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Lifting the Iron Curtain:
School-age Education and Entrepreneurial Intentions

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Abstract

We exploit Germany's reunification to identify how school-age education affects entrepreneurial intentions. We look at university students in reunified Germany who were born before the Iron Curtain fell. During school age, all students in the West German control group received formal and informal education in a free-market economy, while East German students did or did not receive free-market education. Difference-in-differences estimations show that school-age education in a free-market economy increases entrepreneurial intentions. An event study supports the common-trends assumption. Results remain robust in matched samples and when we exploit within-student variation in occupational intentions to control for unobserved individual characteristics.

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1. Introduction

How does school-age education affect occupational choices? We address this question by investigating how German reunification affected the formation of entrepreneurial intentions. The reunification was a great systemic shock that generated a complete, swift and unexpected change in the institutional and economic framework. We exploit this shock as natural experiment on university students in reunified Germany who were born before the reunification. Students born in the socialist German Democratic Republic (GDR) experienced varying degrees of school-age education in two distinct economic systems, while students born in the Federal Republic of Germany (FRG) were only educated in a free-market economy. This setup gives us the unique opportunity to analyze how formal and informal education in a free-market economy affects the formation of entrepreneurial intentions.

We choose to look at entrepreneurial intentions because the perception of entrepreneurship and private firm ownership as part of economic freedom is one of the most distinct differences between the two former regimes. In free-market economies, entrepreneurship is considered an important driver of economic growth, which puts it high on the political agenda. By contrast, the GDR not only promoted dependent employment in state-owned companies over self-employment,[1] but also propagated through the state-controlled media the Marxist notion that entrepreneurs are expropriators who must be overthrown by the working class, taught it at school and exercised it in state-run youth organizations. With the reunification, East Germany instantaneously adopted the West German free-market system. Among other changes, this sudden turn came with significant changes in school-age education: socialist ideology was immediately dropped from school curricula, while the relevant extra-curricular activities in the socialist organizations for children (*Jungpioniere*) and youths (*Freie Deutsche Jugend*) came to an end. We consider this shock as an extreme case of a policy intervention useful to assess how policy can affect entrepreneurial intentions. Consequently, we interpret our estimations as upper-bound on the effect that any policy interventions during school-age could possibly have on the formation of entrepreneurial intentions.

Our difference-in-differences estimations show that university students who were born in the GDR report significantly lower entrepreneurial intentions than university students who grew up in the FRG.[2] This finding applies to the average East German student in our sample, irrespective

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[1] The resulting lack of entrepreneurial activities is considered important in understanding the eventual failure of the socialist regime (c.f. Audretsch, 2007).

[2] Falck et al. (2011) find similar results in multivariate regressions.

of whether she received some education in the free-market economy or not. However, East German students who finished school after reunification and experienced some free-market education show higher entrepreneurial intentions than East German students who finished school before reunification. The latter are 9.7 percentage points less likely to express entrepreneurial intentions than their West German counterparts. Those who were treated with some free-market education are on average only 2.8 percentage points less likely to express entrepreneurial intentions. The treatment makes up for 71% of the difference in entrepreneurial intentions between East and West German students.

All our estimations take account of more general trends in entrepreneurial intentions by comparing students who studied at the same university, chose the same major, and lived the same number of years in reunified Germany. To assess the validity of the common trend assumption underlying the DiD approach, we perform an event study analysis that splits our sample into 2-year graduation cohorts from secondary school. Starting from 1983, the analysis shows no indication of pre-treatment effects while the effect increases persistently for cohorts who graduated after reunification in 1990. Additionally, we exploit the fact that we observe students who graduated from secondary school in different years but were surveyed in the same wave. This allows us to identify the effect of school-age education in a free-market economy conditional on East-German-specific time trends that absorb potentially confounding effects from changes in the economic and social environment. These East-specific trends also account for the fact that the share of East German high-school graduates going to university may have increased over time (c.f. Fuchs-Schündeln and Masella, 2015).

Robustness tests show that our results are not affected by the exclusion of selective subsamples (among them occupations that typically lead to self-employment) and matching on observables. We also exploit within-student variation in the attractiveness of entrepreneurship relative to other potential occupational alternatives to account for unobserved individual-level characteristics. All specifications support our main findings and suggest that we identify a plausibly causal effect of changes in formal and informal education during school-age on the formation of individual entrepreneurial intentions.

While we are looking at entrepreneurial intentions, policy-makers may be particularly interested in ways to stimulate entrepreneurial activity. If we agreed on this policy goal, evidence from Falck et al. (2012) would support using intentions to predict entrepreneurial activity. They employ the 1970 British Cohort Study to show that students who stated entrepreneurial intentions at age 16 have a significantly higher probability of being an entrepreneur at age 34

than students who did not. While it is reassuring to see that intentions translate into action, we would like to add a word of caution. A policy goal of merely increasing the number of entrepreneurs may be counterproductive if too many individuals with low entrepreneurial abilities give entrepreneurship a try. Instead, we believe that a more promising policy goal would be to increase the awareness of entrepreneurship as an occupational choice.

This paper connects to an established literature arguing that the collapse of the GDR came as a big surprise (cf. Alesina, Fuchs-Schündeln, 2007; Fuchs-Schündeln, 2008; Redding and Sturm, 2008). Within a year of the fall of the Berlin Wall in November 1989, the GDR joined the FRG in October 1990. With this act of reunification, the GDR adopted the FRG's institutions fully. This had significant impacts on virtually all aspects of public life. State-owned enterprises were privatized, political competition was introduced, freedom of speech was guaranteed and the East German economy became fully integrated into the free-market economy of reunified Germany. We focus on the unexpected changes in East German students' school-age education brought about by the adoption of the West-German education system.

Our paper further links to the literature on behavioral effects of macroeconomic experiences. This literature shows that individual beliefs, attitudes, and aspirations depend on the cultural and political environment, and that these preferences may change as a result of significant macroeconomic shocks. Previous research shows that experiencing periods of recession or high inflation early in life increases risk-aversion and the preference for redistribution, while reducing the probability of participating in financial markets (Malmendier and Nagel, 2011; Malmendier and Nagel, 2013; Giuliano and Spilimbergo, 2014). Similarly, we show that a systemic shock experienced during school-age affects later entrepreneurial intentions. Our findings further suggest that the timing of the shock plays a role. Children who experienced the reunification shock at an earlier point in their school-age education show stronger changes in their entrepreneurial intentions. This finding corroborates Alesina and Fuchs-Schündeln's (2007) conclusion that socialist attitudes do not disappear instantly but take generations to change. Our results suggest that school-age education can be a driver of this development.

Finally, our paper adds to the literature on the formation of entrepreneurial intentions. This well-established literature has looked at genetic factors (Nicolaou and Shane, 2011); parents and family (Lindquist et al., 2015; Fairlie and Robb, 2007); peer effects (Nanda and Sørensen, 2010; Lerner and Malmendier, 2014; Falck et al., 2012); entrepreneurship courses (Rosendahl Huber et al., 2014; Oosterbeek et al., 2011); and training measures (Karlan and Valdivia, 2011; Fairlie et al., 2015). We show that a sudden change in the institutional environment of school-

age children affects the formation of entrepreneurial intentions. This is closely related to the literature on entrepreneurship education. This literature finds that entrepreneurship courses at universities or training programs in later life barely raise individual entrepreneurial intentions. Our research provides one potential explanation for this finding: entrepreneurial intentions are formed during school-age and may be hard to change later in life. Instead, the German reunification experiment suggests that changes in schooling, curricula, extra-curricular activities, etc., could be policy measures to stimulate entrepreneurial intentions. Research by Falck and Woessmann (2013) and Sobel and King (2008) supports this interpretation.

The remainder of this paper is organized as follows: Section 2 reviews the formal and informal education at school age in the GDR. Section 3 introduces our empirical strategy and the data used. Section 4 presents our main results and robustness checks. Section 5 concludes.

2. Formal and Informal Education at School-Age in the GDR

Education policies in the German Democratic Republic (GDR) were centrally determined by the ministry for national education. Formal education was organized into a unitary school (*Polytechnische Oberschule*) that combined primary and secondary school. All students attended this school for ten years (Waterkamp, 1987). A small fraction of students were allowed to continue school for two more years at an extended secondary school (*Erweiterte polytechnische Oberschule)*, which prepared them for academic studies.[3] Access to this extended secondary school was not merely based on school achievement but also depended on loyalty to the ruling socialist party. Entry criteria involved participation in the socialist party's youth organisation FDJ (*Freie Deutsche Jugend*), a declaration of commitment to serve in the army, and the parents' socialist merits. Overall, only 8-12 percent of the students in a given year could enter extended secondary school. This strict selection process was meant to insure future graduates' loyalty to the state (Stenke, 2004).

The main difference between the FRG's and GDR's school curricula was the GDR's goal to form socialist personalities by teaching communist convictions, as explicitly stated in the socialist party's 1989 manifesto (p. 67f.). From grade seven on, students had to attend lessons in Marxism and Leninism as part of social studies (*Staatsbürgerkunde*). From 1978 on, this subject was supplemented by preliminary military training (*Wehrkundeunterricht*) for male students. In contrast, social studies in the FRG (*Sozialkunde*) focused on mechanisms of the

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[3] An indirect way to obtain a university-entrance degree was to combine a 3-year apprenticeship with additional schooling after ten years of unitary school.

democratic process and civil rights. Moreover, economics courses introduced GDR students to socialist production tenets (Judt, 1997), whereas the FRG curriculum taught the mechanisms of a free-market economy.

In the GDR, the state's influence on school-age education was not confined to the formal school curricula. Extracurricular activities were also state-run and provided another channel to streamline the youth ideologically. By far the most relevant part of informal education took place in the Socialist party's youth organizations (FES, 1984). Upon entering elementary school at age six, children would usually join the Young Pioneers *(Jungpioniere)*, where they remained Junior Pioneers until third grade, rising to Thaelmann Pioneers from grade four to the end of grade seven. The Young Pioneers' goal was to educate young socialists into the values the collective. Their activities comprised afternoon meetings on Wednesdays and camps, but also social tasks like waste collection, looking after elderly people or upkeeping of public spaces. In 1988, around 1.5 million children between ages 6-13 were members of the young pioneers. This corresponds to a 96-percent participation rate.[4]

In grade eight at the age of 14, children would usually move on to the socialist youth organization Free German Youth (*Freie Deutsche Jugend, FDJ*). Around the same time, in grade eight, students would also attend the Youth Ceremony (*Jugendweihe*) that was meant to be an alternative to the Christian Confirmation and marked the entry into adult life. The FDJ organized nearly all parts of youth life, including cultural activities, sports, and trips. While attending these extracurricular activities was not compulsory, not attending them entailed severe disadvantages, since they were, for instance, one of the entry criteria into professional life and determined the occupational choices. As a result, almost 80 percent of the youth aged 14-25 were FDJ members (cf. Mählert, 2001 and Zilch, 1999). After reunification, the youth socialist organizations ceased to exist, but the youth ceremony survived as one of the few remaining elements of East German culture. This may be explained by the comparatively low importance of religion as an alternative.

Taken together, formal and informal education in the GDR was designed to educate "socialist" individuals who held a critical attitude towards free-market economies and particularly the role of entrepreneurs. When students are taught time and again that entrepreneurs are expropriators, it can be expected that this will sustainably affect their own desire to become an entrepreneur in the future.

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[4] The underlying numbers are published in Statistisches Jahrbuch (1989), pages 355 and 412. Zilch (1999) provides more statistics and discusses them in detail.

With reunification, the structures of the West German educational system were adopted in East Germany (cf. Wilde, 2002; Block and Fuchs, 1993). First and foremost, this change involved the immediate elimination of any socialist element from the curriculum and the gradual replacement of former "socialist" teachers.[5] Additionally, the informal education in ideology-based youth organizations came to an end. The new educational goal was now to develop independent personalities, foster critical thinking, creativeness and initiative, and overall, instil democratic values in line with the free-market economy (Fuchs-Schündeln and Masella, 2015). Thus, with the change in the educational system, East German students were suddenly exposed to virtues that are also conducive to entrepreneurship.

2. Basic Empirical Strategy

2.1 Difference-in-Differences estimation in repeated cross-sections

To identify how the changes in school-age education that came with German reunification affected individual entrepreneurial intentions, we employ a difference-in-differences (DiD) strategy for a sample of university students in reunified Germany who were all born before the reunification, either in the democratic FRG (West) or the socialist GDR (East). In the simplest case, the DiD framework compares students raised in the East who graduated from secondary school before or after reunification to a West German control group. To implement this approach, we estimate the following basic regression specification:

Equation 1:

$$I_{iwum} = \alpha_w + \alpha_u + \alpha_m + \beta_1 East + \beta_2 After90 + \beta_3 (East * After90) + X'\beta_4 + \epsilon_{iwum}$$

The dependent variable I_{iwum} measures university student *i*'s entrepreneurial intentions, i.e. *i*'s willingness to become an entrepreneur in the future, observed in survey wave *w* when studying major *m* at university *u*. *East* is a dummy variable that equals unity if university student *i* graduated from secondary school in East Germany (before or after reunification), and zero if schooling was completed in West Germany.[6] This variable accounts for time-persistent GDR influences. *After90* is another dummy variable that is unity if secondary school was finished in

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[5] Since the pupil-teacher ratio had been significantly lower in the GDR – 11.8 compared to 15.7 in the FRG in 1985 (Stenke, 2004, p. 16) –, there was some room for dismissals. Overall, about one-third of the GDR teachers lost their jobs, predominantly those who were politically involved.
[6] Since mobility of families with children of school-age is rather low across German states (*Bundesländer*), we also consider this to be a proxy for a students' region of birth.

reunified Germany, and zero if the student graduated from secondary school in either the GDR or the FRG before reunification. *After90* thus captures a post-reunification-trend common to all university students.

The coefficient of interest is β_3, the difference-in-differences estimator that captures the effect of experiencing reunification during school-age on East German students' entrepreneurial intentions. East German students who received some formal and informal education under the free-market economy in reunified Germany should be more similar to the West German control group than East German students who only experienced formal and informal education in the GDR.

Matrix X includes a comprehensive set of individual-level control variables relating to students' demographics, study progress and motives, job expectations, personal characteristics, and the students' social network. This rich set of background variables allows us to control for demographic and idiosyncratic effects on entrepreneurial intentions that may structurally differ between students born in either East or West Germany. ε_{iwum} is an error term clustered at the university-by-survey-year level.[7]

Beyond the individual controls, we add survey year fixed effects α_w, university fixed effects α_u, and major fixed effects α_m. Note that university choice and the choice of a specific major can also be considered part of the treatment effect as education in a free-market economy may affect students' entrepreneurial intentions through their university and subject choice (Fuchs-Schündeln and Masella 2014). Since we only exploit within-university and within-major variation, we overcome potential selection bias. University fixed effects further control for time-persistent differences in the orientation of the university towards entrepreneurship; major fixed effects pick up structural differences in the job market opportunities for graduates from different fields; and, finally, survey year fixed effects control for cyclical influences on the attractiveness of entrepreneurship and guarantee that we only compare students who lived the same number of years in reunified Germany. Beyond that, we observe in every survey wave students of similar age who differ in their treatment status. The DiD setup thus allows us to identify the effect of school-age education in a free market economy on university students of similar age who spent the same amount of time in reunified Germany.

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[7] Our results are robust towards alternative levels of clustering, namely university-, major-, and university-by-major-level.

2.2 Student Survey Data

To assess students' entrepreneurial intentions, we employ repeated cross-sectional data from a large student survey regularly conducted by the University of Constance (*Studiensituation und studentische Orientierung*). Five survey waves conducted after German reunification contain information on whether students graduated from secondary school in East or West Germany.[8] We use this information as a proxy for growing up in either East or West Germany. The surveys were conducted in the winter terms 1992/93, 1994/95, 1997/98, 2000/01, and 2006/07. This gives us a sample of 39,201 students at 26 full universities and universities of applied sciences in Germany. The spatial distribution of the observed universities along with the number of individual observations is shown in Figure 1.

[Figure 1 here]

The survey asks for the students' occupational plans for the future. We use the survey question "Do you want to be permanently self-employed in the future (entrepreneur or freelancer)" as indicator for students' entrepreneurial intentions.[9] Answers are given on a five-point-scale, ranging from "Certainly not" to "Yes, certainly". We *z*-standardize this categorical variable in our baseline estimations. The same categories apply to questions on the attractiveness of other occupations (dependent employment in a company, public service, academia, etc.) that will be used for robustness checks. We furthermore employ information on whether the student finished secondary school in East or West Germany along with information on the graduation year from secondary school. Interacting time and place of graduation then allows us to estimate our DiD framework.

The survey provides a rich portfolio of background information on the students' demographics, parental background, social activities, study progress, motives for studying and choosing one's subjects, personal characteristics and self-assessed job perspectives.[10] Table 1 provides descriptive statistics for a selection of our control variables. Columns 1 and 2 compare students who graduated from secondary school in West Germany before (Column 1) or after (Column

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[8] We drop observations of students who finished secondary school abroad.

[9] In the robustness checks, we will present specifications where we drop observations of students who, conditional on their majors, are likely to become freelancers. Doing so does not affect our results.

[10] Throughout all specifications, we thus control for age and its square, gender, having children, marital status, parents' education, parents being entrepreneurs, aspired degree, terms studied, GPA in secondary school diploma, already holding a university degree, having changed majors, various study motives, reasons for choosing field of studies, indicators for satisfaction with study choice and progress, having a student job, expectations towards future job and relevance of certain job characteristics, expected labor market difficulties, various personal characteristics and relevance of certain areas of life, political attitudes, participation in clubs and organizations, and social contact to peer groups and family. A full list of our control variables is provided in Appendix A.

2) reunification. Columns 3 and 4 do the same for students who graduated from secondary school in East Germany. A simple mean comparison of students' entrepreneurial intentions suggests a difference-in-differences effect of 0.19. However, the descriptive statistics also reveal differences in other observables. East German students are somewhat younger than West German students, more junior in their studies, and more often female. East German students who graduated from secondary school in the GDR are significantly less likely to have entrepreneurial parents. Our design further implies that students who graduated from secondary school before reunification are somewhat older on average, more senior in their studies, and less frequently observed in the later survey waves. We will control for all these differences and additionally provide robustness checks where we match the samples on observables to make sure that all individual-level controls commonly support the treatment variables. To account for the fact that unobservable characteristics may still bias our estimations, we will also present an individual-fixed-effects specification in our robustness checks.

[Table 1 here]

We present a detailed description of all control variables in Appendix A.1. Finally, note that missing observations in idiosyncratic controls have been imputed with the sample mean while missing values for outcome variables, the university or major, and for the baseline controls have not been imputed.

3. Main Results
3.1. Effects of the Reunification Shock

In a first step, we present results for our basic DiD-specification where we regress students' standardized entrepreneurial intentions on an *East* dummy indicating whether the student graduated from secondary school in East Germany (or the former GDR), a dummy variable *After90* indicating whether the student graduated from secondary school after reunification in 1990, and an interaction term *East*After90* indicating whether an East German student received some education in reunified Germany before finishing secondary school. Results are reported in Table 2.

[Table 2 here]

The coefficient of the East dummy shows that university students who were born in the GDR (and thus experienced some socialist education and socialization) have significantly lower entrepreneurial intentions than students raised and educated in West Germany. These findings are conditional on survey-year, university, and major fixed effects. The effect decreases in size

once we control for demographics and family background (Column 2); study-related issues (Column 3); job-related issues (Column 4); personal characteristics (Column 5); and the student's social network (Column 6), but it remains significantly negative throughout all specifications. At the same time, the *East*After90* interaction shows that experiencing German reunification at school age, i.e. the sudden change to formal and informal education in free-market economy of reunified Germany, does have a significantly positive effect on entrepreneurial intentions of students born in East Germany. Entrepreneurial intentions of students born in West Germany are not affected by the reunification shock once we include individual-level controls (as indicated by the insignificant *After90* dummy).

Column 7 is our preferred specification, where we include all control variables. Our results indicate that students born in East Germany have, on average, 9.7 percent of a standard deviation lower entrepreneurial intentions than students born in West Germany. Compared to this group, students who were born in East Germany and experienced German reunification during school-age turn out to be much more entrepreneurial. Accordingly, if an average East German student was treated with education in the free-market economy, this would reduce the negative effect of socialism by (0.069/0.097*100) 71 percent. In unreported specifications, we alternatively use years of school attendance as a (less exogenous) explanatory variable. Results from these regressions suggest that it would take about eleven years of free-market education for an average East German student to catch up with an average West German student's entrepreneurial intentions. There is no significant effect, either in statistical or in economic terms, of education after reunification on the entrepreneurial intentions of students born in West Germany.

So far, we have estimated the effects of reunification on university students' standardized entrepreneurial intentions using OLS. We now exploit the fact that the original variable is measured on a five-point scale and estimate ordered probit models. Doing so helps us investigate the marginal effects on steps of the outcome scale. Results are reported in Table 3.

[Table 3 here]

We report marginal effects for the treatment variables *East*, *After90*, and *East*After90* with all other variables evaluated at their sample means. Columns 1-5 refer to the five different outcome categories of the question "Do you want to be permanently self-employed in the future (entrepreneur or freelancer)", ranging from "certainly not" (Column 1) to "yes, certainly" (Column 5). Both the *East*-Dummy measuring the effect of socialist education and the *East*After90*-interaction-effect measuring systemic change affect all outcome categories, with

a significantly weaker effect on being indifferent towards entrepreneurship, and a significantly stronger effect on having pronounced entrepreneurial intentions. The point estimates of the *East*-dummy are always larger than the point-estimates of the interaction effect and *East*After90* has always the opposite sign. The effect of education in reunified Germany on students born in West Germany is always zero. Most obviously, education in reunified Germany affects university students' attitude towards entrepreneurship along the whole spectrum. These findings justify the use of a linear model in the remaining sections.

3.2. Robustness and Validity

In a next step, we test the robustness and validity of our findings using subsample analyses, including propensity score matching. Results are presented in Tables 4 and 5.

[Table 4 here]

One could be concerned that our results were driven by "structurally entrepreneurial" subsamples, be it students aiming at professions that typically lead to self-employment, or students who could not, for any (e.g. political) reason, acquire their preferred qualification in the socialist GDR, and made up for it after reunification. In Column 1, we repeat the estimation from Table 2, Column 7, leaving out medicine and law students, who are likely to become freelancers in the future. Removing those study fields has no effect. It may also be the case that some university students who were not allowed to finish high school in the GDR's heavily regulated education system made up for their high school diploma after reunification. Because of their age or experiences, those students may be specifically entrepreneurial. In Column 2, we thus drop late graduates who received a high school diploma in reunified Germany at an extraordinarily high age (21 or older). In a similar vein, some students may have been denied university entry in the GDR for political reasons, despite their high-school diploma. Additionally, one may argue that the effects are biased by students who experienced reunification after they had already started to study in the GDR and suddenly had to adjust their career plans. To account for that, Column 3 restricts the sample to students who started studying after reunification in 1990. Our initial results hold in all subsamples.

In Column 4, we first drop students who are indifferent towards entrepreneurship from the sample before standardizing the outcome variable. As already suggested by the small effects on this outcome category in the ordered-probit regressions in Table 3, this only leads to a slight increase in the coefficients.

Next, we present a placebo-specification for students who are studying to become a teacher.[11] Since they have already made a clear occupational choice, entrepreneurship should be an irrelevant occupational alternative, which should consequently not be directly affected by exogenous influences. Results of this placebo-exercise are reported in Column 5. Reassuringly, we do not find an effect on students who should not be affected.

Our empirical setup implies that we necessarily observe a smaller number of students who graduated from secondary school before reunification in later survey waves. Still, we decided to employ all survey waves since we want to observe university students with varying degrees of school-age education in the free market economy, including those with a complete school career from first grade to graduation in reunified Germany. However, doing so may induce a downward bias in our estimations, because the reference group of less-entrepreneurial East German students educated entirely in the GDR is under-represented in the later waves. To assess this potential bias, we drop the last two survey waves and restrict the sample to university students surveyed in the 1990s in Column 6. The coefficients of interest do indeed increase in size, while the ratio between *East*-coefficient and *East*After90*-coefficient remains virtually the same.

Typically, students who graduated from secondary school before reunification tend to be slightly older than university students who were surveyed in the same wave and graduated from secondary school after reunification. These age differences should not be a major concern, since all students are surveyed while they are still studying at university. However, given the relevance of age for the decision to become an entrepreneur (cf. Boente et al., 2009, Parker, 2009), one might be concerned by the fact that West German students who graduated from school before reunification are on average older than the other groups (cf. Table 1). This partly relates to the fact that the share of male students is comparatively high in this group (at a time when military service was mandatory for men in Germany), but also to a longer tail of long-term students. Throughout all specifications we controlled for students' age (and its square), gender, and related differences like marital status or having children. In column 7, we additionally drop all university students aged 40 years or older at the time of observation. Our initial results hold.[12]

One big advantage of our dataset is the great number of individual-level control variables. To guarantee common support of all covariates, we now employ propensity score matching (PSM)

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[11] In Germany, school teachers need to obtain a specific university degree (*Staatsexamen Lehramt*) that exclusively qualifies for becoming a teacher.

[12] In the original sample, students' age ranges from 17 to 65 years, with a mean of 24.66 and a median of 24. Our results also hold when we further restrict the sample to university students between 20 and 30 years of age.

techniques. Results are reported in Table 5. Summary statistics on the matched samples are provided in the Appendix B.

[Table 5 here]

Panel A reports results from samples matched on the *East*-Dummy. Panel B reports results from samples matched on the *East*After90*-Dummy.[13] Based on all individual-level controls but excluding fixed effects, we calculate propensity scores for the respective treatment variable and keep treated observations along with their seven nearest neighbors.[14] We then repeat the previous DiD-estimations on the more homogenous matched samples. In a first specification, we retain all treated observations (i.e. all East German students or all East German students who finished school in reunified Germany) and their nearest neighbors. As Columns 1 and 4 of Table 5 show, our initial results hold if we improve the common support of all control variables using PSM.

In a second specification, we put a deliberate focus on homogenizing subsamples in terms of students' age. As mentioned above, previous research suggests an inverse u-shaped relationship between entrepreneurship and age, with a peak at age 40. Similarly, individual entrepreneurial intentions may increase with age such that significant age differences between treatment and control group could induce confounding trends. To account for that, we first calculate propensity scores based on the age variable only and drop 20 percent of all observations with the lowest propensity scores. After that, we again match on all observables and select nearest neighbors. Results are reported in Columns 2 and 5. Reassuringly, they suggest that remaining age differences between treatment and control group do not bias the effects in our main specification.

A final concern with the validity of our results relates to the fact that we cannot explicitly account for migration. We only observe where university students graduated from secondary school, but not where they were born. If this measurement error was the same for East and West German students we would face a downward bias. More worrisome would be a scenario where comparatively entrepreneurial children at school age moved with their families from West Germany to East Germany after reunification. In that case, the positive *East*After90* effect could not only indicate a change in East German students' entrepreneurial intentions, but also

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[13] Estimations on matched samples using the *After90*-Dummy or stepwise combinations of the *East* and the *After90* Dummy produce similar results.

[14] Matched-sample-estimations show consistent patterns when we retain different numbers of nearest neighbors. We chose seven nearest neighbors to ensure that we always keep between 50 percent and 75 percent of the original sample. We apply this rule to all our matching specifications.

selective in-migration. Although we cannot directly control for this confounding effect, the literature clearly shows that East-West migration was the dominant migration pattern within Germany after reunification (Fuchs-Schündeln and Schündeln, 2009; Hunt, 2006; Burda, 1993), and that the few West-East migrants were predominantly returning East Germans (Beck, 2004).

To address the potential bias more formally, we add a third matching specification where we first drop 5 percent of the treated observations with the lowest propensity score before selecting nearest neighbors. Conditional on their individual characteristics, those East German students who were dropped from the sample have a low probability of being East Germans (Panel A), or of being East Germans and having received free-market education (Panel B). If we had miscoded a relevant number of East Germans who were actually born in West Germany, we should obtain substantially different results from these specifications. However, Columns 3 and 6 of Table 5 clearly show that this is not the case.

The alternative case would be selective migration from East to West Germany. This did indeed happen and it may very well be the case that we erroneously code a number of migrants from East to West Germany as students who were never exposed to any socialist education or socialization. If more entrepreneurial families were more likely to move, we would expect a downward bias from unobserved East-West migration. In that case, our results would be a conservative lower bound. However, the insignificant *After90*-Dummy implies that inner-German migration is of second-order importance for our regression results.

3.3. East German Specific Trends and Event Study

In our baseline regressions, we control for a full set of survey year dummies. These dummies capture changes in the attractiveness of entrepreneurship over time. Moreover, they control for the effects of living in a free-market economy, i.e. the general effects of socialization in reunified Germany, since they ensure that we only exploit variation in the entrepreneurial intentions of students who have been living in reunified Germany for the same number of years. Given the structure of our research design, we can even go one step further and control for East- and West-German specific trends after reunification. Changes in the attractiveness of entrepreneurship over time might occur because of changes in the economic environment, but also because of changes in the general perception of entrepreneurship. Such changes might differ between East and West Germany. Specifically, the parental and societal influences may have developed differently. This could potentially bias our estimates, particularly since we observe an increasing number of treated university students in the later survey waves. An East

German-specific time trend accounts for this potential effect. We thus extend our baseline specification from equation (1) by additionally interacting the survey year dummies with the *East* dummy. Results are shown in Table 6.

[Table 6 here]

Table 6 clearly shows that the positive effect of education in reunified Germany is not confounded with an East-specific positive effect of living in reunified Germany or of being raised by increasingly entrepreneurial East German parents.[15] The treatment effect slightly increases in size when controlling for this East German-specific trend, suggesting that parental and societal influences work in the opposite direction.

So far, we have identified the average treatment effect over several years of education in reunified Germany. To assess whether the treatment varies with the duration of education in reunified Germany, we now turn to parametric event study estimates. Importantly, the event study estimates also shed light on the existence of common pre-existing trends in East German and West German students' entrepreneurial intentions. The estimation equation for the event study analysis is an extension of our baseline equation (1):

Equation 2:

$$I_{iwum} = \alpha_w + \alpha_{w,East} + \alpha_u + \alpha_m + \alpha_{East} + \alpha_{GradCohort_c} + X'\beta + \sum \gamma_{-89}(East * GradCohort_{c_{-89}}) + \sum \gamma_{+90}(East * GradCohort_{c_{+90}}) + \epsilon_{iwum}$$

In this extended equation, we add a full set of dummy variables for 2-year cohorts of secondary school graduates *c* and their interactions with the *East* dummy. We start with the graduation cohort of the years 1983-84.[16] The γ_{-89} coefficients reflect differences in the pre-treatment trends between students which were either born in East or West Germany. The γ_{+90} coefficients give us the graduation-cohort-specific treatment effects. All γ-coefficients are estimated relative to the cohort which finished school in the reunification years 1989 and 1990. Results of the event study are shown in Figure 2.

[Figure 2 here]

Figure 2 shows the γ-coefficients from Equation 2 along with the 95%-confidence intervals. For all three graduation cohorts before reunification, the coefficient is small and not

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[15] Note that the coefficient size of the *East* dummy cannot be interpreted in this specification since it is measured relative to the omitted *east*wave* Dummy. We thus do not report coefficients of the *East* and the (insignificant and close to zero) *After90* main effects.

[16] Students who graduated from secondary school earlier have been dropped from the sample.

significantly different from zero. We interpret this as support for the validity of the common trends assumption in our DiD approach. Only after 1990 does the coefficient increase in size, and it becomes statistically significantly different from zero from the 1993-1994 cohort onwards. The results of the event study analysis imply that already 3 years of school-age education in reunified Germany make a statistically significant difference between those who graduated in 1989-1990 and those who graduated in 1993-1994 (who have otherwise spent the same period of time in reunified Germany).

3.4. Exploiting Within-Student Variation

The previous sections have established a robust and significant effect of experiencing German reunification at school-age on the formation of entrepreneurial intentions. Our findings cannot be explained by general or group-specific time trends, outliers, university- or major-specific effects, or a rich set of observable individual characteristics. We will now turn to a student-fixed-effect specification that allows us to test whether unobservable individual characteristics bias our results. For this purpose, we exploit the fact that we observe the same student answering multiple questions on the attractiveness of different occupational alternatives. The survey asks "In which area do you want to be permanently employed in the future?", and gives 7 answer categories, e.g. "entrepreneurship", "at a university" or "in a private company". This gives us the opportunity to evaluate the attractiveness of entrepreneurship relative to other occupations in a student fixed effect specification.

To implement this strategy, we create a new outcome variable, "occupational choice", which contains two observations per university student: her evaluation of entrepreneurship as occupational choice and her evaluation of the most preferred other occupational alternative, both measured on a five-point-scale. With two observations per individual, we can estimate

Equation 3:

$$I_i = \alpha_i + \beta_1 Eship + \beta_2(East * Eship) + \beta_3(After90 * Eship) + \\ + \beta_4(East * After90 * Eship) + \epsilon_i$$

The dependent variable I_i measures university student *i*'s evaluation of entrepreneurship and the most preferred other occupational alternative. Again, I_i is standardized to a mean of zero and a standard deviation of one. *Eship* is a dummy variable that equals unity if I_i measures entrepreneurship as an occupational choice, and it takes the value zero for the student's most preferred other occupation. Accordingly, β_1 measures the relative attractiveness of

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entrepreneurship. Since we observe two occupational preferences per university student, we can include individual fixed effects α_i to account for unobservable student characteristics. *East*Eship* is an interaction term that measures how being born and raised in the GDR affects the relative attractiveness of entrepreneurship. *After90*Eship* measures whether the relative attractiveness of entrepreneurship changes with education in reunified Germany. Finally, the triple interaction term *East*After90*Eship* gives us the treatment effect on East German students who experienced German reunification at school age and were educated for some years in the free-market economy. We do not add further control variables since they are absorbed by the individual-level fixed effects. However, we can run estimations on the matched samples that were introduced in Table 5. Results are reported in Table 7.

[Table 7 here]

The results reveal that entrepreneurship is relatively unattractive to university students. On average, they have 85.4 percent of a standard deviation lower preferences for entrepreneurship than for their most preferred other occupation. In line with our previous results, the aversion to entrepreneurship is relatively stronger among students born and raised in the socialist GDR. They score another 19.6 percent of a standard deviation lower. However, if East German students were treated with some free-market education in reunified Germany, they would find entrepreneurship 12.8 percent of a standard deviation more attractive than East German students who were not treated. This is about two-thirds of the negative East effect on the relative attractiveness of entrepreneurship. For West German students, being educated in reunified Germany does not make a difference. We obtain quasi-identical results when repeating the estimations on the more homogenous matched samples.

It is reassuring to see that we find very similar results in regressions with individual fixed effects. We interpret it as evidence that the DiD results reported above are unlikely to be confounded by unobserved individual heterogeneity. Given the large number of individual-level controls at hand, this is plausible. Overall, these findings make us confident that we estimate a causal effect of formal and informal school-age education in the free market economy on the formation of entrepreneurial intentions.

5. Conclusions

To the best of our knowledge, this is the first paper to look at the effect of formal and informal education during school age on the formation of entrepreneurial intentions. To establish causality, we exploit the German reunification as a natural experiment that implied a sudden

and sustained change in school-age education. All socialist ideology was dropped from school curricula, and extracurricular activities in the socialist party's youth organization came to an end. Using this extreme case of a change to school-age education, we find that university students who experienced the systemic change from socialism to capitalism during school age have on average 71 percent higher entrepreneurial intentions than otherwise similar students who finished their education in the socialist system. The treatment effect increases with the duration of treatment. In other words, our results imply that East German students would catch up with the entrepreneurial intentions of their West German counterparts after around eleven years of school-age education in the free-market economy.

The effect of reunification on entrepreneurial intentions cannot be explained by the mere experience of reunification (and the related upheavals), since all university students in our survey share this experience. Moreover, the effect is not simply the result of living in a free-market economy. To exclude this possibility, we only exploit variation from students who lived in reunified Germany for the same number of years. Our results show that the observed effect on entrepreneurial intentions is neither driven by a correlated East-German-specific time trend, nor by unobserved individual characteristics. In fact, the effect exclusively affects East German university students who experienced the reunification shock when they had not yet finished secondary school.

While our results suggest that school-age education can affect the formation of entrepreneurial intentions, we cannot distinguish whether entrepreneurial intentions increase due to the establishment of new educational measures, or due to the demise of old ones. More specifically, we cannot make inferences on the relative importance of changes in the curricula, the organizational structure of the school system, or the extra-curricular participation in clubs and associations that also have educational effects. Further research is needed to identify concrete educational measures that affect the formation of entrepreneurial intentions during school age.

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Figure 1: Universities Observed
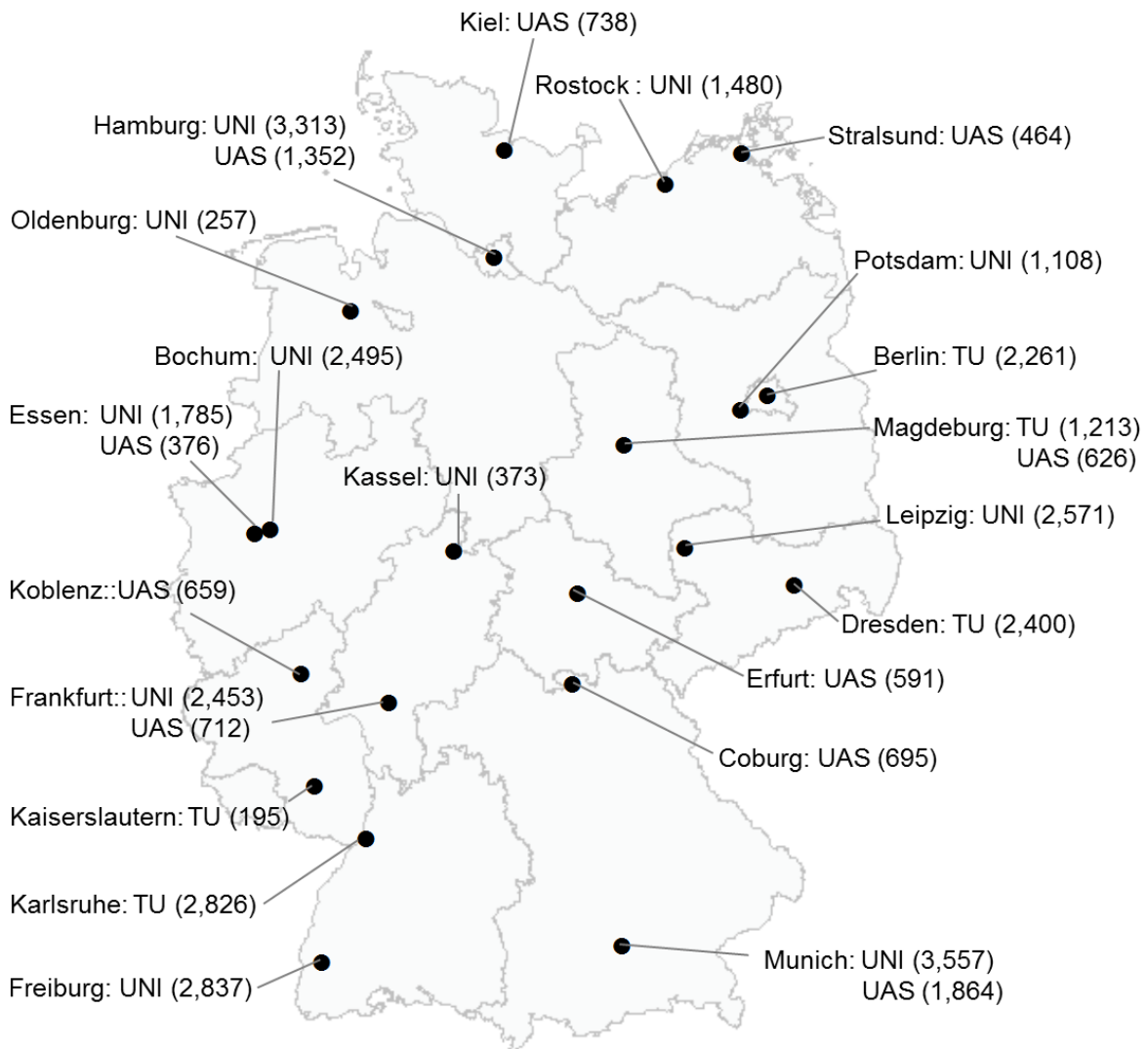
Notes: Figure depicts spatial distribution of Universities (UNI), Technical Universities (TU), and Universities of Applied Sciences (UAS) observed in the student survey. Number of individual student observations is given in parentheses.

Figure 2: Event Study
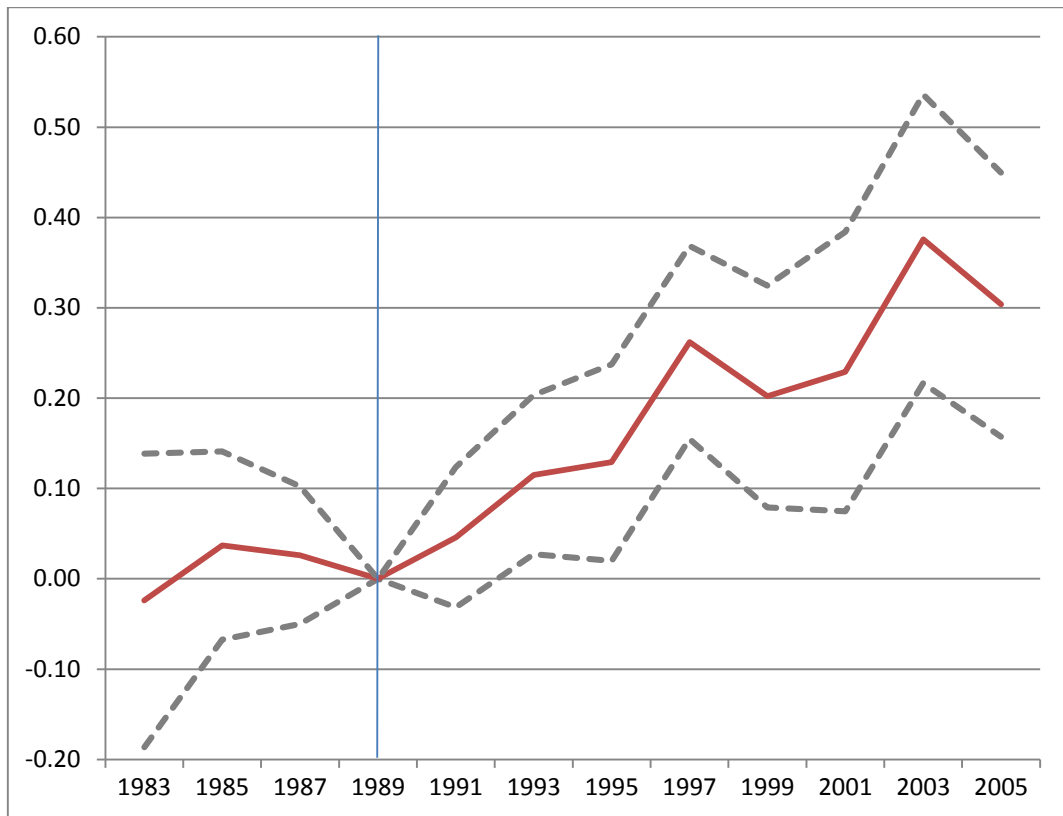
Notes: Solid red line depicts γ-coefficients estimated from Equation 2 with 2-year-graduation-cohorts (secondary school). Baseline cohort (years 1989-1990) is marked. Dashed lines depict related 95%-confidence intervals.

Table 1: Descriptive Statistics

		West German		East German	
graduated from secondary school:		before 1991	after 1990	before 1991	after 1990
		(1)	(2)	(3)	(4)
Observations (No.)		12,361	16,462	2,811	7,567
entrepreneurial intentions (avg)		0.47	0.42	0.22	0.36
entrepreneurial intentions (std. avg.)		0.05	0.01	-0.14	-0.41
survey wave	WT 1992/93	46.78	5.32	56.10	7.27
	WT 1994/95	34.10	12.77	31.87	12.01
	WT 1997/98	13.01	21.85	8.32	20.25
	WT 2000/01	5.07	29.16	2.99	29.84
	WT 2006/07	1.04	30.90	0.71	30.63
major subject	linguistic & cultural science	14.59	14.00	10.96	13.65
	psychology	2.34	1.50	1.82	2.42
	social affairs & pedagogics	6.79	7.50	7.03	9.22
	sports science	0.85	1.22	2.07	1.63
	jurisprudence	5.43	6.80	6.85	8.21
	social sciences	3.35	4.23	2.07	5.90
	natural sciences	16.19	16.90	11.92	13.30
	medicine	7.58	8.56	11.06	6.52
	agronomy & nutrition science	1.76	1.76	2.18	2.34
	engineering	23.00	19.82	28.91	18.30
	arts & music	3.34	3.16	1.61	2.08
	economic sciences	14.04	13.85	12.71	15.12
	other	0.75	0.70	0.82	1.31
semester (avg.)		10.52	6.00	7.71	5.44
age (avg.)		27.36	23.64	24.93	22.35
female		37.03	49.10	40.83	59.87
with children		10.38	2.99	13.99	3.71
parents entrepreneur		16.34	15.78	11.03	16.28

Notes: Table reports descriptive statistics on the sample of university students from the "student survey". If not otherwise specified, percentage of observations is reported. Columns 1 and 2 report descriptive statistics for students who finished secondary school in West Germany. Columns 3 and 4 report descriptive statistics for students who finished secondary school in East Germany. West and East German subsamples are further split into students who finished school before (Columns 1 and 3) or after (Columns 2 and 4) the German reunification.

Table 2: DiD-Estimation of the Reunification-Effect

entrepreneurial intentions	no ctr (1)	baseline (2)	studies (3)	jobmarket (4)	character (5)	Network (6)	all ctr (7)
East	-0.222***	-0.180***	-0.135***	-0.122***	-0.181***	-0.178***	-0.097***
	(0.027)	(0.028)	(0.028)	(0.026)	(0.027)	(0.029)	(0.027)
East*After90	0.162***	0.126***	0.101***	0.088***	0.125***	0.126***	0.069***
	(0.025)	(0.026)	(0.027)	(0.024)	(0.026)	(0.027)	(0.025)
After90	-0.057***	-0.004	-0.003	-0.005	-0.010	-0.003	-0.001
	(0.015)	(0.017)	(0.017)	(0.016)	(0.017)	(0.017)	(0.016)
FE (wave, uni, major)	yes	yes	yes	yes	yes	Yes	yes
baseline controls	no	yes	yes	yes	yes	Yes	yes
idiosyncratic controls	no	no	yes	yes	yes	Yes	yes
Adj. R-Squared	0.107	0.161	0.191	0.232	0.180	0.167	0.248
Observations	38,594	37,419	37,419	37,419	37,419	37,419	37,419

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1. All specifications include survey year dummies, university dummies, and dummies for the students' majors. Additional control variables are added according to the column headings. A complete list of the related variables is provided in the Appendix A.1. All standard errors are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 3: OProbit Estimation of the Reunification-Effect

entrepreneurial intentions	certainly not (1)	rather not (2)	don't know (3)	yes, perhaps (4)	yes, certainly (5)
East	0.024***	0.026***	0.003***	-0.017***	-0.036***
	(0.006)	(0.006)	(0.001)	(0.004)	(0.008)
East*After90	-0.020***	-0.022***	-0.003***	0.014***	0.030***
	(0.005)	(0.005)	(0.001)	(0.003)	(0.007)
After90	0.002	0.002	0.000	-0.001	-0.003
	(0.003)	(0.003)	(0.000)	(0.002)	(0.005)
FE (wave, uni, major)	yes	yes	yes	yes	yes
baseline controls	yes	yes	yes	yes	yes
idiosyncratic controls	yes	yes	yes	yes	yes
Pseudo R-Squared	0.106	0.106	0.106	0.106	0.106
Observations	37,419	37,419	37,419	37,419	37,419

Notes: Table reports the three treatment variables' marginal effects on the 5 outcome categories derived from an ordered probit regression, with all other control variables held constant at the mean. All specifications include survey year dummies, university dummies, dummies for the students' majors, and all the demographic and idiosyncratic control variables used in Table 2, Column 7. A complete list of these variables is provided in the Appendix A.1. All standard errors are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 4: Robustness Tests and Effect Validity

entrepreneurial intentions	no freelancer (1)	no late grads (2)	studystart after 90 (3)	no indifferent (4)	teacher (5)	nineties only (6)	under 40 years (7)
East	-0.096***	-0.103***	-0.109***	-0.100***	0.002	-0.118***	-0.092***
	(0.027)	(0.027)	(0.030)	(0.027)	(0.081)	(0.030)	(0.027)
East*After90	0.073**	0.070***	0.080***	0.076***	-0.031	0.088***	0.061**
	(0.028)	(0.025)	(0.028)	(0.025)	(0.072)	(0.030)	(0.025)
After90	-0.004	0.000	-0.007	-0.003	0.051	-0.001	0.002
	(0.019)	(0.017)	(0.017)	(0.016)	(0.049)	(0.020)	(0.016)
FEs	yes	yes	yes	yes	yes	yes	yes
baseline ctr.	yes	yes	yes	yes	yes	yes	yes
idiosyncratic ctr.	yes	yes	yes	yes	yes	yes	yes
Adj. R-Squared	0.244	0.244	0.249	0.254	0.165	0.251	0.247
Observations	31,891	33,769	30,027	36,071	3,847	22,781	37,118

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1 for the subsamples described in the column headings. All specifications include survey year dummies, university dummies, dummies for the students' majors, and all the demographic and idiosyncratic control variables used in Table 2, Column 7. A complete list of these variables is provided in the Appendix A.1. All standard errors are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 5: Matching on Observables

entrepreneurial intentions	Panel A: Match on East			Panel B: Match on East*After90		
	all treated	homogenized	trimmed	all treated	Homogenized	trimmed
	(1)	(2)	(3)	(4)	(5)	(6)
East	-0.102***	-0.069**	-0.089***	-0.076**	-0.081**	-0.075**
	(0.028)	(0.031)	(0.031)	(0.031)	(0.033)	(0.033)
East*After90	0.074***	0.066**	0.063**	0.066**	0.070**	0.067**
	(0.027)	(0.030)	(0.028)	(0.029)	(0.030)	(0.031)
After90	-0.016	-0.000	-0.012	-0.012	0.017	0.010
	(0.018)	(0.023)	(0.022)	(0.023)	(0.022)	(0.023)
FE (wave, uni, major)	yes	yes	yes	yes	Yes	yes
baseline controls	yes	yes	yes	yes	Yes	yes
idiosyncratic controls	yes	yes	yes	yes	Yes	yes
Adj. R-Squared	0.249	0.255	0.254	0.243	0.250	0.245
Observations	26,453	21,797	23,300	22,252	19,313	19,698

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1 for subsamples matched on the East-Dummy (Panel A) or the East*After90 interaction dummy (Panel B) by calculating propensity scores and selecting 7 nearest neighbors. Different specifications are defined in the column headings. All specifications include survey year dummies, university dummies, student major dummies, and all the demographic and idiosyncratic control variables used in Table 2, Column 7. A complete list of these variables is provided in the Appendix A.1. Descriptive statistics for the matched samples can be found in the Appendix B. All standard errors are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 6: DiD-Estimation including East-Trend

entrepreneurial intentions	no ctr (1)	baseline (2)	studies (3)	jobmarket (4)	character (5)	network (6)	all ctr (7)
East*After90	0.165***	0.131***	0.118***	0.096***	0.127***	0.131***	0.086***
	(0.031)	(0.034)	(0.034)	(0.033)	(0.033)	(0.034)	(0.032)
East	yes	yes	yes	yes	yes	yes	yes
After90	yes	yes	yes	yes	yes	yes	yes
east*wave	yes	yes	yes	yes	yes	yes	yes
FE (wave, uni, major)	yes	yes	yes	yes	yes	yes	yes
baseline controls	no	yes	yes	yes	yes	yes	yes
idiosyncratic controls	no	no	yes	yes	yes	yes	yes
Adj. R-Squared	0.107	0.161	0.191	0.232	0.180	0.167	0.248
Observations	38,594	37,419	37,419	37,419	37,419	37,419	37,419

Notes: Table reports OLS results from difference-in-differences regressions according to Equation 1, additionally including an East-specific nonlinear trend East*Survey-Wave. All specifications include an East-Dummy, an After90-Dummy, survey year dummies, university dummies, and dummies for the students' majors. Additional control variables are added according to the column headings. A complete list of the related variables is provided in the Appendix A.1. All standard errors are clustered on the university-by-survey-year level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Table 7: Student-Fixed Effects Estimation

occupational choice	Panel A: Full sample unmatched (1)	Panel B: Matched on East all treated (2)	homogenized (3)	trimmed (4)	Panel C: Matched on East*After90 all treated (5)	homogenized (6)	trimmed (7)
Eship	-0.854***	-0.842***	-0.855***	-0.839***	-0.838***	-0.845***	-0.852***
	(0.017)	(0.024)	(0.030)	(0.027)	(0.029)	(0.035)	(0.034)
East*Eship	-0.196***	-0.196***	-0.190***	-0.198***	-0.193***	-0.209***	-0.208***
	(0.041)	(0.045)	(0.053)	(0.048)	(0.055)	(0.061)	(0.059)
East*After90*Eship	0.128***	0.130**	0.135**	0.134**	0.123**	0.144**	0.153**
	(0.049)	(0.053)	(0.061)	(0.057)	(0.062)	(0.068)	(0.066)
After90*Eship	0.009	0.001	0.013	-0.003	0.001	0.010	0.005
	(0.022)	(0.030)	(0.036)	(0.033)	(0.035)	(0.040)	(0.040)
Individual FE	yes	yes	yes	yes	yes	yes	yes
Adj. R-Squared	0.126	0.121	0.117	0.119	0.122	0.118	0.128
Observations	77,228	52,969	43,630	46,659	44,558	38,668	39,454

Notes: Table reports OLS results from difference-in-differences-in-differences regressions according to Equation 3. Column 1 of Panel A reports results for the full, unmatched sample. All other columns report results for subsamples matched on the East-Dummy (Panel B) or the East*After90 interaction dummy (Panel C) by calculating propensity scores and selecting 7 nearest neighbors. Different specifications are defined in the column headings. All specifications include individual level fixed effects. A complete list of the observables used for matching is provided in the Appendix A.1. All standard errors are clustered on the student level. *** 1 percent significance level; ** 5 percent significance level; * 10 percent significance level.

Appendix A, Table A1: Detailed Variable Description

Variable	*Survey Question*	Sub-question	Relevant answer category	Type
Outcomes				
entrepreneurial intention	*In which area do you want to be permanently employed in the future?*	self-employed (entrepreneur or freelancer)	"certainly not", "rather not", "don't know", "yes, perhaps", "yes, certainly"	continuous
alternative occupation	*-ditto-*	at school, at university, other public service, non-profit organizations, employment in private company, alternative work projects & collectives	highest value	continuous
Explanatories				
East	*Where did you receive your qualification for university entrance?*		"in one of the new German states (former GDR)"	binary
after1990	*In which year did you receive your (first) qualification for university entrance?*		1991 or later	binary
Fixed Effects				
survey year			1992/93, 1994/95, 1997/98, 2000/01, 2006/07	categorical
university	*At which university do you study at?*		1-26	categorical
major field of studies	*Which subjects do you currently study?*	Major subject	aggregated categories 1-13	categorical
Baseline Controls				
Age	*How old are you?*		value and value^2	continuous
Gender	*Your gender?*		male, female	binary
Children	*Do you have children?*		yes (any children)	binary
marital status	*Your marital status?*		"married", "single, with permanent partner", "single, without permanent partner", "widowed/divorced"	categorical
aspired degree	*Name your aspired degree*		"diploma", "magister artium", "state exam (no teacher)", "state exam teacher", "BA", "MA", "other" "do not know yet"	categorical
education_father	*Name the highest degree your father has reached*		"secondary school (8th grade)", "middle school (10th grade)", "high school (12th/13th grade)", "no graduation (less than 8th grade)", "misc/do not know"	categorical
education_mother	*Name the highest degree your mother has reached*			categorical
anyparent_entrepreneur	*Which occupation does your father/mother have*		"small self-employed (e.g. retailer, craftsman)", "medium self-employed (e.g. big retailer, chief agent)", "big self-employed (e.g. factory owner)"	binary

Table A1 continued

Variable	*Survey Question*	Sub-question	Relevant answer category	Type
Study related Controls				
Terms	*How many terms have you studied at university yet?*			continuous
GPA	*With which Grade Point Average did you graduate from school?*		GPA, standardized by east/west average GPA per year of graduation	continuous
second degree	*Do you already hold a university degree?*		"no"	binary
changed major	*Have you, in the course of your studies,…*	changed your major subject?	"yes"	binary
study motive: interest in field	*In how far do you think studies at a university are useful to you with respect to…*	learning more about the chosen field of studies	1-7	continuous
study motive: income	*-ditto-*	receiving a good income	1-7	continuous
study motive: interesting job	*-ditto-*	getting an interesting job later on	1-7	continuous
study motive: social position	*-ditto-*	receiving a high position in society	1-7	continuous
study motive: realize ideas	*-ditto-*	realizing my own ideas	1-7	continuous
study motive: help people	*-ditto-*	helping other people later on	1-7	continuous
study reason: talent	*How important where the following reasons for deciding on your field of studies?*	own talent and skills	1-7	continuous
study reason: future job	*-ditto-*	clear job aspirations	1-7	continuous
study reason: job security	*-ditto-*	good prospects for secure job	1-7	continuous
study reason: leadership	*-ditto-*	good prospects for getting a leading position	1-7	continuous
plans abandoning	*Do you currently seriously think about abandoning studies?*		1-7	continuous
dislikes studying	*All things considered, do you like being a student?*		1-7	continuous

Table A1 continued

Variable	*Survey Question*	Sub-question	Relevant answer category	Type
Job related Controls				
student job	*How do you finance your education?*	By own work during the semester / By own work in semester breaks	>0 h/week in either answer	binary
important at job: security	*What is important for you with regard to a job?*	Job security	1-7	binary
important at job: ideas	*-ditto*	to have the opportunity to realize one's own ideas	1-7	binary
important at job: income	*-ditto-*	high income	1-7	binary
important at job: self-reliance	*-ditto-*	to be able to take decisions independently	1-7	binary
important at job: leadership	*-ditto-*	possibility to lead other people	1-7	binary
important at job: tasks	*-ditto-*	to be given new tasks again and again	1-7	binary
important at job: academia	*-ditto-*	possibility to work at academic tasks	1-7	binary
important at job: responsibility	*-ditto-*	tasks that require a sense of responsibility	1-7	binary
important at job: help	*-ditto-*	possibility to help others	1-7	binary
important at job: advancement	*-ditto-*	advancement possibilities	1-7	binary
important at job: investigation	*-ditto-*	possibility to investigate unknown things	1-7	binary
important at job: balance	*-ditto-*	work-life balance	1-7	binary
important at job: society	*-ditto-*	a job where you do things that are useful to society	1-7	binary
important at job: relaxation	*-ditto-*	a job where you do not have to strain yourself	1-7	binary
important at job: free time	*-ditto-*	much leisure	1-7	continuous
no job difficulties	*What describes your job perspectives after graduation best?*		hardly any difficulties to find a job	binary
job alternative: study	*If you could not realize your job aspirations due to the labor market conditions after graduation, what would you do?*	I would continue studying (post graduate studies) to improve my job prospects	1-4	continuous
job alternative: burden	*-ditto-*	I would be willing to accept greater burdens (e.g. move, commute longer distances)	1-4	continuous
job alternative: different job	*-ditto-*	I would look for a job with similar qualification requirements and remuneration	1-4	continuous

Variable	Survey Question	Sub-question	Relevant answer category	Type
job alternative: financial loss	*-ditto-*	I would accept financial loss if the job matches my qualification / skills	1-4	continuous

Table A1 continued

Variable	Survey Question	Sub-question	Relevant answer category	Type
Controls for individual characteristics				
type: skeptical	*In how far do the following statements apply to you personally?*	I doubt whether I will graduate at all	1-7	continuous
type: hardworking	*-ditto-*	I work intensely and much for my studies	1-7	continuous
type: good learner	*-ditto-*	It is easy to me to learn and remember	1-7	continuous
type: nervous	*-ditto-*	During exams I am often so excited that I forget things that I actually know	1-7	continuous
type: fast	*-ditto-*	I want to finish my studies as fast as possible	1-7	continuous
problem: peer contact	*What causes difficulties for you?*	To get into contact to other students	1-4	continuous
problem: teachers	*-ditto-*	Dealings with lecturers	1-4	continuous
problem: competition	*-ditto-*	Competition amongst students	1-4	continuous
problem: discussion	*-ditto-*	To participate in discussions during seminars	1-4	continuous
burden: orientation	*In how far do you perceive the following issues to be a burden?*	Problems to keep orientation	1-7	continuous
burden: anonymity	*-ditto-*	anonymity at university	1-7	continuous
burden: exams	*-ditto-*	examinations	1-7	continuous
burden: financial situation	*-ditto-*	current financial situation	1-7	continuous
burden: personal problems	*-ditto-*	personal problems (e.g. fears, depression)	1-7	continuous
burden: job perspectives	*-ditto-*	uncertain job perspectives	1-7	continuous
important: politics	*How important are the following areas of life to you?*	politics and public life	1-7	continuous
important: culture	*-ditto-*	arts and culture	1-7	continuous
important: studies	*-ditto-*	university and studies	1-7	continuous
important: science	*-ditto-*	science and research	1-7	continuous
important: job	*-ditto-*	job and work	1-7	continuous
important: partner	*-ditto-*	partner/own family	1-7	continuous
important: technology	*-ditto-*	technics and technology	1-7	continuous
important: leisure	*-ditto-*	leisure and hobby	1-7	continuous
attitude towards competition	*How much do you agree on the following statements?*	Mutual competition destroys people's solidarity	1-7	continuous

| attitude towards incentives | -ditto- | People do not exert themselves without competition | 1-7 | continuous |

Table A1 continued

Variable	*Survey Question*	Sub-question	Relevant answer category	Type
Controls for social network				
participation: anything	*How often to you participate in the activities of the following groups and organizations?*	students association, student council, senate, political groups, fraternities, informal action groups, sports, religious groups, cultural activities, miscellaneous	any top 2 positive value	binary
contact: friends	*How often do you have contact to the following people?*	friends and acquaintances from outside the university	1-4	continuous
contact: family	-ditto-	parents and siblings	1-4	continuous
contact: peers	-ditto-	students from own field of studies	1-4	continuous
contact: lecturers	-ditto-	teachers and lecturers of own field of studies	1-4	continuous
contact: job	-ditto-	people working in the aspired occupational field	1-4	continuous
contact: foreigners	-ditto-	foreign students	1-4	continuous

Appendix B: Descriptive Statistics for Matched Samples

Table B1: Matched on East, All treated

graduated from secondary school:		West German		East German	
		before 1991	after 1990	before 1991	after 1990
		(1)	(2)	(3)	(4)
Observations (No.)		5.925	10,888	2,702	7,317
entrepreneurial intentions (avg.)		0.48	0.41	0.22	0.36
entrepreneurial intentions (std. avg.)		0.06	0.01	-0.13	-0.03
survey wave	WT 1992/93	49.08	5.45	56.07	7.33
	WT 1994/95	33.76	12.46	31.90	11.94
	WT 1997/98	11.86	20.46	8.33	20.09
	WT 2000/01	4.52	28.66	2.96	29.78
	WT 2006/07	0.78	32.97	0.74	30.86
major subject	linguistic & cultural science	13.65	14.21	10.87	13.61
	psychology	2.27	1.60	1.82	2.45
	social affairs & pedagogics	6.24	7.42	7.01	9.09
	sports science	0.85	1.19	2.08	1.52
	jurisprudence	5.51	6.51	6.83	8.24
	social sciences	2.82	4.17	1.93	5.98
	natural sciences	16.69	17.85	12.24	13.31
	medicine	7.81	8.99	11.02	6.53
	agronomy & nutrition science	1.84	1.84	2.00	2.38
	engineering	24.07	19.07	28.98	18.31
	arts & music	3.33	3.17	1.67	2.07
	economic sciences	14.16	13.34	12.73	15.16
	other	0.76	0.64	0.82	1.33
semester (avg.)		10.00	5.58	7.72	5.46
age (avg.)		26.59	23.12	24.93	22.36
female		38.65	52.18	40.71	59.72
with children		11.58	3.13	13.88	3.72
parents entrepreneur		15.95	15.27	11.03	16.26

Notes: Table reports descriptive statistics for the matched sample of university students used in Column 1 of Table 5. If not otherwise specified, percentage of observations is reported. Columns 1 and 2 report descriptive statistics for students who finished secondary school in West Germany. Columns 3 and 4 report descriptive statistics for students who finished secondary school in East Germany. West and East German subsamples are further split in students who finished school before (Columns 1 and 3) or after (Columns 2 and 4) reunification.

Table B2: Matched on East, Homogenized

graduated from secondary school:		West German		East German	
		before 1991	after 1990	before 1991	after 1990
		(1)	(2)	(3)	(4)
Observations (No.)		3,648	9,505	2,146	6,765
entrepreneurial intentions (avg.)		0.45	0.40	.021	.036
entrepreneurial intentions (std. avg.)		0.05	0.02	-0.12	-0.01
survey wave	WT 1992/93	61.18	5.87	64.35	7.83
	WT 1994/95	35.91	13.46	33.08	12.59
	WT 1997/98	2.92	21.67	2.56	21.03
	WT 2000/01	0.00	27.46	0.00	30.18
	WT 2006/07	0.00	31.52	0.00	28.35
major subject	linguistic & cultural science	11.84	13.89	10.22	13.44
	psychology	0.99	1.48	1.12	2.37
	social affairs & pedagogics	5.00	6.91	5.51	8.79
	sports science	0.96	1.13	2.24	1.53
	jurisprudence	5.85	7.04	6.96	8.48
	social sciences	2.33	3.83	1.63	6.04
	natural sciences	17.74	18.93	13.21	13.40
	medicine	8.40	9.22	11.67	6.60
	agronomy & nutrition science	1.79	1.70	2.01	2.41
	engineering	25.82	19.02	29.74	18.15
	arts & music	2.83	3.00	1.40	2.12
	economic sciences	16.01	13.34	13.59	15.31
	other	0.44	0.52	0.70	1.35
semester (avg.)		7.69	5.07	7.00	5.04
age (avg.)		24.13	22.44	23.45	21.86
female		36.62	52.78	42.08	60.87
with children		3.98	1.73	7.83	2.35
parents entrepreneur		15.65	15.16	10.53	16.26

Notes: Table reports descriptive statistics for the matched sample of university students used in Column 2 of Table 5. If not otherwise specified, percentage of observations is reported. Columns 1 and 2 report descriptive statistics for students who finished secondary school in West Germany. Columns 3 and 4 report descriptive statistics for students who finished secondary school in East Germany. West and East German subsamples are further split in students who finished school before (Columns 1 and 3) or after (Columns 2 and 4) reunification.

Table B3: Matched on East, Trimmed

graduated from secondary school:		West German		East German	
		before 1991	after 1990	before 1991	after 1990
		(1)	(2)	(3)	(4)
Observations (No.)		4,475	9,631	2,500	7,019
entrepreneurial intentions (avg.)		0.47	0.39	0.22	0.36
entrepreneurial intentions (std. avg.)		0.07	0.01	-0.12	-0.02
survey wave	WT 1992/93	51.15	5.27	57.44	7.45
	WT 1994/95	34.73	12.46	32.24	12.21
	WT 1997/98	10.19	19.60	7.56	20.22
	WT 2000/01	3.42	28.41	2.16	29.72
	WT 2006/07	0.51	34.25	0.60	30.40
major subject	linguistic & cultural science	12.39	14.03	10.50	13.35
	psychology	1.95	1.69	1.64	2.48
	social affairs & pedagogics	5.92	7.47	6.79	9.15
	sports science	0.63	1.17	2.08	1.57
	jurisprudence	5.18	6.86	6.65	8.12
	social sciences	2.20	3.99	1.64	5.88
	natural sciences	17.77	18.49	12.34	13.22
	medicine	8.34	8.87	11.42	6.60
	agronomy & nutrition science	1.99	1.79	2.00	2.41
	engineering	25.32	18.73	29.65	18.50
	arts & music	3.41	3.17	1.56	2.07
	economic sciences	14.16	13.20	12.66	15.28
	other	0.74	0.55	0.88	1.36
semester (avg.)		9.75	5.46	7.62	5.36
age (avg.)		25.96	22.86	24.57	22.23
female		37.99	54.00	41.40	60.28
with children		11.60	3.07	13.60	3.66
parents entrepreneur		15.51	15.02	10.72	16.70

Notes: Table reports descriptive statistics for the matched sample of university students used in Column 3 of Table 5. If not otherwise specified, percentage of observations is reported. Columns 1 and 2 report descriptive statistics for students who finished secondary school in West Germany. Columns 3 and 4 report descriptive statistics for students who finished secondary school in East Germany. West and East German subsamples are further split in students who finished school before (Columns 1 and 3) or after (Columns 2 and 4) reunification.

Table B4: Matched on East*After90, All treated

		West German		East German	
graduated from secondary school:		before 1991	after 1990	before 1991	after 1990
		(1)	(2)	(3)	(4)
Observations (No.)		3,891	9,489	1,845	7,317
entrepreneurial intentions (avg.)		0.49	0.40	0.23	0.36
entrepreneurial intentions (std. avg.)		0.08	0.01	-0.12	-0.02
survey wave	WT 1992/93	52.94	5.39	60.65	7.33
	WT 1994/95	34.34	11.95	32.03	11.94
	WT 1997/98	9.30	19.43	5.58	20.09
	WT 2000/01	3.14	28.44	1.46	29.78
	WT 2006/07	0.28	34.79	0.27	30.86
major subject	linguistic & cultural science	13.79	14.80	10.22	13.61
	psychology	1.75	1.66	1.52	2.45
	social affairs & pedagogics	5.90	7.36	6.85	9.09
	sports science	0.67	1.16	1.90	1.52
	jurisprudence	5.87	6.57	6.96	8.24
	social sciences	2.81	4.24	1.79	5.98
	natural sciences	17.91	18.27	12.88	13.31
	medicine	7.21	8.70	10.54	6.53
	agronomy & nutrition science	1.65	1.80	1.74	2.38
	engineering	24.04	18.13	29.67	18.31
	arts & music	3.27	3.23	1.41	2.07
	economic sciences	14.48	13.50	13.70	15.16
	other	0.64	0.58	0.82	1.33
semester (avg.)		9.40	5.29	7.30	5.46
age (avg.)		25.73	22.76	23.87	22.36
female		42.10	55.20	46.02	59.72
with children		8.56	2.35	10.73	3.72
parents entrepreneur		16.09	15.86	10.68	16.26

Notes: Table reports descriptive statistics for the matched sample of university students used in Column 4 of Table 5. If not otherwise specified, percentage of observations is reported. Columns 1 and 2 report descriptive statistics for students who finished secondary school in West Germany. Columns 3 and 4 report descriptive statistics for students who finished secondary school in East Germany. West and East German subsamples are further split in students who finished school before (Columns 1 and 3) or after (Columns 2 and 4) reunification.

Table B5: Matched on East*After90, Homogenized

graduated from secondary school:		West German		East German	
		before 1991	after 1990	before 1991	after 1990
		(1)	(2)	(3)	(4)
Observations (No.)		2,672	8,524	1,589	6,765
entrepreneurial intentions (avg.)		0.46	0.41	0.20	0.36
entrepreneurial intentions (std. avg.)		0.06	0.02	-0.14	-0.01
survey wave	WT 1992/93	62.01	5.78	65.20	7.83
	WT 1994/95	35.37	12.68	32.47	12.59
	WT 1997/98	2.62	19.98	2.33	21.03
	WT 2000/01	0.00	28.31	0.00	30.18
	WT 2006/07	0.00	33.25	0.00	28.35
major subject	linguistic & cultural science	13.19	14.68	9.46	13.44
	psychology	1.20	1.52	1.13	2.37
	social affairs & pedagogics	5.73	6.75	5.86	8.79
	sports science	0.71	1.13	1.77	1.53
	jurisprudence	6.00	7.30	6.75	8.48
	social sciences	2.17	4.12	1.45	6.04
	natural sciences	18.18	18.63	13.62	13.40
	medicine	7.65	8.80	11.92	6.60
	agronomy & nutrition science	1.46	1.69	2.02	2.41
	engineering	25.00	18.00	29.51	18.15
	arts & music	3.34	2.90	1.45	2.12
	economic sciences	14.88	13.92	14.25	15.31
	other	0.49	0.56	0.82	1.35
semester (avg.)		7.66	4.91	6.92	5.04
age (avg.)		24.00	22.27	23.17	21.86
female		39.75	55.27	47.26	60.87
with children		3.52	1.43	7.24	2.35
parents entrepreneur		16.73	15.26	11.27	16.26

Notes: Table reports descriptive statistics for the matched sample of university students used in Column 5 of Table 5. If not otherwise specified, percentage of observations is reported. Columns 1 and 2 report descriptive statistics for students who finished secondary school in West Germany. Columns 3 and 4 report descriptive statistics for students who finished secondary school in East Germany. West and East German subsamples are further split in students who finished school before (Columns 1 and 3) or after (Columns 2 and 4) reunification.

Table B6: Matched on East*After90, Trimmed

graduated from secondary school:		West German		East German	
		before 1991	after 1990	before 1991	after 1990
		(1)	(2)	(3)	(4)
Observations (No.)		2,756	8,521	1,721	6,952
entrepreneurial intentions (avg.)		0.47	0.39	0.20	0.36
entrepreneurial intentions (std. avg.)		0.07	0.01	-0.13	-0.01
survey wave	WT 1992/93	56.46	5.50	62.87	7.38
	WT 1994/95	33.24	11.75	30.74	12.11
	WT 1997/98	7.98	18.51	5.17	20.17
	WT 2000/01	2.14	28.37	1.22	29.70
	WT 2006/07	0.18	35.88	0.00	30.64
major subject	linguistic & cultural science	13.84	14.89	9.49	13.41
	psychology	1.64	1.71	1.11	2.49
	social affairs & pedagogics	5.28	7.07	6.17	9.00
	sports science	0.47	1.05	2.15	1.57
	jurisprudence	5.43	6.95	6.75	8.17
	social sciences	2.29	4.07	1.63	6.01
	natural sciences	17.37	18.99	13.27	13.36
	medicine	7.06	8.52	10.88	6.54
	agronomy & nutrition science	1.82	1.75	1.92	2.36
	engineering	25.05	17.70	30.56	18.28
	arts & music	3.24	3.29	1.34	2.09
	economic sciences	15.88	13.45	14.03	15.37
	other	0.62	0.56	0.70	1.34
semester (avg.)		9.16	5.18	7.27	5.34
age (avg.)		24.93	22.51	23.60	22.15
female		43.11	56.13	46.19	60.85
with children		7.29	2.07	10.58	3.37
parents entrepreneur		17.82	15.35	10.69	16.40

Notes: Table reports descriptive statistics for the matched sample of university students used in Column 6 of Table 5. If not otherwise specified, percentage of observations is reported. Columns 1 and 2 report descriptive statistics for students who finished secondary school in West Germany. Columns 3 and 4 report descriptive statistics for students who finished secondary school in East Germany. West and East German subsamples are further split in students who finished school before (Columns 1 and 3) or after (Columns 2 and 4) reunification.