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Additional Career Assistance and Educational Outcomes for Students in Lower Track Secondary Schools

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Abstract: Based on local policy variation, this paper estimates the causal effect of additional career assistance on educational outcomes for students in Lower Track Secondary Schools in Germany. We find mostly insignificant effects of the treatment on average outcomes, which mask quite heterogeneous effects. For those students, who are taking extra coursework to continue education, the grade point average is unaffected and the likelihood of completing a Middle Track Secondary School degree falls. In contrast, educational outcomes improve for students who do not take extra coursework. Hence, the treatment causes a reversal of educational plans after graduation.

Keywords: lower track secondary schools, career guidance, educational upgrading
JEL-Classification: I20, J24

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1 Introduction

In light of growing demand for more skilled labor relative to less skilled (Katz and Autor 1999, Acemoglu and Autor 2011), there is a lot of concern that the tracked school system in Germany prevents students in the lower track secondary schools (LTSS) to obtain a sufficiently high level of education [Hanushek and Woessmann 2006, Brunello and Checchi 2007, OECD 2014a, Piopiunik 2014]. Yet, a large share of LTSS students continues schooling beyond graduation from LTSS either striving for a higher educational degree (typically a degree from a middle track secondary school, MTSS) or participating in pre-vocational training, a remedial vocational schooling system. LTSS students graduate at a fairly young age of 15 to 16 years and there is concern that adolescents are not well prepared to take educational decisions which are in their long-term interest. Therefore, a strong emphasis is put on career guidance for LTSS students during the last two years of school. However, little is known about the effectiveness of such interventions. This paper estimates the effect of additional career assistance (ACA) on educational outcomes during and after LTSS, relying on quasi-experimental local variation in ACA.

Traditionally, students in Germany are tracked after grade 4 into an upper (or academic) track secondary school *(UTSS, Gymnasium)*, which provide the opportunity to enter university, a middle track secondary school (MTSS, *Realschule*), or a Lower Track Secondary School (LTSS, *Hauptschulen*). The school-to-work transition of most LTSS and MTSS students involves some vocational training (typically in a specific occupation through an apprenticeship) after leaving secondary school. Over time, chances have deteriorated for less skilled students to find apprenticeship positions and students strive for higher secondary school degrees (Beicht et al. 2007, 2008). Correspondingly, the share of LTSS students among all students has been falling strongly over time (Protsch 2014).

The school-to-work transition of LTSS students is hampered by an accumulation of negative risks (Beicht and Granato 2010, Beicht et al. 2007, 2008). LTSS students perform poorly in reading and math (Klieme et al. 2001). There is a growing concentration of disadvantaged students with a migration background or a low socioeconomic status of their parents (Autorengruppe Bildungsberichterstattung 2012, p. 263, Kultusministerkonferenz 2010, Battaglini et al. 2005). Furthermore, there is evidence for

a strong intergenerational transmission of cognitive and noncognitive abilities (Anger 2011). Even though labor market conditions have strongly improved since 2006, the vast majority of LTSS students do not start an apprenticeship immediately after leaving LTSS. LTSS students who fail to complete the school leaving degree (LTSS degree) or who have a poor grade point average (GPA) typically enter pre-vocational training (*Übergangssystem*), a government sponsored support system. Pre-vocational training provides further general schooling and basic vocational training to increase the readiness of students for regular vocational training or for continuing education.[1]

Recent studies show that there is sizeable educational mobility between the three main tracks in Germany and the highest degree obtained is not fully determined by tracking after grade 4 (Mühlenweg and Puhani 2010, Dustmann et al. 2016, Biewen and Tapalaga 2016). Dustmann et al. (2016) find only a small long-term effect of track choice at age 10 on highest educational degree, wages, occupational choice, and unemployment.[2] Evidently, the initial track choice can be revised over time. Biewen and Tapalaga (2016) find a strong social selection in the decision to do so.

The final GPA is particularly important for the transitions after LTSS. For potential future employers, it is a key signal of the student's cognitive abilities. The GPA also serves as a prerequisite for further schooling. LTSS students, who fulfill the necessary grade requirements, have the possibility to continue schooling in order to complete an MTSS degree, possibly in combination with school based vocational training. In the specific setting analyzed in our paper, LTSS students can take extra MTSS-track coursework during grades 8 and 9 in order to prepare themselves for educational upgrading. We take MTSS-track coursework as an indicator that students plan to continue for an MTSS degree after LTSS and that they invest time and effort to accomplish this plan. The access to the MTSS-track courses is open for well performing students based on the GPA in grade 7 and the teacher's evaluation of the student. Depending on the final GPA, these students have the option of completing an MTSS degree either in grade 10 within a general secondary school or through continuation in a two-year vocational training school.

[1] In our setting, this involves either a preparatory vocational entry training year (BEJ, *Berufseinstiegsjahr*) or a vocational preparation year (BVJ, *Berufsvorbereitungsjahr*).

[2] The analysis is based on the compliers when instrumenting track choice at age 10 by the cutoff between adjacent birth months determining entry into primary school. These compliers are likely to be at the margin between two track choices.

LTSS graduates face a complex decision problem at a fairly young age (15 to 16 years) under incomplete information regarding regional labor market conditions, possible occupation choices, and returns to (further) education (Fitzenberger et al. 2015). The recent literature on behavioral economics of education emphasizes that adolescents are not well prepared to take educational decisions which are in their long-term interest (Koch et al. 2015; Lavecchia et al. 2016; Lindahl et al. 2014). The existing literature focusses on the question as to whether behavioral barriers prevent students from investing more into education (e.g. by attending college after graduation from high school or by applying to more challenging colleges which presumably provide a better education). Less attention is paid to finding the right match regarding the educational track when there is a choice between different options either involving further general education or a vocational track.

The choice to start vocational training in a specific occupation may determine the entire labor market career. Risk aversion, which grows with lower cognitive ability (Dohmen et al. 2010), may prevent students from taking risky decisions with high expected returns. Adolescents still learn about their preferences and may have a present bias, thus not taking into account the long-term consequences of the choices they make (Koch et al. 2015, Lavecchia et al. 2016, Lindahl et al. 2014). Choosing a specific vocational track involves the choice between about 300 different training occupations, which requires to find the right match between one's own preferences and labor market opportunities and to undertake the educational investment required to be offered an apprenticeship by a firm. Continuing general education often is the more salient option at the time of graduation from LTSS, especially because apprenticeships offered in the labor market may not appear sufficiently attractive. Rather, students strive for educational upgrading in order to improve their chances in the labor market or they continue in prevocational training.

There is a strong demand for career guidance, especially for students in LTSS and MTSS schools, for whom such activities have been expanded strongly during the last two decades in Germany (Solga et al. 2012). OECD (2004) provides an overview of career guidance policies in OECD countries. Knowledge about the content of occupations and jobs offered in the labor market may reduce search frictions. Students choose between vocational training and a continuation of education in light of labor market opportunities. Given that knowledge about future returns should reduce un-

certainty, one would expect higher returns to education and better earnings prospects (Borghans et al. 2013, Zafar 2011, Stinebrickner and Stinebrickner 2011).

There is little economic research on the effects of career guidance policies (*Berufsorientierung*, own translation) at the point of time when students decide between vocational training and further schooling, see OECD (2004) and Fitzenberger et al. (2015) for surveys. Saniter and Siedler (2014) find that providing occupational knowledge to students results in higher educational attainment and smoother transitions into the labor market.[3] Specifically, LTSS and MTSS students show an increase in the probability of educational upgrading by 8-12 percentage points (pp) and a reduction in the risk of becoming unemployed. Rodríguez-Planas (2012) analyzes a program in the U.S. that is meant to increase high school completion and postsecondary education by offering mentoring by case workers, educational services, and financial awards. She finds sizeable positive intention-to-treat effects for high-school completion (+5.3 pp) and post-secondary education (+6 pp). Labor market outcomes such as hours worked, having a full-time job and earnings are initially negatively affected, but this effect is offset over the course of three years.

In contrast to various low-intensity information treatments discussed in the recent literature on behavioral economics of education (Koch et al. 2015; Lavecchia et al. 2016), career guidance policies in Germany provide quite intensive treatments. As our main contribution, we provide first causal evidence on the effect of additional career assistance (ACA), i.e. more intensive information, counselling, coaching, and mentoring regarding the school-to-work transition and vocational training, on educational outcomes during and after LTSS for the region of Freiburg. Students in the City of Freiburg receive more intensive career guidance (ACA) compared to LTSS students in the surroundings of Freiburg (see Arbeitsagentur Freiburg 2007). ACA was introduced in the City of Freiburg for all LTSS students in order to improve their school-to-work transition. The treatment group and the control group are in the same local labor market and the same educational institutions apply. As a unique feature of our data we observe whether a student takes extra MTSS-track coursework which is an indicator that the student plans to complete an MTSS degree later on. Using data from our own surveys among LTSS students merged with administrative school

[3]They use a nationwide reform in Germany which enables them to use the exogenous variation of timing and location of the opening of job information centers by the Federal Labor Office (*Bundesanstalt für Arbeit*), which provide easier access to occupational knowledge.

data and administrative employment records in the Integrated Labour Market Biographies (IEB), we investigate the effect of ACA on grade development in LTSS and on educational upgrading after leaving LTSS.

There is an apparent trade-off between the goal of ACA to foster the school-to-work transition immediately after leaving LTSS and the fact that ACA may make LTSS students more aware of the importance of educational outcomes for their future labor market careers. ACA may lead to an increase in learning effort by students, in particular for students without MTSS-track coursework because they may want to catch up in order to meet the grade prerequisites for a continuation of schooling. Our empirical analysis shows small and mostly insignificant effects of ACA on average educational outcomes, which, however, mask quite heterogeneous effects. For LTSS students taking MTSS-track coursework, ACA shows no effect on grades, and it makes them less likely to complete an MTSS degree, even though these students were on track to continue schooling after graduating from LTSS. In contrast, ACA improves the grades for all students, who do not take MTSS-track coursework. In this group, only for students without migration background, ACA shows a positive effect on the completion of an MTSS degree, while there are no significant effects for students with migration background. Hence, for most students, ACA causes a reversal of educational plans after graduation. Even though our study applies to one region in Germany, it provides various insights beyond the specific setting analyzed here.

The remainder of the paper is organized as follows: Section 2 describes the background of our analysis and the data. The imputation of the *Middle Track Secondary School degree* for individuals with missing data and the estimation approach for the outcome regressions are described in section 3. Section 4 presents the empirical results. Section 5 concludes. Appendix A includes Tables and Figures. Appendix B describes details on how to use the education information provided by the IEB records. The Additional Online Appendix C contains complementary empirical results.

2 Background of Analysis and Data

Our analysis involves LTSS students in grades 8 and 9 for two cohorts in the late 2000's in the region of Freiburg. Our analysis is based on two data sources. First, we use data from surveys conducted by ourselves together with administrative school records, see

Fitzenberger and Lickleder (2015) for further details. We observe students in grades 8 and 9 at all LTSS in the city of Freiburg (11 schools) and 5 control schools from the same labor market (municipalities near the city of Freiburg), see Figure 1 for a map showing the location of the treatment schools and the control schools. The treatment is restricted to the small City district of Freiburg, which is well integrated with the area surrounding it where the control group is located. In fact, most control schools are very close to the City center of Freiburg and they can be viewed as being part of the urban area of Freiburg. Public transportation is very good, which allows students in the treatment and control group to commute easily within the urban area of Freiburg.

< Figure 1 about here >

All LTSS students in Freiburg receive Additional Career Assistance (ACA) during grades 8 and 9.[4] ACA is an intensive treatment amounting to 160 hours per year and grade. It allows to learn about one's strengths, weaknesses, and skills as well as about occupations and application requirements for further schooling and apprenticeship training. Furthermore, through counselling, coaching, and mentoring, it helps students to learn more about one's preferences and to make better decisions, and finally, it signals the importance of a better education to make it in the labor market.

Our sample includes 664 students, among whom 464 are from the city of Freiburg (treatment group) and 200 from the surroundings of Freiburg (control group). The students are from 16 schools (involving 23 classes), among which 11 schools (involving 16 classes) are in the treatment group. Students were interviewed three or four times during grades 8 and 9 (Timecode in brackets: grade and semester): first semester (8:1, 9:1) and second semester (8:2, 9:2) of grades 8 and 9, respectively. Figure 2 shows the timing of the surveys.[5] Our data include administrative data on school achievement (grades in class 7 to 9) and individual characteristics (gender, migration background).

< Figure 2 about here >

Table 1 shows the sample size of the survey data from school with time codes in the first column. In addition to grades, we also observe whether a student takes extra MTSS-track coursework. The decision to take MTSS-track coursework is based on

[4]See Arbeitsagentur Freiburg, Netzwerk Schule-Ausbildung Freiburg (2007). The German name for the ACA program in Freiburg is 'Erfolgreich in Ausbildung'.

[5]For practical reasons, it was only possible to conduct the first survey for the first cohort during the second semester of grade 8.

the GPA and on the assessment of the teacher at the end of grade 7, such that better performing students are more likely to take MTSS-track coursework. Table 2 shows basic descriptive statistics for students in the treatment group and the control group. We have information on students' family background (the education and employment status of parents) and teacher assessments of student's performance (social and personal competences, improvement in the autonomy of career planning etc). Students in the treatment group more often have a migration background (40% versus 27%) and their fathers less often have a medium or high education (38% versus 43%). Based on teacher assessments, students in the treatment group show lower standardized social and personal competences (0.39 versus 0.5).[6] This suggests that the treatment group is negatively selected compared to the control group.

< Tables 1 and 2 about here >

We collected data beginning in grade 8 at school until three/four years after they left LTSS.[7] Table 3 shows the sample size ($\equiv$ number of survey responses) over time. In each survey, we ask students to report all relevant transitions since their last survey participation. We observe the immediate transition to further education as well as the immediate start of an apprenticeship.[8] The follow-up surveys after LTSS ask about the timing and the type of further educational degrees completed.

< Table 3 about here >

There are two ways to complete an MTSS degree after graduating from LTSS with typically 9 years of schooling completed so far. First, students continue to grade 10 directly after grade 9 of LTSS if they take extra MTSS-track coursework (*Zusatzunterricht*) during grade 8 and 9 and they satisfy some GPA requirements. Note that regular MTSS students are expected to complete an MTSS degree after ten years of

[6]The variable social and personal competences is divided by the standard deviation but not demeaned, see notes in legend of Table 2.

[7]Survey dates after leaving LTSS: 1st 6 months, 2nd beginning of second year, 3rd beginning of third year (only second cohort), 4th beginning of fourth year (only first cohort). For practical reasons, we run the third wave for both cohorts at the same point in time. For this reason we observe the first cohort in their third survey after LTSS at the beginning of year four and the second cohort at the beginning of year three. For most analyses, we observe the third wave for both cohorts.

[8]As we only have data until the year 2013, we can not observe the completion of a vocational training degree and a number of students may not even have started an apprenticeship in light of the fact that the average age at the start of an apprenticeships increases from 18.5 years in 1993 to 20.0 years in 2011 (BIBB 2013, p. 155, Table A4.5-2). Educational upgrading and continuation in pre-vocational training delay in start of vocational training.

schooling. Some, but not all LTSS schools offer the 10th grade option (*Werkrealschule*) allowing students to continue for an MTSS degree in the same schools. The share of students for whom the 10th grade option is available in the same school is 63% in the treatment group and 73% in the control group, see Table 2. Second, students apply for Two-Year-Vocational Schools (*Berufsfachschule*) if they satisfy the GPA requirements in grade 9.

We merge the administrative school records and the survey data to the administrative employment records in the Integrated Labour Market Biographies (IEB) for all students in our survey who agreed to this. The consent rate is very high (compare Sakshaug and Kreuter 2012). Among the 664 students interviewed in the schools, we have the consent for 599 ($\equiv$ 90%) students to have their IEB records merged to the survey results. The consent rate is slightly higher in the treatment group (91%) than in the control group (88%), see Table 2. The IEB records contain information on students' employment status (records of employees paying social security) and also include information on the educational degree, which we will use in addition to our survey information to identify upward educational mobility. For more information on the IEB data, see vom Berge et al. (2013).

The follow-up period of our surveys and the merged administrative data allow to observe the completion of an MTSS degree, which typically occurs during the first two years after LTSS. Because of panel attrition, our survey data involve the information on the MTSS degree up to three years after leaving LTSS for only $N = 272$ observations. In the IEB data, the secondary schooling degree is observed for persons who are in contact with the employment agency. This information is recorded for job seekers and for participants in active labor market programs (data sources: *ASU* and *MTH*, see vom Berge et al. 2013). We merge the additional IEB information regarding as to whether and when an MTSS degree is first observed to our survey data (see Appendix B and section 3 - further information is available upon request). When a higher educational level such as an MTSS degree is recorded in the IEB data, we use this information in the same way as for the survey data. Using the additional information from the IEB records, we have in total $N = 407$ observations with nonmissing information on the completion of an MTSS degree during the first three years after leaving LTSS. For another $N = 241$ students with missing information, we impute the probability for the completion of an MTSS degree, see section 3.

3 Estimation Approach

We provide regression estimates of the effect of ACA on the GPA in German and Math at the end of grade 9 and on the cumulative incidence of completing an MTSS degree by individual i at time t (measured by the dummy variable $mtss_{it}$). Our regressions control for the following set of covariates (X_i) and their interactions: (i) Individual and family characteristics like gender, migration background, employment status and education level of parents, (ii) the share of foreigners in the neighborhood, (iii) the GPA in German and Math at the end of grade 7 and the dummy for extra MTSS-track coursework reflecting individual achievement at the end of grade 7 (extra MTSS-track coursework indicates the plan to continue for an MTSS degree), and (iv) the teacher assessment of the social and personal competences of the student.

We impute the MTSS information for individuals with missing information. The imputation of the MTSS information and the implementation of the MTSS outcome regressions are described in the following.

3.1 Imputation of MTSS Degree

To impute the probability of an MTSS degree by year $t = 1, 2, 3$ after LTSS ($P(mtss_{it} = 1 \mid X_{it})$), we regress $mtss_{it}$ on an expanded set of covariates with nonmissing information on MTSS degree and then calculate the predicted probabilities for reaching an MTSS degree by year t for those 241 individuals with missing MTSS information.[9] Our estimation period involves the first three years after leaving LTSS for two cohorts, where we observe the second cohort only for the first 28 months after leaving LTSS.

The probit model used for imputation is specified as

$$(1) \qquad P(mtss_{it} = 1 \mid X_i) = \Phi(\alpha + \gamma \cdot X_i + \lambda \cdot V_i + \sum_{k=2}^{16} \delta_k \cdot class_{k,i} + \epsilon \cdot cohort_i)\,,$$

where $\Phi(.)$ denotes the standard normal distribution function. Our regression estimates are robust to different imputation strategies. Our estimation strategy is to provide the best fit among observations with observed $mtss$. Detailed results are available upon request.

[9] In the end, we have $N = 648$ observations in the entire sample. We lose 16 observations (relative to the total of $N = 664$ observations) because important covariates used in the imputation regression below can not be used. Further details are available upon request.

We observe the end of years 1 [12], 2 [22], and 3 [32] after leaving LTSS.[10] First, we control for a set of covariates (X_i) as described above (including an interaction term between migration background and MTSS-track coursework) and a cohort dummy ($cohort_i$). In addition to the estimation of the cumulative incidence of an MTSS degree, further control variables are included with an additional set of covariates (V_i) and set of class dummies ($class_{k,i}, k = 2, 3, ...16$). We estimate equation 1 based on the $N = 407$ individuals with valid educational information after leaving LTSS based on the survey data and the IEB data (see above and Appendix B). We then use the predicted probability $P(mtss_{it} = 1 \mid X_{it})$ of earning an MTSS degree as the dependent variable in later outcome regressions.

3.2 MTSS Outcome Regressions

The MTSS outcome regressions use as dependent variable the binary information on having completed an MTSS degree by year t for the $N = 407$ individuals with nonmissing MTSS information and the imputed MTSS probability for another $N = 241$ individuals with missing MTSS information. For the entire sample ($N = 648$), we estimate fractional probit regressions, for which the dependent variable takes values between zero and one.[11] As robustness check, all results are also reported for probit regressions based on the sample of $N = 407$ individuals with nonmissing MTSS information. Section 4.4 describes the actual specifications of the regression model.

For the MTSS outcome regressions, we include a dummy variable for individuals for whom we learn whether an MTSS degree has been completed from the IEB-Data ($MTSS\text{-}IEB_i$). The latter is based on the observed variables in the IEB and not on the regression based imputation described above. This way we account for a potential selection bias among individuals for whom IEB records could be merged and for whom MTSS-relevant information, which is not available in the survey data, can be used. For the entire sample ($N = 648$), we include a dummy variable ($imp_{\hat{p},i}$) for the $N = 241$ individuals with imputed MTSS probability. The dummy variable ($imp_{\hat{p},i}$) accounts for a potential selection bias associated with the missing MTSS information.[12]

[10] Time code in brackets. The years are defined according to the beginning of school years and apprenticeship contracts (September - August).

[11] We apply the user written command `fracglm` in STATA. For further details, see Williams 2015 and Wooldridge 2010, pp. 748-753.

[12] Individuals with imputed MTSS information are negatively selected with respect to observables

When discussing the results of the fractional probits, we report estimated average marginal effects (AME's). We perform several robustness checks, which are available in the Additional Online Appendix C.

4 Empirical Results

First, we provide descriptive evidence on the takeup of MTSS-Track Coursework and the completion of an MTSS degree after LTSS. Second, we motivate the quasi-experimental nature of ACA treatment. Third, we estimate the treatment effects of ACA on the GPA in grade 9 and on the completion of an MTSS degree during the first three years after LTSS.

4.1 Descriptives on MTSS-Track Coursework and Completion of MTSS Degree

We first consider the takeup of extra MTSS-track coursework (MTSS-CW) starting in grade 8, see Figure 3. The decision on MTSS-CW is based on the GPA in grade 7 and teacher assessment regarding a student's readiness for educational upgrading after graduation from LTSS. This is decided upon before the start of the ACA treatment in grade 8. In our combined sample (treatment and control group), 53% of the LTSS students take MTSS-track coursework, while 47% do not.

< Figure 3 about here >

Both in the treatment group and in the control group, students are tracked into two paths, which each involve about half of the students. The path MTSS-CW involves additional education as a preparation for the continuation of schooling after LTSS. Students taking extra MTSS-CW plan to obtain further education. In contrast, students not taking MTSS-CW do not strive for further education, possibly because they plan to enter the labor market immediately after LTSS or because they are still undecided about what to do after LTSS.

controlled for. Among these individuals, we observe a higher fraction of students with migration background, a worse GPA in grade 7, and a lower fraction of students with MTSS-CW.

The tracking by MTSS-CW is highly predictive with regard to the transition observed after LTSS. Taking MTSS-CW is associated with a higher likelihood to continue in grade 10 or vocational schools as further education. Not taking MTSS-CW is associated with a higher likelihood to continue in pre-vocational training after LTSS. There is little difference regarding the immediate start of an apprenticeship in the treatment group but, in the control group, students not taking MTSS-CW are more likely (25%) to start an apprenticeship immediately after leaving LTSS compared to those taking MTSS-CW (9%). Overall, students (not) taking MTSS-CW are a positive (negative) selection regarding educational outcomes and entry into prevocational training. The association is ambiguous regarding the immediate start of an apprenticeship.

Next, we turn to the completion of an MTSS degree. Figure 4 displays the fraction of those who complete an MTSS degree over three years after leaving LTSS both for the treatment and the control group. Moreover, it contrasts the smaller sample ($N = 407$, referred to as *surieb*) of students, for whom the completion of an MTSS degree is observed in the survey data or the IEB data, with the larger sample ($N = 648$, referred to as *surieb+imputed*), which also includes those individuals with missing MTSS information for whom we use the imputed probability to complete an MTSS degree, see Section 3 for details. As a robustness check, we report basically all empirical results on the completion of an MTSS degree for both samples.

Our findings suggest that students from the control group tend to complete an MTSS degree earlier but students from the treatment group manage to catch up, especially during the second year after LTSS. This is in line with students in the treatment group being more likely than in the control group to continue with vocational schooling compared to moving to grade 10. Vocational schools allow to complete an MTSS degree only after two years instead of one year in the case of grade 10. Figure 4 also shows that the estimated shares are in line with the observed MTSS share among the control group, whereas the estimated share among the treatment group students is slightly higher than the observed share. It is also noteworthy that three years after LTSS about 50% of all students in both the treatment and the control group have completed an MTSS degree, which shows the importance of educational upgrading among LTSS students. Furthermore, there are virtually no differences between the smaller sample and the larger sample among the control group and the pattern is quite similar for the smaller and the larger sample among the treatment group.

< Figure 4 and 5 about here >

Figure 5 distinguishes further by takeup of MTSS-CW. The top grey solid line refers to those students with MTSS-CW in the control group. The bottom solid black line refers to those students without MTSS-CW in the control group. Our descriptive findings shows that completion of an MTSS degree among students with MTSS-CW is considerably lower in the treatment group compared to the control group and the difference is of oppositive sign among students without MTSS-CW. This provides first suggestive evidence that the ACA treatment results in a revision of plans regarding educational upgrading. In a regression-to-the-mean type of effect, the treatment reduces the completion rate among those students, who are on track for an MTSS degree, and increases the MTSS completion rate among students, who are not on track for an MTSS degree. These findings are confirmed by our regression estimates discussed below.

4.2 Quasi-experimental Nature of Treatment

Recall that the ACA treatment takes place in all LTSS schools in the City of Freiburg and the control group consists of LTSS schools in the surroundings of Freiburg, see Figure 1 and the discussion in section 2. All treatment and control schools are located in the same labor market. Most control schools are just as close to the city center of Freiburg as many of the treatment schools. All control schools are well connected to the City of Freiburg by public transportation.

Ideally, to investigate the quasi-experimental nature of the ACA treatment, we would want to investigate whether there were average individual level differences in outcomes between LTSS students in grades 8 and 9 in the treated schools and the control schools before the start of the ACA treatment. Unfortunately, we do not have access to such data.

To investigate whether there are significant differences between the LTSS students in the treatment group and the control group before the beginning of the ACA treatment in grade 8, we analyze the differences in the GPA at the end of grade 7 [GPA(7)], in the take-up of MTSS-CW, and in social and personal competences early in grade 8. The presumption is that these outcomes are determined before the start of the ACA treatment and therefore not affected by the ACA treatment. This is the case for both

GPA(7) and the take-up of MTSS-CW because these are pre-determined at the very beginning of grade 8 and because it is quite plausible that there are no anticipation effects of the ACA treatment.[13] Even though the teacher assessment of social and personal competences takes place some way during grade 8, we do not think that this is affected by the ACA treatment. Note that the teachers are not providing the ACA treatment.

We explore placebo effects of the ACA treatment on the aforementioned three, arguably pre-determined outcomes. Table 2 shows minor differences between the treatment group and the control group in GPA(7), MTSS-CW, and social and personal competences, which are not significant (see first columns in Tables 4 to 6, respectively). Starting with GPA(7), we actually do find a better GPA in grade 7 for the treatment group and the control group after controlling for migration background, other controls in grade 8:1, and social and personal competences. These differences are significant at a 5%-level for students with a migration background, but not so for students without a migration background. These findings suggest that the treated with migration background may have a systematically better GPA(7) than the students in the control group after accounting for other observable differences at the beginning of grade 8. Even though the difference is not significant for the students without migration background the point estimates are of a similar magnitude. To be on the safe side, all our main outcome regressions control for GPA(7).

Turning next to social and personal competences (Table 5) and MTSS-CW (Table 6), we find small negative but insignificant conditional differences in social and personal competences and mostly positive but insignificant differences in MTSS-CW. Whether we control for GPA(7) does not have a noticeable effect. Thus, the ACA treatment can be interpreted as being quasi-experimental both with regard to the social and personal competences of the student early in grade 8 and with regard to MTSS-CW as the next educational outcome observed after GPA(7). This conclusion remains unchanged whether we control for GPA(7) in both cases and for social and personal competences in the case of MTSS-CW.

< Tables 4, 5, and 6 about here >

[13] Some career assistance, as in the control group, had been common in grades 8 and 9 even before the ACA treatment started. Furthermore, it is unlikely that LTSS students already focus before grade 8 on a more intensive form of career assistance starting in grade 8. The possibility to take MTSS-track coursework starting in grade 8 is a much more salient issue in grade 7.

We conclude that there is weak evidence that GPA(7) tends to be slightly better for those students with a migration background among the treatment group compared to the control group after controlling for other background controls. There is no evidence for placebo effects for MTSS-CW and social and personal competences irrespective of which controls are used. The latter findings confirm the quasi-experimental nature of the treatment after conditioning on GPA(7), which is evidence in favor of our evaluation approach. Nevertheless, all subsequent outcome regressions control for differences in GPA(7), MTSS-CW, and social and personal competences when estimating the causal effect of the ACA treatment. Furthermore, we perform robustness checks with regard to how we control for GPA(7).

4.3 Treatment Effect on GPA in Grade 9

In this section, we estimate the effect of the ACA treatment on GPA(9), which is the final average GPA in German and Math at the end of grade 9, while accounting as in the previous section for the association with individual characteristics, which are predetermined at the beginning of grade 8 (see discussion in section 3). As above, we use the imputed information on MTSS-CW. We control for GPA(7) thus analyzing the value-added over the last two years in LTSS. According to the German grading system, a lower number refers to a better grade. Thus, a negative coefficient reflects an improvement in performance in response to an increase of a covariate.

We start with the following specification:

$$GPA(9)_i = \alpha + \tau \cdot treat_i + \gamma \cdot X_i + u_i\,, \tag{2}$$

where $treat_i$ is the dummy for the ACA treatment and X_i involves the covariates which are predetermined at the beginning of grade 8.

Estimating a uniform treatment effect, the OLS Regression (2) shows a negative effect of ACA on the final GPA (see Table 7, specification 1). Thus, the point estimate suggests that ACA improves the GPA but the effect is not significant. There are some interesting findings regarding the other covariates. As expected, GPA(7) is a significant and strong positive predictor of GPA(9). Female students show a significantly worse GPA(9) conditional on GPA(7). In combination with a positive male-to-female GPA(7) gap, this suggests a catching up of males relative to females in combination

with a delay in development of males relative to females in grade 7. Students with MTSS-CW, who are students with better grades in grade 7, strongly improve their final grade, which suggests that MTSS-CW is associated with greater learning effort and learning success and which is a prerequisite for educational upgrading after LTSS. In addition, better social and personal competences (as assessed by the teacher) and a higher educational degree of the father are associated with an improvement in GPA(9). Our further analysis shows no evidence for mediation channels of the estimated ACA treatment effect via internships and improvement of autonomy in career planning (these results are available upon request). There is no significant effect of the availability of a 10th grade option at the local LTSS of the student.

< Table 7 about here >

Next, we allow the treatment effect to differ first by MTSS-CW (see Table 8, specification 2) and second by the interaction between migration background and MTSS-CW (see Table 9, specification 3). The more general specification 3 is given by

$$
\begin{aligned}
(3) \quad GPA(9)_i \;=\; & \alpha + \tau_1 \cdot treat_i \cdot \overline{m}_i \cdot \text{MTSS-CW}_i + \tau_2 \cdot treat_i \cdot m_i \cdot \text{MTSS-CW}_i + \\
& \tau_3 \cdot treat_i \cdot \overline{\text{MTSS-CW}}_i + \tau_4 \cdot treat_i \cdot m_i \cdot \overline{\text{MTSS-CW}}_i + \gamma \cdot X_i + u_i \,,
\end{aligned}
$$

where m_i ($\overline{m}_i$) is a dummy variable for having a (no) migration background and MTSS-CW_i ($\overline{\text{MTSS-CW}}_i$) is a dummy variable for (no) MTSS-CW. The specification of the interaction effects in equation (3) is guided by the results discussed below.

Specification 2 restricts the effects of MTSS-CW_i and $\overline{\text{MTSS-CW}}_i$ to be the same irrespective of migration background, i.e. $\tau_1 = \tau_2$ and $\tau_4 = 0$. This specification yields a significantly negative treatment effect, i.e. an improvement in GPA(9), for students without MTSS-CW and a small positive but insignificant treatment effect for students with MTSS-CW (see Table 8). Thus, the negative but insignificant treatment effect implied by specification 1 hides a significant difference by takeup of MTSS-CW.

< Table 8 about here >

Further distinguishing between students with and without migration background, specification 3 (see Table 9) still shows no significant effects of treatment on GPA(9) for students with MTSS-CW. Also, the negative treatment effect for students without MTSS-CW does not differ significantly between students with and without migration background. Because of the latter finding, specification 3 involves the main effect for

no-MTSS-CW. Note that despite the significantly negative treatment effect on GPA(9) for students without MTSS-CW, the treated students with MTSS-CW, who are on track to continue schooling after graduating from LTSS (either in grade 10 or in vocational school), still show better final grades than students without MTSS-CW.[14]

< Table 9 about here >

As robustness checks, we rerun the outcome regression as in specification 3 with changes in the way we account for GPA(7), which is the one variable with weak evidence for placebo treatment effects reported in section 4.2 (recall that there was no evidence for placebo treatment effects for MTSS-CW and for social and personal competences). Table AOA.1 in the Additional Online Appendix reports the estimated ACA treatment effects for two benchmark specifications. Specification 4 interacts GPA(7) with migration background and MTSS-CW, which are the two control variables by which specification 3 allows the treatment effect to vary. Specification 5 drops GPA(7) as a covariate. The estimated treatment effects for specification 4 basically coincide with specification 3 and the estimated effects for specification 5 are very similar to specification 3. The estimated treatment effect for students not participating in MTSS-CW is even slightly stronger when omitting GPA(7), which is in accordance with the slight differences in GPA(7) found between treatment and control group (see section 4.2).

Summing up, the results in this subsection suggest that in response to the ACA treatment students without MTSS-CW increase their learning effort and learning success to improve their grades. Through ACA, these students, who typically have a bad GPA(7), may realize during their last two years at LTSS that they will have a better chance to implement a successful career plan if their grades improve. Students may become aware that starting an apprenticeship in their desired occupation may require better grades and/or a higher educational degree together with training in the respective occupational field, both of which can be acquired by completing grade 10 or by attending vocational school (*Berufsfachschulen*). Greater learning effort might be induced by information on grade requirements for access to grade 10 and to vocational schools after LTSS. Our results are robust to how our outcome regression accounts for GPA(7).

[14]The students with MTSS-CW already have a better GPA(7) in grade 7. These detailed results are available upon request.

4.4 Treatment Effect on the Completion of MTSS Degree

We estimate probit regressions for having completed an MTSS degree *mtss* by period t. Specification 1 with a uniform treatment effect is as follows:

$$P(mtss_{it} = 1 \mid X_i) = \Phi(\alpha + \tau \cdot treat_i + \gamma \cdot X_i + \eta_s \cdot imp_i + \eta_p \cdot imp_{\hat{p},i}) \,, \tag{4}$$

where imp_i and $imp_{\hat{p},i}$ are dummy variables for the two imputation steps for the MTSS degree as described in section 3. This regression models the probability (cumulative incidence) that student i has completed an MTSS degree t periods (i.e., during year 1, 2, or 3) after leaving LTSS. Table 10 shows the estimated average marginal effects (AME's) by year. As robustness check to investigate whether the imputation of the MTSS degree affects the results, we report estimates both for the probit regression for the $N = 407$ individuals with nonmissing MTSS information (column 1) and for the fractional probit regression for the larger sample ($N = 648$, column 2), see section 3 for details. The results based on the two samples are quite similar with reduced standard errors in column (2). In the following, we mostly rely on the latter regarding significance.

< Table 10 about here >

Based on specification 1, ACA (treatment) significantly reduces the probability to complete an MTSS degree by 12 pp in the first year after leaving LTSS. This means that students complete grade 10 successfully at a higher rate. Recall that Figure 3 showed a higher transition rate to grade 10 in the control group. The absolute size of the ACA effect falls strongly during years 2 and 3 and becomes insignificant. Hence, a higher share among the treated completes an MTSS degree via a vocational school (recall Figure 3). Note that the treatment effect is not driven by differences in the availability of the 10th grade option. By itself, the availability of the 10th grade option at the LTSS of the student shows a positive effect, which is not significant in column (2) in Table 10.[15] Overall, ACA causes a delay in completing an MTSS degree but there is no significant effect after three years. These results are similar to the descriptive findings in Figure 4 (recall subsection 4.1).

Table 10 provides further noteworthy findings regarding the impact of other covariates. A migration background is associated with a 7 pp significantly higher rate to

[15]The estimated treatment effect remains basically unchanged when omitting the dummy for the 10th grade option. These results are available upon request

complete an MTSS degree in years 1 and 2, but the effect becomes insignificant in year 3. For students with MTSS-CW, the rate of completing an MTSS degree is 14 pp higher in year 1 and increases further to 23 pp in year 3 (significant in all years). The effect is much higher for students with a migration background in year 1 (interaction effect of 31 pp). The interaction effect changes sign and is insignificant in years 2 and 3. Note that students with migration background are underrepresented among the students with MTSS-CW.[16] A one-unit increase in GPA(7), i.e. a worse grade, is associated with a significant reduction of the probability for an MTSS degree by 10-11 pp in years 2 and 3. Higher social and personal competences and having a more educated father show a significantly positive association with an MTSS degree (only in years 2 and 3 for the latter).[17] These results reflect a considerable heterogeneity across different groups of students, suggesting that information available at the beginning of grade 8 (especially regarding GPA(7) and migration background), which are key determinants for MTSS-CW, are likely to be significant predictors for the completion of an MTSS degree.

The following specification 2 allows for heterogeneous treatment effects by takeup of MTSS-CW, which is motivated by the descriptive findings in Figure 5 (again recall subsection 4.1):

$$P(mtss_{it} = 1 \mid X_{it}) = \Phi(\alpha + \gamma \cdot X_i + \tau_1 \cdot treat_i \cdot \text{MTSS-CW}_i + \tau_2 \cdot treat_i \cdot \overline{\text{MTSS-CW}}_i + \eta_s \cdot \text{MTSS-IEB}_i + \eta_p \cdot imp_{\hat{p},i}) \,. \tag{5}$$

The estimated treatment effects based on specification 2 are reported in Table 11. The results show a highly significant negative treatment effect for students with MTSS-CW, which is stable over time since completion of LTSS and which amounts to about -17 to -18 pp. This finding reflects a lower transition rate to grade 10 for students with MTSS-CW in the treatment group (see above). Students with MTSS-CW tend to prefer two-year vocational schools over the 10th grade option, but they do not complete an MTSS degree at the same rate as nontreated students with MTSS-CW even after year 2. Thus, the treatment reduces MTSS completion among the students with MTSS-CW. For students without MTSS-CW, we find a positive treatment effect

[16]The MTSS-CW takeup rate conditional on migration background is 42 percent and conditional on no migration background it is 57 percent.

[17]These results are similar to the findings reported by Biewen and Tapalaga (2016) that educational upgrading is more likely for students with a higher socio-economic background.

in years 2 and 3, which is, however, only significant for the larger data set (column 2). We do not report the results for year 1 in the case of no MTSS-CW because by that time almost nobody in the treatment group has completed an MTSS degree. Note that the estimated heterogeneous treatment effects are not driven by the availability of the 10th grade option at the LTSS of the student. The 10th grade option at the LTSS shows a positive effect, which is, however, not significant in column (2) [this result is not reported in Table 11, but it is available upon request].

< Table 11 about here >

Furthermore, we explore as to whether the treatment effect differs by migration background based on the following specification 3:

$$(6)\ P(mtss_{it} = 1 \mid X_{it}) = \Phi(\alpha + \gamma \cdot X_i + \tau_1 \cdot t_i \cdot \overline{m}_i \cdot \text{MTSS-CW}_i + \tau_2 \cdot t_i \cdot m_i \cdot \text{MTSS-CW}_i$$

$$+\tau_3 \cdot t_i \cdot \overline{m}_i \cdot \overline{\text{MTSS-CW}}_i + \tau_4 \cdot t_i \cdot m_i \cdot \overline{\text{MTSS-CW}}_i + \eta_s \cdot \text{MTSS-IEB}_i + \eta_p \cdot imp_{\hat{p},i}) \,.$$

Because the estimated treatment effects are fairly stable over time, we pool years 2 and 3. We do not pool over all three years because of the differences in the time until possible completion of an MTSS degree between further schooling in grade 10 and in two-year vocational schools. Table 12 shows the results of specification 3 for year 1 and for pooling years 2 and 3. When pooling years 2 and 3, we add a dummy for year 3, whose coefficient proves significantly positive.

< Table 12 about here >

Distinguishing by migration background shows an interesting pattern. The negative treatment effect for students with MTSS-CW in years 2 and 3 reported above shows the same order of magnitude of about -17 to -18 pp both for students without and with migration background and the effect is highly significant in both cases for the larger sample. For students without MTSS-CW, we find a significantly positive treatment effect of about 16 pp only for students without migration background. There is a small negative, albeit insignificant treatment effect for students with migration background - again, we do not report the results for year 1 for students without MTSS-CW.

One may be concerned that the sizeable time investment involved with the ACA treatment during grades 8 and 9 may reduce the learning efforts of students with MTSS-CW, which may make them less prepared for completing an MTSS degree after

LTSS.[18] However, the findings in section 4.3 show that ACA does not cause a significantly worse GPA(9). Thus, we do not think that the aforementioned mechanism is plausible. In fact, the higher share of treated students with MTSS-CW attending vocational schools instead of grade 10 in comparison to the control group suggests that ACA makes students with MTSS-CW more inclined to choose a vocational track instead of completing an MTSS degree.

Finally, we perform a number of robustness checks which are reported in the Additional Online Appendix. First, Tables AOA.2 and AOA.3 provide the results of an OLS regression based on the specifications 1 and 3 discussed above. The results are very similar to the (fractional) probit estimates discussed above. Second, we investigate the robustness of the (fractional) probit estimates in specification 3 with regard how the outcome regressions account for GPA(7). As for the robustness checks in the previous subsection, specification 4 interacts GPA(7) with migration background and MTSS-CW and specification 5 drops GPA(7) as a covariate, see Tables AOA.4 and AOA.5. The estimated treatment effects for specification 4 and specification 5 are very similar to specification 3.

Summing up, based on our findings for years 2 and 3, we conclude that the ACA treatment reduces educational upgrading among students with MTSS-CW, who are on track for educational upgrading, irrespective of migration background, i.e. ACA seems to increase the attractiveness of a direct entry into the labor market. In contrast, ACA fosters educational upgrading among students without migration background and no MTSS-CW. No such effect can be found for the large group of students with a migration background and no MTSS-CW. Altogether, ACA causes a significant reversal of the plans regarding educational upgrading, with the exception of the students with migration background and no MTSS-CW. Our results are robust to reestimating the models using OLS instead of fractional probits, to the way we deal with missing data, and to how our outcome regressions account for GPA(7).

[18] We are grateful to both Jörg Schweri and Susan Steiner for raising this point.

5 Conclusions

This paper estimates the effect of Additional Career Assistance (ACA) on educational outcomes for students in Lower Track Secondary Schools (LTSS) for the region of Freiburg (Germany). We combine data from our own surveys with administrative data to construct a comprehensive data set involving grades at school and educational outcomes after leaving school. Compared to LTSS students in the surroundings of Freiburg, students in the City of Freiburg receive ACA through more intensive information, counselling, and mentoring regarding the school-to-work transition and vocational training. At the same time, many LTSS students with good grades take extra MTSS-track coursework during the last two years in LTSS, thus preparing themselves for a higher educational degree. As a unique feature of our data we observe whether a student takes extra MTSS-track coursework which is an indicator that the student plans to complete an MTSS degree later on. We investigate the effect of ACA on final grades in LTSS and on educational upgrading after LTSS.

There is an apparent trade-off between the goal of ACA to foster the school-to-work transition immediately after leaving LTSS and the fact that ACA may make LTSS students more aware of the importance of good educational outcomes for their future labor market careers. ACA may lead to an increase in learning efforts by students, in particular for students without MTSS-track coursework, because they may want to catch up in order to meet the grade prerequisites for further schooling. Our empirical analysis shows no significant effect of ACA on average educational outcomes, which, however, masks quite heterogeneous effects. In fact, while final LTSS grades do not change significantly for students who take MTSS-track coursework, grades improve significantly for students who do not take MTSS-track coursework. The effects on final grades do not differ significantly between students with and without migration background. Furthermore, ACA causes students who take MTSS-track coursework to become less likely to obtain an MTSS degree irrespective of migration background. In contrast, among students who do not take MTSS-track coursework, students without migration background become more likely to obtain an MTSS degree, mostly at two-year vocational schools, while students with migration background do not show a significant effect of ACA.

Our findings are indeed surprising. For LTSS students with MTSS-track coursework,

ACA shows no effect on grades, and it makes them less likely to complete an MTSS degree, even though these students were on track to continue schooling after graduating from LTSS. Thus, ACA induces a number of these students to reverse their initial plans. Students with MTSS-track coursework may learn through ACA to focus on starting vocational training, and thus reduce their efforts towards educational upgrading. The reversal of plans should not be viewed per se as a failure of ACA, because a reversal may be quite appropriate when students learn new information and develop a clearer career plan. In contrast, ACA improves the grades for all students, who do not take MTSS-track coursework. Only for students without migration background in this group, ACA shows a positive effect on the completion of an MTSS degree, while there are no significant effects for students with a migration background. For the former group, our results might reflect that ACA compensates for a lack of support by the social environment of these students and these students now strive for better educational outcomes. However, it is disconcerting that such positive effects on the completion of an MTSS degree are not found for students with migration background in the non-MTSS-track coursework group. Future research should determine the consequences of the findings reported in this paper on long-term outcomes.

Even though our study applies to one region in Germany, it provides various insights beyond the specific setting analyzed here. First, chances to start an apprenticeship immediately after graduating from LTSS are generally quite low. Thus, many students, parents, and teachers prefer a higher educational degree which involves further schooling after graduating from LTSS. We find that the treatment effects differ strongly by the fact whether a student plans to obtain a higher educational degree. Second, the ACA program in the City of Freiburg reflects the general trend in Germany that career guidance has been intensified in many regions in Germany over the last two decades. Third, career guidance must acknowledge an apparent trade-off for weaker students. Such students may engage in additional career planning activities with the goal to start an apprenticeship immediately after graduation from secondary school and they may be frustrated by the fact that these efforts are often not successful (see Fitzenberger and Lickleder, 2015). However, as shown in this study, increasing learning efforts to obtain a higher educational degree among weaker students may compensate for such a negative effect. Fourth, career guidance policies in different countries (OECD 2004) may be informed by the finding that the policy analyzed here results in a reversal of educational plans.

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A: Tables and Figures

Table 1: Survey Responses during LTSS

Grade and semester	treatment group	control group	total
8:1	143	78	221
8:2	299	83	382
9:1	327	97	424
9:2	246	108	354
N	464	200	664

Notes: Reading example: 8:1 is first semester in grade 8. Here, we only observe students from the second cohort. For other points in time we observe both cohorts. For $N = 664$ individuals we observe at least one point in time and administrative data from schools.

Table 2: Descriptive Statistics by Treatment Status (Averages)

Variable	treatment group	control group	total	N-nomiss
female	.48	.40	.46	664
migration background (m)	.40	.27	.36	664
MTSS-track coursework	.55	.53	.54	664
father employed	.86	.90	.87	538
father medium/high education	.38	.43	.39	550
GPA Grade 7	3.06	3.09	3.07	644
social and personal competences (teacher)	.39	.50	.42	664
share of foreigners in residential area	14.0	9.0	12.5	664
10th grade available at LTSS	.63	.73	.66	664
Consent rate to merge IEB records	.91	.88	.90	664
N	464	200	664	

Notes: $N - nomiss$ number of observations for which variable is not missing in total sample. Including imputed values for MTSS-track coursework. Social and personal competences are an average of six competence variables based on teacher assessments. Missing values for social/personal competences are set to zero (raw variables are measured on a four-point Likert scale ranging from -1.5 to 1.5). The averaged social and personal competences are standardized by the sample standard deviation of the individual averages but not demeaned.

Table 3: Survey Responses after Leaving LTSS

year	treatment group	control group	total
1	445	153	598
2	179	91	270
3	178	91	269
4	145	73	218
N	464	200	664

Notes: The numbers count the number of valid survey responses. For $N = 664$ individuals we have at least one survey response after LTSS and administrative data from schools.

Table 4: OLS Placebo Pretreatment Outcome - Final GPA at End of Grade 7

Dependent Variable:	GPA(7)					
treat	-.028	-	-.156	-	-.180*	-
	[.121]	-	[.092]	-	[.085]	-
treat*$\bar{m}$	-	-.062	-	-.139	-	-.177
	-	[.12]	-	[.118]	-	[.111]
treat*m	-	-.049	-	-.196**	-	-.187**
	-	[.12]	-	[.079]	-	[.074]
Migration Background	No	Yes	Yes	Yes	Yes	Yes
Other controls	No	No	Yes	Yes	Yes	Yes
Social/personal comp.	No	No	No	No	Yes	Yes
R-sq	.00	.02	.09	.09	.17	.17
N	644	644	644	644	644	644

Notes: Standard errors clustered at school level. Other controls determined by grade 8:1: Family background variables, gender. * p<0.1, ** p<0.05, *** p<0.01.

Table 5: OLS Placebo Social and Personal Competences - Teacher Assessment early Grade 8

Dependent Variable:	Social/Personal Competences (8)					
treat	-.109	-	-.117	-	-.200	-
	[.129]	-	[.132]	-	[.139]	-
treat*$\bar{m}$	-	-.203	-	-.223	-	-.265
	-	[.147]	-	[.150]	-	[.163]
treat*m	-	.057	-	.038	-	-.038
	-	[.097]	-	[.096]	-	[.106]
Migration Background	No	Yes	Yes	Yes	Yes	Yes
GPA Grade 7	No	No	Yes	Yes	Yes	Yes
Other controls	No	No	No	No	Yes	Yes
R-sq	.00	.01	.08	.10	.13	.13
N	664	664	664	664	664	664

Notes: Standard errors clustered at school level. Other controls determined by grade 8:1: Family background variables, gender. * p<0.1, ** p<0.05, *** p<0.01.

Table 6: OLS Placebo Pretreatment Outcome - MTSS-track coursework Grade 8

Dependent Variable:	MTSS-CW					
treat	.036	-	.011	-	.029	-
	[.068]	-	[.052]	-	[.056]	-
treat*$\bar{m}$	-	.069	-	.040	-	.046
	-	[.060]	-	[.054]	-	[.060]
treat*m	-	.023	-	-.022	-	-.016
	-	[.077]	-	[.063]	-	[.060]
Migration Background	No	Yes	No	Yes	Yes	Yes
GPA Grade 7	No	No	Yes	Yes	Yes	Yes
Social/personal comp.	No	No	Yes	Yes	Yes	Yes
Other controls	No	No	No	No	Yes	Yes
R-sq	.01	.03	.37	.38	.41	.41
N	664	664	664	664	664	664

Notes: Standard errors clustered at school level. Other controls determined by grade 8:1: Family background variables, gender. All regressions include a dummy for imputed MTSS-CW. The regression with GPA(7) includes a dummy for those observations with missing grades. * p<0.1, ** p<0.05, *** p<0.01.

Table 7: OLS - Final GPA [$GPA(9)$] when Leaving LTSS (Specification 1)

treat	-.0819
	[.06]
migration background (m)	.1045
	[.10]
female	.2528**
	[.10]
m * female	-.0833
	[.06]
share of foreigners in	.0067
residential area	[.004]
GPA(7)	.3786***
	[.07]
MTSS-track coursework	-.4733***
	[.10]
female * MTSS-CW	-.0471
	[.14]
m * MTSS-CW	.1009
	[.09]
social and personal competences	-.0677**
(teacher, 8:1/8:2)	[.03]
father employed	-.0001
	[.08]
father medium/high educated	-.0911**
	[.04]
10th grade available	-.0533
at LTSS	[.06]
Other controls	Yes
N	634
R-sq	.475

Notes: The dependent variable $GPA(9)$ involves the average grade in German/Math at the end of grade 9 when graduating from LTSS. Regression includes dummies for imputed values and for second cohort. *treat* represents treatment. "10th grade at school" is a dummy variable that indicates whether the lower track secondary school offers the 10th grade option. Other controls include: cohort dummy, missing dummies for MTSS-CW, GPA(7), father employed, father medium/high educated.

Table 8: OLS - Final GPA [$GPA(9)$] when Leaving LTSS (Specification 2)

treat * MTSS-CW	.0465
	[.06]
treat * no MTSS-CW	-.228**
	[.09]
Other controls	Yes
N	634
R-sq	.481

Notes: The dependent variable $GPA(9)$ involves the average grade in German/Math at the end of grade 9 when graduating from LTSS. Other controls are all control variables in Table 7.

Table 9: OLS - Final GPA [$GPA(9)$] when Leaving LTSS (Specification 3)

treat * MTSS-CW * m	.0199
	[.15]
treat * MTSS-CW * $\overline{m}$	.0568
	[.07]
treat * no MTSS-CW	-.2609**
	[.11]
treat * no MTSS-CW * m	.0937
	[.18]
Other controls	Yes
N	634
R-sq	.481

Notes: The dependent variable $GPA(9)$ involves the average grade in German/Math at the end of grade 9 when graduating from LTSS. Other controls are all control variables in Table 7.

Table 10: AME's for Probit for Completion of MTSS Degree - Specification 1

Dependent variable: *mtss*	Year 1		Year 2		Year 3	
	(1)	(2)	(1)	(2)	(1)	(2)
treat	-0.1025***	-0.0890***	-0.0857	-0.0669	-0.0647	-0.0426
	[0.04]	[0.03]	[0.08]	[0.05]	[0.06]	[0.04]
migration background (m)	-0.0281	-0.0781*	0.1974***	0.0881*	0.0775	0.0442
	[0.05]	[0.04]	[0.06]	[0.05]	[0.05]	[0.05]
female	-0.1283	-0.1588***	-0.0431	-0.0779	0.0157	0.0144
	[0.08]	[0.05]	[0.06]	[0.05]	[0.06]	[0.04]
m * female	0.1234**	0.1910***	0.0045	0.1106**	0.0707	0.1164*
	[0.06]	[0.05]	[0.06]	[0.05]	[0.07]	[0.07]
share of foreigners in	0.0007	-0.0004	0.0057	0.0064*	0.0059	0.0079***
residential area	[0.00]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]
GPA(7)	-0.0019	-0.0342	-0.1478***	-0.1583***	-0.1203***	-0.1278***
	[0.04]	[0.03]	[0.04]	[0.03]	[0.03]	[0.02]
MTSS-track coursework	0.1031	0.0472	0.2388***	0.1925**	0.2517***	0.2524***
	[0.08]	[0.06]	[0.09]	[0.08]	[0.08]	[0.08]
female * MTSS-CW	0.0731	0.1176*	0.0753	0.0882	0.0459	0.0152
	[0.09]	[0.06]	[0.07]	[0.07]	[0.06]	[0.07]
m * MTSS-CW	0.0523	0.0948*	-0.1871**	-0.1138*	-0.1050	-0.1073
	[0.07]	[0.05]	[0.09]	[0.06]	[0.09]	[0.08]
social and personal competences	0.0470***	0.0419***	0.0324	0.0410***	0.0525**	0.0466***
(teacher, 8:1/8:2)	[0.02]	[0.01]	[0.02]	[0.01]	[0.02]	[0.02]
father employed	-0.0360	-0.0478	-0.1376*	-0.1175**	-0.0262	-0.0471
	[0.06]	[0.05]	[0.07]	[0.05]	[0.05]	[0.04]
father medium/high educated	0.0202	0.0058	0.1150***	0.1206***	0.1097***	0.1351***
	[0.04]	[0.03]	[0.02]	[0.02]	[0.04]	[0.02]
10th grade available	0.0592*	0.0269	0.0443	0.0098	0.0622	0.0565
at LTSS	[0.03]	[0.03]	[0.05]	[0.05]	[0.04]	[0.04]
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects MTSS						
dummy MTSS-IEB	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy MTSS-Probit	No	Yes	No	Yes	No	Yes
N	407	648	407	648	407	648
Pseudo-Rsq	0.187	0.209	0.202	0.186	0.207	0.191

Notes: Table reports average marginal effects (AME). The dependent variable is dummy variable/probability of MTSS degree by year since LTSS. Other controls as in Table 7. Column (1) restricted sample. Column (2) full sample with imputed probability for MTSS degree in case of missings.

Table 11: AME's (Fractional) Probit for Completion of MTSS Degree - Specification 2 - Heterogeneous Treatment Effects by MTSS-CW

Dependent variable: *mtss*	Year 1		Year 2		Year 3	
	(1)	(2)	(1)	(2)	(1)	(2)
treat * MTSS-CW	-0.1558***	-0.1431***	-0.1706	-0.1746**	-0.1639*	-0.1680***
	[0.05]	[0.04]	[0.11]	[0.08]	[0.09]	[0.06]
treat * no MTSS-CW	0.0827	0.0645	0.0662	0.0913**	0.0735	0.1065**
	[0.08]	[0.05]	[0.08]	[0.04]	[0.07]	[0.05]
Fixed effects MTSS						
dummy MTSS-IEB	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy MTSS-Probit	No	Yes	No	Yes	No	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
Pseudo-Rsq	0.209	0.228	0.213	0.198	0.217	0.203

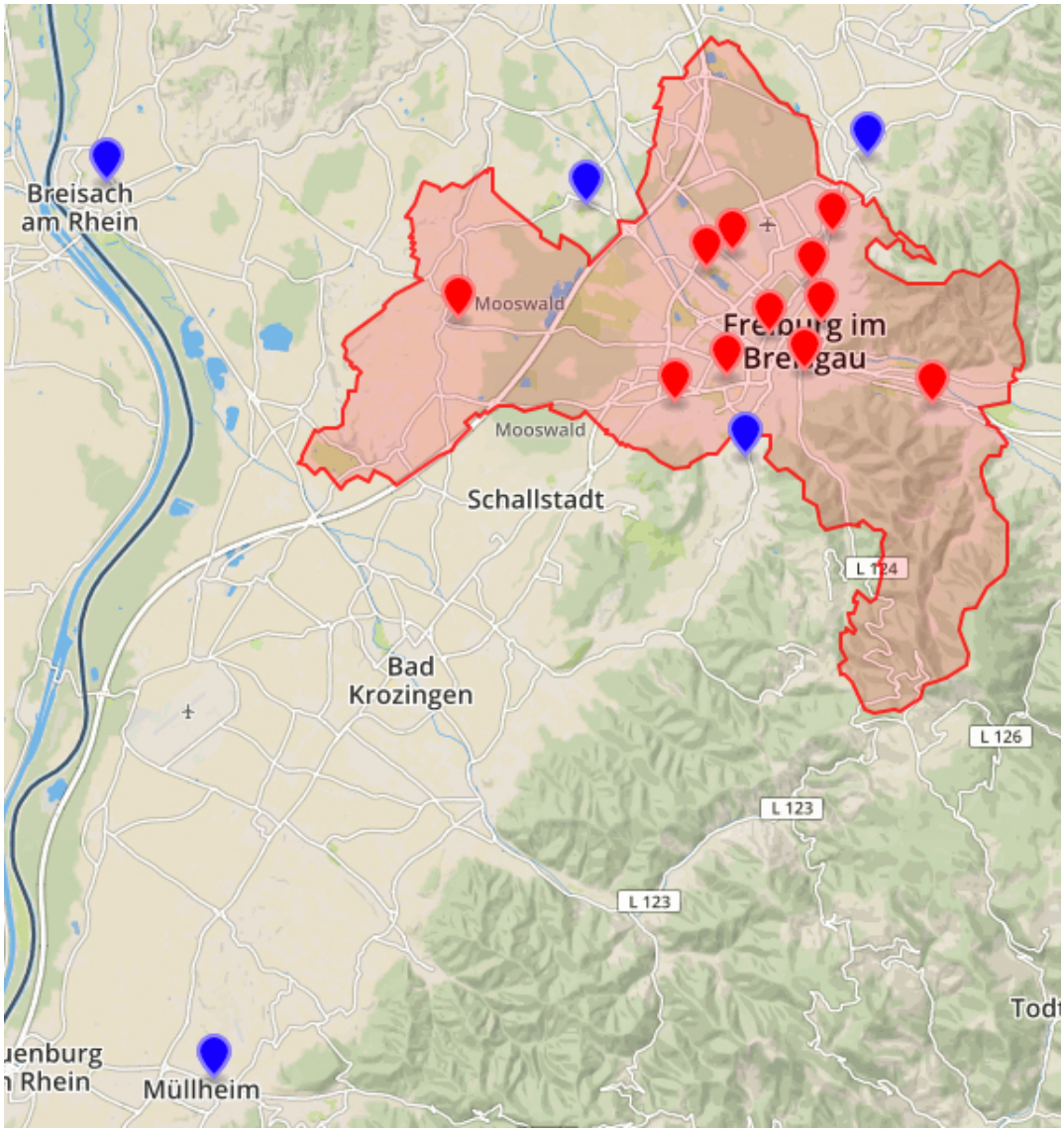
Notes: Table reports average marginal effects (AME). The dependent variable is dummy variable/probability of MTSS degree by year since LTSS. Other controls are all control variables in Table 10. Column (2) full sample with imputed probability for MTSS degree in case of missings.

Table 12: AME's (Fractional) Probit for Completion of MTSS Degree - Specification 3 - Heterogeneous Treatment Effects by MTSS-CW and Migration Background

Dependent variable: *mtss*	Year 1		Year 2, 3	
	(1)	(2)	(1)	(2)
treat * $\overline{m}$ * MTSS-CW	-0.1941***	-0.1827***	-0.1416	-0.1688**
	[0.06]	[0.05]	[0.10]	[0.08]
treat * m * MTSS-CW	-0.0628	-0.0411	-0.2419**	-0.1870***
	[0.05]	[0.05]	[0.11]	[0.07]
treat * $\overline{m}$ * no MTSS-CW	-	-	0.1643***	0.1840***
	-	-	[0.06]	[0.04]
treat * m * no MTSS-CW	-	-	-0.0556	-0.0231
	-	-	[0.11]	[0.08]
Year 3 Dummy	-	-	0.0761***	0.0843***
	-	-	[0.01]	[0.02]
Fixed effects MTSS				
dummy MTSS-IEB	Yes	Yes	Yes	Yes
imputation dummy MTSS Probit	No	Yes	No	Yes
Other controls	Yes	Yes	Yes	Yes
N	407	648	407	648
Pseudo-Rsq	0.220	0.237	0.218	0.203

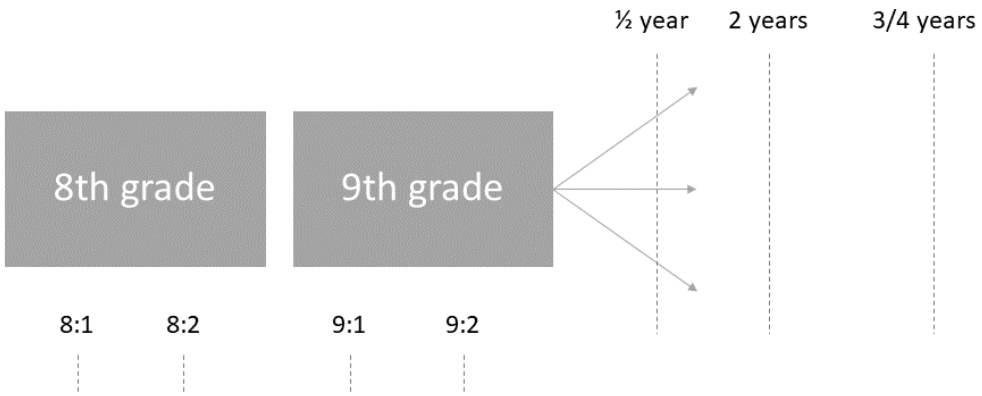
Notes: Table reports average marginal effects (AME). The dependent variable is dummy variable/probability of MTSS degree by year since LTSS. Other controls are all control variables in Table 10. Column (2) full sample with imputed probability for MTSS degree in case of missings. We do not report the results for year 1 for treatment interacted with no MTSS-CW because the AME's by migration background are quite noisy and differ strongly from the OLS estimates. This is related to the fact that only a small number of individuals hold an MTSS degree by year one.

Figure 1: Location of Treatment and Control Group (LTSS's)



Source: Open source map from *www.openstreetmap.org* [created on 11 August 2017] - red shaded area and dots for address of LTSS schools in data added. • Red area/dots: City of Freiburg/treatment schools. • Blue dots: Control schools in surroundings of Freiburg. Geographic Distance Freiburg City Center to Müllheim City Center: 27 km.

Figure 2: Timing of Surveys

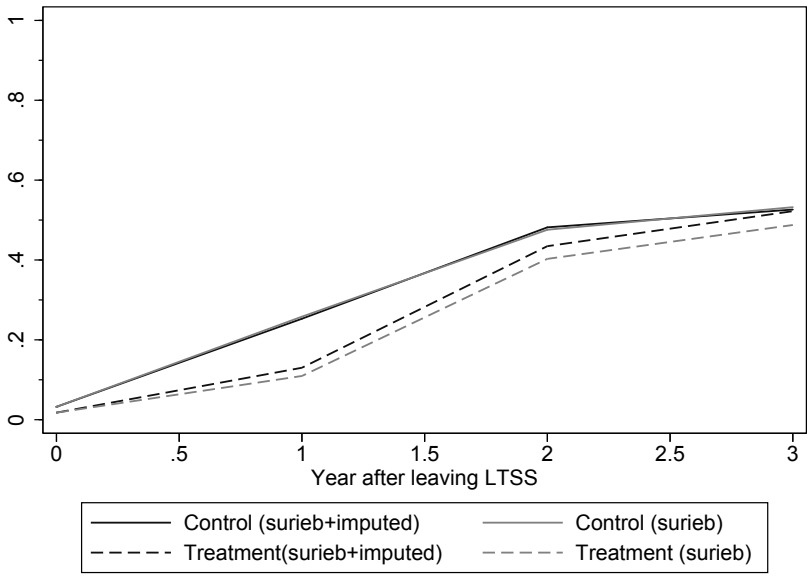


Notes: The surveys involve the two cohorts who graduated in 2009 and in 2010, respectively (in grade 9:2). The first survey for the first cohort started in 8:2 and the first survey for the second cohort started in 8:1.
First and second survey after LTSS: 6 months and 2 years after LTSS.
Third survey after LTSS: 4 and 3 years after LTSS for cohorts 1 and 2, respectively

Figure 3: MTSS-track Coursework and Transitions after LTSS

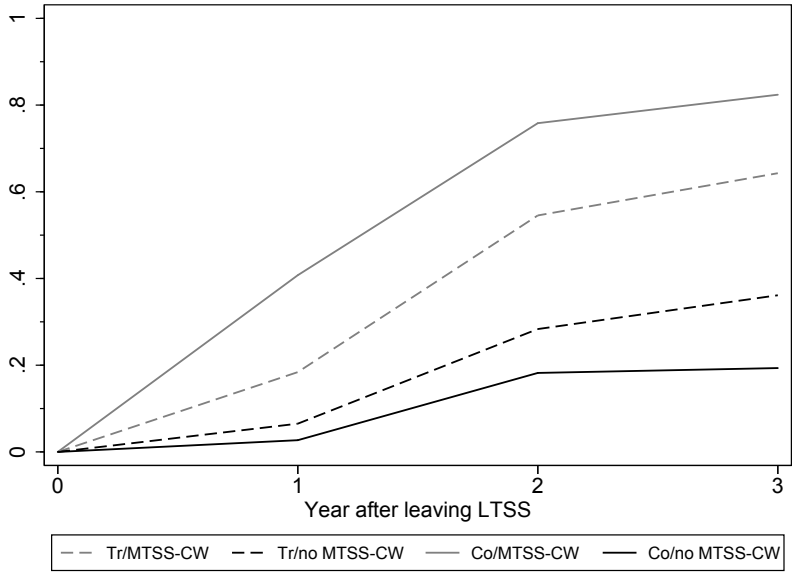
Source: Own survey and calculations, $N = 664$, including imputed values. Immediate Transitions after completing 9th grade in LTSS based on consolidated data. 10th grade: option to achieve MTSS degree within LTSS, Vocational school: 2-year-school involving vocationally oriented education/training with the option to achieve MTSS degree.

Figure 4: Completion MTSS degree by Treatment



Notes: *Control/Treatment* denote the control group and the treatment group, respectively. Sample with survey data and IEB data (referred to as *surieb*, $N = 407$) vs. larger sample including those with imputed probability of earning an MTSS degree (referred to as *surieb+imputed*, $N = 648$).

Figure 5: Completion MTSS degree by MTSS-CW and Treatment



Notes: Larger sample including those with imputed probability of earning an MTSS degree, see Figure 4. Tr refers to treatment group and Co to control group.

B: Determination of Highest Educational Degree after leaving LTSS

The IEB data involve information on the highest educational degree reached. Only when an LTSS-Certificate is observed as the highest educational degree three years after leaving LTSS, we take it that no higher educational degree is reached.

Specifically, the educational information from the IEB data is used as follows:

1. Use information on the MTSS degree from the IEB-data and use information on the documented LTSS-Certificate if there is no information on the MTSS degree achieved.
2. Use information on the MTSS degree from the IEB-data, and only use information on the maximal achieved LTSS-Certificate if this information is from at least 3 years after leaving LTSS [time codes: 31 or 32, see footnote 10].
3. Only for time periods with information from IEB available (unbalanced panel).

We use the education information both in the survey data and the merged IEB data to determine as to whether and when an MTSS degree has been completed after leaving LTSS. When the survey data or the IEB data show a higher educational level than LTSS, e.g. an MTSS degree, this information is used from the earliest point of time onwards, when this is observed. If the survey data and the IEB data are contradictory, we rely on the information in the survey data.

C: Additional Online Appendix

Robustness Checks

Table AOA.1: OLS - Final GPA [$GPA(9)$] when Leaving LTSS - Specifications (4) and (5)

Specification	(4)	(5)
treat * MTSS-CW * m	0.0109	0.0454
	[0.16]	[0.06]
treat * MTSS-CW * $\overline{m}$	0.0578	-0.0248
	[0.06]	[0.15]
treat * no MTSS-CW	-0.2602**	-0.3383***
	[0.11]	[0.08]
treat * no MTSS-CW * m	0.0929	0.0984
	[0.18]	[0.18]
Other controls	Yes	Yes
N	634	634
R-sq	.482	.392

Notes: The dependent variable $GPA(9)$ involves the average grade in German/Math at the end of grade 9 when graduating from LTSS. Specification (4) as in Table 8, except that GPA in grade 7 is interacted with migration background and MTSS-track coursework. Specification (5) as in Table 8, except that GPA in grade 7 is omitted. Other controls are all control variables in Table 7.

Table AOA.2: OLS Regression for Completion of MTSS Degree - Specification 1

Dependent variable: *mtss*	Year 1		Year 2		Year 3	
	(1)	(2)	(1)	(2)	(1)	(2)
treat	-0.1276**	-0.1111**	-0.0931	-0.0708	-0.0657	-0.0419
	[0.05]	[0.04]	[0.08]	[0.05]	[0.06]	[0.04]
migration background (m)	-0.0549	-0.1032***	0.1632**	0.0712	0.0688	0.0456
	[0.03]	[0.03]	[0.06]	[0.05]	[0.06]	[0.05]
female	-0.0936**	-0.1333***	-0.0253	-0.0615	0.0200	0.0225
	[0.04]	[0.03]	[0.05]	[0.04]	[0.06]	[0.04]
m * female	0.1280**	0.2056***	-0.0011	0.1089*	0.0742	0.1233
	[0.06]	[0.05]	[0.07]	[0.05]	[0.08]	[0.08]
share of foreigners in	0.0016	0.0008	0.0059	0.0062*	0.0060	0.0075**
residential area	[0.00]	[0.00]	[0.01]	[0.00]	[0.01]	[0.00]
GPA(7)	-0.0002	-0.0311	-0.1436***	-0.1549***	-0.1204***	-0.1273***
	[0.04]	[0.03]	[0.04]	[0.03]	[0.03]	[0.03]
MTSS-track coursework	0.1046	0.0340	0.2492**	0.2150**	0.2884***	0.2908***
	[0.09]	[0.07]	[0.10]	[0.09]	[0.10]	[0.09]
female * MTSS-CW	0.0372	0.1144**	0.0634	0.0721	0.0464	0.0047
	[0.07]	[0.05]	[0.07]	[0.07]	[0.07]	[0.07]
m * MTSS-CW	0.1072	0.1690***	-0.1587*	-0.0978	-0.1079	-0.1190
	[0.07]	[0.06]	[0.09]	[0.06]	[0.10]	[0.09]
social and personal competences	0.0545**	0.0529***	0.0333	0.0431***	0.0487**	0.0448**
(teacher, 8:1/8:2)	[0.02]	[0.02]	[0.02]	[0.01]	[0.02]	[0.02]
father employed	-0.0434	-0.0473	-0.1386*	-0.1148*	-0.0287	-0.0511
	[0.06]	[0.05]	[0.08]	[0.05]	[0.06]	[0.04]
father medium/high educated	0.0208	0.0073	0.1104***	0.1183***	0.1063**	0.1338***
	[0.05]	[0.03]	[0.03]	[0.02]	[0.04]	[0.02]
10th grade available	0.0579*	0.0261	0.0526	0.0122	0.0622	0.0558
at LTSS	[0.03]	[0.04]	[0.05]	[0.05]	[0.04]	[0.04]
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects MTSS						
dummy MTSS-IEB	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy MTSS Probit	No	Yes	No	Yes	No	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
R-sq	0.157	0.213	0.242	0.275	0.255	0.293

Notes: The dependent variable is dummy variable/probability of MTSS degree by year since LTSS. Specification as in Table 10. Column (2) full sample with imputed probability for MTSS degree in case of missings.

Table AOA.3: OLS Regression for Completion of MTSS Degree - Specification 3 - Heterogeneous Treatment Effects by MTSS-CW and Migration Background

Dependent variable: *mtss*	Year 1		Year 2, 3	
	(1)	(2)	(1)	(2)
treat * $\overline{m}$ * MTSS-CW	-0.3051**	-0.2796**	-0.1563	-0.1795**
	[0.13]	[0.10]	[0.10]	[0.08]
treat * m * MTSS-CW	-0.1018	-0.0872	-0.2507**	-0.1761**
	[0.09]	[0.09]	[0.11]	[0.07]
treat * $\overline{m}$ * no MTSS-CW	-	-	0.1130**	0.1426****
	-	-	[0.05]	[0.04]
treat * m * no MTSS-CW	-	-	-0.0445	-0.0164
	-	-	[0.12]	[0.08]
Year 3 Dummy	-	-	0.0762***	0.0854***
	-	-	[0.01]	[0.02]
Fixed effects MTSS				
dummy MTSS-IEB	Yes	Yes	Yes	Yes
imputation dummy MTSS Probit	No	Yes	No	Yes
Other controls	Yes	Yes	Yes	Yes
N	407	648	407	648
Rsq	0.193	0.249	0.263	0.301

Notes: The dependent variable is dummy variable/probability of MTSS degree by year since LTSS. Other controls are all control variables in Table 10. Specification as in Table 12. Column (2) full sample with imputed probability for MTSS degree in case of missings. We do not report the results for year 1 for treatment interacted with no MTSS-CW because the AME's by migration background are quite noisy and differ strongly from the OLS estimates. This is related to the fact that only a small number of individuals hold an MTSS degree by year one.

Table AOA.4: AME's (Fractional) Probit for Completion of MTSS Degree - Specification 4 - Heterogeneous Treatment Effects by MTSS-CW and Migration Background, GPA(7) interacted with MTSS-CW and Migration Background

Dependent variable: *mtss*	Year 1		Year 2, 3	
	(1)	(2)	(1)	(2)
treat * $\overline{m}$ * MTSS-CW	-0.1872***	-0.1806***	-0.1413	-0.1704**
	[0.06]	[0.05]	[0.10]	[0.08]
treat * m * MTSS-CW	-0.0564	-0.0402	-0.2310**	-0.1824**
	[0.05]	[0.05]	[0.11]	[0.07]
treat * $\overline{m}$ * no MTSS-CW	-	-	0.1847***	0.1849****
	-	-	[0.06]	[0.04]
treat * m * no MTSS-CW	-	-	-0.0694	-0.0250
	-	-	[0.11]	[0.08]
Year 3 Dummy	-	-	0.0760***	0.0843***
	-	-	[0.01]	[0.02]
Fixed effects MTSS				
dummy MTSS-IEB	Yes	Yes	Yes	Yes
imputation dummy MTSS Probit	No	Yes	No	Yes
Other controls	Yes	Yes	Yes	Yes
N	407	648	407	648
Pseudo-Rsq	0.250	0.258	0.225	0.207

Notes: Table reports average marginal effects (AME). The dependent variable is dummy variable/probability of MTSS degree by year since LTSS. Other controls are all control variables in Table 10. Specification as in Table 12, except that GPA in grade 7 is interacted with migration background and MTSS-track coursework. Column (2) full sample with imputed probability for MTSS degree in case of missings. We do not report the results for year 1 for treatment interacted with no MTSS-CW because the AME's by migration background are quite noisy and differ strongly from the OLS estimates. This is related to the fact that only a small number of individuals hold an MTSS degree by year one.

Table AOA.5: AME's (Fractional) Probit for Completion of MTSS Degree - Specification 5 - Heterogeneous Treatment Effects by MTSS-CW and Migration Background, GPA(7) dropped

Dependent variable: *mtss*	Year 1		Year 2, 3	
	(1)	(2)	(1)	(2)
treat * $\overline{m}$ * MTSS-CW	-0.2072***	-0.1969***	-0.1467	-0.1805***
	[0.07]	[0.05]	[0.09]	[0.07]
treat * m * MTSS-CW	-0.0498	-0.0368	-0.2326**	-0.1745**
	[0.06]	[0.06]	[0.11]	[0.08]
treat * $\overline{m}$ * no MTSS-CW	-	-	0.1645**	0.1973***
	-	-	[0.07]	[0.04]
treat * m * no MTSS-CW	-	-	-0.0424	-0.0120
	-	-	[0.13]	[0.08]
Year 3 Dummy	-	-	0.0764***	0.0843***
	-	-	[0.01]	[0.02]
Fixed effects MTSS				
dummy MTSS-IEB	Yes	Yes	Yes	Yes
imputation dummy MTSS Probit	No	Yes	No	Yes
Other controls	Yes	Yes	Yes	Yes
N	407	648	407	648
Pseudo-Rsq	0.207	0.220	0.198	0.182

Notes: Table reports average marginal effects (AME). The dependent variable is dummy variable/probability of MTSS degree by year since LTSS. Other controls are all control variables in Table 10. Specification as in Table 12, except that GPA in grade 7 is dropped. Column (2) full sample with imputed probability for MTSS degree in case of missings. We do not report the results for year 1 for treatment interacted with no MTSS-CW because the AME's by migration background are quite noisy and differ strongly from the OLS estimates. This is related to the fact that only a small number of individuals hold an MTSS degree by year one.