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

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

March 1, 2016

Abstract: This paper estimates the effect of Additional Career Assistance (ACA) on educational outcomes for students in Lower Track Secondary Schools (LTSS) for the area of Freiburg (Germany). The analysis uses individual data during the late 2000's on grades in LTSS and educational outcomes after leaving LTSS. Compared to LTSS students in the surroundings of Freiburg, students in the City of Freiburg receive more intensive information, counselling, and mentoring regarding the school-to-work transition and vocational training (ACA). The goal of ACA is to foster the transition to the labor market. Many LTSS students with good grades participate in additional teaching during the last two years in LTSS, thus preparing themselves for a higher educational degree after leaving LTSS. We investigate the effect of ACA on grade development in LTSS and on educational upgrading after leaving LTSS. Our empirical analysis shows negligible effects of ACA on educational outcomes, which, however, mask quite heterogeneous effects. In fact, educational outcomes worsen (improve) for German students who (do not) participate in additional teaching. We find no significant effects for students with a migration background.

Keywords: lower track secondary schools, vocational training, career guidance

JEL-Classification: I20, J24

1 Introduction

There is a lot of concern that the tracked school system in Germany results in low educational outcomes for students in lower track secondary schools (LTSS) (Hanushek and Woessmann 2006). At the same time, the German apprenticeship system is often viewed as a role model because of its low youth unemployment rate (OECD 2013). Nevertheless, LTSS students have particular difficulties in managing the school-to-work transition (BMBF 2013). Only a small fraction of LTSS students starts an apprenticeship or begin full-time vocational training immediately after leaving LTSS (Beicht et al. 2007, 2008; Protsch 2014; Fitzenberger and Lickleder 2015). Instead, a large share of LTSS students continues schooling striving for a higher educational degree¹ and a large share transfers to pre-vocational training, a vocational schooling system intended to prepare students for the labor market after leaving secondary school. LTSSs put a lot of effort on career guidance policies to prepare for a successful school-to-work transition. Such policies involve the provision of information about labor market opportunities as well as counselling and mentoring. A direct school-to-work transition, however, may be in conflict with educational upgrading. This paper investigates the effect of additional career assistance (ACA), i.e. more intensive information, counselling, and mentoring regarding the school-to-work transition and vocational training, on educational outcomes during and after LTSS during the late 2000's for the area of Freiburg. At the time, students in the City of Freiburg receive higher additional career assistance compared to LTSS students in the surroundings of Freiburg,

The German education system is rather complex and offers several ways to obtain a particular educational degree. Students are tracked after grade 4. They can proceed to the academic tracks (*Gymnasium*) of secondary schools, which provide the opportunity to enter university, and, to the non-academic tracks of secondary schools (middle schools), the Lower Track Secondary Schools (LTSS, *Hauptschulen*) and the Middle Track Secondary Schools (MTSS, *Realschule*), where over the long term, entry into the labor market is dominated by vocational training in a specific occupation.

Students leaving school are confronted by a situation where the demand for highly

¹Mühlenweg and Puhani (2010) and Dustmann et al. (2016) emphasize the importance of educational mobility between the different tracks of the German schooling system.

skilled as opposed to less skilled workers has increased, which reflects the increased skill requirements in the labor market (Katz and Autor 1999, Reinberg and Hummel 2002, Spitz-Oener 2006, Acemoglu and Autor 2011). In line with this, the cognitive complexity of apprenticeship occupations in Germany has been growing due to an increasing share of secondary school students who strive for a higher degree within the tracking system in Germany (Protsch 2014).² As a consequence, students graduating from the lowest school track in Germany experience a decrease in access. However, students from Middle and Upper Track Secondary Schools (UTSS, *Gymnasium*) experience faster and higher rates of transition to apprenticeship training (Beicht et al. 2007, 2008). This is also reflected in the considerable number of students with a UTSS degree (*Hochschulreife*) who start an apprenticeship contract — a share that amounts to 25 percent of new contracts (BIBB 2015).

Although labor market conditions have improved since 2006, the transition after graduation from LTSS is not dominated by an the immediate start of apprenticeship training. In addition to the transition to apprenticeship, students who have failed to achieve a school leaving degree or who earned only poor marks can accomplish pre-vocational training (*Übergangssystem*), which reflects a lack of readiness for vocational training.³ After leaving LTSS, students that fulfill the grade requirements face the possibility of educational advancement (upgrading). For student of the LTSS this type of educational mobility is the equivalent of pursuing an MTSS Certificate. More education serves as a signal for higher cognitive skills (Spence 1973) and affects cognitive skills directly (Cunah and Heckman 2007). Students that receive Additional General Teaching (AGT) in grades 8 and 9 have the option of entering grade 10 and achieving a higher educational certificate within one year. Access to AGT is based on grades in grade 7 and teacher's evaluation of the student. A second option is to apply for a two-year vocational training school where students also choose a specific occupational field and acquire an MTSS qualification after two years. Unfortunately, as a result of decreasing transition rates into the lowest school track in Germany in the last decades, the composition of LTSS students shows a higher share of students with a migration background and who have a low-socioeconomic family background (Autorengruppe Bildungsberichterstattung 2012, p. 263, Kultusministerkonferenz 2009).

²Protsch 2014 analyzes the development of educational targets that are defined in the framework plan of apprenticeships (*Ausbildungsrahmenplan*) and that are binding for training companies.

³Which can be either a preparatory vocational entry training year (BEJ, *Berufseinstiegsjahr*) or a vocational preparation year (BVJ, *Berufsvorbereitungsjahr*).

In addition they perform worse in reading and math (Schaffner et al. 2004, Klieme et al. 2001). Battaglini et al. 2005 analyze the effect of observed peer behavior on own abilities and find that the optimal peer has a slightly worse self-control problem than oneself; one's successes are more encouraging as a result. Group composition plays an important role as among groups with very poor self-confidence, social interaction may even deteriorate initial self-control problems (Battaglini et al. 2005). Because the transition from school-to-work is negatively influenced by school performance, educational level, and migration background, LTSS students suffer from an accumulation of negative risks (Beicht and Granato 2010, Beicht et al. 2007, 2008).

However, recent studies suggest that even in the case of a rather low-quality school, one that is associated with the lowest school tracks, the final educational degree is not predetermined. Dustmann et al. (2016) find only a slight long-term effect of school quality on school degree, wages, occupational choice, and unemployment, where school quality is defined by more advanced peers, more highly paid teachers, and a more academic curriculum. Their finding can partly be explained by student upgrading and downgrading between schools of varying quality. This upgrading and downgrading indicates that students are able to revise their initial selection of school type. Moreover, the study shows that the quality of the middle school has only a slight impact on the type of secondary education. The authors argue that students who manage to upgrade during their education are able to compensate for time spent with less challenging peers and a less challenging curriculum. Mühlenweg and Puhani 2010 show that students who enter school at a relatively young age are only two-thirds as likely to enter the highest educational track (Gymnasium) in Germany. However, this segregation only persists up to grade 10 (at age 16), at which point the school system offers more mobility between tracks. They show that disproportionate upgrading of younger school entrants and disproportionate downgrading of older school entrants extenuates the initial age effect on track attendance.

Students leaving LTSS face a complex decision at a relatively young age in a situation of asymmetric information regarding regional labor market conditions, the choice of occupation and returns to (further) education. There is an undisputed demand in the provision of career guidance policies, especially for students leaving the lower tracks of the German School System. Knowledge factors about the content of occupations and jobs offered in the labor market (occupational knowledge) lead to efficiency gains,

the result is a better match of interests and abilities due to more information on earnings profiles and job perspectives; i.e., uncertainty in the choice of occupation and/or education is reduced. Regarding the choice of education, one must consider that educational choices are influenced by student expectations about future economic returns (Zafar 2011, Stinebrickner and Stinebrickner 2011). Given that knowledge about future returns in terms of career guidance should reduce uncertainty, one would expect higher returns to education and better earnings prospects (Borghans et al. 2013). Saniter and Siedler (2013) show that occupational knowledge leads to higher educational attainment and smoother transitions into the labor market. They provide difference-in-difference estimates of the effects of occupational knowledge on labor market outcomes and educational choices.⁴ Specifically, Lower Track and Medium Track Secondary School (LTSS and MTSS) students show an increase in the probability of upward educational mobility of 8-12 pp (Saniter and Siedler 2013, p. 3) and a reduction in the risk of becoming unemployed. However, they find no evidence for earnings effects. Rodríguez-Planas (2012) perform a randomized evaluation of a program that is meant to increase high school completion and postsecondary education by offering mentoring by case workers, educational services, and financial awards. They find positive intent-to-treat (ITT) effects for school completion (5.3 pp) and postsecondary education (6 pp) that was driven by female participants. Labor market outcomes such as hours worked, having a full-time job and earnings are initially negatively affected, but this effect is offset within three years.

In order to meet the access requirements for higher educational tracks, especially for students not participating in AGT, an improvement in grades is crucial. To successfully invest in further education, soft skills play an important role (Koch et al. 2014). Some studies underline the problem of dropping out because of problems associated with a lack of motivation and self-control (Oreopoulos 2007, Eckstein and Wolpin 1999). Impatience adversely affects school performance as measured by the highest level of school completed and grades (Lindahl et al. 2014). Moreover, impatience explains aspects of observed gender difference in academic performance (Duckworth and Seligman 2005), and more impatient children exhibit less effort and discipline at school (Sutter et al. 2013). In addition to these obstructive factors, self-discipline is seen as a strong predictor for academic performance (Duckworth and Seligman 2005).

⁴They 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 that provide occupational knowledge.

As performance measures such as grades not only depend on ability but are also affected by learning effort, self-control is highly important in countering the problem of present-bias (Solomon and Rothblum 1984, Steel 2007). However, educational environment also affects soft skills (Cunha et al. 2006, Cunha and Heckman 2007, Heckman et al. 2010) and there are correlations between soft skills and family background. Kosse and Pfeiffer 2012 and 2013 document a correlation between the impatience and self-control of children and their mothers, and there is a correlation between the risk and trust attitudes of children and those of their parents (Dohmen et al. 2013).

There is little economic research on the effect of Career Assistance on labor market outcomes and educational mobility (Fitzenberger et al. 2015). Using a comprehensive data set involving grades at school and educational outcomes after leaving school, this paper investigates the effect of Additional Career Assistance (ACA) on the achievement of a higher educational degree after leaving a Lower Track Secondary School (LTSS) in Germany. In our framework, counseling corresponds to Additional Career Assistance (ACA), which provides additional knowledge regarding own excellence, preferences, and skills as well as knowledge about occupations and application requirements for additional schooling and apprenticeship training.⁵

Following the previous theoretical arguments and empirical findings we address the following hypothesis: Additional knowledge about occupations and access requirements may lead to an increase in scholastic effort, in particular for students not participating in AGT because have the option to catch up by an improvement in grades during grades 8 and 9 to meet access requirements for further schooling.⁶

There is an area of conflict with respect to Additional Career Assistance and the trend of entering higher educational tracks. Overall, we see no evidence that ACA improves grades over the last two years at LTSS. However, this finding hides the positive heterogeneous treatment effects for better performing German students and the negative effects for German students who perform worse at the beginning of grade 8. Although better performing students who benefit from ACA make gains in individual performance, they do not earn a higher educational degree within one additional year of schooling. Instead, they tend to achieve an MTSS-Certificate with an occupational specialization at two-year vocational schools. Moreover, we find positive effects from

⁵For a description of the ACA, see Arbeitsagentur Freiburg 2007.

⁶These students can acquire a Middle Track Secondary School Degree by attending two-year vocational schools (*zweijährige Berufsfachschule*).

Additional Career Assistance for students that are relatively underperforming at the beginning of grade 8. They have a likelihood of achieving a MTSS-Certificate of about +6 percentage points.

The remainder of the paper is organized as follows: Section 2 describes the data and introduces the estimation strategy for our main variable of interest: achieving the *reaching Middle Track Secondary School Certificate (mtss)*. Section 3 presents the empirical results. We conclude in section 4. Appendix A shows Tables and Figures and Appendix B describes part of the data cleaning procedures. The Additional Online Appendix contains complementary empirical results (Tables and Figures starting with AOA.).

2 Empirical Design and Data

2.1 Data

We use two data sets for our analysis. First, we use own survey data. We observed 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). All LTSS students in Freiburg receive Additional Career Assistance (ACA) during grades 8 and 9 as part of the career guidance policies.⁷ This training amounts to 160 hours per year and grade. The Additional Career Assistance (ACA) provides additional knowledge about individual strengths and weaknesses, preferences, and skills as well as knowledge about occupations and application requirements for further schooling and apprenticeship training. Our sample includes 664 students; 464 are from the city of Freiburg (treatment group), and 200 are from the control group. The students are from 16 schools and 23 classes (11 schools and 16 classes are from the treatment group). They 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.⁸ For this analysis, we use, for example the information on planned transition paths after LTSS. Our data include administrative data

⁷See Arbeitsagentur Freiburg, Netzwerk Schule-Ausbildung Freiburg (2007). The German name for the ACA in Freiburg is 'Erfolgreich in Ausbildung'.

⁸For practical reasons, it was only possible to conduct the first survey for the first cohort at the end of grade 8.

on school achievement (grades in class 7 to 9) and individual characteristics (gender, migration background). Table 1 shows the sample size of questionnaire data from school with time codes in the first column (i.e., 8:1 means grade 8 first half-year). In addition to grades, we also observe participation in Additional General Teaching (AGT), where the students who participate have good test scores at the end of grade 7.⁹ Table 11 shows the proportions of basic characteristics for treatment and control group students. Moreover, we have information on students' family background (the education and employment status of parents) and teacher assessments of student's performance (need for additional individual support, social and cognitive skills, improvement in the autonomy of career planning). The share of problematic students in need of additional support (*support = yes*) is 82.26 percent in the treatment and 63.50 percent in the control group.

Furthermore, we collected data from students beginning in grade 8 at school until three/four years after they left Lower Track Secondary School (LTSS).¹⁰ Table 2 shows the sample size over time after leaving LTSS, with specific information on students' current situation (status information). We observe transition paths for further education as well as apprenticeship contracts. Questions contain information on timing and level of educational certificates. Moreover, we asked students about their highest expected school certificate, and students also assessed their knowledge about application requirements for further (vocational) schooling. There are two ways to achieve a middle secondary track certificate after graduating LTSS with the typical 9 years of schooling. First, students continue to grade 10 directly after grade 9 of LTSS if they participate in the Additional General Teaching Lessons (AGT, *Zusatzunterricht*) during grade 8 and 9 and satisfy some mean grade requirements. Second, students apply for Two-Year-Vocational Schools (*Berufsfachschule*) if they satisfy the grade requirements in grade 9 (typically, half-year reports are the basis of students' application).

We connect administrative and survey data to the SIAB records of all students participating in the survey that agreed to the procedure. These SIAB data contain infor-

⁹In addition to grade requirements, the assessment of the teacher influences the decision whether a student can participate in AGT.

¹⁰Survey 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 over both cohorts.

mation on students' employment status (records of employees paying social security) and also include information on educational degree, which we will use in addition to our survey information to identify upward educational mobility.¹¹

Table 1: Questionnaires at School

Grade and semester	treatment	control	Σ
8:1	143	78	221
8:2	299	83	382
9:1	327	97	424
9:2	246	108	354
<i>N</i>	464	200	664

Note: 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.

Table 2: Questionnaires after School - Status information

year	treatment	control	Σ
1	445	153	598
2	179	91	270
3	178	91	269
4	145	73	218
<i>N</i>	464	200	664

2.2 Estimation Strategy

For most of our analyses we control for the following set of covariates (X_i) and their interactions. First, we control for individual and family characteristics like gender, migration background, employment status and education level of parents. Furthermore, we use the share of foreigners in the residential area as a proxy for living environment. Average grade in German and Math at the end of the 7th school year and information on whether the individual attained Additional General Teaching (AGT) are variables of individual achievement at the beginning of 7th grade. Moreover, we use information based on teacher assessment of the student's abilities. There, we ask whether individual coaching/mentoring is desirable for a specific student and obtain an evaluation of the social and cognitive skills of the student. The main dependent

¹¹For more information, see vom Berge et al. 2013.

variable $mtss_{it}$ is the cumulative incidence of achieving a middle track secondary school (MTSS) certificate of individual i at time t . We start by using information available from the survey up to three years after leaving Lower Track Secondary School which provides $N = 272$ observations.

$$mtss_{it} = \alpha + \tau \cdot treatment + \gamma \cdot X_i + u_{it}$$

Moreover, we are able to impute missing information on education certificate achieved by using IABS-Data. In this case, the level of education is observed for persons who are in contact with the employment agency. They appear in the statistics of job seekers and/or as participants in active labor market programs (data sources: *ASU* and *MTH*) for the period of contact. We apply different strategies for these additional data on MTSS (see Appendix B). In the end, we use strategy (2), where information on a maximal LTSS-Certificate is used if we observe this information during the third year after the student has left school; this ensures that no higher educational level is achieved in this time period. An observed higher educational level such as MTSS-Certificate is used in the same way as for the questionnaire data.¹² In the case of individuals for whom we use additional information on achieved MTSS ($mtss$) using IABS-Data, we include a dummy variable (imp_i) and/or interactions of this dummy variable with variables characterizing further subgroups to keep our model flexible, as we suspect that individuals who are in contact with the employment agency are overrepresented for some subgroups.

We further expand our number of observations by including the predicted probabilities for reaching an MTSS-Certificate $P(mtss_{it} = 1 | X_{it})$. Achieved MTSS-Certificate is imputed for the remaining individuals (no survey data and no contact with unemployment/training statistic) by estimating a Probit model separately for each half year after leaving LTSS. 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.

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

¹²Estimates are robust to different imputation strategies. Results are available upon request. Applied strategy allows best fit of $m\hat{t}ss$ compared with observed $mtss$.

We observe the end of years 1 [12], 2 [22], and 3 [32] after leaving LTSS.¹³ First, we control for a set of covariates (X_i) as described above (including an interaction term between migration background and AGT) and a cohort dummy ($cohort_i$). In addition to the estimation of the cumulative incidence of an MTSS-Certificate, further control variables are included with an additional set of covariates (V_i) and set of class dummies ($class_{k,i}$, $k = 2, 3, \dots, 16$). For this estimation, we use the information $N = 272$ individuals with valid panel information after leaving LTSS and additionally all information from IABS-Data regarding educational level achieved as described above. We then use the predicted probability $P(mtss_{it} = 1 | X_{it})$ of earning an MTSS-Certificate as the dependent variable in later estimations. For the following regressions, we also include a dummy variable ($imp_{\hat{p},i}$) for individuals for whom we use estimated information on the MTSS-Certificate. We apply a Fractional Response General Linear Model, as unlike the usual Probit Regression, the dependent variable is allowed to take values between zero and 1.¹⁴

Estimation equation of average treatment effects:

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

Estimation equation allowing for heterogeneous treatment affects with regard to attaining Additional General Teaching (AGT):

$$P(mtss_{it} = 1 | X_i) = \Phi(\alpha + \tau_1 \cdot treatment \cdot AGT + \tau_2 \cdot treatment \cdot no\ AGT + \gamma \cdot X_i + \eta_s \cdot imp_i + \eta_p \cdot imp_{\hat{p},i})$$

We perform several robustness checks. Most of them can be found in the Additional Online Appendix.¹⁵

¹³Time code in brackets. Years are defined according to the beginning of school years and apprenticeship contracts (September - August).

¹⁴We apply the user written command `fracglm` in STATA. For further details, refer to the help menu in STATA, Williams 2015, and Wooldridge 2010, pp. 748-753.

¹⁵As robustness checks, we first use different imputation strategies for *mtss*-information from the SIAB-Data (see Appendix B). Second, we apply different rules for using information from panel data over SIAB-Data and vice versa (If using rule 1: use IABS data only if Survey data is missing. If using rule 2: use IABS data over survey data). Third, we estimate OLS Regressions instead of Probit Regressions for imputing the remaining missing values of MTSS.

3 Empirical Results

3.1 Transition Plans and Highest expected School Certificate

Planned and realized Transition Paths

We have information on the planned transition paths of students during grades 8 and 9, which are shown in table 3. We observe three different paths: *apprenticeship*, *further schooling* and *no idea / other*.¹⁶ For the last survey at the end of grade 9, we further distinguish between *continuing grade 10* and *starting vocational schooling* as the two types of further schooling after grade 9.

Table 3: Plans for transition after LTSS

grade and halfyear	control				treatment			
	81	82	91	92	81	82	91	92
transition plan								
no idea / other	0.04	0.08	0.03	0.03	0.04	0.08	0.03	0.17
apprenticeship	0.22	0.23	0.27	0.29	0.20	0.22	0.19	0.18
further schooling	0.74	0.69	0.70	0.68	0.76	0.69	0.79	0.65
—— grade 10				0.39				0.14
—— vocational school				0.29				0.51
N	78	83	99	31	157	297	329	84

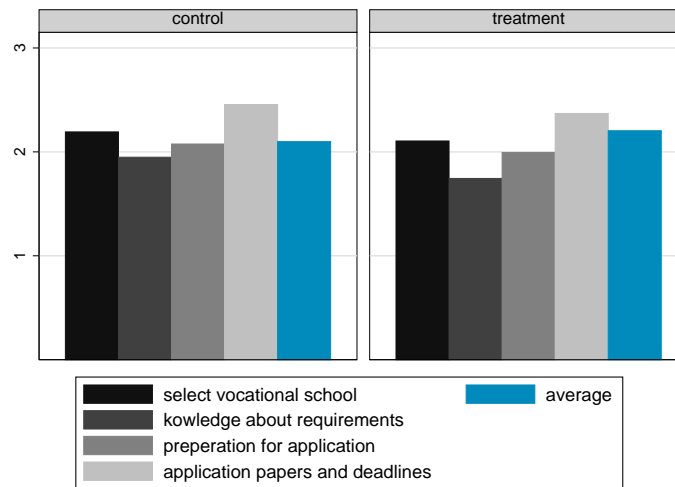
Source: own survey data, including student and teacher questionnaires.

We observe a difference in the transition to grade 10, which enables students to achieve an MTSS-Certificate in one additional school year. In the treatment group in the middle of grade 9 [91], almost 80 percent indicated they would continue with further schooling. This proportion slightly declined at the end of grade 9 [92] to 65 percent. In this group only every fourth student wanted to continue to grade 10. The share of students who indicated further schooling are similar in the control group (70 percent at [91] and 68 percent at [92]) but every second student indicated the desire to continue with schooling in grade 10.

Students from the treatment group receive intensive training and information about the requirements for the application at vocational schools. Figure 1 shows students'

¹⁶The category *no idea / other* includes persons who will start *vocational orientation/pre-vocational training* if they cannot start an apprenticeship.

Figure 1: Knowledge for Application at Vocational Schools



Note: Sample Size for the average variable: control group $n = 77$, treatment group $n = 184$.

assessment of their knowledge of the application for vocational schools using the German grading scheme (1=very good, 2, 3, 4, 5, 6=insufficient). For the variables regarding application for further schooling and in particular for vocational schooling, students assess themselves on average with a grade of on average 2.1 in the control group and 2.2 in the treatment group. The difference between both groups is not significant. The students' self-assessment differs only with respect to the question regarding *knowledge of the requirements*. Here, students of the treatment group tend to perform better (1.74) compared to students in the control group (1.95). Overall, we see no significant difference between self-assessed knowledge about applications and preparation for vocational schools. On average, students seem to be well prepared.

Table 4 shows the actual transition paths up to 4 years after LTSS. We find that the fraction of students who went directly to grade 10 is more than twice as high in the control group (25 percent) compared to students in the treatment group (11 percent). We see that the overall fraction of students who continue schooling (MTSS (10th grade) and Vocational School) is approximately 60 percent for both groups together. Students in the treatment group tend to choose vocational schooling over 10th grade.

Table 4: Transition after LTSS (Questionnaire Panel)

year	control group				treatment group			
	1	2	3	4	1	2	3	4
MTSS (10th grade)	25.50%	1.11%	1.10%	0.00%	11.01%	3.35%	2.26%	0.69%
High School	0.00%	6.67%	14.29%	9.59%	0.23%	1.68%	5.65%	6.21%
Vocational School (and school)	35.57%	36.67%	7.69%	4.11%	47.48%	48.60%	9.04%	6.21%
Berufskolleg	0.00%	4.44%	6.59%	8.22%	0.00%	1.68%	11.30%	6.90%
Vocational Orientation	17.45%	1.11%	0.00%	0.00%	24.77%	3.35%	2.26%	0.00%
Internship	1.34%	1.11%	1.10%	4.11%	1.15%	1.12%	1.69%	1.38%
Voluntary Gap Year (social)	0.00%	4.44%	1.10%	1.37%	1.15%	0.56%	2.26%	1.38%
Apprenticeship	18.12%	33.33%	53.85%	53.42%	10.55%	23.46%	44.63%	46.21%
military service/ community service (BFD)	0.67%	1.11%	2.20%	1.37%	0.46%	1.12%	3.39%	4.83%
Employment	0.67%	4.44%	4.40%	12.33%	0.92%	6.15%	10.17%	22.07%
Unemployed, out of labor force, and other	0.67%	5.56%	7.69%	5.48%	2.29%	8.94%	7.34%	4.14%
N	149	90	91	73	436	179	177	145
Population	200	200	200	200	464	464	464	464

Note: Year is always the beginning of school years after LTSS. "1" is September after leaving LTSS.

Expected and Transition Plans

For the first, second and third year after leaving LTSS, we collected data on the highest expected School Certificate.¹⁷

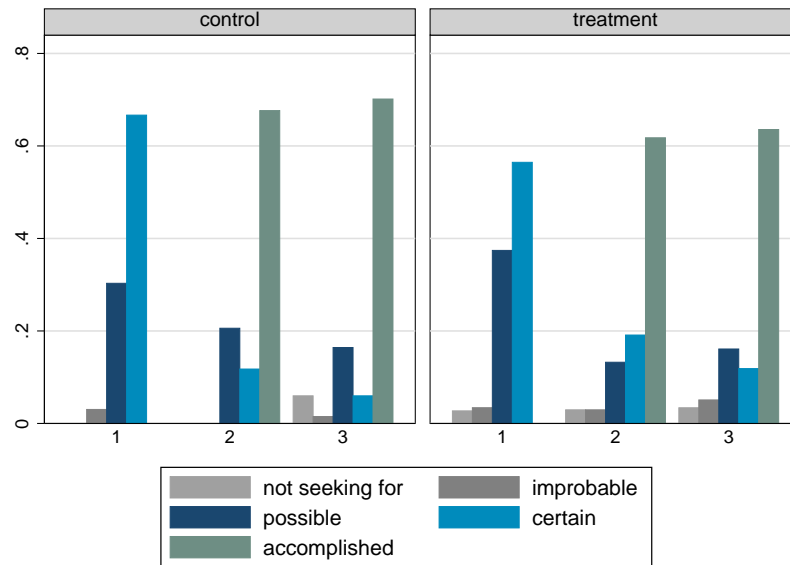
We see that almost all students earn an LTSS-Certificate over the observation interval.

In the first observation half a year after leaving LTSS, approximately 67 percent of control group students indicate that accomplishing Middle Track Secondary School (MTSS) is *certain* (see Figure 2). However, for treatment group students, this fraction is lower and approximately 56 percent. The fraction of students who have earned an MTSS-Certificate rises over the following observations in year 2 and 3, where the control group shows a higher completion rate compared to the treatment group (70 percent vs. 64 percent).

When pooling the answers *certain* and *accomplished*, we see that a similar share of students of the control and treatment groups strive for an MTSS-Certificate after at least three years after leaving LTSS (76 percent of the control group and 75 percent of the treatment group)

¹⁷We asked students half a year after LTSS (questionnaire number 1), two years after LTSS (questionnaire number 2) and three (cohort 1: four) years after LTSS (questionnaire number 3).

Figure 2: Highest expected School Certificate: Middle Track Secondary School



Note: Sample Size of control group $n_1 = 68, n_2 = 34, n_3 = 72,$
treatment group $n_1 = 153, n_2 = 75, n_3 = 144.$

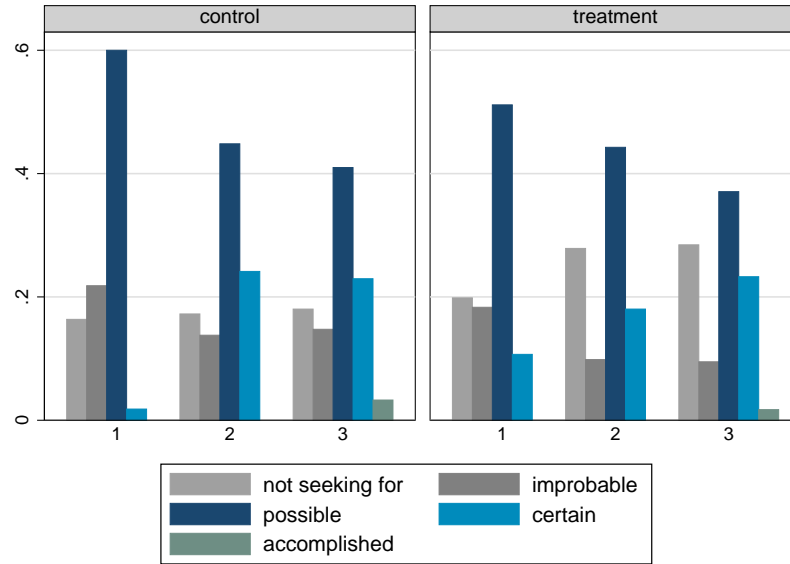
Figure 3 provides similar evidence on completion of an UTSS degree. Both groups indicate this track *possibly* being accomplished at a relatively high rate in the beginning; this then declines over time, with an overall higher level for the control group students. The fraction of students who state they are not seeking this certificate is higher for treatment students (and rises for this group over time). Approximately 23 percent indicate the accomplishment of this track as being *certain*, and a few students have already managed to complete this track. About every 20-25 percent of LTSS students are likely to achieve an Upper Track Secondary School certificate.

Realized Middle Track School Certificate

Figure 4 compares the fraction of those who earned an MTSS-Certificate over three years after leaving LTSS with imputed and estimated MTSS-Certificates using the estimation approaches discussed in Section 2.2.

Descriptive findings suggest that students from the control group tend to earn the MTSS-Certificate earlier but students from the treatment group manage to catch up, especially during the second year after LTSS. This is in line with the findings that students in the treatment group report choosing vocational schooling over grade 10,

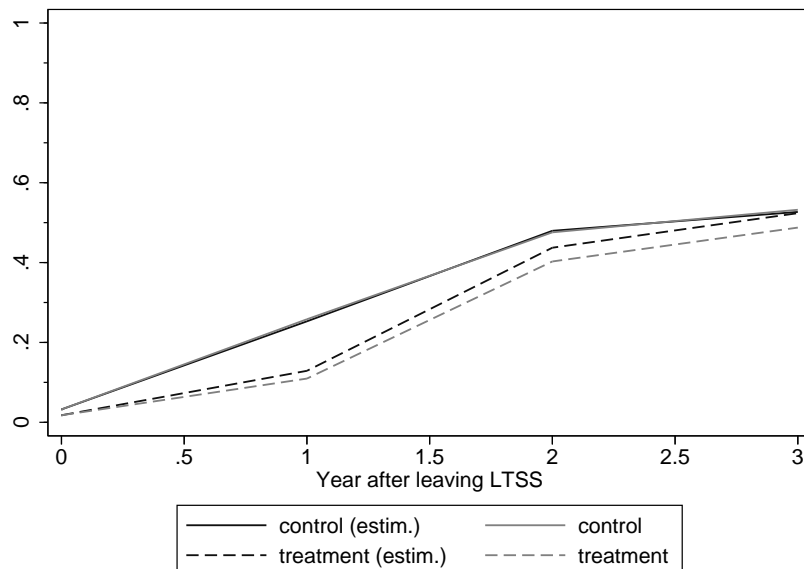
Figure 3: Highest expected School Certificate: Upper Track Secondary School (up to grade 13 or 12)



Note: Sample Size of control group $n_1 = 68, n_2 = 34, n_3 = 72,$
treatment group $n_1 = 153, n_2 = 75, n_3 = 144.$

which leads to an MTSS-Certificate after two years instead of one year. This figure also shows that the estimated shares are in line with the observed shares of the MTSS-Certificate, as the estimated shares for the treatment group students are slightly higher than the observed shares.

Figure 4: MTSS-Certificate



3.2 School Performance

Grades in the middle and at the end of grade 9 are especially important as they enable or prohibit access to planned and desired transition paths. In addition to being signaling effects for future employers, they serve as an access requirement for further schooling in grade 10 and vocational schools with occupational specialization. In this section, we investigate the effect of individual characteristics on the final grade at the end of grade 9; specifically, we investigate the average grade in the main subjects of German and Math. For this we use (as in the previous section) the imputed information on participating at AGT. We control for test scores in grade 7 in the subjects German and Math so that our analysis reflects the change in grades over the last two years in LTSS.¹⁸ This leads to the following estimation equation, where we control for the covariates X_i presented in section 2.2:

$$GM(9)_i = \alpha + \tau \cdot treatment_i + \gamma \cdot X_i + u_i$$

The OLS Regression shows no treatment effect on the final grade (see Table 5). Female students tend to show worse grades conditional on grades at the end of grade 7. Students participating in AGT - which are students with on average better grades in grade 7 - improve their final grade. In addition, better assessed social and cognitive skills by the teacher and fathers with a higher educational degree are associated with improvement. As to be expected, grades in grade 7 influence test scores in grade 9 significantly, and the second cohort tends to show less improvement compared to the first cohort observed.¹⁹

Now, we allow the treatment effects to differ between the groups with and without AGT (see Table 6) and, second, between the subgroups with a migration background interacted with participating in AGT (see Table 7). For this, we estimate OLS regressions using the following estimation equation:

$$GM(9)_i = \alpha + \tau_1 \cdot t_i \cdot AGT_i + \tau_2 \cdot t_i \cdot no\ AGT_i + \gamma \cdot X_i + u_i$$

For this first estimation, the results are shown in Table 6. We estimate a significant

¹⁸As in the German grading system, small grades refer to better grades/test scores a negative coefficient reflects an improvement in performance.

¹⁹We find no evidence for mediation channels via internships and improvement of autonomy in career planning.

Table 5: OLS - Final Grade when Leaving LTSS (1)

<i>GM(9)</i>	
treatment	-0.0783 [0.06]
cohort	0.1346* [0.07]
migration background	0.0702 [0.09]
female	0.2085*** [0.05]
share of foreigners in residential area	0.0053 [0.00]
average grade in German and Math (7:2)	0.3857*** [0.07]
Additional General Teaching (AGT)	-0.4724*** [0.08]
m * AGT	0.0852 [0.08]
individual coaching/mentoring: desirable (teacher, 8:2)	-0.0167 [0.10]
social and cognitive skills (teacher, 8:1/8:2)	-0.1160*** [0.03]
father employed	-0.0314 [0.07]
father medium/high educated	-0.0902** [0.04]
Other controls	Yes
N	634
R-sq	0.478
adj. R-sq	0.464

Note: regression includes dummies for missing data of questionnaires.

positive treatment effect for students with no AGT and a significant negative treatment effect for students with AGT.

$$GM(9)_i = \alpha + \tau_1 \cdot t_i \cdot m_i \cdot AGT_i + \tau_2 \cdot t_i \cdot m_i \cdot no\ AGT_i + \\ + \tau_3 \cdot t_i \cdot \bar{m}_i \cdot AGT_i + \tau_4 \cdot t_i \cdot \bar{m}_i \cdot no\ AGT_i + \gamma \cdot X_i + u_i$$

The results for the second model are shown in Table 7. On a highly significant level, German students with no AGT lessons tend to improve, whereas German students with AGT lessons perform worse. Students with a migration background and no AGT lessons also tend to improve (this effect is not statistically significant). Students who are on track to continue schooling (AGT, 10th grade) show better final grades (they are already at a high level in grade 7); and for German students, this effect is in line with a higher rate of transition to apprenticeship contracts, which might lead to a lower effort in grade 9 as they anticipate the start of an apprenticeship.

The other group of German students who were not on track to continue schooling directly (from the perspective of 7th grade) are likely to increase their effort to improve their grades. This might be initiated by information on grade requirements for access to vocational schools (*Berufsfachschulen*) after LTSS. The analysis of the interaction between AGT and treatment shows improvement for students with no AGT lessons (-0.1982**) and deterioration for those with AGT (0.2408**). Students may also realize during their last two years at LTSS that their desired occupation requires a higher educational degree. Moreover, students obtain information from employers, who appreciate previous experience in a particular occupational field, which can be acquired by attending vocational school. This conforms with the results of Licklederer (2016) indicating that German students with AGT in the treatment group choose direct access to the apprenticeship system over 10th grade.

Table 6: OLS - Final Grade when Leaving LTSS (2)

<i>GM(9)</i>	
t * AGT	0.2408** [0.09]
t * no AGT	-0.1982** [0.09]
Other controls	Yes
N	634
R-sq	0.483
adj. R-sq	0.467

Note: Regression includes dummies for missing data of questionnaires.

Table 7: OLS - Improvement in Grades (3)

<i>GM(9)</i>	
t * m * AGT	0.03 [0.13]
t * m * no AGT	-0.1579 [0.14]
t * \bar{m} * AGT	0.2847*** [0.09]
t * \bar{m} * no AGT	-0.2357** [0.10]
Other controls	Yes
N	634
R-sq	0.483
adj. R-sq	0.467

Note: Regression includes dummies for missing data of questionnaires.

3.3 Treatment Effect on the Completion of MTSS Degree

Following the estimation strategy presented in section 2.2, we estimate fractional Probit Regressions for earning an MTSS-Certificate $mtss$. The econometric model is specified as follows:

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

This regression reflects the cumulative incidence of an MTSS degree t periods after leaving LTSS. Table 8 shows the results for the small sample with survey and SIAB data (columns with (1)) and the larger sample with imputed information on $mtss$ (columns (2)). The estimations with the larger sample (columns with (2)) show similar estimates with reduced standard errors, which leads to greater significance. For the following interpretation, we focus on columns (2). Overall, ACA reduces the probability of earning an MTSS-Certificate by 8 to 10 percentage points within the first two years after leaving LTSS. This effect is highly significant in the first year after leaving LTSS, implying that control group students manage to complete the 10th school year more often. In addition, this students with a migration background are able to earn a higher school certificate during the first and second year by approximately 7 ppt compared to German students.

The rate at which students who participated in AGT earn a higher school certificate is 17 ppt greater in year one and 20 ppt greater in year two. This effect is even higher for students with a migration background. The interaction effect is 34 ppt in year one and 57 ppt in year two.

A worse (= higher) grade in grade 7 reduces the probability of an MTSS degree by 10 ppt in years one and two. Higher social and cognitive skills also increase the probability of achieving a higher school certificate. A more educated father tends to slightly reduce the probability of earning an MTSS-Certificate slightly for year two.

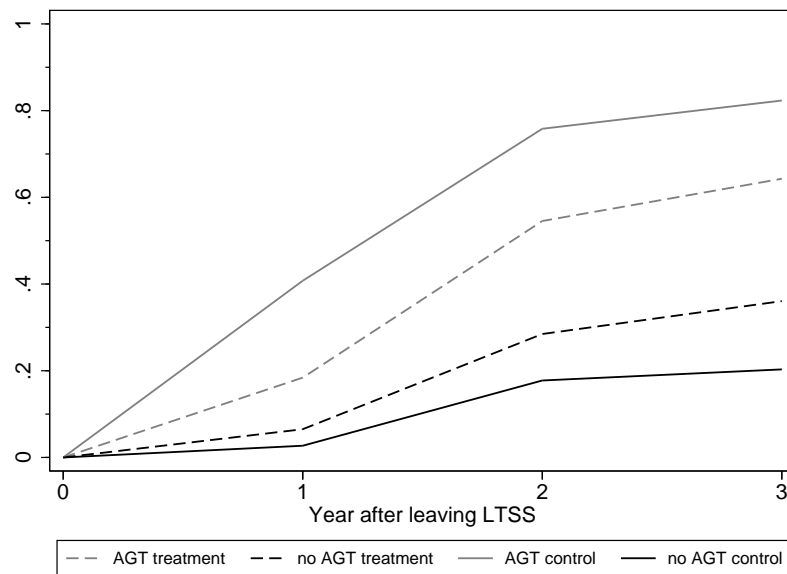
Table 8: Fractional Probit Estimation (AME)

Dependent variable: <i>mtss</i>	Year 1		Year 2		Year 3	
	(1)	(2)	(1)	(2)	(1)	(2)
Treatment	-0.1059 *** [0.04]	-0.0997 *** [0.03]	-0.0856 [0.07]	-0.0773 * [0.05]	-0.0688 [0.06]	-0.0506 [0.03]
Migration background (m)	0.0680 * [0.04]	0.0657 ** [0.03]	0.0740 ** [0.03]	0.0692 *** [0.03]	0.0459 [0.04]	0.0453 [0.03]
Female	-0.0392 0.0411	-0.0098 0.0262	-0.0055 0.0486	-0.0091 0.0378	0.0575 0.0523	0.0590 0.0384
Share of foreigners in residential area	0.0007 [0.00]	-0.0001 [0.00]	0.0063 [0.01]	0.0068 ** [0.00]	0.0060 [0.00]	0.0085 *** [0.00]
m * AGT	0.3073 *** [0.04]	0.3361 *** [0.04]	0.5251 *** [0.06]	0.5673 *** [0.04]	0.6161 *** [0.06]	0.6315 *** [0.04]
Average grade in German and Math (7:2)	0.0195 [0.03]	0.0045 [0.02]	-0.1015 *** [0.04]	-0.1103 *** [0.02]	-0.0975 *** [0.03]	-0.1126 *** [0.02]
Additional General Teaching (AGT)	0.1605 *** [0.06]	0.1677 *** [0.05]	0.2230 *** [0.06]	0.1990 *** [0.04]	0.2454 *** [0.05]	0.2259 *** [0.04]
Individual coaching/mentoring: desirable (teacher, 8:2)	0.0314 [0.08]	0.0707 [0.06]	0.0007 [0.09]	0.0111 [0.06]	0.0249 [0.09]	0.0439 [0.05]
Social and cognitive skills (teacher, 8:1/8:2)	0.0884 *** [0.03]	0.1068 *** [0.02]	0.0587 * [0.04]	0.0831 *** [0.02]	0.0856 ** [0.03]	0.0819 *** [0.02]
Father medium or high educated	0.0069 [0.05]	-0.0098 [0.03]	-0.0350 *** [0.10]	-0.0513 *** [0.06]	-0.0083 *** [0.12]	-0.0169 *** [0.07]
Fixed effects						
cohort	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
Adj. R-sq	0.1595	0.1769	0.1863	0.1805	0.1999	0.1941

Note: for n=52 individuals we further implement imputed information on participating at AGT estimated by probit regression (imputation dummy is included).

From a descriptive point of view Figure 5 shows the cumulated incidence of students with and without AGT who acquired an MTSS-Certificate by treatment group. The figure suggests that the difference between both groups is smaller for the treatment group both in absolute and in relative terms, implying that students with no AGT tend to be able to catch up with those that already perform better in grade 7. At the same time, the incidence of an MTSS degree among those with AGT is much lower in the treatment group compared to the control group students, in particular in year one. This could arise from a lower rate of students in the treatment group that strive to continue to grade 10 immediately after graduating from LTSS, which is in line with the descriptive findings discussed in Section 3.1.

Figure 5: MTSS-Certificate by AGT and Treatment



We use the following equation to estimate heterogeneous treatment effects regarding the participation in AGT:

$$P(mtss_{it} = 1 | X_{it}) = \Phi(\alpha + \tau_1 \cdot treatment \cdot AGT + \tau_2 \cdot treatment \cdot no\ AGT + \gamma \cdot X_i + \eta_s \cdot imp_i + \eta_p \cdot imp_{\hat{p},i})$$

First, we estimate fractional Probit Regressions separately for years one to three (see Table 9). Estimates presented in columns (1) belong to regressions where we use

available survey data and SIAB records. Columns (2) additionally use imputed data. Results indicate a highly significant negative treatment effect for students with AGT, which is stable over the observed years and amounts to about -16 percentage points. This reflects a lower transition rate to the 10th grade for students with AGT in the treatment group. These students tend to choose two-year vocational schools over 10th grade. Moreover, a companion study on the transition to apprenticeship contracts finds that German students with AGT tend to opt for a direct transition to apprenticeship training as opposed to further schooling (Licklederer 2016). For students without AGT, we see a positive effect in the first and third year. As this effect is also relatively stable over time, we pool over years.

Table 9: Fractional Probit Estimation (AME)

Dependent variable: <i>mtss</i>	Year 1		Year 2		Year 3	
	(1)	(2)	(1)	(2)	(1)	(2)
Treatment * AGT	-0.1634*** [0.05]	-0.1605*** [0.03]	-0.1665* [0.10]	-0.1652** [0.07]	-0.1653* [0.09]	-0.1662*** [0.05]
Treatment * no AGT	0.0804 [0.07]	0.0641* [0.04]	0.0520 [0.07]	0.0421 [0.04]	0.0617 [0.06]	0.0827** [0.04]
Fixed effects						
cohort	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
Adj. R-sq	0.1826	0.1962	0.1942	0.1878	0.2086	0.2047

Note: for n=52 individuals we further implement imputed information on participating at AGT estimated by probit regression (imputation dummy is included).

Table 10 shows the results of Pooled Fractional Probit Regressions pooling year 2 and 3 and pooling all years. With pooled years we observe a positive effect for students without AGT. These students from the treatment group gain from ACA as they manage to earn an *mtss* at a rate that is 6 to 7 ppt greater.

4 Conclusions

Using a comprehensive data set involving grades at school and educational outcomes after leaving school, this paper investigates the effect of Additional Career Assistance (ACA) on earning a higher educational degree after leaving a Lower Track Secondary

Table 10: Pooled Fractional Probit Estimation (AME)

Dependent variable: <i>mtss</i>	Year 2, 3		Year 1,2,3	
	(1)	(2)	(1)	(2)
Treatment * AGT	-0.1661 *** [0.09]	-0.1658 *** [0.06]	-0.1749 ** [0.08]	-0.1739 *** [0.05]
Treatment * no AGT	0.0562 [0.06]	0.0627 * [0.04]	0.0684 [0.05]	0.0667 ** [0.03]
Fixed effects				
cohort	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
N	407	648	407	648
Adj. R-sq	0.2025	0.1971	0.2389	0.2413

Note: for n=52 individuals we further implement imputed information on participating at AGT estimated by probit regression (imputation dummy is included). Standard errors are clustered on individual level.

School (LTSS) in Germany. In our framework, counseling corresponds to Additional Career Assistance (ACA), which provides additional knowledge about own excellence, preferences, and skills as well as knowledge about occupations and application requirements for further schooling and apprenticeship training. Our hypothesis questions whether additional knowledge about occupations and access requirements leads to an increase in scholastic effort, especially for below the average students who, can catch up by improving their grades to meet access requirements for further schooling after LTSS and thus higher educational degrees.

Our data suggest that ACA does not affect self-assessed knowledge about application and preparation for vocational schools from a descriptive point of view. Both treatment and control students seem to be well prepared on average. We observe a descriptive difference of 14 percentage points in the fraction of students who directly enter grade 10 after leaving LTSS. As both groups intend in a similar proportion to invest further in education, this results in a higher share of students in the treatment group that opt for vocational schools instead of grade 10. This reflects a greater intention to directly invest in occupational knowledge while at the same time pursuing a higher educational degree, both of which are enabled by two-year vocational schools. At least three years after leaving LTSS, a comparable share of students in both groups intend to pursue an MTSS-Certificate.

Our empirical estimations suggest that on average there is no significant effect of

ACA on improvement in school grades over the last two years at LTSS. However, this finding obscures the positive heterogeneous treatment effects for better performing German students and the negative effects of German students who performance worse at the beginning of grade 8. Although better performing students with ACA further invest in individual performance, they do not pursue a higher educational degree within one additional year of schooling. Instead, they tend to earn an MTSS-Certificate with an occupational specialization at a two-year vocational school. Moreover, we find positive effects from Additional Career Assistance for students who are relatively underperforming at the beginning of grade 8. They have a likelihood of earning an MTSS-Certificate of about +6 percentage points. We observe a significant proportion of students plan to acquire a higher educational degree in both groups where ACA results in a significantly higher share of students that pursue a specialization in an occupational field at vocational school. This occupational specialization presupposes an examination with own desires and interests, strengths and weaknesses. As underperforming students in particular profit by ACA, this might reflect the potential of ACA to compensate for a lack of family support.

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A: Tables and Figures

Table 11: Share of Subsamples

variable	treatment	control
female	0.48	0.40
migration background (m)	0.40	0.27
AGT	0.51	0.44
m, given female	0.43	0.33
m, given male	0.37	0.23
AGT, given female	0.52	0.41
AGT, given male	0.50	0.46
AGT, given m	0.42	0.37
AGT, given not m	0.57	0.47

B: Data Cleaning Procedures

We apply different strategies for using this additional data. In the end, we use strategy (2); we only use information on a maximal LTS-Certificate if we observe this information during the third year after leaving school to make sure that no higher educational level is reached. An observed higher educational level such as an MTSS-Certificate is used in the same way as in the questionnaire data.

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

C: Additional Online Appendix

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

OLS Estimations

Table AOA.1: Upward mobility - OLS

Dependent variable: <i>mtss</i>	Year 1		Year 2		Year 3	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.1338** [0.05]	-0.1252*** [0.04]	-0.0898 [0.07]	-0.0733 [0.04]	-0.0692 [0.06]	-0.0494 [0.03]
Migration background (m)	-0.0140 [0.03]	-0.0268 [0.02]	0.1396*** [0.04]	0.0960** [0.04]	0.1022* [0.05]	0.1038* [0.06]
Female	-0.0345 [0.04]	-0.0062 [0.03]	0.0018 [0.05]	-0.0035 [0.04]	0.0659 [0.06]	0.0628 [0.04]
Share of foreigners in residential area	0.0014 [0.00]	0.0005 [0.00]	0.0063 [0.01]	0.0064** [0.00]	0.0060 [0.01]	0.0081*** [0.00]
m * AGT	0.1655*** [0.05]	0.2050*** [0.05]	-0.1104 [0.08]	-0.0339 [0.05]	-0.1019 [0.09]	-0.1164 [0.08]
Average grade in German and Math (7:2)	0.0091 [0.03]	-0.0128 [0.02]	-0.1149*** [0.04]	-0.1272*** [0.02]	-0.1114*** [0.03]	-0.1157*** [0.02]
Additional General Teaching (AGT)	0.0926 [0.07]	0.0892 [0.06]	0.2754*** [0.08]	0.2266*** [0.05]	0.3153*** [0.07]	0.3018*** [0.06]
Individual coaching/mentoring: desirable (teacher, 8:2)	0.0292 [0.10]	0.0778 [0.07]	0.0113 [0.10]	0.0139 [0.07]	0.0351 [0.09]	0.0472 [0.06]
Social and cognitive skills (teacher, 8:1/8:2)	0.0877** [0.03]	0.1043*** [0.02]	0.0614* [0.03]	0.0831*** [0.02]	0.0845** [0.03]	0.0845*** [0.02]
Father medium or high educated	0.0281 [0.05]	0.0277 [0.03]	0.1125*** [0.03]	0.1459*** [0.02]	0.1118** [0.04]	0.1405*** [0.02]
Fixed effects						
cohort	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
Adj. R-sq	0.105	0.177	0.195	0.256	0.220	0.277

Note:

Table AOA.2: Upward mobility - Heterogenous Treatment Effect - OLS

Dependent variable: <i>mtss</i>	Year 1		Year 2		Year 3	
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment * AGT	-0.2440** [0.10]	-0.2411*** [0.07]	-0.2266* [0.11]	-0.2057** [0.08]	-0.1904** [0.08]	-0.1871*** [0.05]
Treatment * no AGT	0.0368 [0.04]	0.0349 [0.03]	0.0679 [0.05]	0.0680* [0.03]	0.0820 [0.06]	0.1037** [0.05]
Fixed effects						
cohort	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
Adj. R-sq	0.132	0.209	0.208	0.271	0.229	0.294

Note:

Robustness Checks

Table AOA.3: Fractional Probit Estimation (AME)

Dependent variable: <i>mtss</i>	Year 1		Year 2		Year 3	
	(1)	(2)	(1)	(2)	(1)	(2)
Treatment	-0.1047*** [0.04]	-0.0999*** [0.03]	-0.0834 [0.07]	-0.0688 [0.04]	-0.0677 [0.06]	-0.0477 [0.03]
Migration background (m)	0.0698** [0.03]	0.0711** [0.03]	0.0817** [0.03]	0.0808*** [0.03]	0.0505 [0.04]	0.0472 [0.03]
Female	-0.0401 0.0431	-0.0136 0.0277	-0.0018 0.0490	-0.0072 0.0372	0.0617 0.0526	0.0580 0.0370
Share of foreigners in residential area	0.0006 [0.00]	-0.0001 [0.00]	0.0063 [0.01]	0.0067** [0.00]	0.0059 [0.00]	0.0087*** [0.00]
m * AGT	0.3294*** [0.04]	0.3596*** [0.04]	0.5451*** [0.07]	0.5861*** [0.05]	0.6243*** [0.07]	0.6363*** [0.05]
Average grade in German and Math (7:2)	0.0093 [0.03]	-0.0117 [0.02]	-0.1111*** [0.03]	-0.1237*** [0.02]	-0.1076*** [0.03]	-0.1136*** [0.02]
Additional General Teaching (AGT)	0.1459*** [0.06]	0.1514*** [0.05]	0.2202*** [0.06]	0.1894*** [0.04]	0.2435*** [0.05]	0.2237*** [0.04]
Individual coaching/mentoring: desirable (teacher, 8:2)	0.0280 [0.08]	0.0685 [0.06]	0.0023 [0.09]	0.0097 [0.07]	0.0262 [0.09]	0.0392 [0.06]
Social and cognitive skills (teacher, 8:1/8:2)	0.0887*** [0.03]	0.1047*** [0.02]	0.0603* [0.04]	0.0816*** [0.02]	0.0870** [0.04]	0.0840*** [0.02]
Father medium or high educated	0.0119 [0.05]	-0.0104 [0.03]	-0.0301*** [0.10]	-0.0548*** [0.06]	0.0103*** [0.12]	-0.0262*** [0.07]
Fixed effects cohort	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
Adj. R-sq	0.16	0.18	0.18	0.18	0.20	0.19

Note: the model controls for missing AGT information by including an missing dummy.

Table AOA.4: Fractional Probit Estimation (AME)

Dependent variable: <i>mtss</i>	Year 1		Year 2		Year 3	
	(1)	(2)	(1)	(2)	(1)	(2)
Treatment * AGT	-0.1535*** [0.05]	-0.1537*** [0.04]	-0.1966* [0.11]	-0.1852** [0.08]	-0.1931* [0.09]	-0.1931*** [0.06]
Treatment * no AGT	0.1053 [0.09]	0.0988* [0.05]	0.0812 [0.07]	0.0743* [0.04]	0.0920 [0.07]	0.1089** [0.05]
Fixed effects cohort	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
Adj. R-sq	0.16	0.19	0.19	0.18	0.20	0.19

Note: AGT missing dummy included.

Table AOA.5: Pooled Fractional Probit Estimation (AME)

Dependent variable: <i>mtss</i>	Year 2, 3		Year 1,2,3	
	(1)	(2)	(1)	(2)
Treatment * AGT	-0.1949 *	-0.1908 ***	-0.1858 **	-0.1843 ***
	[0.10]	[0.07]	[0.08]	[0.06]
Treatment * no AGT	0.0857	0.0942 **	0.0966 *	0.0989 ***
	[0.07]	[0.04]	[0.06]	[0.04]
d1	-	-	-0.2780 ***	-0.2882 ***
	-	-	[0.02]	[0.02]
d3	0.0754 ***	0.0737 ***	0.0663 ***	0.0650 ***
	[0.01]	[0.01]	[0.01]	[0.01]
Fixed effects				
cohort	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
N	407	648	407	648
Adj. R-sq	0.2055	0.2009	0.2399	0.2451

Note: Includes a missing dummy for AGT.

Table AOA.6: Fractional Probit Estimation with interaction effects (AME)

Dependent variable: <i>mtss</i>	Year 1		Year 2		Year 3	
	(1)	(2)	(1)	(2)	(1)	(2)
Treatment * AGT	-0.1634 *** [0.05]	-0.1605 *** [0.03]	-0.1665 * [0.10]	-0.1652 ** [0.07]	-0.1653 * [0.09]	-0.1662 *** [0.05]
Treatment * no AGT	0.0804 [0.07]	0.0641 [0.04]	0.0520 [0.07]	0.0421 [0.04]	0.0617 [0.06]	0.0827 ** [0.04]
Migration background (m)	0.0590 [0.04]	0.0637 * [0.04]	0.0666 ** [0.03]	0.0670 ** [0.03]	0.0392 [0.04]	0.0447 [0.03]
Female	-0.0295 [0.04]	-0.0011 [0.03]	-0.0013 [0.05]	-0.0025 [0.04]	0.0640 [0.05]	0.0684 [0.04]
Share of foreigners in residential area	0.0005 [0.00]	-0.0004 [0.00]	0.0057 [0.01]	0.0061 ** [0.00]	0.0055 [0.00]	0.0076 *** [0.00]
m * AGT	0.4467 [0.08]	0.4745 [0.06]	0.6058 [0.06]	0.6504 [0.04]	0.6985 [0.07]	0.7283 [0.04]
Average grade in German and Math (7:2)	0.0236 [0.03]	0.0098 [0.02]	-0.0964 *** [0.04]	-0.1059 *** [0.02]	-0.0933 *** [0.03]	-0.1070 *** [0.03]
Additional General Teaching (AGT)	0.3276 *** [0.10]	0.3206 *** [0.06]	0.3823 *** [0.08]	0.3493 *** [0.05]	0.4128 *** [0.07]	0.4096 [0.03]
Individual coaching/mentoring: desirable (teacher, 8:2)	0.0398 [0.08]	0.0796 [0.06]	0.0077 [0.10]	0.0219 [0.07]	0.0336 [0.10]	0.0584 [0.06]
Social and cognitive skills (teacher, 8:1/8:2)	0.0845 [0.03]	0.1018 [0.02]	0.0546 [0.04]	0.0789 *** [0.03]	0.0821 ** [0.04]	0.0775 *** [0.02]
Father medium or high educated	0.0155 [0.04]	0.0294 [0.03]	0.1051 *** [0.03]	0.1500 *** [0.02]	0.1051 *** [0.04]	0.1479 *** [0.02]
Fixed effects cohort	Yes	Yes	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
N	407	648	407	648	407	648
Adj. R-sq	0.1826	0.1962	0.1942	0.1878	0.2086	0.2047

Note: for n=52 individuals we further implement imputed information on participating at AGT estimated by probit regression (imputation dummy is included).

Table AOA.7: Pooled Fractional Probit Estimation (AME)

Dependent variable: <i>mtss</i>	Year 2, 3		Year 1,2,3	
	(1)	(2)	(1)	(2)
Treatment * AGT	-0.1661 *** [0.09]	-0.1658 *** [0.06]	-0.1749 ** [0.08]	-0.1739 *** [0.05]
Treatment * no AGT	0.0562 [0.06]	0.0627 * [0.04]	0.0684 [0.05]	0.0667 ** [0.03]
Migration background (m)	0.1209 ** [0.05]	0.0894 * [0.04]	0.0785 [0.05]	0.0478 [0.03]
Female	0.0314 [0.05]	0.0331 [0.03]	0.0100 [0.04]	0.0218 [0.03]
Share of foreigners in residential area	0.0056 [0.00]	0.0069 *** [0.00]	0.0038 [0.00]	0.0042 ** [0.00]
m * AGT	-0.1161 [0.09]	-0.0619 [0.06]	-0.0377 [0.07]	0.0159 [0.05]
Average grade in German and Math (7:2)	-0.0949 *** [0.03]	-0.1060 *** [0.02]	-0.0533 ** [0.03]	-0.0638 *** [0.02]
Additional General Teaching (AGT)	0.4405 *** [0.09]	0.4037 *** [0.05]	0.4111 *** [0.09]	0.3749 *** [0.05]
Individual coaching/mentoring: desirable (teacher, 8:2)	0.0203 * [0.10]	0.0399 [0.06]	0.0316 [0.09]	0.0598 [0.06]
Social and cognitive skills (teacher, 8:1/8:2)	0.0681 *** [0.04]	0.0782 *** [0.02]	0.0733 *** [0.03]	0.0870 *** [0.02]
Father medium or high educated	0.1053 *** [0.03]	0.1494 *** [0.02]	0.0745 *** [0.02]	0.1073 *** [0.02]
d1			-0.2777 *** [0.02]	-0.2879 *** [0.02]
d3	0.0757 *** [0.01]	0.0740 *** [0.01]	0.0664 *** [0.01]	0.0653 *** [0.01]
Fixed effects				
cohort	Yes	Yes	Yes	Yes
imputation dummy Probit	No	Yes	No	Yes
imputation dummy IABS	Yes	Yes	Yes	Yes
Other controls	Yes	Yes	Yes	Yes
N	407	648	407	648
Adj. R-sq	0.2025	0.1971	0.2389	0.2413

Note: for n=52 individuals we further implement imputed information on participating at AGT estimated by probit regression (imputation dummy is included).