile). We cannot compute means for the latter variable as the answer format included a border category "Job started before 2000" without higher resolution and thus, the variable is not continuous.

*Job sector* indicates the industry where a person is employed. Note that the category *Public* refers to public institutions other than universities or health facilities, like schools, government departments, or libraries. *Business* refers to the private sector. The *ISCO-08 Skill level* captures the ability to carry out the tasks and duties of a given job, ranging from 1 (lowest) to 4 (highest).

			Agents		Principals		
			Round 1	Round 10	Round 1	Round 10	
<i>Hypothesis 1</i>			East	99	55	92	51
			West	172	121	169	125
<i>Hypothesis 2</i>	Younger Germans (born in '80s)	East	52	30	64	39	
		West	99	67	103	76	
	Older Germans (born before '80)	East	47	25	28	12	
		West	73	54	66	49	

Table 4: Number of agents and principals in each subsample in the first and final round.

		Control level		
	Obs.	No	Low	Medium
East Germans	790	<b>3.45</b> (2.62;1;2;6)	<b>3.80</b> (1.99;2;3;5)	<b>4.08</b> (1.64;3;3;5)
West Germans	1460	<b>3.41</b> (2.61;1;2;6)	<b>3.53</b> (1.78;2;3;5)	<b>3.67</b> (1.31;3;3;4)
Younger East Germans	384	<b>3.33</b> (2.63;1;2;6)	<b>3.49</b> (1.80;2;3;5)	<b>3.63</b> (1.28;3;3;4)
Younger West Germans	831	<b>3.07</b> (2.43;1;2;5)	<b>3.28</b> (1.65;2;2;4)	<b>3.57</b> (1.15;3;3;4)
Older East Germans	406	<b>3.58</b> (2.61;1;3;7)	<b>4.10</b> (2.11;2;4;6)	<b>4.50</b> (1.81;3;3;7)
Older West Germans	629	<b>3.86</b> (2.76;1;3;7)	<b>3.86</b> (1.91;2;4;5)	<b>3.79</b> (1.48;3;3;4)

Table 5: Agents' efforts as a function of the principal's control level.

of 1 ( $\chi^2$  tests:  $p$ -value  $< 0.001$ ), which indicates that agents are willing to perform in the interest of the principal when control is absent. The average intrinsic motivation of East and West Germans (both cohorts pooled) does not differ significantly, which is also true for our two cohorts in East and West ( $\chi^2$  tests:  $p$ -values  $> 0.47$  for all three comparisons). Effort under low control tends to be higher in the East than in the West ( $\chi^2$  test:  $p$ -value = 0.083), though the difference is insignificant for the subsample comparisons of younger and older cohorts ( $\chi^2$  tests:  $p$ -values  $> 0.24$  for both comparisons). However, effort under medium control is significantly higher in the East than in the West ( $\chi^2$  test:  $p$ -value = 0.002). This difference is driven by the older cohort ( $\chi^2$  test:  $p$ -value  $< 0.001$ ), while average reactions to medium control do not differ significantly between younger East and West Germans ( $\chi^2$  test:  $p$ -value = 0.391).

Overall, the evidence suggests that agents' behavior might differ in the two parts of Germany mainly because aversion to medium control is stronger in the West than in the East, which applies in particular to the older cohort. Moreover, potential differences in control aversion between East and West cannot be attributed to differences in intrinsic motivation. The degree of intrinsic motivation revealed by agents' efforts in the no-control condition is sufficiently large so that aversion to low and medium control could potentially be observed in all samples. Additional descriptive statistics on agents' efforts are provided in Appendices C.2 and C.3.

A relevant question for the design of work systems is whether principals benefit from controlling their agents. To address this question, we analyze the differences between efforts under low and no control and between efforts under medium and no control (see Appendix C.4). Average effort differences are positive in both East and West. Principals gain significantly more with control when facing older East Germans compared to older West Germans, while we never reject



the null hypothesis that effort differences are identical for younger East and West Germans.

#### 4.4 Testing Hypothesis 1: Control aversion among East and West Germans

To test whether West Germans are more control averse than East Germans, we consider the pooled samples across cohorts of all non-migrant East Germans and all non-migrant West Germans. Before we formally test our first hypothesis, we give a rough impression on our main findings with respect to Hypothesis 1.

##### Hypothesis 1: Main results at a glance

Figure 1 provides an overview of control aversion among East and West Germans. Pooled across all rounds, average aversion to low control (on the left) and medium control (on the right) is always more negative and thus stronger among West Germans than among East Germans. In both subsamples, aversion to medium control is more pronounced than aversion to low control.

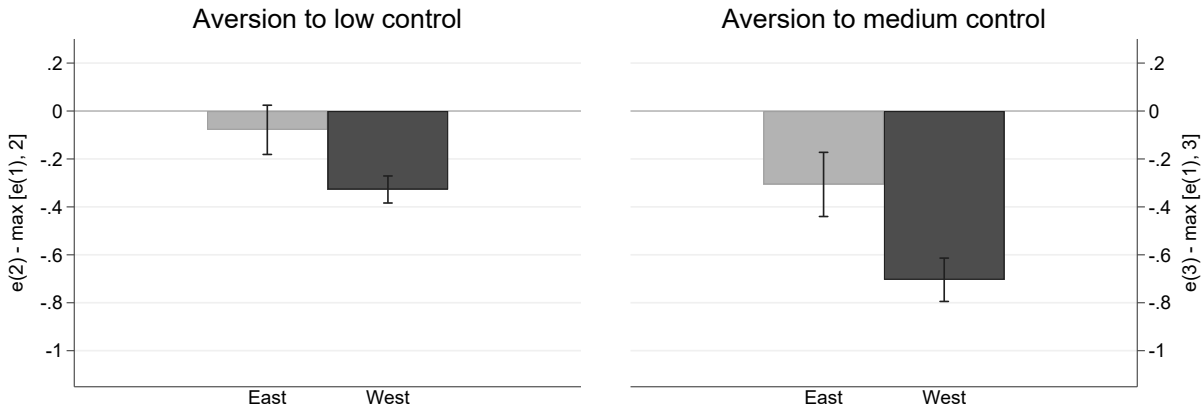


Figure 1: Average control aversion among East and West Germans.

*Notes:* The more negative the values, the more control averse a subsample is on average. The error bars represent 95% confidence intervals.

##### Hypothesis 1: Regressions and details

**Result 1.** *East Germans are significantly less control averse than West Germans.*

To formally test whether the magnitude of control aversion is more substantial in the West than in the East, we rely on a series of regression models. The estimation method is linear mixed models where random intercepts at the agent and session levels are included. Random effects are assumed to be independent and to follow a normal distribution with mean zero. Our regression models allow the agent's behavior to be correlated across rounds as well as the behavior of different agents in the same session to be correlated.<sup>15</sup> Models 1 to 3 predict aversion to low control, which corresponds to the difference between the effort under low control and the shifted effort under no control ( $e(2) - \max[e(1), 2]$ ), and models 4 to 6 predict aversion to medium control, which corresponds to the difference between the effort under medium control and the shifted effort under no control ( $e(3) - \max[e(1), 3]$ ). Table 6 reports our estimation results on control aversion.

<sup>15</sup>For all regression models, the estimate of the random intercept at the session level is basically zero. The nature of our matching protocol limits the degree to which the behavior of agents in the same session is correlated. Running the same regressions without a random intercept at the session level generates almost identical standard errors. Using OLS regressions with standard errors clustered for subjects also gives similar results.

	Dependent variable: Aversion to					
	Low control			Medium control		
	$e(2) - \max[e(1), 2]$			$e(3) - \max[e(1), 3]$		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.021 (0.097)	0.089 (0.098)	0.365 (0.354)	-0.193 (0.160)	-0.196 (0.166)	-0.039 (0.587)
West	-0.272** (0.121)	-0.361*** (0.122)	-0.341** (0.137)	-0.425** (0.200)	-0.506** (0.199)	-0.512** (0.224)
Half2		-0.361*** (0.064)	-0.345*** (0.063)		-0.447*** (0.074)	-0.447*** (0.075)
West*Half2		0.253*** (0.080)	0.239*** (0.078)		0.226** (0.091)	0.228** (0.092)
$b_A(2) - b_A(1)$		0.008*** (0.001)	0.007*** (0.001)			
$b_A(3) - b_A(1)$					0.003*** (0.001)	0.003*** (0.001)
Female			-0.004 (0.120)			0.106 (0.199)
Partner			0.088 (0.135)			0.108 (0.225)
Childhood_north			-0.058 (0.152)			0.081 (0.250)
Later_north			0.071 (0.157)			0.065 (0.260)
Studies_human			-0.199 (0.185)			-0.344 (0.307)
Studies_tech			0.059 (0.163)			0.072 (0.270)
Studies_social			-0.021 (0.169)			0.136 (0.280)
Trustworthiness			-0.037 (0.027)			-0.089** (0.044)
LifeControl			-0.025 (0.038)			0.005 (0.063)
Observations	2,250	2,250	2,229	2,250	2,250	2,229
Log-likelihood	-3,226.898	-3,191.045	-3,116.434	-3,625.179	-3,597.102	-3,551.063
<b>Hypothesis testing</b>						
East=West in Rounds 1-5		<b><math>p = 0.003</math></b>	<b><math>p = 0.013</math></b>		<b><math>p = 0.011</math></b>	<b><math>p = 0.022</math></b>
East=West in Rounds 6-10		$p = 0.391$	$p = 0.471$		$p = 0.169$	$p = 0.213$

Notes: Standard errors in parentheses. \*\*\*(1%); \*\*(5%) significance level.

Table 6: Control aversion among East and West Germans.

Averaged over all rounds, control aversion is insignificantly different from zero among East Germans and significantly stronger among West Germans (models 1 and 4). The results of models 2 and 5 show that experienced agents in the East express more control aversion than inexperienced agents and this increase is less pronounced in the West. The effect of belief differences is positive and strongly significant. Thus, the larger the share of principals agents expect to choose low control (model 2) or medium control (model 5) instead of no control, the less negatively they react to control.<sup>16</sup> The inclusion of demographic controls and attitudes towards trust and control has little impact on the estimated coefficients of models 2 and 5.<sup>17</sup>

<sup>16</sup>The small size of the coefficients for belief differences can have two reasons. First, since agents' beliefs add up to 100 (see Subsection 3.1), beliefs differences have a large range from -100 to 100. Second, agents can condition their effort on the control level and therefore, beliefs might play a minor role.

<sup>17</sup>*Partner* equals 1 if the subject is in a steady relationship and 0 otherwise. *Childhood\_north* equals 1 if the subject spent her childhood in the North of Germany and 0 otherwise. Similarly, *Later\_north* indicates whether the subject spent her life after studies in the North of Germany. *Studies\_social* equals 1 if the field of study belongs

None of the demographics affects control aversion as shown in models 3 and 6. The more an agent expects trustworthiness from strangers the more control averse she is, and significantly so in the medium control condition, while control over life does not have a systematic or significant effect on control aversion.<sup>18</sup>

We also employ job-related variables to predict control aversion like subjects' employment status (self-employment versus dependent employment), whether they have any personnel responsibility, the sector in which they are working (university, business, health/social, or public), the skill level required for their current job (elementary jobs, workers, technicians, or professionals), the number of weekly working hours, and for how long they have been working in their current job. Moreover, we elicited work-related experiences like the extent of predefined tasks, the extent of predefined task execution, and the extent of performance control. For those three aspects, we always asked for subjects' perception of control or freedom and for their desire (details are provided in Appendix C.6). None of these work-related information helps to explain control aversion.<sup>19</sup>

Finally, the lower panel of Table 6 reports  $\chi^2$ -tests on the equality of linear combinations of coefficients to test whether control aversion differs among East and West Germans in the first (rounds 1 to 5) and second (rounds 6 to 10) halves of the experiment. East-West differences are significant only in the first half of rounds. Yet, the effect goes in the same direction also in the second half of rounds (as illustrated in Appendix C.5).

We conclude that there is support for Hypothesis 1 as overall, East Germans are significantly less control averse than West Germans, though this difference is weaker towards the end of the experiment.

#### 4.5 Testing Hypothesis 2: Control aversion among younger and older East and West Germans

To test Hypothesis 2, we distinguish between younger and older Germans (born in the 1980s and born before 1980), and we compare these subsamples between East and West. Indeed, younger East Germans were at most 10 years at German reunification in 1990, and 8 years or younger when the 'wind of change' started blowing in East Germany.<sup>20</sup> We do not expect their control-related preferences to be effectively shaped by the coercive regime of former East Germany. On the other hand, most older East Germans have clearly been indoctrinated and spent at least part of their youth under the repressive regime. They completed primary school in the East and experienced at least some political indoctrination as so-called Thälmann pioneers. The choice of our age cut-off is in accordance with Oettingen et al. (1994) who show that some school experience is needed to shape different agency and control beliefs in East and West Berlin school children.<sup>21</sup>

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to the category "behavioral & social sciences except economics" and 0 otherwise; *Studies\_human* equals 1 if the field of study belongs to "humanities" and 0 otherwise; and *Studies\_tech* equals 1 if the field of study belongs to "engineering, life & natural sciences" and 0 otherwise. Economists are captured by the constant.

<sup>18</sup>*Trustworthiness* is the subject's score on the question "Imagine the following situation: You enter a shop shortly before closing. A person you do not know approaches you and asks you for 10 euros. The person says she/he urgently needs some items but has forgotten to take her/his wallet. She/he assures you that she/he will send the money by post. You give the person 10 euros and your address. Do you think the person will send you the money?" where answers are on a 10-point Likert scale with 1 being 'no, for sure not' and 10 being 'yes, for sure'. *LifeControl* is the subject's score on the question "Some people feel they have absolute freedom of choice to shape their lives. Other people feel that they are not free at all to decide about their life. How much freedom of choice do you feel you have in shaping your life?" where answers are on a 10-point Likert scale with 1 being 'no freedom at all' and 10 being 'absolute freedom'.

<sup>19</sup>Details are available upon request.

<sup>20</sup>The expression "Wind of change" goes back to a song by the German rock band Scorpions from 1991, expressing hope due to the fall of the communist governments.

<sup>21</sup>In a comparative study performed shortly after reunification, Oettingen et al. (1994) found that East Berlin schoolchildren scored lower on self-efficacy than their West Berlin counterparts. They were also more likely to conform to expectations and performance evaluations of their teachers. However, highly intelligent children did

## Hypothesis 2: Main results at a glance

Before formally testing our second hypothesis, we again give a first impression of our main findings with respect to Hypothesis 2. Figure 2 provides an overview of control aversion among younger and older East and West Germans. Pooled across all rounds, average aversion to low control (on the left) and medium control (on the right) is clearly negative for all subsamples except for older East Germans. Thus, on average, we observe aversion to low and medium control among all subsamples except for older East Germans. Moreover, average control aversion is rather similar among the younger cohorts in East and West, while older West Germans are far more control averse than older East Germans.

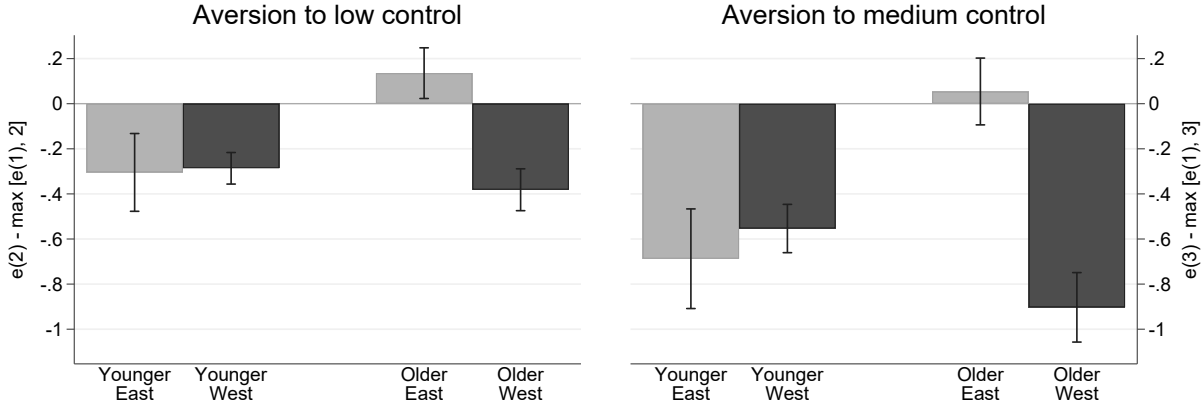


Figure 2: Average control aversion among younger and older East and West Germans.

*Notes:* The more negative the values, the more control averse a subsample is on average. The error bars represent 95% confidence intervals.

## Hypothesis 2: Regressions and details

**Result 2.** *Older East Germans are significantly less control averse than older West Germans. There is no significant difference in the reactions to control of younger East and West Germans.*

Table 7 reports the regression results from linear mixed models with random intercepts for agents and sessions. Figure 3 complements our estimation results.

Regression results of models 1 and 4 show that aversion to low or medium control is significantly negative both for younger and older West Germans. By contrast, control aversion is insignificantly different from zero in the East except for younger Germans in the medium control condition. For older East Germans, there are even (non-significant) hidden benefits of control. The lower panel of Table 7 reports  $\chi^2$ -tests on the equality of coefficients to test whether control aversion differs between the two age cohorts from East and West. Older West Germans are significantly more averse to both low and medium control than older East Germans, but we never reject the null hypothesis that control aversion among younger Germans is the same in East and West.

According to the regression results of models 2 and 5, aversion to low and medium control is strongly significant for both age cohorts of West Germans in the first half of rounds, and those agents become even more control averse in the second half of rounds. Among inexperienced agents in the East, control aversion is significant only for the younger Germans in the medium control condition (though in a weak sense). Aversion to low and medium control becomes strongly significant in the second half of rounds for younger East Germans, but it remains insignificant for older East Germans. The effect of belief differences is again positive and significant. We never reject the null hypothesis that control aversion among young Germans is the not differ in their self-efficacy judgments.

	Dependent variable: Aversion to					
	Low control			Medium control		
	$e(2) - \max[e(1), 2]$			$e(3) - \max[e(1), 3]$		
	(1)	(2)	(3)	(4)	(5)	(6)
Younger East Germans	-0.175 (0.135)	-0.079 (0.136)	0.146 (0.370)	-0.444** (0.221)	-0.417* (0.225)	-0.384 (0.608)
Younger West Germans	-0.252*** (0.096)	-0.259*** (0.097)	-0.005 (0.356)	-0.468*** (0.158)	-0.568*** (0.164)	-0.513 (0.588)
Older East Germans	0.136 (0.136)	0.261* (0.138)	0.501 (0.362)	0.071 (0.227)	0.042 (0.229)	0.113 (0.597)
Older West Germans	-0.346*** (0.110)	-0.290*** (0.111)	-0.046 (0.369)	-0.821*** (0.183)	-0.877*** (0.186)	-0.858 (0.610)
Younger East Germans * Half2		-0.443*** (0.143)	-0.182 (0.373)		-1.008*** (0.233)	-0.978 (0.611)
Younger West Germans * Half2		-0.315*** (0.099)	-0.056 (0.357)		-0.778*** (0.169)	-0.719 (0.589)
Older East Germans * Half2		-0.101 (0.142)	0.138 (0.364)		-0.274 (0.236)	-0.204 (0.600)
Older West Germans * Half2		-0.466*** (0.115)	-0.222 (0.370)		-1.113*** (0.191)	-1.092* (0.612)
$b_A(2) - b_A(1)$		0.008*** (0.001)	0.007*** (0.001)			
$b_A(3) - b_A(1)$					0.003*** (0.001)	0.003*** (0.001)
Trustworthiness			-0.035 (0.027)			-0.085* (0.044)
LifeControl			-0.025 (0.038)			0.007 (0.063)
Demographic controls	No	No	Yes	No	No	Yes
Observations	2,250	2,250	2,229	2,250	2,250	2,229
Log-likelihood	-3,225.382	-3,188.416	-3,113.690	-3,622.815	-3,592.771	-3,546.372
<b>Hypothesis testing</b>						
<i>East = West in rounds 1-10</i>						
Younger Germans	$p = 0.639$			$p = 0.930$		
Older Germans	$p = \mathbf{0.006}$			$p = \mathbf{0.002}$		
<i>East=West in rounds 1-5</i>						
Younger Germans		$p = 0.279$	$p = 0.397$		$p = 0.576$	$p = 0.657$
Older Germans		$p = \mathbf{0.002}$	$p = \mathbf{0.004}$		$p = \mathbf{0.002}$	$p = \mathbf{0.002}$
<i>East=West in rounds 6-10</i>						
Younger Germans		$p = 0.463$	$p = 0.497$		$p = 0.406$	$p = 0.380$
Older Germans		$p = \mathbf{0.045}$	$p = 0.065$		$p = \mathbf{0.004}$	$p = \mathbf{0.005}$

Notes: Standard errors in parentheses. \*\*\*(1%); \*\*(5%); \*(10%) significance level.

The upper four regressors apply to all rounds in models 1 and 4, but only to rounds 1-5 in the remaining models.

Table 7: Control aversion among younger and older East and West Germans.

same in East and West. In stark contrast, older Germans are always significantly more control averse in the West than in the East.

Regression results of models 3 and 6 show that none of the demographics affects control aversion.<sup>22</sup> Once more, optimistic views on trustworthiness increase control aversion, and significantly so in the medium control condition, while control over life does not have a systematic or significant effect on control aversion.

Moreover, we include our job-related variables in the regression models (self-employment, personnel responsibility, sector, skill level, weekly working hours, years in the current job) as well as work-related experiences (perceptions and desire of the extent of predefined tasks, the extent of predefined task execution, and the extent of performance control, see Appendix C.6). None of these work-related variables has a significant impact on aversion to low or medium

<sup>22</sup>We consider the same demographic controls as in Table 6. The corresponding details are available upon request.

control.<sup>23</sup>

We also consider alternative divisions of our sample into younger and older subjects by varying the cutoff of the year of birth from 1977 to 1983. Hypothesis testing results are robust to those alternative divisions of our sample (see Appendix C.8 for details).

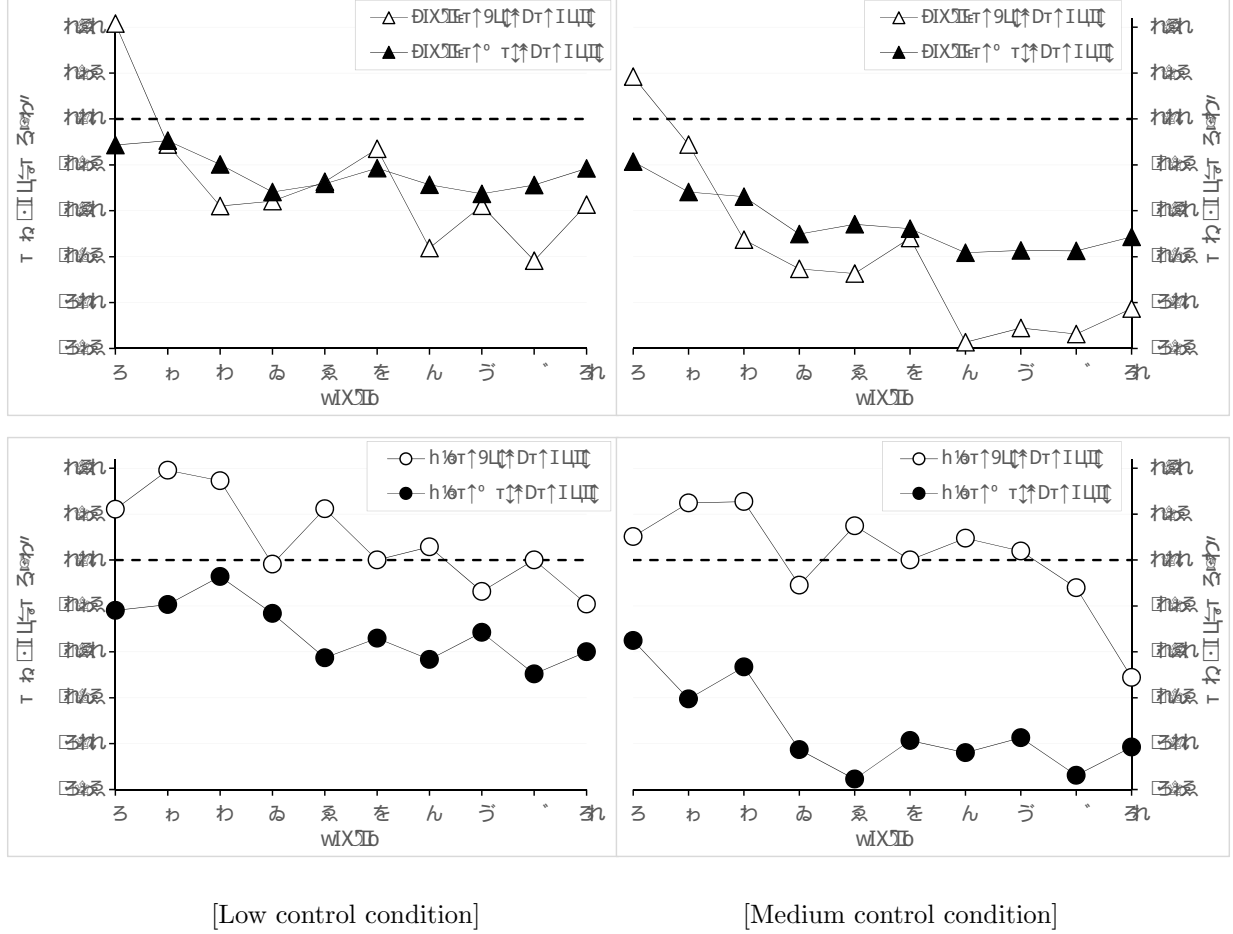


Figure 3: Dynamics of control aversion among younger and older East and West Germans.

In a nutshell, we find strong support for our second hypothesis. Older West Germans are always significantly more control averse than older East Germans, for whom negative effects of control are basically absent, but we never reject the null hypothesis that control aversion among younger Germans is the same in East and West.<sup>24</sup> Note also that the empirical support for Hypothesis 2 is not driven by a generation effect as we never reject the null hypothesis that control aversion is of similar magnitude among younger and older West Germans ( $\chi^2$  tests:  $p$ -values  $> 0.10$  for aversion to low and medium control).

## 5 Additional results

The results provided in this section complement and corroborate our main findings. We first study the behavior of intra-German migrants. Second, we compare the frequency and strength

<sup>23</sup>Details are available upon request.

<sup>24</sup>Robustness checks where control aversion is based on effort costs rather than effort levels confirm these findings (see Appendix C.7).

of control aversion in East and West. Third, we discuss agents' beliefs and principals' choices. Fourth, we present results of a robustness experiment with student samples.

## 5.1 Older German migrants

To complement our findings on Hypothesis 2, we compare control aversion among migrants and non-migrants in our older cohort.<sup>25</sup> If institutional experience at a younger age has a permanent effect on control-related preferences, our older migrants' control aversion should be closer to their peers in the part of their origin than to their peers in the part of their destination (supporting Hypothesis 2). Indeed, we never reject the null hypothesis that control aversion of East and West German migrants differs from their peers in the part of their origin. However, migrants' control aversion always differs significantly from their peers in the part of their destination, i.e., older East Germans who have migrated to the West are significantly less control averse than older non-migrant West Germans and older West Germans who have migrated to the East are significantly more control averse than older non-migrant East Germans. This is additional evidence in support of our second hypothesis, namely that experiencing a liberal or coercive regime has a long-lasting impact on control-related preferences (see Appendix C.9).

## 5.2 Frequency and strength of control aversion

This subsection sheds light on the mechanism driving Results 1 and 2. More average control aversion among (older) West compared to (older) East Germans could be driven by more frequent control averse reactions, and/or by stronger negative reactions to control in the West.

### 5.2.1 Agents' types

To complement the discussion on average behavior, we report on the heterogeneity of agents' reactions to control (see Appendix C.10 for details and graphical representations). We derive the type of an agent's reaction by counting the number of rounds in which the agent makes selfish, control averse, control neutral and control prone choices. About a quarter of the agents in East and West exert minimal effort at each control level in all 10 rounds, and about 35% (40%) in the East (West) do so in the majority of rounds (i.e. in at least 6 rounds). Control averse reactions where agents who reduce their effort when controlled are the next most frequent. Approximately 12% (16%) of agents in the East (West) express control aversion in all 10 rounds, and about 18% (28%) of the East (West) agents are control averse in the majority of rounds. Agents who exert the same effort at each control level amount to 11% (7%) in the East (West) and 18% (15%) of agents in the East (West) are largely indifferent to control. Finally, control prone reactions, i.e. instances where control increases effort beyond the enforcement level, almost disappear over time, and hardly any agent is control prone in all 10 rounds. Yet, 14% (3%) in the East (West) make control prone choices in the majority of rounds.

Control averse reactions are significantly more prevalent among older West Germans than older East Germans (as illustrated in Figures 16 and 17 of Appendix C.10). About 12% (21%) of older agents in the East (West) are control averse in all 10 rounds, 12% (33%) of older East (West) agents are control averse in the majority of rounds, and 76% (51%) of older agents in the East (West) never show a control averse reaction. There is no significant difference in the frequency of the other types between East and West.<sup>26</sup> Clearly, a higher prevalence of

<sup>25</sup>In our sample, we have 10 older agents who migrated from East to West Germany (7 remaining in round 10) and 9 agents who migrated from West to East Germany (6 remaining in round 10). This sample size is small and the results should be treated with caution, but at least it gives us an impression. We consider as migrants people who spent most of their childhood between 3 and 12 years in one part of Germany and who spent most of their studies and/or time after studies in the other part of Germany.

<sup>26</sup>We rely on mixed-effects logistic regressions. The regression models fail for the control prone type as there are too few observations.

the crowding out type among older Germans in the West than in the East explains, at least partly, why we observe more control aversion among older West Germans than among older East Germans.

### 5.2.2 Strength of agents' control aversion

Results 1 and 2 might also be driven by stronger negative reactions to control among West Germans compared to East Germans. To test this conjecture, we run regressions similar to those reported in Tables 6 and 7 where we restrict the sample to control averse choices. Control averse older East and West Germans do not differ in the strength of their reactions to low or medium control ( $\chi^2$ -tests:  $p$ -values  $> 0.10$ ). For younger Germans, if at all, we rather find the opposite tendency: control averse younger Germans react more strongly to low control in the East than in the West and mainly so in the second half of rounds, while this East-West difference does not generalize to medium control. Thus, Results 1 and 2 are not driven by stronger negative reactions to control in the West compared to the East (see Appendix C.11).

## 5.3 Agents' beliefs and principals' choices

We now discuss whether agents' beliefs or principals' choices differ between East and West Germans, which might account for the East-West differences in control aversion. Additional information is provided in Appendices C.12 to C.15.

### 5.3.1 Agents' beliefs

In line with the distribution of principals' control decisions as detailed below, agents expect the medium control level most frequently. Averaged over all agents and rounds, expected frequencies of no control, low and medium control are 12%, 16% and 72% (13%, 16% and 71%) in the East (West). We fail to reject the null hypothesis that the distribution of individual beliefs about the frequency of principals who choose the no, low or medium control level is the same in the two parts of Germany. The same finding applies to the subsamples of younger and older professionals in East and West. We conclude that behavioral differences among agents in East and West are not driven by different expectations about the principals' behavior.

### 5.3.2 Principals' choices

In accordance with their beliefs (as discussed in Appendix C.14), the majority of principals in all subsamples choose the medium control level. Averaged over all principals and rounds, frequencies of no, low and medium control are very similar in the East (19%, 13% and 68%) and in the West (17%, 18% and 65%). The estimated control level does not differ significantly between both parts of Germany, which is also true for younger and older principals in East and West. Thus, differences in control aversion between East and West cannot be explained by differences in the principals' behavior.<sup>27</sup>

## 5.4 Robustness experiment with students

This section reports on a second online experiment which relies on the usual sample of undergraduate students from four locations, two in the East of Germany (Magdeburg and Jena) and two in the West (Oldenburg and Heidelberg). This experiment enables us to conduct three robustness checks. First, we test whether the finding that the influence of state coercion on control aversion is short-lived is robust to the subject pool. Second, we test whether reactions to control are sensitive to two key procedural aspects of our main experiment, namely the incentive scheme (paying few instead of all participants) and the scale of interactions (national instead of local).

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<sup>27</sup>This argument is of secondary relevance as agents interact with principals from both parts of Germany.



The procedures are very similar to our main experiment and students repeatedly take part in the principal-agent interaction described in Subsection 3.1. The full experiment is detailed in Appendix D.

#### 5.4.1 Control aversion among students in East and West

We rely on more than one city from each part of Germany to limit the risk of misattributing unsystematic differences to the East-West dimension. We searched for two sufficiently comparable city pairs where each is equipped with an experimental laboratory. Thanks to the consent of the respective laboratories, we were able to implement our favored matching of the city pairs Magdeburg (East)/Oldenburg (West) and Jena (East)/Heidelberg (West). The more southern cities Jena and Heidelberg are smaller, have more students and overall a younger population, a lower unemployment rate and a higher GDP relative to East or West Germany than the northern cities Magdeburg and Oldenburg (see Appendix D.1).

Even though control aversion tends to be slightly stronger in the two Western cities than in the two Eastern cities, this tendency is never significant at the 5 percent level for the matched city pairs Magdeburg/Oldenburg and Jena/Heidelberg. The same conclusion holds for experienced agents and is robust with respect to demographic controls. In summary, students' choices confirm that the influence of state coercion on control aversion is only short-lived (see Appendix D.3).

#### 5.4.2 Methodological aspects: payment scheme and scale of interactions

We implement three methodological treatments addressing the payment scheme, scale of interactions, and knowledge about the scale of interactions (see Appendix D.2). These treatments are incremental variations from the laboratory to our main experiment in terms of the payment scheme (paying all or few participants) and scale of interactions (local or national). Concretely, we move from a treatment using the conditions that usually prevail in the laboratory (all subjects are paid, local interactions) to a treatment using the conditions of our main experiment (few subjects are paid, knowledge about national scale of interactions).<sup>28</sup> The same treatment variables were implemented in Magdeburg, Oldenburg, Jena and Heidelberg.

Neither the payment scheme nor the scale of interactions or the knowledge about it has a meaningful impact on agents' reactions to control (as detailed in Appendix D.4). This conclusion also applies to agents' average efforts, principals' choices and the beliefs of both roles as we never reject the null hypothesis at the 10 percent level.

## 6 Conclusion

Our paper provides the first evidence on the (in)stability of control-related preferences following institutional turnover and therefore makes a novel contribution to the literature on cultural persistence and change. Control aversion attracted a lot of attention in the economic literature only recently, though it is of high relevance as it challenges the core assumption of economics that people respond positively to incentives. Our data suggest that control preferences are affected by the nature of the politico-economic system.

We investigate whether state coercion affects the interplay between control and motivation, as well as the stability of this potential effect across generations. To do so, we exploit the division of Germany after the Second World War and the reunification of East and West Germany in 1990 as a natural experiment. Following division, East Germans experienced a coercive regime while West Germans experienced a liberal regime. After reunification, East Germans and West Germans alike have been living in a liberal democracy.

Relying on a large-scale online experiment with East and West Germans of different generations, our data suggest that the imposition of the different regimes led to more control aversion

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<sup>28</sup>We never mentioned East and West explicitly.

in the West than in the East, and this difference is more pronounced for the older generation born before 1980, while the difference vanishes in the younger generation of East and West Germans who essentially grew up in reunified Germany.<sup>29</sup> Still, for East Germans who have been socialized under a coercive regime, the experience of a liberal regime does not make them to completely abandon the control-related preferences they acquired earlier.

Surprisingly, in our setting, intrinsic motivation in the absence of control is very similar among East and West Germans. Whether this finding is specific to our sample of highly educated professionals is a question open to future research. Notably, we hardly observe control aversion among our older East German professionals, a sample of highly skilled people who are used to relatively much freedom and responsibility at work.

More control aversion in the West is driven by more frequent control averse choices, while the strength of negative reactions to control is similar in both parts of Germany. We test a series of potential additional predictors for control aversion, including sociodemographic characteristics and in particular work-related experiences, but they do not help to explain the difference in control aversion between (older) East and West Germans.

Taking a broader perspective on German history of the 20th century, one could speculate about the distribution of control preferences before the German division. All Germans have experienced two world wars and it is unlikely that control aversion was wide-spread under these conditions and in a time where conservative values including obedience were much more common than today. Thus, conceivably, while East Germans learned to tolerate control even more under their coercive regime, West Germans developed more control aversion under the liberal regime within a few decades, again suggesting that control preferences are likely to adjust rather quickly to institutional incentives.

## References

- Acemoglu, D. and Jackson, M. O. (2015). History, expectations, and leadership in the evolution of social norms. *Review of Economic Studies*, 82(2):423–456.
- Alesina, A. and Fuchs-Schündeln, N. (2007). Good-bye Lenin (or not?): The effect of communism on people’s preferences. *American Economic Review*, 97(4):1507–1528.
- Alesina, A. and Giuliano, P. (2015). Culture and institutions. *Journal of Economic Literature*, 53(4):898–944.
- Alesina, A., Giuliano, P., and Nunn, N. (2013). On the origins of gender roles: Women and the plough. *Quarterly Journal of Economics*, 128(2):469–530.
- Ariely, D., Garcia-Rada, X., Gödker, K., Hornuf, L., and Mann, H. (2019). The impact of two different economic systems on dishonesty. *European Journal of Political Economy*, 59:179–195.
- Baltussen, G., Post, T., van den Assem, M. J., and Wakker, P. P. (2012). Random incentive systems in a dynamic choice experiment. *Experimental Economics*, 15:418–443.
- Bauernschuster, S., Falck, O., Gold, R., and Heblich, S. (2012). The shadows of the socialist past: Lack of self-reliance hinders entrepreneurship. *European Journal of Political Economy*, 28(4):485–497.
- Becker, S. O., Mergele, L., and Woessmann, L. (2019). Political systems as natural experiments? Evidence from the GDR. mimeo.

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<sup>29</sup>This finding speaks against a potential identification problem referring to differences between East and West prior to the German division driving our results.

- Bowles, S. (1998). Endogenous preferences: The cultural consequences of markets and other economic institutions. *Journal of Economic Literature*, 36(1):75–111.
- Bowles, S. and Polanía-Reyes, S. (2012). Economic incentives and social preferences: Substitutes or complements? *Journal of Economic Literature*, 50(2):368–425.
- Boyd, R. and Richerson, P. J. (1985). *Culture and the Evolutionary Process*. University of Chicago Press, Chicago, IL.
- Brosig-Koch, J., Helbach, C., Ockenfels, A., and Weimann, J. (2011). Still different after all these years: Solidarity behavior in East and West Germany. *Journal of Public Economics*, 95(11-12):1373–1376.
- Burda, M. C. and Severgnini, B. (2018). Total factor productivity convergence in german states since reunification: Evidence and explanations. *Journal of Comparative Economics*, 46(1):192–211.
- Burdin, G., Halliday, S., and Landini, F. (2018). The hidden benefits of abstaining from control. *Journal of Economic Behavior & Organization*, 147:1–12.
- Chua, R. Y.-J. and Iyengar, S. S. (2006). Empowerment through choice? A critical analysis of the effects of choice in organizations. *Research in Organizational Behavior*, 27:41–79.
- Cubitt, R. P., Drouvelis, M., Gächter, S., and Kabalin, R. (2011). Moral judgments in social dilemmas: How bad is free riding? *Journal of Public Economics*, 95(3-4):253–264.
- Dickinson, D. and Villeval, M.-C. (2008). Does monitoring decrease work effort? the complementarity between agency and crowding-out theories. *Games and Economic Behavior*, 63:56–76.
- Falk, A. and Kosfeld, M. (2006). The hidden costs of control. *American Economic Review*, 96(5):1611–30.
- Fernandez, R. (2013). Cultural change as learning: The evolution of female labor force participation over a century. *American Economic Review*, 103(1):472–500.
- Frese, M., Kring, W., Soose, A., and Zempel, J. (1996). Personal initiative at work: Differences between East and West Germany. *Academy of Management Journal*, 39(1):37–63.
- Fuchs-Schündeln, N. and Masella, P. (2016). Long-lasting effects of socialist education. *Review of Economics and Statistics*, 98(3):428–441.
- Fulbrook, M. (2008). *A History of Germany 1918-2008: The Divided Nation*. Wiley-Blackwell, 3rd ed.
- Gächter, S., Herrmann, B., and Thöni, C. (2010). Culture and cooperation. *Philosophical Transactions of the Royal Society B-Biological Sciences*, 365(1553):2651–2661.
- Gächter, S. and Schulz, J. F. (2016). Intrinsic honesty and the prevalence of rule violations across societies. *Nature*, 531(7595):496–499.
- Giavazzi, F., Petkov, I., and Schiantarelli, F. (2019). Culture: Persistence and evolution. *Journal of Economic Growth*, 24(2):117–154.
- Gieseke, J. (2014). *The History of the Stasi: East Germany’s Secret Police, 1945-1990*. Berghahn Books, New York, Oxford.

- Giuliano, P. (2007). Living arrangements in Western Europe: Does cultural origin matter? *Journal of the European Economic Association*, 5(5):927–952.
- Giuliano, P. and Nunn, N. (2017). Understanding cultural persistence and change. Working paper 23617, NBER Working Paper Series.
- Giuliano, P. and Spilimbergo, A. (2014). Growing up in a recession. *Review of Economic Studies*, 81(2):787–817.
- Guiso, L., Sapienza, P., and Zingales, L. (2006). Does culture affect economic outcomes? *Journal of Economic Perspectives*, 20(2):23–48.
- Guiso, L., Sapienza, P., and Zingales, L. (2008). Alfred marshall lecture - social capital as good culture. *Journal of the European Economic Association*, 6(2-3):295–320.
- Harrison, G. W., Lau, M. I., and Williams, M. B. (2002). Estimating individual discount rates in Denmark: A field experiment. *American Economic Review*, 92(5):1606–1617.
- Heineck, G. and Süssmuth, B. (2013). A different look at Lenin’s legacy: Social capital and risk taking in the two Germanies. *Journal of Comparative Economics*, 41(3):789–803.
- Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., McElreath, R., Alvard, M., Barr, A., Ensminger, J., Henrich, N. S., Hill, K., Gil-White, F., Gurven, M., Marlowe, F. W., Patton, J. Q., and Tracer, D. (2005). “Economic man” in cross-cultural perspective: Behavioral experiments in 15 small-scale societies. *Behavioral and Brain Sciences*, 28(6):795–855.
- Hwang, S.-H. and Bowles, S. (2011). The sophisticated planner’s dilemma: Mechanism design with endogenous preferences. Working paper, Santa Fe institute.
- International Labour Organization (2012). International Standard Classification of Occupations ISCO-08: Structure, group definitions and correspondence tables. Geneva: ILO.
- Jacob, M. and Tyrell, M. (2010). The legacy of surveillance: An explanation for social capital erosion and the persistent economic disparity between East and West Germany. *SSRN eLibrary*.
- Kuran, T. (1987). Preference falsification, policy continuity and collective conservatism. *Economic Journal*, 97(387):642–665.
- Lichter, A., Löffler, M., and Sieglösch, S. (forthc.). The long-term costs of government surveillance: Insights from Stasi spying in East Germany. *Journal of the European Economic Association*.
- Lowes, S., Nunn, N., Robinson, J. A., and Weigel, J. L. (2017). The evolution of culture and institutions: Evidence from the Kuba Kingdom. *Econometrica*, 85(4):1065–1091.
- Nunn, N. and Wantchekon, L. (2011). The slave trade and the origins of mistrust in Africa. *American Economic Review*, 101(7):3221–3252.
- Ockenfels, A. and Weimann, J. (1999). Types and patterns: An experimental East-West-German comparison of cooperation and solidarity. *Journal of Public Economics*, 71(2):275–287.
- Oettingen, G., Little, T. D., Lindenberger, U., and Baltes, P. B. (1994). Causality, agency, and control beliefs in East versus West Berlin children: A natural experiment on the role of context. *Journal of Personality and Social Psychology*, 66(3):579–595.

- Rainer, H. and Siedler, T. (2009). Does democracy foster trust? *Journal of Comparative Economics*, 37(2):251–269.
- Rubin, D. B. (2006). *Matched sampling for causal effects*. Cambridge University Press, New York.
- Rudorf, S., Baumgartner, T., Markett, S., Schmelz, K., Wiest, R., Fischbacher, U., and Knoch, D. (2018a). Intrinsic connectivity networks underlying individual differences in control-averse behavior. *Human Brain Mapping*, 39(12):4857–4869.
- Rudorf, S., Schmelz, K., Baumgartner, T., Wiest, R., Fischbacher, U., and Knoch, D. (2018b). Neural mechanisms underlying individual differences in control-averse behavior. *The Journal of Neuroscience*, 38(22):5196–5208.
- Sack, B. C. (2017). Regime change and the convergence of democratic value orientations through socialization. evidence from reunited germany. *Democratization*, 24(3):444–462.
- Schmelz, K. and Ziegelmeyer, A. (2019). Reactions to (the absence of) control and workplace arrangements: Experimental evidence from the internet and the laboratory. Working paper.
- The Economist (2015). Germany’s reunification 25 years on. <http://www.economist.com/blogs/graphicdetail/2015/10/daily-chart-comparing-eastern-and-western-germany>. Accessed: 2016-08-17.
- Voigtländer, N. and Voth, H.-J. (2012). Persecution perpetuated: The medieval origins of anti-semitic violence in Nazi Germany. *Quarterly Journal of Economics*, 127(3):1339–1392.
- Warr, P. (2008). Work values: Some demographic and cultural correlates. *Journal of Occupational and Organizational Psychology*, 81:751–775.
- Wyrwich, M. (2019). Women and the labour market in East and West Germany: The role of socialist legacy and pre-socialist tradition. Beiträge zur Jahrestagung des Vereins für Sozialpolitik 2019: 30 Jahre Mauerfall - Demokratie und Marktwirtschaft - Session: Gender Economics I, No. C03-V1. ZBW - Leibniz-Informationszentrum Wirtschaft, Kiel, Hamburg.
- Yamagishi, T., Hashimoto, H., and Schug, J. (2008). Preferences versus strategies as explanations for culture-specific behavior. *Psychological Science*, 19(6):579–584.
- Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology Monograph Supplement*, 9(2):1–27.
- Zajonc, R. B. (2001). Mere exposure: A gateway to the subliminal. *Current Directions in Psychological Science*, 10(6):224–228.
- Ziegelmeyer, A., Schmelz, K., and Ploner, M. (2012). Hidden costs of control: Four repetitions and an extension. *Experimental Economics*, 5(2):323–340.



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