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ABSTRACT

Formation of College Plans: Expected Returns, Preferences and Adjustment Process*

We exploit a large exogenous shock to study the determinants of college attendance and the role played by one's environment. We analyze whether, and how quickly, adolescents' college plans are adapted, explore factors leading to the adjustment, and examine how these factors ultimately impact later educational attainment. Using differences across East German cohorts induced by the timing of the German Reunification (a change for the East from state socialism to capitalist democracy), we show that shortly after relative to before that time, college plans among high-school students increased substantially, which was followed by sizable increases in the completion of the college entrance certificate five years later. Our analysis sheds light on the elasticity of beliefs and preferences of different cohorts of youths in the case of a large shock. Perceived educational returns, economic preferences ("consumerism") and sociopolitical attitudes ("individualism") adapt quickly in response to the shock and are directly linked to changes in plans and outcomes. Cohorts closer to critical educational junctions at the time of Reunification, however, adjusted their plans to a much lesser extent. While they similarly updated the expected returns to education, they exhibited a slower adjustment in their preferences relative to younger cohorts.

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1 Introduction

Whether to attend college or not is an important decision with fundamental long-run implications. Economists and scientists from other disciplines, as well as policymakers, have long been interested in furthering our understanding of the determinants of college attendance and the role played by one's environment. Understanding the determinants is, however, challenging. It is so not only due to the lack of necessary data but also, importantly, because the environment in which individuals' educational plans are formed, and to which they adjust, is typically endogenous to individuals' characteristics, making it difficult to disentangle its effect on outcomes. In this paper, we exploit a shock to one's environment, and its timing over the educational lifecycle, to causally estimate the impact on individuals' educational plans, the components that drive the adjustment, and, ultimately, how changes in early plans factor into later educational outcomes.

Given the critical role of higher educational attainment in later economic success and general wellbeing, it is critical to understand the process of educational decision-making as a means to understanding the emergence, development and persistence of inequality. We focus on the role played by the educational plans made by adolescents, which we observe for different cohorts repeatedly over their educational lifecycle and, in particular, before and after a large shock. To understand how these plans are formed, how they adjust, and which determinants adjust more or less rapidly, we investigate the main factors determining educational decisions: expected returns to education, preferences and supply-side constraints. Thereby, our analysis sheds light on the elasticity of beliefs and of (economic, social and political) preferences of different cohorts of youths to a large shock.

We use the quasi-experiment of German Reunification in October 1990 to study the effect of a large macro shock to the environment of East German youths on their educational plans and, ultimately, their decisions regarding their educational career. Through Reunification, East Germany transitioned from a socialist system with a planned economy to the capitalistic and democratic system of West Germany. The changes in youths' educational attainment in the wake of Reunification were substantial, as documented in Figure 1. While there was a persistent and stable gap in obtaining the "Abitur" (the entrance certificate to college) between East and West Germans for cohorts graduating prior to Reunification (almost a 50 percent difference), this gap closed completely soon after Reunification for younger cohorts. Intermediate cohorts that, in principle, would have had the chance to start the Abitur track at the time of Reunification, did not fully adjust, and so a part of the gap remained for them.[1]

Using detailed annual individual-level data on two cohorts of adolescents in East Germany over several years–before and after Reunification–when the individuals were aged 9 to 20, we

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[1]Youths can either stop school after grade 10 or continue on the path to Abitur with grades 11 and 12.

causally estimate the influence of the regime change on their plans to obtain the college entrance certificate "Abitur" and subsequent educational outcomes. We apply a difference-in-differences (DID) framework that uses variation in the timing of Reunification for the two cohorts of students, who had a three-year age gap, to identify its effect on plans to pursue the Abitur in the future. We analyze the change in the plans of the younger cohort between January 1990 and January 1991 (just before and after Reunification), when the cohort was in grades 7 and 8, using as the counterfactual trend the evolution of the older cohort's plans between the same grades (before Reunification). We then link early educational plans to the actual pursuit of the Abitur five years later.

We show that Reunification had large and long-lasting effects on the educational plans made by adolescents. These adjustments happened relatively quickly. Shortly after Reunification (compared with just before), the likelihood of a student planning to obtain the Abitur increased by 22 percentage points. Importantly, these new educational plans strongly translated into long-run outcomes. Educational plans are highly predictive of the ultimate attainment, and the increase in the intention to pursue the Abitur did in fact lead to a strong increase in the likelihood of completing the Abitur five years later.

What drives the changes in educational plans? A standard education model suggests that there are three main factors determining educational decisions: expected returns to education, preferences, and constraints. These factors are likely to play an important role in influencing not only the ultimate educational attainment, but also the educational plans adolescents make several years before making the actual decision. Data on each component is usually not readily available, which makes it difficult to understand the importance of these different components. In our study, however, we can separately examine these factors to help shed light on the elasticity of beliefs and preferences and, therefore, on the mechanisms behind our main findings. Specifically, we analyze the impact of Reunification on the three potential drivers using unique data on adolescents' expected returns to education, their economic, social and political preferences, and the role of the supply side in relaxing potential constraints (such as constraints on the access to (higher) education in terms of quality and content of education and in terms of access to different fields of study).

The German Reunification implied a sizable increase in the returns to education for East Germans. For instance, the average net income of individuals with a university degree in the East was only 15 percent higher than that of blue-collar workers, compared to 70 percent in the West (see, e.g., Alesina and Fuchs-Schündeln, 2007). While return expectations have been shown to be an important driver of educational *decisions*, we know less about how quickly new information becomes salient and whether, and when, it affects educational *plans*. We show that Reunification did in fact increase students' expected returns to education, and this change occurred soon after Reunification. In particular, the stated importance of education for future earnings increased substantially (by 0.45 of a standard deviation). Moreover, when we link this to changes in educational plans,

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we observe that the planning to obtain the college entrance certificate increased the most among those whose perceived educational returns increased more. The results highlight that rapid changes in expected returns were an important driver for individuals updating positively their educational plans soon after Reunification, with important long-term implications.

Turning to economic, social and political preferences, we observe important changes following Reunification and links to the educational plan. Consumption and economic preferences ("desire for luxury" and "enjoying life") increased sizably (by 0.12 and 0.35 of a standard deviation, respectively). Additionally, the change in terms of social and political preferences suggests a move towards more "individualism". The measures of importance of doing deeds that "help many people", "judgment of peers" and "studying because it is a duty as a student" all decreased (by 0.19, 0.17 and 0.11 of a standard deviation, respectively). Similarly, the importance of being part of a collective and of supporting socialism decreased substantially (by 0.51 and 0.86 of a standard deviation, respectively). Arguably, social and political preferences elicited prior to Reunification might overstate favoring socialism. We, however, are concerned with the heterogeneity among adolescents in the change in stated preferences and how these impact their plans. When linking the change in educational plans to changes in these different preferences, we show that educational plans increased more among those whose social preferences became more individualistic – in other words, among those whose values converged more to those of the West.

Finally, we turn to the educational supply side and investigate the importance of constraints (or the relaxation thereof) in explaining changes in educational plans resulting from Reunification as follows. First, we examine the role of changes in access to higher education (overall, and for certain groups that might have been facing constraints under the socialist regime based on closeness/distance to the regime, previous school performance and parental education). Second, we analyze the relevance of potential changes in access to certain study fields (due to a relative focus on STEM fields under the previous regime). Third, we investigate changes in educational quality or content. We find little evidence that these factors explain increases in educational plans in the short run. We show that the groups that were likely previously constrained increased their educational plans to an extent similar to that of previously less constrained groups.

Our results highlight that a change in the local environment through Reunification had a causal effect on youths' educational plans and on two key determinants of educational decisions, namely expected returns and economic, social and political preferences. The results further highlight that the adjustment in plans and determinants happened within a short time frame around Reunification for the "younger" cohort of those who–at the time of Reunification–still had a few years before deciding about the Abitur track.

Another relevant question is whether the age (or educational stage) at which individuals are affected by a macro shock is relevant for educational decisions. To address this, we examine the

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extent to which members of a slightly older cohort adjusted their educational attainment to the regime change, and the extent and pace of the determinants' adjustment. Applying a difference-in-differences (DID) framework with the counterfactual the older cohort's evolution in the same *years* before and after Reunification enables us to understand the extent to which the older cohort adjust relative to the younger cohort.[2] We find that the older cohort adjusted its expectations about the returns to schooling as quickly as did the younger one (i.e., there was no difference in adjustment between the older and younger cohorts). While economic preferences also adjusted for the older cohort, albeit to a somewhat lesser extent, social and political preferences of the older cohort tended to adjust much less. In particular, in terms of economic preferences, the importance of the goal "enjoying life" increased for the older cohort by nearly as much as it did for the younger cohort, but the "desire for luxury" increased much less relative to the younger cohort. The change in terms of social and political preferences that lean towards more "individualism" occurred to a much lesser extent for the older cohort than for the younger one. The fact that the older cohort adjusted more slowly to the regime change in terms of several important determinants of educational decisions is consistent with the slower adjustment in terms of that cohort's educational attainment (see Figure 1).

Our study sheds new light on the question of whether, to what extent, and how shocks to the economic and societal landscape influence adolescents' educational plans and ultimate long-term educational success. We contribute to the literature in several ways. First, using detailed individual-level data, we link early educational plans during childhood and adolescence to long-run outcomes, which allows us to investigate how predictive these plans are for later decisions. Second, we link the evolution of educational plans during childhood to the evolution of youths' perceived educational returns, their economic, social and political preferences and constraints. This enables us to investigate the determinants of these plans and how they are formed. Third, we identify whether, and how quickly, youths' plans adapt in response to a change in their environment, which implies important changes in the labor market and consumption opportunities. Finally, we show that timing is key: the point in the educational lifecycle at which youths are affected by a shock to their environment has crucial implications for long-term outcomes because it determines the extent to which youths' perceptions and preferences–and therefore also their educational plans–can adjust to the shock.

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[2]Methodologically, to analyze the causal effect of Reunification on the younger cohort, we use as the counterfactual the change in outcomes of the older cohort when its members were in the same grades (all of which were before Reunification). This is important since using as the counterfactual the same years (prior to and post Reunification) for the older cohort would lead to a biased estimate of the causal effect because the older cohort was likely to be affected as well by Reunification. However, a difference-in-differences (DID) framework using as the counterfactual the older cohort's evolution in the same years before and after Reunification enables us to understand the extent to which the older cohort could adjust relative to the younger cohort. More specifically, the DID coefficient can be interpreted as the difference in adjustment between the older cohort and the younger cohort in response to Reunification.

Our study contributes to several strands of research. First, we add to the growing body of literature showing that culture and one's environment shape economic decisions and analyzing the extent to which these factors, and their determinants, adjust to shocks (Fernandez and Fogli, 2006, 2009; Fernandez, 2007; Guiliano and Nunn, 2017; Figlio et al, 2019; Kosse et al, 2020). In a related study, Alesina and Fuchs-Schündeln (2007), also using the German Reunification as a quasi-experiment, show–for different cohorts of adults–that political regime change influences preferences for redistribution.[3] Our research allows for a joint analysis of adjustment processes of economic decisions and their determinants. With longitudinal data across different cohorts on plans, beliefs and preferences, we provide insight into the timing and the process of adjustment. Moreover, the focus of our study is on adolescents–a previously understudied group–for whom it is particularly important to understand the formation and the speed of adjustments of plans and preferences due to their consequences for inequality and social mobility.[4]

Second, we explore the mechanisms underlying the effect of Reunification on educational plans and, consequently, on long-run educational decisions. Several recent studies have shown the link between the perceived rate of return to schooling and actual schooling decision (for instance, Jensen, 2010, showed that students who were better informed (experimentally) of higher returns were significantly less likely to drop out of school in subsequent years. With respect to college attendance, Attanasio and Kaufmann, 2014, show that decisions depend on the expected returns of college). A different stream of literature studies the role of economic preferences such as altruism and trust, in addition to time and risk preferences, in (educational) decisions (see, for recent evidence, Sutter et al., 2013 and Falk et al., 2018). There is, however, relatively little overlap in terms of data sources that permit the exploration of both expected returns and preferences, as well as other potential drivers (recent notable exceptions are Delavande and Zafar, 2019, who study the role of expected monetary returns, nonpecuniary factors and financial constraints, in the decision on the type of college to enroll in, and Boneva and Rauh, 2019, who examine the role of pecuniary and nonpecuniary factor in explaining the socioeconomic gap in college attendance). In our study, we relate changes in (perceived) returns to education and in preferences to students' educational plans. Beyond economic preferences, we study whether changes in social and political preferences that might reflect a convergence to the West German culture (e.g., being more individualistic and

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[3]Other papers have also used German Reunification as a natural experiment to investigate issues such as saving behavior (Fuchs-Schündeln, and Schündeln, 2005; Fuchs-Schündeln, 2008), consumption behavior (Bursztyn and Cantoni, 2012), the economic impact of market access and networks (Redding and Sturm, 2008; Burchardi and Hassan, 2013) and the effect on fertility decisions (Chevalier and Marie, 2017).

[4]Our findings are also related to recent evidence by Jha and Shayo (2019) demonstrating the role of exposure to markets in shaping social values and political preferences. We show that following Reunification and the resulting regime change to capitalism, preferences for consumption increased, converging to the tastes of the more capitalist society. Similarly, social values shifted towards being more individualistic, and political preferences moved away from socialism/communism.

less likely to be part of a collective) play a role.

Finally, regarding policy implications, it has been well established that early investments in children are critical for long-run economic success (see, for instance, the seminal papers by Cunha and Heckman, 2008, and Cunha, Heckman and Schennach, 2010). It is, therefore, important to understand whether investments depend on parents' or youths' educational plans early in life, as well as whether, and to what extent, plans are malleable and can adjust to new circumstances. More generally, it is crucial to shed light on how educational plans are formed and how they depend on family background, skills, beliefs, preferences and constraints to understand their role in the creation and persistence of various types of inequality. Overall, our study helps to inform on the links between early educational planning and later educational decisions and outcomes, offering insight into this black box of the educational decision process.

2 Background

Historic events

Until 1945, East and West Germany were united and a single country. When separation occurred after Germany's defeat in the Second World War, it was exogenously imposed by the winning Allies. In the fall of 1989, change swept through Eastern Europe and led to the fall of the Berlin Wall in November 1989. Importantly, East Germany, formerly called German Democratic Republic (GDR), instead of experiencing a change of government within its borders or a newfound independence as did other countries in this area, ceased to exist as a separate state. On October 3, 1990, East Germany joined the Federal Republic of Germany (FRG), creating a sovereign unified German state (in the event referred to as the "Reunification"). In this process, East Germany changed from state socialism to liberal-democratic capitalism in a short period of time and without a gradual transition (as detailed below).[5]

In the period prior to Reunification, a series of protests by East Germans ("The Peaceful Revolution"), led to the removal of the Berlin Wall in November 1989. A few weeks after the fall of the Wall, West German Chancellor Helmut Kohl announced a 10-point program calling for the two Germanies to expand their cooperation. However, the Socialist Unity Party was still in place in the German Democratic Republic, and there was a great deal of uncertainty until late in the process as to whether Reunification would ultimately occur, as well as regarding its meaning, due to a strong international opposition, in particular, among the Four Powers that had imposed separation

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[5]In our analysis, we use this sudden change in regime in East Germany to compare different cohorts of East German youths affected by Reunification at different times. This allows us to evade the concern that East and West Germany were already characterized by important social, cultural and political differences at the time of separation, as discussed by Becker, Mergele and Woessmann (2020).

on Germany after World War II and that had a direct say in whether Germany would be allowed to reunify. For example, briefly before the fall of the Berlin Wall, British Prime Minister Margaret Thatcher told Soviet General Secretary Mikhail Gorbachev that neither the United Kingdom nor Western Europe desired Reunification of Germany. Thatcher also clarified that she wanted the Soviet leader to do what he could to stop it, telling Gorbachev "We do not want a united Germany".[6] Although she gradually softened her opposition, as late as March 1990, Thatcher summoned historians and diplomats to a seminar at Chequers to ask "How dangerous are the Germans? ".[7]

During the election in the GDR in March 1990, the former Socialist Unity Party of Germany was heavily defeated. A grand coalition was formed under Lothar de Maizière, leader of the East German wing of Kohl's Christian Democratic Union. On August 31, 1990, the "German Reunification Treaty" (Einigungsvertrag), declaring the accession (Beitritt) of the German Democratic Republic to the Federal Republic of Germany, was signed by representatives of the two Governments to be effective as of October 3, 1990. Following the "Two Plus Four Talks" (between the Federal Republic of Germany, the German Democratic Republic, and the Four Powers, namely France, the Soviet Union, the United Kingdom, and the United States), the "Treaty on the Final Settlement with Respect to Germany" was signed in Moscow, Soviet Union, on 12 September 1990, and paved the way for the German Reunification on 3 October 1990.

Education structure before and after Reunification

The East and West German educational systems grew from the same educational roots and shared a common language. During the forty years (1949-1990) of separation, they were characterized by different educational and political philosophies; however, similar elements always remained or came to the fore in various periods of reform. One key feature of the secondary school system that remained the same in West and East Germany was selective college-preparatory education and the "Abitur" degree as the certificate necessary to enter college. This degree, therefore, is the ideal outcome for our analysis since it remained in place and unchanged throughout, before and after Reunification, in both parts of Germany.[8]

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[6]Michael Binyon (11 September 2009). "Thatcher told Gorbachev Britain did not want German reunification". The Times. London.

[7]See Kundnani, Hans (28 October 2009). "Margaret Thatcher's German war". The Times. See also Volkery, Carsten (9 November 2009). "The Iron Lady's Views on German Reunification/'The Germans Are Back!'". Der Spiegel. The pace of events also surprised the French, whose Foreign Ministry had concluded in October 1989 that reunification "does not appear realistic at this moment"; see Knight, Ben (8 November 2009). The headline "Germany's neighbors try to redeem their 1989 negativity" appeared on Deutsche Welle. Ultimately, the key ally was the United States. Although several top American officials opposed rapid unification, Secretary of State James A. Baker and President George H. W. Bush provided strong and decisive support for Kohl's proposals.

[8]See the survey on the development of the East and West German education systems before and after Reunification by Mintrop and Weiler (1994) and the comparison of the education systems of the FRG and GDR by Anweiler et al. (1990).

East Germany had a unified school system in which there was one common school, which almost every East German student attended from grades one through ten, called the polytechnical school ("Polytechnische Oberschule", POS). Students were taught in heterogeneous core groups; tracking was not permitted, and electives were few. After the tenth grade, most students continued with vocational training, implying three years of apprenticeship in a business and part-time study in vocational schools. A minority of students entered the academic track, spending two additional years in extended secondary schools ("Erweiterte Oberschule", EOS) to obtain the Abitur, allowing them access to universities. These students were selected on the basis of grades (GPA) and political attitudes (see Baske, 1990).[9] East Germany's unified school system only began to align with the West German three-track system starting with the 1991/92 school year. The three-track system consisted of a college-preparatory Gymnasium (grammar school), a technically- and clerically-oriented Realschule and a manual labor-oriented Hauptschule (vocational secondary schools). Despite these changes within a short period, the transition was marked by relatively high continuity (see Weishaupt and Zedler, 1994; and Mintrop and Weiler, 1994). Schools retained most of their personnel (only approximately 10 percent of teachers lost their jobs in the years after Reunification) and proceeded to operate without much interruption. Moreover, there was complete continuity in the secondary school system with respect to the selective university-preparatory education and the "Abitur" degree (which was already the same in both East and West Germany).[10]

As shown in Figure 1, until shortly before Reunification, there were sizable differences in educational attainment between East and West Germany. In the West, approximately 30 percent of school-aged students completed the Abitur; in the East, less than 20 percent did so (see also Below et al., 2013). However, after Reunification, East German Abitur completion rates quickly converged to West German rates.

3   Data and Descriptive Statistics

3.1   Longitudinal Study of Students in East Germany

The data used in the following analysis originate from the Longitudinal Study of Students (1985-1995).[11] The study follows students in two parallel cohorts in East Germany from 1985 to 1995.

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[9]In Section 6.3, we investigate whether the relaxation of such constraints led (or contributed) to the change in educational plans and attainment.

[10]Our data also allow us to investigate the short-run effects of Reunification *before* the changes in the school system took place since in our analysis we compare outcomes before Reunification (in January 1990) to those after Reunification (in January 1991)

[11]The data are available at the Central Archive for Empirical Social Research (University of Cologne). A description of the Longitudinal Study of Students can be found in the survey on "Youth studies in the East" ("Jugend im Osten") (see Kuhnke (1997)).

Students in the younger cohort were surveyed between grade 3 in the academic year 1985/86 and grade 12 at the end of the academic year 1994/95 (i.e., between ages 9 and 18), while students in the older cohort were surveyed between grade 6 (in the academic year 1985/86) and up to three years after grade 12 in 1995 (i.e., between ages 12 and 21).[12]

The goal of the study was to understand the determinants of the development of cognitive abilities of children and teenagers, as well as their economic, social and political preferences, and it was continued after the German Reunification. The data are ideal for our purpose in that the survey followed the same individuals from before to after Reunification, covering a wide range of topics, including educational achievement and attainment, as well as preferences, family development, social relations and psychological wellbeing measures. Importantly, the survey asks students about their educational (Abitur) plans at several points in time and follows them over time, allowing us to study how well these measures translate into actual outcomes.

The focus of our main analysis is on students in grades 7 and 8. We observe 1,887 children from the younger cohort and 1,247 children from the older one. Given the longitudinal nature of the study, we can link the individual *change* in perceived returns and (economic, social and political) preferences to the change in Abitur plans before versus after Reunification. Moreover, we track students until the end of grade 12 to study their eventual Abitur decision, linking it to their early educational plans.[13]

Variable descriptions and summary statistics

In Table 1 (a), we present summary statistics for the main variables used in our analysis. Our main outcome variable of interest is students' plan to obtain the "Abitur", which is the college entrance certificate necessary for admission to college.

To investigate the potential mechanisms behind the short-run changes in Abitur plans following the regime change, we examine the different components of the educational decision problem, exploring the perceived returns to education, economic (consumption) preferences (such as the desire to "afford luxury" and "enjoy life"), and social and political preferences (such as the importance of "socialism", the "collective" and doing "good deeds").

With respect to perceived returns, students are asked to rate, on a scale from one to four, the importance of education for later earnings (where 1 is "not very important" and 4 is "very important"). The same scale is used in the questions for all other measures discussed below. Since these measures do not have a natural unit, we standardize them, i.e., subtract the mean and divide by

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[12]As an exception, the "older" cohort was not surveyed in 1991, and neither cohort was surveyed in 1994. Additionally, the set of survey questions varied somewhat from wave to wave.

[13]A good overview of the methodology and implementation of sociological analysis concerning the education system in the East can be found in the survey on "Youth in the East" by Brislinger et al. (1997).

the standard deviation to be able to interpret regression coefficients in terms of standard deviation changes.

As to preferences, we investigate the role of the following measures. With respect to economic goals, students are asked about how important it is to "enjoy life" and to consume "luxury goods" (with responses again expressed on a scale from one to four; see above). To proxy for social attitudes and preferences, we use questions on the importance of doing "good deeds" and "being valued by peers", and use the importance of "duty as a student" as a measure of an individual's study motivation. Finally, political preferences and values are measured via the importance of "supporting socialism" and "being part of a collective". We complement our analysis of political views with other questions that also reflect individualism versus collectivism, such as asking how important people find it to do "good/important deeds".

Arguably, social and political preferences elicited under the socialist regime prior to Reunification might overstate favoring socialism. However, we are only concerned with the heterogeneity among adolescents in the *change* in preferences (from before to after Reunification) and how these changes are *linked* to other outcomes, such as educational plans or whether the individual belongs to the older or younger cohort. Thus, individuals' overstatement (prior to Reunification) of the extent to which they were in favor of socialism, for example, would not affect these correlations.

In Table 1 (b), we present survey questions and summary statistics of the variables used in the heterogeneity analysis to shed light on the importance of different types of constraints. In particular, we examine constraints on access to higher education that could be related to youths' interests and academic ability, and to the families' distance/closeness to the regime (political constraints).

To examine the importance of ability-based constraints in access to college studies, we measure youths' academic performance in school by their GPA (the grading scale is from one to five, where one is the best grade). As to constraints on the access to certain fields/majors, we measure whether an individual's relative strength or interest is in the mathematical (technical) area or in the non-mathematical (verbal) area.[14] We measure "relative objective performance" in terms of relative grades in German versus mathematics. "Relative subjective performance" is measured in terms of the ratio of one's own evaluation of one's performance in German and mathematics (on the scale for absolute measures, 1 is "very good" and 4 is "bad"). "Relative academic interest" is the ratio of measures of interest in topics related to German and the respective measures for mathematics (with the scale of absolute measures ranging from 1 for "strongly interested" to 4 for "not at all interested").

The regime-relevant variables indicate whether an individual was an "FDJ member", i.e., a member of the communist youth organization "Free German Youth" ("Freie Deutsche Jugend

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[14]As discussed below, East Germany before Reunification had a strong focus on STEM fields, in particular engineering, so access to more verbally/less mathematically oriented fields might have been relatively more constrained.

(FDJ)"), a question asked under the socialist regime (before Reunification), and whether the individual was an "FDJ member with a function", i.e., a member of the communist youth organization with a leading role (such as the "FDJ secretary" of the group or the school, or at the municipal or higher level). Finally, we also split the sample by whether an individual's mother had an Abitur certificate. The reason for this approach is that the declared goals of the socialist regime (at least at its origins), although eventually abolished and irrelevant for the cohorts in our study, were to promote children from less-privileged families (i.e., those with less-educated parents, with parents who were workers or farmers, or with other such statuses).

4 Empirical Methodology

4.1 Short-Run Effects of Reunification on Educational Plans

Students' cohort of birth and the timing of Reunification jointly determine the exposure to the change in regime. We use this variation to identify the effect of regime change on various outcomes, starting with educational plans. We analyze changes in the plan to obtain the Abitur (the entrance certificate for college studies) for the younger cohort before and after Reunification, using as the counterfactual trend the evolution of the older cohort's aspirations between the same academic years (grades) (before Reunification).

The students are asked repeatedly–in most grades–about their educational plans. In particular, they are asked whether they are planning to pursue the Abitur. If they decide to do so, it would start in grade 11. The data allow us to observe how students' Abitur plans evolve over their "educational" lifecycle (i.e., across grades). The data follow two cohorts, one being three years older than the other. We exploit the structure of the data and comparability across cohorts to identify the effect of regime change on student educational plans, ultimate educational attainment and potential determinants. The "treatment" of interest is that of regime change on the Abitur plans of the younger cohort following Reunification in October 1990. The advantage resulting from students being interviewed annually (each January) is that it allows us to estimate the effect in the short period before and after Reunification. The older cohort serves as the "control" group for the (counterfactual) trend across grades for the younger cohort. This group captures how plans would have evolved if there had been no Reunification. For instance, the older cohort in grade 8 (in 1988, aged 14) was in the pre-Reunification period, while the younger cohort in grade 8 (in 1991, aged 14) was in the post-Reunification period. The empirical design is such that we focus on the grades directly pre- and post-Reunification for the younger cohort (i.e., grades 7 and 8), which allows us to identify the short-run effects of Reunification and helps compute the correct standard errors (Bertrand, Duflo, Mullainathan, 2003). More generally, we estimate the following equations:

$$EP_{icg} = \beta_0 + \beta_1 T_i + \beta_2 P_{ic} + \beta_3 (T_i P_{ic}) + X_{ic}\delta + \epsilon_{icg} \tag{1}$$

$$EP_{icg} = \beta_0 + \beta_2 T_{ic} + \beta_3 (T_i P_{ic}) + D_i + \epsilon_{icg} \tag{2}$$

where EP_{icg} is the Abitur plan of student i in cohort c in grade g. T_i is a dummy variable indicating "treatment group" (i.e., with the value of 1 if the individual belongs to the younger cohort and zero otherwise). P_{ic} indicates the "post" period, more generally reflecting the student's academic grade. Since we restrict the analysis to grades 7 and 8, P_{ic} is a dummy variable that has the value of one if the academic grade is 8 (where grade 7 is the excluded category). The variable of interest is $(T_i P_{ic})$, which interacts the treatment group and the post-period indicator and has the value of one if a student is from the younger cohort and is in grade 8, which was in the post-Reunification period for the younger cohort. X_{ic} is a vector of predetermined individual-specific characteristics. Alternatively, we include individual fixed effects D_i (see equation (2)) and estimate equations (1) and (2) using ordinary least squares.

To investigate potential mechanisms behind the effect of Reunification on Abitur plans, we estimate the same equations (1) and (2) with different outcome variables, such as "perceived returns to education" and various measures of "economic, social and political preferences". In the second step, we link changes in those components to changes in Abitur plans. This helps us understand the factors of the mechanism behind the updating of educational plans.

In our application of the difference-in-differences (DID) approach, we compare the younger and older cohorts in the same grade (but in different years). Accordingly, the older cohort was unaffected by Reunification since the relevant grades were all before Reunification for this cohort. We therefore use the change in the educational plans of the control group over the same grades, which controls for how the younger cohort's outcomes would have changed without Reunification. Moreover, the key outcome variable "Abitur plans" is very similar in levels across cohorts in the pre-treatment period; hence, we de facto utilize a "matched" DID design. While this is not a necessary condition for using a DID approach since time-constant differences across cohorts are "differenced out", it supports the necessary "parallel trends" assumption.[15] We explicitly test for the "parallel trends" assumption in Section 5.1, showing that the pre-Reunification trends ("pre-trends") of the two cohorts are indeed parallel.

Lastly, we aim to shed further light on the adjustment process by comparing the extent to which the older cohort adjusted their beliefs and preferences and the ultimate educational attainment relative to the younger cohort. To this end, we use a DID approach that compares the younger and older cohorts in the same *years* before and after Reunification. In this case, the older cohort was also

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[15]The matched DID approach is often used when examining variables that are bounded from above or below because the pre-trends in such variables are unlikely to be the same if the pre-treatment outcome levels are very different.

directly affected by Reunification. Measuring a causal impact of Reunification is, therefore, compromised by this approach since the "control" group was directly affected by the regime change. It does, however, inform us on the differential impact of treatment on the two cohorts; in particular, this estimate reflects how much less (or more) the older cohort adjusted to the regime change relative to the younger cohort. By combining the two methods, our strategy allows us to measure the causal effect of Reunification, as well as the extent to which each group adjusted (given their difference in age and closeness to the Abitur take-up). For example, if the DID analysis using years produces an estimate of zero, the older cohort adjusted as much to Reunification "shock" as did the younger one. If, on the other hand, the DID analysis using years produces an estimate as large as that of the DID analysis using grades, then the DID analysis using years also estimates the full causal effect of Reunification on the younger cohort, which implies that the older cohort could not adjust at all.

4.2   Linking Educational Plans to Long-run Educational Attainment

In this section, we study the link between educational plans and later educational attainment. We measure whether Abitur plans–and changes in those plans–impact the students' likelihood of completing the college entrance certification at age 18 (in grade 12), several years after they were asked about their educational plans (in grades 7 and 8).

We test four main hypotheses. First, educational plans predict attainment. Quite simply, if these plans measure something meaningful, they should predict long-run educational attainment. Second, the plans one has in grade 8 are better predictors than those in grade 7. The intuition is that as students progress through grades, their plans become better indicators of what students will do; for example, they learn about their own ability and whether academic performance is sufficient to enter college. Third, the relationship between educational plans and later attainment is stronger for the younger cohort. The latter was exposed to fundamentally new information about the structural break of Reunification by grade 8, while the older cohort learned about it towards the end of grade 10 at the time the decision to enter the track to the Abitur was made. Fourth, the change in the younger cohort's Abitur plan between grades 7 and 8 fully incorporated the new information on the structural break of Reunification, which explains all of the cross-cohort differences.

We begin by estimating the following equation:

$$EA_{ic} = \gamma_0 + \gamma_1 EP_{icg} + \gamma_2 T_i + \epsilon_{icg} \tag{3}$$

where EA_{ic} has the value of 1 if individual i in cohort c undertakes a degree that provides college access (i.e., the "Abitur"). We are primarily interested in γ_1, which measures the relationship between educational plans, EP_{icg}, and ultimate educational attainment. We consider both educa-

tional plans in grade 7 (before Reunification for both cohorts) and grade 8 (after Reunification for the younger cohort but still before Reunification for the older cohort). Controlling for cohort, T_i, allows us to determine whether there are important cohort differences in educational attainment after controlling for students' plans and how this depends on whether we use the plans made in grade 7 or grade 8.

With this specification, we test hypotheses one and two: (1) $\gamma_1 > 0$ and (2) $\gamma_1(grade8) > \gamma_1(grade7)$. Hypothesis (1) predicts a positive relationship between educational plans and later educational achievement. Hypothesis (2) implies simply that as students advance through their educational trajectories, their educational plans are more closely linked to their actual educational choices (e.g., due to learning/updating).

To test hypotheses three and four, we need to allow the link between attainment and plans to vary by cohort. We therefore also estimate the following equation:

$$EA_{ic} = \gamma_0 + \gamma_1 EP_{icg} + \gamma_2 T_i + \gamma_3(EP_{ic}T_i) + \epsilon_{icg} \tag{4}$$

In regression (4), we estimate the differential effect of educational plans by cohort ($EP_{ic}T_i$). In this case, γ_3 measures whether the link between educational plans and attainment differs by cohort. We test the following hypotheses: (3) $\gamma_3 > 0$ (i.e., plans were more strongly tied to outcomes for the younger cohort since it had more information about the regime change), and (4) $\gamma_2(grade8) = 0$. The latter would imply that the effect of Reunification on educational attainment is fully captured by its effect on the younger cohort's change in plans in grade 8 (after Reunification). In other words, it is posited that the grade 8 plans of the younger cohort fully incorporated the information on the structural changes induced by Reunification.

5 Results: Short- and Long-run Effects on Educational Plans and Outcomes

In this section, we identify and quantify the effect of Reunification on Abitur plans. We proceed to explore the relevance of youths' plans for their actual long-run decisions (Abitur completion). In the following section, we shed light on the mechanisms through which Reunification affected educational plans and decisions. In particular, we investigate the roles of youths' expected returns to education and their economic, social, and political preferences, as well as the importance of potential constraints, linking all of these factors to changes in plans.

5.1 Short-Run Effects on Educational Plans

5.1.1 Graphical Representation of Educational Plans

We begin by graphically exploring the effect of Reunification on youths' Abitur plans. Students were asked repeatedly about their educational plans, and in particular, whether they planned to undertake the Abitur. Figure 2 plots–across different academic years/grades–the means and confidence intervals of educational plans of the older and younger cohorts, thereby providing insight into the identification strategy we use for the later regression analysis and supporting the necessary parallel trends assumption.

In particular, we plot the evolution of educational plans for the older cohort between grades 6 and 10. By grade 11, students would have entered the Abitur track if they had decided to pursue the Abitur. Importantly, all grades we observe for the older cohort were before Reunification (October 1990). We note that for this cohort, the fraction of individuals planning to obtain the Abitur declines–and does so at an increasing rate–as the time to choose approaches. One likely explanation for this pattern is that as students progress through the grades, they learn about their skills and update their beliefs with respect to their match with the Abitur track (see Stinebrickner and Stinebrickner, 2014, on learning about one's ability and college dropout).

Figure 2 also displays the Abitur plans of the younger cohort. For this cohort, we observe the evolution of educational plans across grades before and after Reunification. More specifically, we examine the younger cohort in grade 7 (just before Reunification in January 1990) and when its students were in grade 8 (just after Reunification in January 1991). Similarly to the case of the older cohort, we note a decline in this cohort's plan as its students progress through academic grades (prior to the regime change). However, in the post-regime-change period, there is a striking break in this trend, and the fraction of individuals planning to pursue the Abitur increases substantially.

Superimposing, by academic grade, the educational plans of the older cohort on those of the younger cohort shows that in the pre-Reunification period, there was no significant difference in Abitur plans. The likelihoods that an individual in grade 7 (pre-Reunification for both cohorts) planned to obtain the Abitur degree were almost identical (at approximately 38%). However, in grade 8 (pre-Reunification for the older cohort and post-Reunification for the younger cohort), the plans of younger and older cohorts were sizably and significantly different. The likelihood of undertaking the Abitur was 55% for the younger cohort (that had just experienced Reunification) versus only 35% for the older cohort in grade 8 (that had not experienced Reunification at that point).

Supporting the parallel trends assumption, Figure 2 shows that the pre-trends were not only close to parallel but also nearly overlapping, suggesting that the cohorts were closely "matched" in the pre-period. The figures show that–in addition to similar levels in terms of cohorts' plans in

grade 7 (i.e., before treatment)–the pre-trends between the two cohorts were also the same. We will test this formally in the following subsection.

5.1.2 Quantifying the Effect on Educational Plans

We now proceed to quantify the effect of Reunification on Abitur plans. We begin with a difference-in-differences estimation strategy, as described in Section 4.1, in which we compare the educational plans of different cohorts across grades. We then combine this with a fixed effects model.

We estimate the effect of regime change, focusing only on the grade before (grade 7) and the grade after (grade 8) Reunification for the young cohort. The older cohort, considered in the same grades, controls for the (counterfactual) trend, i.e., how the plans of the younger cohort would have evolved between grades 7 and 8 had Reunification not taken place.

In Table 2, columns (1) and (2), we report the results of this estimation using two different specifications: differences-in-differences and fixed effects (FE), respectively. The two specifications suggest similar effects. In particular, comparing Abitur plans prior to Reunification (January 1990) with those shortly afterwards (January 1991), we observe a substantial increase by 19 percentage points without fixed effects and an increase by 22 percentage points if fixed effects are included.[16][17]

In Table 2, columns (3) and (4), we test whether the pre-trends in Abitur plans were similar for the two cohorts. We estimate a differences-in-differences specification (without and with fixed effects, respectively), comparing the evolution of youths' plans before grade 7. Our estimates support the parallel trends assumption in that pre-trends are not significantly different and, in fact, are extremely similar (the estimated coefficient is close to zero).

We have shown that Reunification had a sizable effect on youths' educational plans. We found that these plans adapted very quickly to a large shock (the post-period was within a few months after Reunification). In the following sections, we show that the adaptation of one's educational plans has significant implications for long-run educational decisions. This highlights the importance of the politico-economic environment in which one forms one's educational plans and then subsequently decides on educational investments and attainment.

The regime change implied a move to a system in which educational investments were more

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[16]As discussed in Section 2, the fall of the Wall took place in November 1989, which culminated in the collapse of the communist regime when the Socialist Unity Party lost the elections in the GDR in March 1990. If people already started expecting an increase in economic freedom in November 1989 (while the socialist regime was still in place and Reunification was highly uncertain), i.e., a few weeks before our pre-Reunification survey in January 1990, this would lead us to underestimate the full extent of the effect of the regime change on plans. Thus, our estimates are conservative and–if anything–a lower bound for the full effect of the regime change.

[17]Our estimates obtained by using fixed effects rely on individuals who remain in the sample until grade 8, i.e., after Reunification for the young cohort. For this sample, we show below that not only did the older and younger cohorts exhibit the same pre-trends but also the levels of educational plans were virtually the same.

highly rewarded, which could have prompted students to raise their educational aspirations. However, beyond the changes in returns, educational decisions could have changed because of uncertainty, changes in economic preferences or changes in constraints after Reunification. In Section 6, we provide an extensive analysis of possible mechanisms using information on students' perceived returns and their economic, political and social preferences, and test for the relevance of constraints. All of these factors are then linked directly to the students' change in educational plans.

5.2   Long-Run Effects: Link between Abitur Plans and Outcomes

In this section, we study the direct link between educational plans and long-run educational attainment. We measure whether educational plans–and changes in these plans–impact students' likelihood of obtaining the college entrance certificate at age 18 (in grade 12), several years after they were asked about their educational plans (in grades 7 and 8).

As discussed in Section 4.2, we test four hypotheses. First, educational plans predict attainment. Second, grade 8 plans are better than grade 7 plans at predicting outcomes. Third, the relationship between plans and later attainment is stronger for the younger cohort. Fourth, the grade 8 plans of the younger cohort fully incorporate the information on the structural break of Reunification, which explains all of the cross-cohort differences.

Table 3 provides evidence for all four hypotheses. First, planning to obtain the Abitur is a strong predictor of enrolling in the Abitur track and completing it several years later. Second, grade 8 plans better predict later attainment than do grade 7 plans. The chance of actually obtaining the Abitur for those planning to do so in grade 7 is 47 percentage points higher (column 1), while for those planning to do so in grade 8 it is 61 percentage points higher (column 2). The coefficient on the cohort dummy shows that students from the younger cohort are 33 (17) percentage points more likely to obtain the Abitur.

In columns (3) and (4), we estimate equation (4) and add interaction terms between educational plans and treatment (for grade 7 and grade 8 plans, respectively). As predicted by our third hypothesis, the coefficient on the interaction term is positive and significant, suggesting that plans are more strongly linked to actual educational attainment for the younger cohort. This link is stronger for grade 8 plans, as expected, because for the younger cohort, grade 8 plans were measured soon after Reunification. Fourth, once we allow for heterogeneous effects of grade 8 plans on attainment by cohort, the cohort dummy is no longer significant. In other words, the grade 8 plans of the younger cohort fully incorporate the information on the structural break of Reunification and explain all cross-cohort differences ($\gamma_2 = 0$). This highlights the relevance of plans such that they fully absorb the differential effect of all structural changes on long-run outcomes.

When we investigate the link between youths' Abitur plans in grades 7 and 8 and the actual Abitur completion five years later, our sample size is reduced due to some attrition from the sample. To address concerns of differential attrition potentially driving our results, we perform the following robustness checks. First, we show–considering only individuals who remain in the sample between grades 7 and 12 and who have non-missing information on plans (in grades 7 and 8) and actual outcomes–that our main results of the effect of Reunification on plans remain very similar, both in the difference-in-differences specification and in the fixed effects specification (see columns (1) and (2) in Table A.1). Again, we show that pre-trends are virtually identical (see columns (3) and (4)). Second, we show in Table A.2 that the results on the link between plans and the final Abitur completion are also very similar.

6 Mechanisms

In this section, we explore the mechanisms underlying the effect of Reunification on educational plans and, consequently, on long-run educational decisions. A standard education model includes three (main) components that drive educational decisions: the expected returns of education, economic, social and political preferences, and constraints on the access to (higher) education. Empirically, due to data limitations, it is often difficult to identify the importance of various components. The recent literature has focused on eliciting people's subjective expectations about returns of schooling, as discussed in, for example, the seminal papers by Dominitz and Manski (1997) and Jensen (2010). A different strand of literature has investigated the role in (educational) decisions of economic preferences such as altruism and trust in addition to time and risk preferences (for recent evidence, see, e.g., Sutter et al., 2013, and Falk et al., 2018). However, there is relatively little overlap in terms of data sources that permit the exploration of both expected returns and preferences, or other potential drivers.

In what follows, we relate changes in (perceived) returns to education and in preferences to students' educational plans. Beyond economic preferences, we study whether changes in social and political preferences that might reflect a convergence to the West German culture (e.g., being more individualistic and less likely to be part of a collective) play a role. At the end of the section, we explore the importance of the relaxation of various forms of constraints and a number of alternative mechanisms.

In all analyses in this section, we use the same identification strategy as in Section 5.1 to causally estimate the effect of regime change on each of the components. We measure the change for the younger cohort using the older cohort as the counterfactual trend. We then link all factors directly to changes in cohort members' educational plans to better understand the relevance of each component in the process that subsequently changes educational choice. Once again, an important

feature of the analysis is that we can measure the changes in a narrow period just before and after Reunification.

6.1 Perceived Returns to Education

The average net income of individuals with university degrees in the East was only 15% higher than that of blue-collar workers, compared to 70% in the West (Alesina and Fuchs-Schündeln, 2007). Reunification, and convergence to the West, implied an increase in the returns to a college degree for East Germans. Since a change in actual returns does not necessarily imply an (immediate) change in perceived returns, we use the repeated information in our survey on how important youths perceive education to be for later earnings. We explore how this perception evolved over time and, in particular, how it changed after Reunification.

In Panel A of Table 4, columns (1) and (2), we show that in the narrow period before and after Reunification, there was a dramatic change in perceived returns (see Section 3 for variable definitions and summary statistics). We show that the importance of schooling for earnings increased substantially by 0.45 (without fixed effects) or 0.47 (with fixed effects) of a standard deviation, respectively.

As we further discuss below and show in Table 5, the increase in perceived returns was strongly linked to youths' educational plans. Those who most changed their perceived importance of schooling for later earnings were those most likely to also update their educational plans. This highlights the importance of changes in perceived returns to education in contributing to the increase in educational aspirations and, ultimately, long-run educational attainment. However, it is important to consider other components of the educational production function. In the next section, we turn our attention to changes in economic, social and political preferences contributing to the change in education.

6.2 Economic, Social and Political Preferences

There is a growing body of literature that seeks to understand the role of culture in preference formation (Fernandez and Fogli, 2006, 2009). While cultural values have been shown to be persistent, they have also been shown to converge and adapt to a new status quo over time (Alesina and Fuchs-Schündeln, 2007). In this section, we examine economic, social and political preferences in the narrow period before and after the regime change to understand the rate at which they adapted and the importance of such changes, as reflected by actual (educational) decisions.

A causal estimation of the impact of culture on preferences is often complicated by reverse causality concerns. The unanticipated fall of the Berlin Wall allows us to examine this. Following an identification strategy similar to that presented in Section 4.1, we consider the impact of Reuni-

fication on students' economic, social and political preferences. At several points in time, students were asked about their preferences – for instance, about their goals in life. We explore how these goals evolved over time and, in particular, how they changed after Reunification (for the younger cohort relative to the older one).

In Panel A of Table 4 (columns (3)-(6)), we show that there was a dramatic change in economic preferences following Reunification. The importance of consuming "luxury goods" and of "enjoying life" increased substantially. In columns (3) and (5), we show that (without fixed effects), relative to being under the communist regime, the desire for these outcomes increased by 0.12 and 0.34 of a standard deviation, respectively. The results in columns (4) and (6), in which we include fixed effects, are very similar. These results suggest a rapid convergence in terms of individuals' economic preferences to the more capitalist regime.

With respect to social preferences, we find that students reduced the importance they placed on their role with respect to others. One goal or value that we consider is the importance of doing good deeds that "help people" in addition to that of being "valued by peers" or that of "studying because it is a duty as a student." Panel B of Table 4 shows that all decreased (changing by -0.19, -0.17, and -0.11 of a standard deviation, respectively), although the importance of "duty as a student" did not decline significantly. It is often discussed whether capitalist societies foster more individualistic traits. Our findings are consistent with the hypothesis that they do.

As to political preferences, we observe a convergence to the more democratic regime. Metrics for questions about the importance of supporting socialism (or the GDR) and supporting, or being part of, a collective exhibited a sharp decline just after Reunification. In the short period following Reunification, these decreased by 0.51 and 0.86 of a standard deviation, respectively (see Table 4, Panel C).

In Table 5, we link the change in Abitur plans to those in perceived returns and in economic, social and political preferences. We show that the perceived return to schooling is of particular importance, as are changes in social and political preferences. We also note that educational goals rose more among those who believed that education had become more important for future earnings, suggesting that a change in perceived returns to schooling was an important driver of the increase in the planned take-up of the Abitur. Similarly, the increase in the planned take-up was higher among those whose social and political preferences reflected more individualism – converging more to Western attitudes.

This section highlights that the politico-economic regime change led to an important adjustment in perceptions of returns and preferences, and for these young individuals, adaptation occurred soon thereafter. Our results are consistent with these changes being a contributing factor in an increase in the plan to undertake the Abitur (later leading to increased attainment). There was a convergence in behavior and tastes to the more capitalist society, which appears to have contributed

to a quick convergence in terms of educational plans and actual educational attainment.

6.3 Supply-Side Constraints

Beyond changes in economic expectations and preferences, constraints (or the relaxation thereof) might have contributed to changes in educational plans. It might be that some students did not expect to obtain the Abitur, and therefore might not have aspired to it. We study the importance of constraints in several ways – for instance, considering changes in access to university studies, in educational quality, or in educational content. Overall, we find little evidence for these factors.

In principle, changes in access to university studies, or a change in the expected supply of university places, might contribute to a change in educational plans. To understand the importance of this potential mechanism, we focus on potentially "constrained" individuals. While the actual supply of university places did not change in the very short run, changes in the expected supply, especially among those who were more constrained under the Socialist regime, could potentially feed into students' educational plans. We might expect a change in plans among these individuals following a (possibly anticipated) increase in the supply of education. We focus on several forms of constraints in two broad categories: (c1) ability and academic interests and (c2) regime constraints. In Table 6, we report the heterogeneity of aspiration change following Reunification, depending on whether individuals were likely to be "constrained" or "unconstrained".

Under the GDR, access to university studies was based on academic performance (in addition to political ties, as we will discuss later). We might expect that low-ability students did not aspire to go to college if they did not anticipate being able to attend due to constraints (even if they truly desired to go). In such a case, we would expect college aspirations to only increase among these students (or to increase by more than among high-ability students). We classify individuals as having "high" or "low" ability based on their academic grades (GPA) before the regime change. Similarly, given the focus on more technical subjects at universities under the GDR, we might expect that students with a stronger interest (or better performance) in non-math courses relative to math courses might raise their educational aspirations with the expectation that more non-math courses would be available.[18] In columns (1)-(4) of Table 6, we report the heterogeneity analysis and show that there was no differential effect of Reunification on educational aspirations of the potentially "constrained" and "unconstrained".

In Table 6, columns (5)-(7), we examine how two other potential regime constraints could

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[18]For example, Fuchs-Schündeln and Masella (2016) highlight that the teaching of mathematics was of similar importance in the East and the West. However, GDR schools devoted significantly more time to natural sciences, while FRG schools devoted more time to "softer" subjects, such as foreign languages, arts and music. Ammermueller and Weber (2005) compare the distribution of subjects in tertiary education in East and West Germany and observe that the main difference was in the share of graduates in engineering, which was approximately 30% in the East compared to 22% in the West.

differentially impact students' Abitur plans. First, colleges gave priority access to those with strong political ties and commitment. Thus, we might expect a greater increase in aspirations among those who were not party members. However, we do not find evidence of this (see Table 6, columns (5) and (6)). Since the majority of students were members of the youth organization, we also split the sample into a part containing those with (leading) functions in the youth organization and a part containing those without functions, and note very similar changes in the plan to obtain the Abitur. Finally, the GDR initially gave priority in university access to individuals from less-educated families, although this practice had long been abolished. To assess whether this still represented a potential constraint, we classify students based on whether their mothers obtained the Abitur. In column (7), we show that educational plans did not change differentially among these students either.

Finally, educational content or quality might have changed, leading (or contributing) to an increase in educational aspirations. While educational content became less focused on socialism (Fuchs-Schündeln and Masella, 2016; Cantoni et al., 2017), the timing of our analysis shows that– in our context–differences in years under socialism were not responsible for changes in (short-run) educational plans. In our study, the pre-period that measures educational plans for the younger cohort was in early 1990, i.e., after the fall of the Berlin Wall (but before Reunification). Socialist teaching had already been discontinued by then. To provide further evidence on the role of changes in content or education quality for the observed (short-run) changes in plans, we investigate the effect of Reunification on students' grades, relying on a DID approach discussed in Section 4.1. Table A.3 in the Online Appendix shows that Reunification did not have an effect on short-run GPA (and there were no differential pre-trends for the older and younger cohorts). These results suggest that there were no noticeable improvements in content or quality that could explain the increase in the planned take-up of the Abitur in response to Reunification.

7   Adjustment Processes in Abitur Outcomes and Determinants

In this section, we start by investigating the impact of Reunification on long-run educational outcomes across several cohorts. Using (less-detailed) data that cover several cohorts of students in East and West Germany, we examine the aggregate trends in the Abitur take-up before and after Reunification. To understand the mechanism behind these trends, we use our detailed microdata, comparing the younger and older cohorts in East Germany in the years before and after Reunification. In particular, we are interested in understanding the extent to which the older cohort adjusted to the macro shock relative to the younger one with respect to students' expectations (returns to education) and preferences (economic as well as sociopolitical).

7.1 Convergence in Long-run Abitur Attainment

In this section, we supplement our analysis by investigating the speed of convergence, after Reunification, of long-run educational outcomes using the well-known and widely used German Socio-Economic Panel (GSOEP) data.[19] Although these data do not contain information on youths' Abitur plans, they allow us to analyze the convergence process in terms of educational attainment (obtaining the university entrance certificate, the Abitur) between different cohorts of East and West German youths. Our analysis is based on individuals born between 1969 and 1980, i.e., those who were between 10 and 21 years old at the time of Reunification, and thus were differentially able to respond to the event of Reunification in terms of educational decisions.

We compare, across different cohorts, the Abitur completion rates of East German youths to those of West German youths aged between 10 and 21 at the time of Reunification. This allows for variation in terms of when–during the youths' academic lifecycle–they were impacted by the regime change. As part of these cohorts, we consider our "older" and "younger" cohorts, as well as cohorts that were even older (Abitur completion occurred before Reunification) or even younger (education completion occurred even later, with more exposure to the new regime). The use of West German cohorts allows us to analyze the convergence process and thereby to shed some light on the speed and extent of adjustment to the macro shock of different East German cohorts.[20] Since the political and economic regime and the school system remained unchanged in West Germany, while East Germany adopted the West German regime, it seems plausible that West Germans' educational decisions were (relatively) unaffected by the event of Reunification. However, since we observe two cohorts of East Germany before and after Reunification, we do not need West Germans for counterfactual trends to estimate causal effects. Instead, we only use data on West Germans to show the convergence between East and West and the speed of convergence.

In Figure 1, we separately plot Abitur completion rates of East and West German youths across different cohorts. Comparing such rates of the cohort aged 19-21 with those of the cohort aged 16-18 in East and West Germany, Figure 1 shows that there was a gap in terms of Abitur attainment of 50% for these cohorts and that the trends in educational attainment were relatively parallel up to the cohorts that were aged 16-18 and were just about to decide or had just decided to pursue the Abitur around the time of Reunification. In contrast, for younger cohorts, there were substantial changes in Abitur attainment in the wake of Reunification. In particular, comparing the cohort aged

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[19]GSOEP is an annual household panel, started in West Germany in 1984. From 1990 onwards, it also covered the territory of the former German Democratic Republic. We use the original sample established in 1984, and the subsample covering the territory of the former GDR that began in 1990.The GSOEP is one of the main tools for social science and economic research in Germany and was used–among other examples–by Alesina and Fuchs-Schündeln (2007) in their analysis of the effect of Reunification on redistribution preferences. An overview of data, sampling, topics, etc. is provided by, e.g., Goebel et al (2018).

[20]A comparison of East and West Germans has been considered in other studies using the German Reunification as a natural experiment: for example, by Alesina and Fuchs-Schündeln (2007).

16-18 years (somewhat older than the "older" cohort in our main analysis) with the cohort aged 13-15 years (similar to our "younger" cohort), we observe a sizable jump in Abitur completion and a clear convergence. While the difference between East and West Germany is 13 percentage points for the older cohort, the difference is only 4 percentage points for the younger cohort and no longer significant. If one were to interpret the difference in these differences as causal, this would suggest a causal effect of Reunification on Abitur completion rates of approximately 9 percentage points. For the youngest cohorts (aged 10-12 at Reunification) the gap between East and West Germany closed completely, i.e., there was complete convergence in the East and West German rates of Abitur completion, which are both approximately 32%.

In Table A.4 in the Appendix, we quantify the convergence results, presenting the coefficients from estimating a difference-in-differences regression comparing two different cohorts of East and West Germans who were affected by Reunification at different points in their educational lifecycle. According to column (1), the coefficient on the interaction of "East x Younger Cohort" is 0.09, suggesting that Reunification increased the likelihood of Abitur completion significantly, by 9 percentage points. Column (2) presents results from a placebo test and shows that the pre-trends in Abitur completion rates were not statistically different (and indeed were very similar) in East and West Germany.

This section highlights several important findings. First, it demonstrates the robustness of one of our main findings—namely that educational attainment increases sizably among those who have the opportunity, in terms of timing of educational choices, to adjust to a change in regime—and shows that adjustment happens quickly, as even the cohorts that experienced Reunification only shortly before deciding to enter the Abitur track began to adjust. Second, using the data on West Germany, we document that the gap in educational attainment closed completely within a few years of Reunification. Third, most importantly, the analysis highlights that the timing of macro events can be crucial for one's lifetime outcomes. This has been shown in other contexts, such as that of graduating during a recession (see the seminal paper by Baker et al., 1994, and more recent studies, such as, Oyer, 2008; Kahn, 2010; Oreopoulos et al., 2012). Since East German cohorts that experienced Reunification towards the end of high school but before the completion of the Abitur did not fully adjust their educational decisions to the new economic environment, it suggests that students with the possibility to adjust their Abitur take-up to the new economic conditions do not do so, "sticking" to their prior plans.

7.2   Adjustment in Determinants by Cohort

In the analysis so far, we have explored the causal effect of Reunification on the younger cohort. We have used as the counterfactual the change in outcomes of the older cohort when its students

were in the same grades (all of which were before Reunification). This is important since the older cohort was likely to be affected by Reunification, and using the same years would lead to a biased estimate of the causal effect. At the same time, a difference-in-differences framework using as the counterfactual the older cohort's evolution in the same *years*, before and after Reunification, enables us to understand the extent to which the older cohort could adjust relative to the younger one. More specifically, it can be interpreted as how much less the older cohort adjusted relative to the younger one. For example, if the estimate of the DID analysis comparing the same years is zero, this implies that the older cohort could adjust to Reunification to the same extent as did the younger one (while the causal effect on the younger one is given by the DID analysis using as the counterfactual the evolution over the same grades, which–for the older cohort–were all before Reunification). A positive estimate instead tells us how much less the older cohort could adjust relative to the younger one.

Table 7 presents the coefficients from estimating the difference-in-differences regression for four outcomes: perceived returns to education and economic, social, and political preferences. As shown in panel A, columns (1) and (2), the older cohort adjusted its expectations about the returns to schooling as quickly as did the younger cohort. The estimates obtained using the older cohort in the same years as the counterfactual show that there was no difference in adjustment between the older and younger cohorts. Columns (3)-(6) show that economic preferences also adjusted for the older cohort, albeit to a somewhat lesser extent. In particular, in terms of economic preferences the importance of the goal "enjoying life" increased for the older cohort by nearly as much as for the younger one, but the "desire for luxury" increased much less than it did for the younger cohort.

In terms of sociopolitical preferences, however, there are stark differences across cohorts. As displayed in panel B, columns (1)-(6), social and political preferences of the older cohort tended to adjust much more slowly. The change in terms of social and political preferences towards more "individualism" also occurred to a much lesser extent for the older cohort than for the younger one. The fact that the older cohort adjusted more slowly to the regime change in terms of several important determinants of educational decisions is consistent with (and suggests a mechanism for) the slower adjustment in terms of that cohort's educational attainment.

8   Conclusion

The long-standing educational gap in completion of the Abitur (the certificate prerequisite to entering college) between East and West Germany closed entirely approximately one decade after the German Reunification. We exploit this large macro shock, which saw East Germany, a previously communist country, reunite with West Germany and converge to the democratic-capitalist regime of the latter, to causally estimate the shock's impact on the educational plans of adolescents in East

Germany. Using detailed longitudinal data on different cohorts of East German students, we show that the switch in regime induced an immediate and sharp increase of 22% in the adolescents' (aged 13-14 years) plan to obtain the Abitur. Several years later, this translated almost entirely into an actual increase in going to college among these youth.

To understand how educational plans are formed, how they adjust, and which determinants adjust more or less rapidly, our study allows for a detailed investigation into a wide spectrum of factors. We explore changes in expected returns to education, economic, social and political preferences, and changes in constraints. Investigating the motives behind the change in youths' plans, we show that a leading explanation is that even at this young age (and quite soon after Reunification), the youths understood that there was a strong increase in returns to college education, to which they reacted. This change in perceived returns was strongly linked to changes in educational plans, which ultimately led to an increase in long-run educational investments. Beyond the changes in returns, we identify changes in educational plans that were linked to changes in preferences. While it is typically difficult to measure preferences and values, especially in the short periods around a regime change, our paper sheds light on how these evolved and adapted to those of the capitalist and democratic West, as well as on their links to changes in educational plans. Overall, the results highlight the importance of perceived returns as well as the elasticity of preferences, thereby shedding light on the process of formation of plans as well as their role in educational decision-making.

To explore whether the age (or educational stage) at which individuals are affected by a macro shock is relevant to educational decisions, we examine the extent to which a slightly older cohort adjusted the respective educational attainment to the regime change, and the extent and pace of the determinants' adjustment. We show that cohorts closer to critical educational junctions at the time of Reunification, however, adjusted their plans to a much lesser extent. While they similarly updated their subjective expectations about the returns of education, they exhibited a slower adjustment in their preferences relative to younger cohorts.

From a policy perspective, our study helps inform on the link between early educational planning and later educational decisions and outcomes. It is crucial to understand the role played by beliefs of the labor market, as well as own preferences and supply-side constraints, in educational planning. It is similarly important to understand just how malleable these plans are and whether they can adjust to new circumstances. Overall, our study allows an insight into this black box of the educational decision process and–given the critical role of educational attainment for later economic success and general wellbeing–helps further our understanding of the emergence and persistence of inequality.

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Figures and Tables

Figure 1: Abitur Completion Rates by Cohort (East and West Germany)
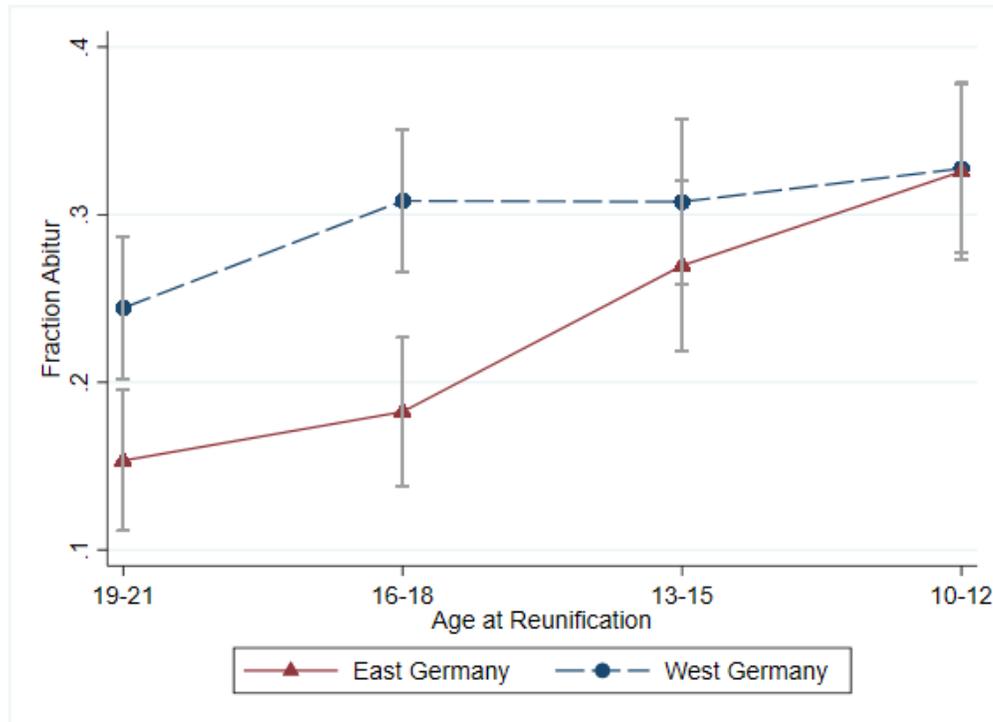
Notes: The figure displays Abitur completion rates (college entrance certificate) for different cohorts of youths in East and West Germany. The dots represent the average fraction of individuals with completed Abitur for different cohorts (by age at Reunification) and the gray bars represent the 95% confidence intervals.

Figure 2: The Effect of Reunification on Abitur Plans
(East Germany)
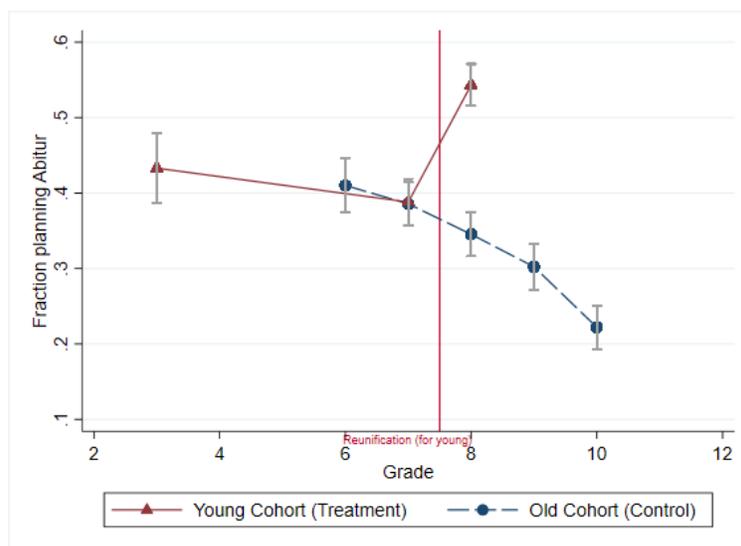
Notes: The figure displays Abitur plans for a "young" and an "old"
cohort in East Germany and how they evolve across grades. The dots
represent the average fraction of youths planning to obtain the Abitur
and the gray bars represent the 95% confidence intervals.

Table 1: Descriptive Statistics

(a) Variables - Main Analysis

	Question	Answers	Mean	Std.Dev.	N.Ind.
Abitur Plans	Do you plan to obtain the Abitur (university entrance certificate)?	0 1	0.4231	0.4941	2893
Perceived Returns	How important is study-ing/learning in school for later earnings?	1 4	3.1071	0.8123	3134
Economic Prefs.					
Afford Luxury	How important is it to be able to afford some luxury?	1 4	3.0398	0.8309	3134
Enjoy life	How important is it to enjoy life as much as possible?	1 4	3.0860	0.8045	3134
Social Prefs.					
Good Deed	How important is it to do good/important deeds?	1 4	2.9547	0.7985	3134
Valued by Peers	How important is it to be valued by peers?	1 4	2.4576	0.8134	3134
Duty as Student	Motivation for studying: duty as a student.	1 4	2.8349	0.8586	3134
Political Prefs.					
Socialism	How important is it to support socialism?	1 4	2.4898	0.8886	3134
Collective	How important is it to support/be part of the collective?	1 4	3.2280	0.6687	3134

(b) Description: Variables for Heterogeneity Analysis

	Question	Answers	Mean	Std.Dev.	N.Ind.
Academic Ability/Interests					
Acad. Performance	GPA of Math and German.	1 5	3.6773	0.8436	2660
Relative Obj. Performance	Relative grades German vs. Math.		0.9398	0.3481	1909
Relative Subj. Performance	Own evaluation of relative performance German vs. Math.		1.1224	0.4832	1909
Relative Acad. Interest	Relative interest in German vs. Math.		1.3671	0.7314	1909
Regime-Relevant Variables					
FDJ Member	Member of youth organization of communist party	0 1	0.9648	0.1843	1929
FDJ Member with func.	Member with function	0 1	0.4434	0.4969	1929
Abitur Mother	Mother has a completed Abitur degree	0 1	0.1817	0.3857	1125

Notes: For more details see Section 3.

Table 2: The Effect of the Reunification on Youths' Abitur Plans

	Abitur Plans			
	Main		Placebo Test (Pre-Trend)	
	[1]	[2]	[3]	[4]
Treatment x Post Reunification	0.193***	0.221***	-0.010	0.005
	[0.022]	[0.023]	[0.029]	[0.031]
Treatment Group (Young)	0.005		0.015	
	[0.022]		[0.027]	
Post Reunification (Grade 8)	-0.040***	-0.045***	-0.021	0.049***
	[0.014]	[0.013]	[0.018]	[0.018]
Constant	0.386***	0.383***	0.407***	0.368***
	[0.015]	[0.006]	[0.018]	[0.009]
N Observations	4309	4309	3413	3413
N Individuals	2893	2893	2362	2362
Individual FE	NO	YES	NO	YES
R-sqared	0.025	0.071	0.001	0.011

Notes: Standard errors are in brackets. "Treatment Group" takes value 1 for the younger cohorts and 0 for the older cohort. "Post Reunification" takes value 1 for grade 8 (1987/88 for the older cohort and 1990/91 for the younger one) and value 0 for grade 7 (1986/87 for the older cohort and 1989/90 for the younger one). The placebo test compares the change in outcomes of the two cohorts prior to grade 7.

Table 3: Longer-Run Educational Outcome: Abitur Completion and Abitur Plans

| | Abitur Completion | | | | | |
	[1]	[2]	[3]	[4]	[5]	[6]
Treatment Group (Young)			0.331***	0.170***	0.250***	0.019
			[0.025]	[0.024]	[0.033]	[0.025]
Abitur Plan in Grade 7	0.471***		0.476***		0.394***	
	[0.027]		[0.025]		[0.035]	
Abitur Plan Gr 7 x Treatment					0.169***	
					[0.050]	
Abitur Plan in Grade 8		0.653***		0.614***		0.445***
		[0.021]		[0.022]		[0.038]
Abitur Plan Gr 8 x Treatment						0.297***
						[0.046]
Constant	0.204***	0.095***	0.041**	0.017	0.081***	0.086***
	[0.017]	[0.012]	[0.017]	[0.016]	[0.017]	[0.016]
N Observations	1027	1220	1027	1220	1027	1220
N Individuals	1027	1220	1027	1220	1027	1220
R-squared	0.226	0.427	0.338	0.454	0.345	0.475

Notes: Standard errors are in brackets. Abitur plans are measured in grades 7 and 8, as indicated in the table, while Abitur completion is measured at age 18 (i.e. in 1992 for the older and 1995 for the younger cohort).

Table 4: Mechanisms: The Effect of Reunification on Perceived Returns and Preferences

Panel A

	Perceived Returns		Economic Preferences			
	Earn a Lot		Afford Luxury		Enjoy Life	
	[1]	[2]	[3]	[4]	[5]	[6]
Treatment x Post Reunification	0.448***	0.469***	0.125**	0.121*	0.342***	0.334***
	[0.053]	[0.062]	[0.053]	[0.065]	[0.055]	[0.069]
Treatment Group (Young)	-0.174***		-0.144***		-0.148***	
	[0.045]		[0.046]		[0.045]	
Post (Grade 8)	-0.116***	-0.103***	0.200***	0.161***	-0.086**	-0.120***
	[0.038]	[0.040]	[0.039]	[0.041]	[0.040]	[0.044]
Constant	0.029	-0.076***	-0.054	-0.110***	0.032	-0.027
	[0.033]	[0.016]	[0.035]	[0.017]	[0.033]	[0.018]
N Observations	4500	4500	4500	4500	4500	4500
N Individuals	3134	3134	3134	3134	3134	3134
Individual FE	NO	YES	NO	YES	NO	YES
R-squared	0.017	0.042	0.020	0.032	0.010	0.016

Panel B

	Social Preferences					
	Good/Important Deed		Valued by Peers		Duty as Student	
	[1]	[2]	[3]	[4]	[5]	[6]
Treatment x Post Reunification	-0.028	-0.189***	-0.141***	-0.174***	-0.086	-0.114
	[0.054]	[0.065]	[0.053]	[0.064]	[0.055]	[0.070]
Treatment Group (Young)	0.012		-0.156***		-0.209***	
	[0.044]		[0.044]		[0.042]	
Post (Grade 8)	-0.351***	-0.339***	-0.184***	-0.164***	-0.364***	-0.349***
	[0.040]	[0.043]	[0.037]	[0.040]	[0.040]	[0.044]
Constant	0.181***	0.225***	0.213***	0.129***	0.316***	0.205***
	[0.032]	[0.017]	[0.032]	[0.017]	[0.030]	[0.018]
N Observations	4500	4500	4500	4500	4500	4500
N Individuals	3134	3134	3134	3134	3134	3134
Individual FE	NO	YES	NO	YES	NO	YES
R-squared	0.034	0.108	0.031	0.042	0.059	0.090

Panel C

	Political Preferences			
	Collective		Socialism	
	[1]	[2]	[3]	[4]
Treatment x Post Reunification	-0.525***	-0.509***	-0.949***	-0.863***
	[0.055]	[0.070]	[0.050]	[0.064]
Treatment Group (Young)	0.095**		-0.018	
	[0.045]		[0.042]	
Post (Grade 8)	0.076*	0.073*	0.014	0.012
	[0.040]	[0.043]	[0.036]	[0.039]
Constant	0.063*	0.112***	0.275***	0.243***
	[0.033]	[0.018]	[0.031]	[0.017]
N Observations	4500	4500	4500	4500
N Individuals	3134	3134	3134	3134
Individual FE	NO	YES	NO	YES
R-squared	0.035	0.045	0.179	0.172

Notes: Standard errors are in brackets. "Treatment Group" takes value 1 for the younger cohorts and 0 for the older cohort. "Post Reunification" takes value 1 for grade 8 (1987/88 for the older cohort and 1990/91 for the younger one) and value 0 for grade 7 (1986/87 for the older cohort and 1989/90 for the younger one).

Table 5: Link between Change in Abitur Plans and Changes in Returns and Preferences

| Link to Change in | Change in Abitur Plans | | | | | | | |
| | Perceived Returns | Afford Luxury | Enjoy Life | Good Deed | Valued Peer | Duty Student | Collective | Socialism |
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	0.076***	0.011	0.036	0.011	-0.021	-0.068**	-0.093***	
	[0.028]	[0.031]	[0.029]	[0.030]	[0.030]	[0.029]	[0.030]	
N Observations	1133	1133	1133	1133	1133	1133	1133	1133
N Individuals	1133	1133	1133	1133	1133	1133	1133	1133
R-squared	0.006	0.000	0.001	0.000	0.000	0.005	0.008	0.018

Notes: Standard errors in brackest. The table relates the changes in educational plans between grade 7 and grade 8 (for younger and older cohort) with the changes in perceived returns and economic and soio-political preferences.

Table 6: Heterogeneous Effects of Reunification on Abitur Plans (Supply-Side Constraints)

	Abitur Plans						
	By Ability/Interest Constraints				**By Regime Constraints**		
	GPA	Relative Performance/Interest (Verbal vs Math)			FDJ Membership		Mother Abitur
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Treatment x Post Reunification	0.245***	0.209**	0.243***	0.209***	-0.017	0.235***	0.200***
	[0.034]	[0.086]	[0.045]	[0.040]	[0.157]	[0.037]	[0.040]
x GPA above med.	-0.054						
	[0.055]						
x Rel. Obj. Perf. above Median		0.020					
		[0.090]					
x Rel. Subj. Perf. above Median			-0.025				
			[0.056]				
x Rel. Acad. Interests ab. Median				0.032			
				[0.054]			
x FDJ Member					0.259		
					[0.160]		
x FDJ Member with func.						-0.014	
						[0.054]	
x Abitur Mother							-0.096
							[0.093]
N Observations	3826	3171	3043	3077	3040	3040	1794
N Individual	2693	2047	1934	1954	1929	1929	1125
Individual FE	YES	YES	YES	YES	YES	YES	YES
R-squared	0.072	0.072	0.070	0.070	0.079	0.071	0.059

Notes: Standard errors are in brackets. "Treatment Group" takes value 1 for the younger cohorts and 0 for the older cohort. "Post Reunification" takes value 1 for grade 8 (1987/88 for the older cohort and 1990/91 for the younger one) and value 0 for grade 7 (1986/87 for the older cohort and 1989/90 for the younger one). All regressions contain the full set of interactions as controls. We report the coefficients from the triple interactions of "Treatment x Post Reunification" with each measure (see Table 1 for a description).

Table 7: Adjustment in Determinants by Cohort (Difference-in-Difference Effect by Year)

Panel A	**Perceived Returns**		**Economic Preferences**			
	Earn a Lot		Afford Luxury		Enjoy Life	
	[1]	[2]	[3]	[4]	[5]	[6]
Treatment x Post Reunification	0.035	0.018	0.459***	0.410***	0.115*	0.070
	[0.065]	[0.078]	[0.063]	[0.075]	[0.065]	[0.081]
Treatment Group (Young)	0.035		-0.437***		-0.121**	
	[0.049]		[0.047]		[0.050]	
Post Reunification (Year 1991)	0.305***	0.358***	-0.111**	-0.102*	0.156***	0.159***
	[0.053]	[0.060]	[0.050]	[0.053]	[0.051]	[0.059]
Constant	-0.174***	-0.168***	0.186***	-0.103***	-0.034	-0.103***
	[0.038]	[0.019]	[0.034]	[0.020]	[0.038]	[0.021]
N Observations	3461	3461	3461	3461	3461	3461
N Individuals	2665	2665	2665	2665	2665	2665
Individual FE	NO	YES	NO	YES	NO	YES
R-squared	0.029	0.106	0.032	0.050	0.014	0.030
Panel B	**Social Preferences**		**Political Preferences**			
	Good/Important Deed		Collective		Socialism	
	[1]	[2]	[3]	[4]	[5]	[6]
Treatment x Post Reunification	-0.387***	-0.517***	-0.433***	-0.386***	-0.869***	-0.770***
	[0.065]	[0.077]	[0.068]	[0.087]	[0.068]	[0.088]
Treatment Group (Young)	0.764***		0.393***		0.587***	
	[0.047]		[0.048]		[0.047]	
Post Reunification (Year 1991)	0.010	-0.009	-0.028	-0.069	-0.088	-0.101
	[0.054]	[0.060]	[0.056]	[0.066]	[0.058]	[0.071]
Constant	-0.365***	0.218***	-0.092**	0.182***	-0.055	0.321***
	[0.036]	[0.018]	[0.037]	[0.021]	[0.037]	[0.020]
N Observations	3461	3461	3461	3461	3461	3461
N Individuals	2665	2665	2665	2665	2665	2665
Individual FE	NO	YES	NO	YES	NO	YES
R-squared	0.095	0.137	0.043	0.083	0.160	0.260

Notes: Standard errors are in brackets. "Treatment Group" takes the value 1 for the younger cohort and value 0 for the older one. "Post Reunification" take value 1 if the academic year is 1990/91 and 0 if the academic year is 1989/90.

ONLINE APPENDIX – For Online Publication

A. Tables

Table A.1: The Effect of Reunification on Youths' Abitur Plans: Balanced Panel

	Abitur Plans			
	Main		Placebo Test (Pre-Trend)	
	[1]	[2]	[3]	[4]
Treatment x Post Reunification	0.214***	0.154***	-0.044	-0.003
	[0.048]	[0.040]	[0.065]	[0.072]
Treatment Group (Young)	-0.102**		-0.058	
	[0.048]		[0.062]	
Post Reunification (Grade 8)	-0.057***	-0.057***	-0.010	0.025
	[0.020]	[0.020]	[0.027]	[0.026]
Constant	0.473***	0.455***	0.483***	0.444***
	[0.023]	[0.009]	[0.028]	[0.015]
N Observations	1227	1227	993	993
N Individuals	700	700	625	625
Individual FE	NO	YES	NO	YES
R-sqared	0.009	0.024	0.006	0.003

 Notes: Standard errors are in brackets. "Treatment Group" takes value 1 for the younger cohorts and 0 for the older cohort. "Post Reunification" takes value 1 for grade 8 (1987/88 for the older cohort and 1990/91 for the younger one) and value 0 for grade 7 (1986/87 for the older cohort and 1989/90 for the younger one). The placebo test compares the change in outcomes of the two cohorts prior to grade 7. The sample is restricted to those individuals who remain in the sample until age 18, i.e. the same sample as in the following table.

Table A.2: Longer-Run Educational Outcome: Abitur Completion and Abitur Plans

	[1]	[2]	[3]	[4]
Treatment Group (Young)	0.369***	0.227***	0.266***	0.035
	[0.031]	[0.033]	[0.048]	[0.043]
Abitur plan in Grade 7	0.476***		0.405***	
	[0.030]		[0.038]	
Plan Grade 7*Treatment			0.204***	
			[0.061]	
Abitur plan in Grade 8		0.546***		0.452***
		[0.032]		[0.040]
Plan Grade 8*Treatment				0.306***
				[0.061]
Constant	0.045**	0.044**	0.079***	0.083***
	[0.018]	[0.017]	[0.017]	[0.017]
N Observations	700	700	700	700
N Individuals	700	700	700	700
R-squared	0.381	0.428	0.390	0.447

Notes: Standard errors are in brackets. Educational plans are measured in grades 7 and 8, as indicated in the table, while Abitur completion is measured at age 18 (i.e. in 1992 for the older and 1995 for the younger cohort).

Table A.3: The Effect of Reunification on Academic Performance

| | GPA (Math and German) | | | |
| | Main | | Pre-Trend | |
	[1]	[2]	[3]	[4]
Treatment x Post Reunification	-0.048	-0.047	0.018	0.028
	[0.038]	[0.032]	[0.032]	[0.022]
Treatment Group (Young)	0.005		0.001	
	[0.039]		[0.040]	
Post (Grade 8)	-0.100***	-0.189***	-0.094***	-0.099***
	[0.022]	[0.016]	[0.021]	[0.015]
Constant	0.058**	0.103***	0.044	0.046***
	[0.028]	[0.008]	[0.028]	[0.005]
N Observations	5111	5111	4607	4607
N Individuals	3392	3392	2645	2645
Individual FE	NO	YES	NO	YES
R-squared	0.004	0.108	0.002	0.032

Notes: Standard errors are in brackets. "Treatment Group" takes value 1 for the younger cohorts and 0 for the older cohort. "Post Reunification" takes value 1 for grade 8 (1987/88 for the older cohort and 1990/91 for the younger one) and value 0 for grade 7 (1986/87 for the older cohort and 1989/90 for the younger one). The placebo test compares the change in outcomes of the two cohorts prior to grade 7.

Table A.4: The Effect of the Reunification on Abitur Completion

| | Abitur Completion | |
| | Main | Placebo Test (Pre-Trend) |
	[1]	[2]
Cohort x East (Reunification)	0.088*	-0.035
	[0.048]	[0.045]
Cohort	-0.001	0.064**
	[0.032]	[0.029]
East Germany	-0.126***	-0.091***
	[0.033]	[0.032]
Constant	0.308***	0.244***
	[0.021]	[0.021]
N Observations	1378	1435
N Individuals	1378	1435
R-sqared	0.012	0.020

Notes: Standard errors in brackets. "After" takes value 1 for cohorts aged 13 to 15 at the time of Reunification and 0 for cohorts aged 16 to 18 at Reunification.