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# Quasi-Experimental Evaluation of a Student Mentoring Program

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## Abstract

This paper presents evidence from a natural-experiment which evaluates the effectiveness of a student mentoring program. The mentoring includes several compulsory, scheduled, face-to-face appointments between a mentor and a student in the first study year. All mentors are graduated and employed by the institution. For the evaluation, I use the fact that the mentoring is only offered to students in an economics and management program, whereas it is not offered to students in an industrial engineering program. However, students in both programs take the same classes and write the same exams in their first study year. I find that the mentoring program significantly decreases the failure rates in the first semester exams.

JEL-Classification: I21, I28

Keywords: Student Mentoring, Natural Experiment

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# 1 Introduction

Student attrition is an issue in higher education worldwide. In OECD countries 31 percent of all university students who enroll fail to earn any degree ([OECD, 2011](#)). Attrition causes high economic costs because a college wage premium is only paid when a degree is attained. Especially in subjects with high expected returns like engineering, science or economics, 40 to 50 percent of the students fail or do not obtain a degree. It is well documented that up to 60 percent of these students leave the university in the first two semesters (e.g. [Heublein et al., 2010](#)). In these semesters students often fail because they lack non-academic skills like time management, self-organization or identification with the subject.

One popular way to enhance non-academic skills is student mentoring where a more experienced member (mentor) of a university maintains a relationship with a less experienced, often new member (mentee) to the university. The mentor provides information, support and guidance to enhance the mentee's chances of success in the university and beyond ([Campbell and Campbell, 1997](#)). Topics and forms of mentoring vary widely, in most cases it is not focused on academic skills, but rather on time management, motivation, self-organization and knowledge about the institution ([Crisp and Cruz, 2009](#)). Although heterogeneous forms of mentoring do exist, most higher institutions, especially in the US and UK, offer some kind of mentoring.

Despite the frequent use of mentoring in higher education institutions, only in recent years a few studies have evaluated the effectiveness of mentoring programs with an experimental or quasi-experimental design. ([Bettinger and Baker, 2011](#); [Scrivener and Weiss, 2009](#); [Angrist et al., 2009](#)). Overall, these studies found only small effects of mentoring programs. However, previous research only investigated low quality mentoring, in which undergraduate students delivered the mentoring or a high mentee-mentor ratio was present. So far, there are no studies of high quality mentoring which examine the promising combination of graduated mentors who are part of the faculty and a low mentee-mentor ratio.

This paper studies the effects of a high quality student mentoring program on

first year study success at Leibniz University Hanover (LUH), Germany. All mentors are graduated and employed at the university. Most of them have a degree in management or economics which is often obtained at LUH. This gives the mentors a rich knowledge about the institution which can be passed to the mentees. The mentoring program is offered to first year Bachelor students who are enrolled in an Economics and Management (EM) program. The focus of the mentoring is on the first months of their studies in which the students have several mandatory appointments with their mentor. None of the mentors consults more than 20 students. Topics of the appointments include: time management, transition from high school to college or general advice.

I use a difference-in-differences approach to evaluate the effects of the mentoring program. For this purpose, I use the fact that LUH does not offer the mentoring to students in an industrial engineering (IE) program. However, in certain classes these IE students take the same exams and attend the same lectures as the EM students. Therefore, the IE students are a reliable control group to examine the effectiveness of the mentoring treatment. For the analyses, I include five student cohorts from Winter 2006 to Winter 2010. The mentoring was not offered for any degree in the first two student cohorts. For the next three student cohorts the mentoring program was just offered for EM students. The introduction of the mentoring is the only change in the study situation between EM and IE students. Hence, changes in the difference of exam failure, grades and absent rates between EM and IE students are causally linked to the mentoring.

I find that the mentoring program significantly decreased the failure rate and increased the grades for several courses. The effects are highest in the first semester exams where the failure rate decreases between 9 and 15 percentage points which is a reduction of the failure rate by 27 to 37 percent. The effects get smaller in the second term, when the appointment frequency between mentor and mentee fades out. Investigating subsamples reveals that female students benefit most from the mentoring program at least in some exams. The results hardly change when controls for age, gender, nationality, high school GPA, as well as place and type of high school are included. Despite the strong effects on the first semester exams, the effects on

the second year retention are small and similar to the previous studies.

Participation in the mentoring was compulsory for all EM students. Nevertheless, refusals were not penalized. This suggests that not all students complied in the mentoring and, therefore, all estimates measure intention-to-treat effects. However, a student questionnaire reveals that almost all students took part in the mentoring. Female students used the mentoring program more often than male students which can explain the higher effects for these students. In contrast, students with a foreign citizenship participate less often and if they participated, they had less appointments with their mentor.

The findings of this article contribute to a broader literature which examines policies to enhance college success. This literature mostly focuses on financial rewards for students or remedial classes. [Angrist et al. \(2009\)](#) as well as [Leuven et al. \(2010\)](#) and [Paola et al. \(2012\)](#) investigate the results of financial incentives on college outcomes and retention in the US and Europe. Positive results occur only for women or well-performing students. [Bettinger and Bridget \(2009\)](#) examine college remediation by a quasi-experimental research design in the US and show that remediation reduces attrition. On the opposite, [Di Pietro \(2012\)](#) finds no effects of remedial courses in the UK in a quasi-experimental study.

However, financial reward interventions assume that the naturally existing incentives are not strong enough for students, whereas remediation interventions assume that students lack academic skills. In contrast to these interventions, mentoring is based on the assumption that behavioral and non-academic factors lead to failure and attrition and that these factors can be improved by a small nudge. The results of my study in which a small intervention has a big effect support this hypothesis.

The rest of the paper is organized as follows: Section [2](#) provides details of the Faculty of Economics and Management at the Leibniz University Hanover and the Hanover mentoring program. Section [3](#) describes the data and provides summary statistics. It also reports results from a questionnaire which investigates the student's utilization and the perception of the Hanover mentoring program. Section [4](#) shows the econometric framework and presents results. Section [5](#) gives robustness checks. Section [6](#) summarizes and concludes.

## **2 The Hanover Mentoring Program**

### **2.1 School Background**

Leibniz University Hanover (LUH) is a university with 23.000 students and 90 degree programs. Major fields of the university are science and engineering. In these fields, LUH reaches international excellence. Despite this focus on science and engineering the Faculty of Economics and Management is ranked among the top ten in Germany. As it is typical also for well performing German universities, most undergraduate, graduate and PhD-students at LUH come from the surrounding areas. The Faculty of Economics and Management offers two undergraduate bachelor degree programs: one in economics and management (EM) and the other in industrial engineering (IE). Both programs have been offered since 2006 after the Bologna reform. Before this reform students could only attain diploma degrees at the Faculty of Economics and Management.

The EM program has a nominal duration of four years. Each year is divided into a winter and a summer semester. In the winter semester, lectures start in October and end in January and in the summer semester the lectures start in April and end in July. In the first academic year, which always begins in the winter semester, all EM students follow exactly the same program of four compulsory courses in the first semester and four compulsory courses in the second. It is important to note that it is not possible for the students to switch or postpone any class since they are automatically enrolled for the exams. The exams take place every semester once the courses are finished and the re-take exams (for students who either fail or have been absent from the regular test) are organized in June and December. It is only after the fifth semester that students choose different packages of courses to specialize either in economics or in business.

The IE program has a nominal duration of three and a half years. It is a mixture of economics and management and engineering. In economics and management the IE students have to take the same courses with the same lectures and exams as the EM students. However, the IE students attend some courses in a later semester than the EM students. Beyond that, IE students take different mathematics courses, they

do not take any statistics class and they attend two classes of mechanical engineering and two classes of electrical engineering in the first year. Table 1 gives an overview in which semester IE and EM students have to take the first year economics and management courses.

Table 1: Overview of Economic and Management Classes in the EM and IE Programs

Course	EM	IE
Business Studies I (Accounting + Business Informatics)	1. Sem.	1. Sem.
Business Studies II (Marketing + Business Management)	1. Sem.	3. Sem.
Economics I (Introduction to Economics)	1. Sem.	3. Sem.
Mathematics I	1. Sem.	Own Course
Business Studies III (Production Management + HRM)	2. Sem.	2. Sem.
Economics II (Microeconomics)	2. Sem.	4. Sem.
Mathematics II	2. Sem.	Own Course
Statistics I	2. Sem.	-

In both programs the failure rates in the first semester exams are as high as 50 percent, particularly in mathematics for EM students and engineering for the IE students. These rates are comparable to economics and business programs at other German faculties. However, the examination regulation is rather strict in the Hanover faculty. If a student fails an exam, there is just one more attempt to re-take the exam. If this student also fails the second attempt, the faculty exmatriculates the student automatically. This rule applies only for the economics and management courses but for both EM and IE students. In the engineering courses, the IE students are allowed to re-take the exams two times. The result of any exam counts for the final grade of the bachelor degree. Therefore, the first semester is on the one hand important for the final grade of the degree and on the other hand a fail leads to the re-take exam which decides on being exmatriculated or not.

## 2.2 Design of the Mentoring Program

The Hanover mentoring program was implemented after the introduction of tuition fees in Lower Saxony in the Winter term of 2006. Since then each student pays 500 Euro tuition per semester. As the government has not been allowed to cut its spending on the universities, this tuition is a top up revenue for the universities. After discussion with the students, the Faculty of Economics and Management decided to spend part of the additional money on a mentoring program. The faculty offered the

revenue earned by the tuition to the departments conditional on the participation of at least one department member in the mentoring. If the department agrees it can use the money for hiring additional staff. Afterwards, the department determines which member joins the mentoring program. The IE students are not included in the mentoring program because their tuition fees are not allocated to the Faculty of Economics and Management. However, the mentoring program is the only additional service at the Faculty of Economics and Management, which is not available for IE students because the newly hired staff, apart from the mentoring, exclusively offers additional lectures and office hours. Both the lectures and the office hours are open to IE and EM students and therefore improving the study conditions for both groups.

The Hanover Mentoring Program pursues three goals: Improving the student performance, increasing the study satisfaction and decreasing the failure and attrition rates. To reach these three goals, the mentoring covers four topics which are supposed to have a significant influence on first semester study success. The first topic is the smooth transition from high school to college. Often first semester students realize too late that the amount of class content is much greater at the university level than in high school. Therefore, the students start too late in the semester with the preparation for the exams. Furthermore, especially in a strict system like in Hanover, the students are not aware of the consequences if they fail an exam. On the contrary, some first semester students are overwhelmed and scared by the challenges of a university study. In both cases the mentor can adjust these valuations and set the student on the right track. The second topic is the reduction of separation and exclusion for the first semester students. Here the study satisfaction of the students could get improved because the students have a personal contact person and they get the feeling that the institution is interested in them. Additionally, the mentor directly brings the student to other students to establish a study group. The third topic is advice in general topics, like financing, part-time jobs or housing. Advice in these topics could save energy and time which the student could use for preparation instead. Finally, the mentor directly tackles non-academic skills such as giving advice in how to benefit from lectures.



To achieve the goals and to cover the mentioned topics most effectively, the mentors exhibit certain characteristics. One common characteristic of all mentors is to be employed by the faculty itself. This gives the mentor the institutional knowledge for practical advices. Additionally, the mentors are probably in higher risk of sanctions than an external mentor when the commitment for the mentoring is low. Another characteristic is that all of the mentors are graduates. Most of them hold an economics or management degree which is often earned at the Hanover faculty. This makes the mentors reliable when they give advice to the mentees' because the mentor has already achieved the goal for which the mentee aims, and the mentors are able to understand the mentees problems because they can go back to experience from their own studies. Finally, most mentors are PhD-students (in Germany PhD-students are mostly employed by the departments in the faculty) which leads to a low average age of the mentors resulting in a possibility of mutual trust and identification between mentor and mentee. Table 2 gives an overview of the mentor characteristics in every year since implementation.

Table 2: Overview of Mentor Characteristics

		Cohort	
	2008	2009	2010
Number of Mentors	25	30	30
Mentees per Mentor	15.8	14.5	14.6
Average Age of the Mentor	29.7	30.4	32.2
Female Mentors in %	45.5	34.5	34.1
Mentors with Economic or Management Degree in %	100	95.2	100
Mentors Graduated at Leibniz University Hanover in %	66.5	67.3	68.4

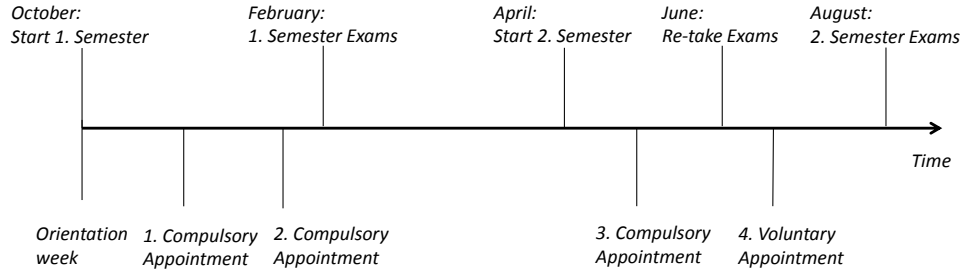
In addition to the mentors' characteristics, the mentoring program also possesses certain design features to achieve the intended goals. One feature is that at least three appointments between mentor and mentee are compulsory, scheduled and face-to-face. The appointments are face-to-face to enable a personal relationship between mentor and mentee. The appointments are scheduled to guarantee that they take place in critical phases of the first semester and the first year. The appointments are compulsory to ensure that all students participate in the mentoring. Each of the appointments has a duration of approximately 30 minutes. Beyond these appointments the mentor encourages the mentee to hold contact via e-mail or telephone

or to use the regular office hours of the mentor. Another feature of the mentoring program is a low mentor-to-mentee ratio of 1 to 20 or 1 to 10 depending on the mentor's labor contract. Furthermore, the mentors received training in negotiation and continuous feedback from supervision.

The mentoring starts in October with the beginning of the semester. Each student takes part in an orientation week which gives the students the possibility to get to know each other. The orientation week is organized in groups with a size of 40 students. Each group is accompanied by a graduated faculty employee. These accompanying employees are mentors as well. Therefore, the mentors can already build up a relationship with their mentees during this week. Additionally, during the orientation week, the mentors announce that participation in the mentoring is compulsory and that students get penalized if they do not participate. However, penalties have not been executed for non-participating students in any year of the mentoring, yet. Because orientation week group sizes are too high for an aspired mentor mentee ratio, half of the students are randomly allocated to a second mentor. This second mentor participates one day in the orientation week.

The major focus of the mentoring program is on the first 6 months of the university study. Therefore, the first compulsory meeting takes place four weeks after the start of the semester. In this meeting the focus is on the transition between high school and college. The second meeting is scheduled after Christmas four weeks before the final exams of the first semester. The focus of this second meeting is on exam preparation. This date has been chosen because there is still time for the students to adjust their learning behavior. The third meeting is compulsory for all students, but the focus is on those students who have failed an exam. The intention of the third meeting is the preparation for the re-take exams. A fourth appointment is voluntary. Figure 1 summarizes the schedule for the appointments in the first year. All students get the information about the scheduled appointments during the orientation week. This makes the mentoring program transparent and reliable for the students.

Figure 1: Time Schedule of the Hanover Mentoring



### 3 Data and Descriptives

In order to estimate the effect of the mentoring program on the exam results, it would not be suitable just to compare the exam outcomes of the EM students before and after implementation of the mentoring. Another approach is necessary because changes in the exam outcomes could also be ascribed to time variant factors like the difficulty of the exam or the quality of the lecturers. To solve this problem, I apply a difference-in-differences approach in which I compare the difference between the exam outcomes of the EM students to that of the IE students before and after the introduction of the mentoring program. Due to the fact that IE and EM students take the same exams and attend the same lectures a change in the difference of the exam outcomes between EM and IE students can be explained by the introduction of the Hanover Mentoring Program.<sup>1</sup>

I use two data sources to realize the approach. Firstly, the controlling of the LUH provided results and characteristics of the exam-takers for all first year exams

<sup>1</sup>Beltz et al. (2012) use an approach which is methodologically related to mine. They examine the differences change between a business administration and business education program to evaluate how program and course policies affect the effort and performance of students.

for the cohorts 2006 until 2010. The data contains overall 10.000 exams taken by over 2.500 students in five classes. Secondly, 459 EM students from the mentoring cohorts filled in a questionnaire asking the students if they have participated in the mentoring and how they perceived their mentors and the program. In the next two subsections I present the descriptive statistics of these two data sets.

### 3.1 Student Characteristics and Outcomes

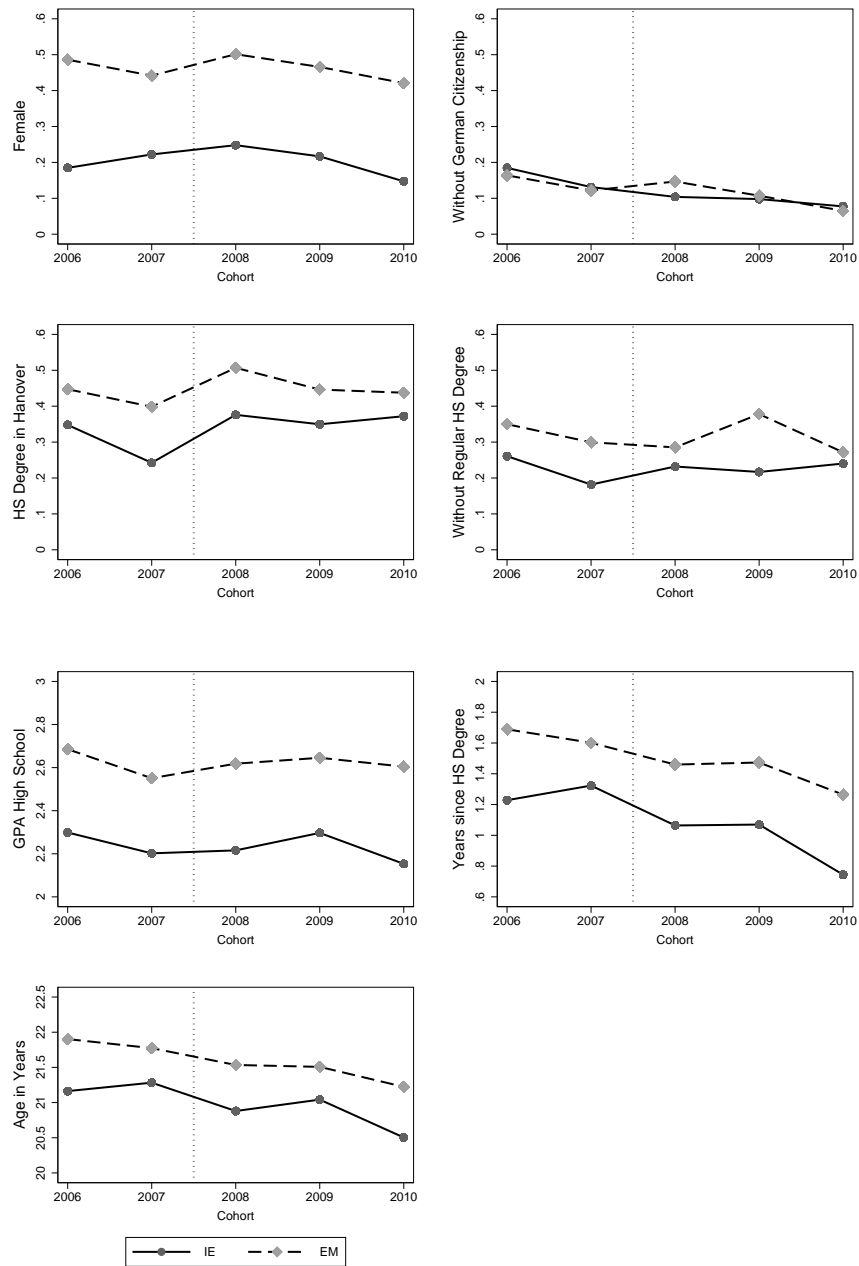
For evaluating the effect of the mentoring on study success I consider three outcomes of interest: The average exam grade, the failure rate and the rate of students who have a certified medical absence from the exam. In Germany the exam grade 1.0 is the best possible result and is equivalent to an A. The next grade is 2.0 which is equivalent to a B. Between 1.0 and 2.0 there are intervals of 1.3 and 1.7 with the same intervals for all other grades. The grade 4.0 for which a student needs at least 50 percent of the available exam points is the lowest grade necessary to pass the exam. All exams with less than 50 percent of the points are failing and marked with a grade of 5.0.<sup>2</sup> If an exam is failed, the student continues with the second attempt in the re-take exam. Since the students are automatically signed up for the exams, getting a medical certification is the only possible way to postpone an exam and continue with the first attempt.

In addition to the exam outcomes the data contains information about the characteristics of each student who took the exam. This information includes gender, citizenship, age and the time between high school graduation of the student and the exam. It also gives information about the grade of his or her secondary education certificate. The secondary school GPA ranges like the exam grades, from 1.0 ("A") to 4.0 ("D") (Between these grades decimal intervals are possible). Finally, the data contains information in which municipality and at which type of school the student achieved her secondary education certificate. Besides a regular "Gymnasium" (Grammerschool) students can also attain their secondary education certificate by a "Gesamtschule" (Comprehensive School), at a job training program or due to a special examination.

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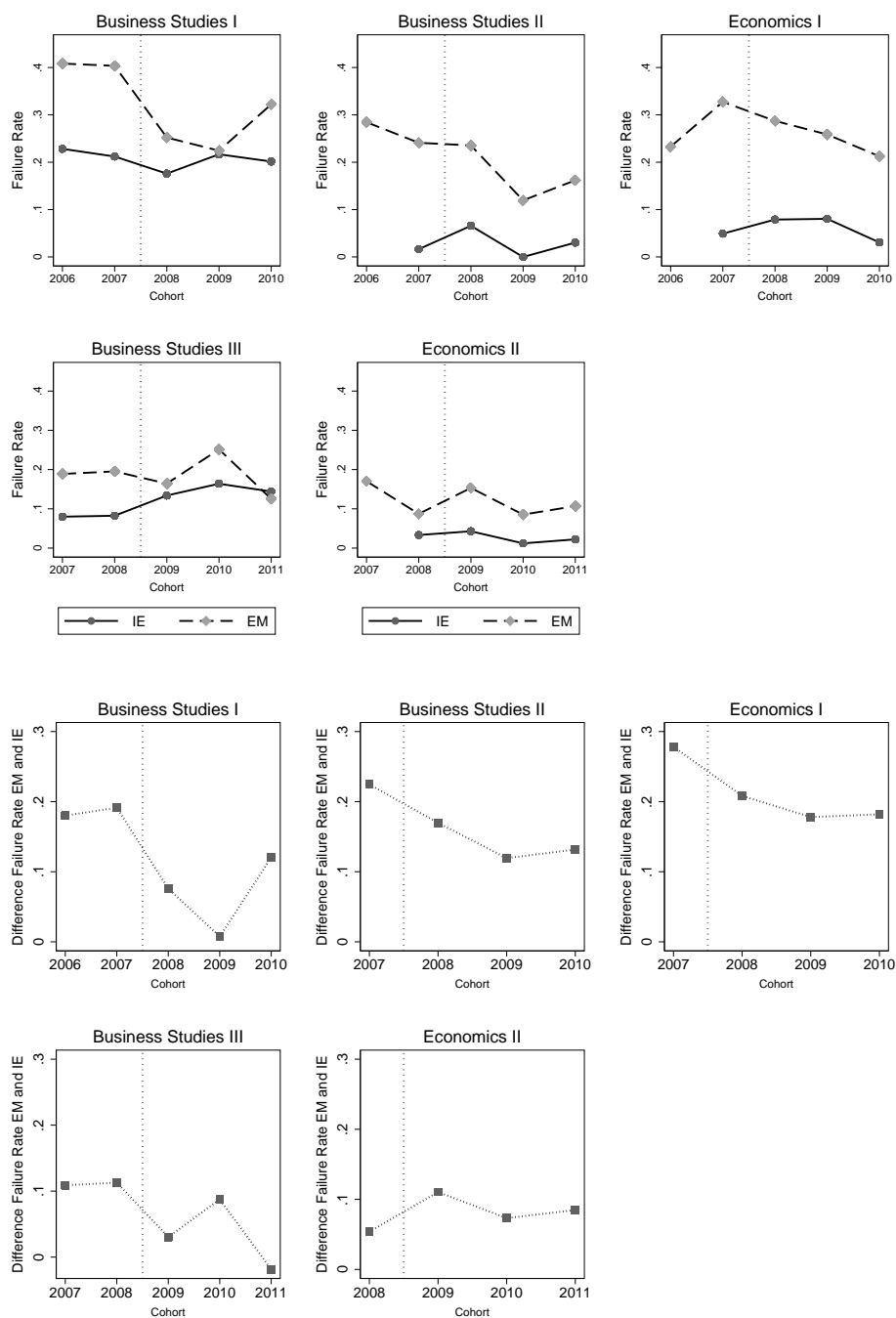
<sup>2</sup>The administrative data from the LUH only contains the grades and not the achieved points as exam results.

Figure 2: First Semester Student Characteristics



Note: All figures report the means of first semester students in IE (solid line) and EM (dashed line). The vertical line indicates the introduction of the mentoring program. High School GPA ranges from 1.0 to 4.0 where 1.0 is the best grade. HS=High School.

Figure 3: Failure Rates



Note: The figures in the first two rows report the failure rates of IE (solid line) and EM (dashed line) students. The figures in the last two rows report the difference of the failure rates between IE (solid line) and EM (dashed line) students. The vertical line indicates the introduction of the mentoring program.

Figure 2 presents the first semester students' characteristics for each cohort. The comparison of IE and EM students reveals differences in several characteristics. The most obvious differences are the lower percentage of female students in IE and the better high school GPA of IE students. The first might be related to the higher technical demands of the IE program which might be less attractive for women. The HS-GPA is higher in the IE program because places are more limited in this program. Many students in both IE and EM earned their high school diploma in Hanover which is typical for a local German university. The rate is lower for the IE students which shows a higher supra-regional attractiveness of this program. In the EM program the percentage of students with a regular high school degree is lower, whereas age and duration since HS-degree is higher. These factors indicate that more career changers and students with heterogeneous career paths choose EM rather than IE. In both programs the rate of students without German citizenship is low and decreases over the years. One reason could be the strict examination regulations at the EM faculty. This regulation might cause international students to choose other universities than Hanover because these students might be more flexible in their location preference.

Overall, the graphs demonstrate that the characteristic differences between EM and IE students just slightly varies by cohort. Additionally to the impression of Figure 2, Table 10, 11, 12, 13 and 14 in the Appendix D give a more detailed descriptive overview of the characteristic means for each class. The last column of each table presents the characteristic difference of the differences before and after introduction of the mentoring. The results of the tables confirm that changes in the characteristic differences are very small and negligible.

The figures in the first two rows in Figure 3 report a descriptive overview about the failure rates of EM and IE students in all five classes. The figure includes all first attempt exams by a student in the regular semester of the exam. For example, exams of students who postponed the regular exam and the re-exam by a medical absence certificate are not included. The IE students have a lower fail rate in 20 of the 22 exams. This is not surprising considering the characteristics of the IE students which are supposed to be correlated with higher study success. In Business

Studies I the failure rate for both the IE and the EM students in any exam is always higher than 20 percent. This shows that failing the exam is not only a serious problem for the EM students, but for the better performing IE students as well. Also in Business Studies III at least eight percent of the IE students fail. In the Economics I and Business Studies II exams the difference in the results between IE and EM students is higher than in Business Studies I. This might be caused in large part by the fact that IE students write these exams in their third semester.

Figure 6 in the Appendix D reveals that IE students have better grades than the EM students in all 22 exams. Like in the failure difference, the grade difference is highest for the Economics I and Business Studies II exams. Figure 7 illustrates that EM students are more often medically excused than IE students. This is not surprising because EM students are in higher risk to fail an exam and therefore these students may benefit more from postponing an exam. Especially for EM students, the rate is higher in the second semester exams than in the first semester exams which might be a lagged behavior modification to the strict examination rule.

The figures in the last two rows in Figure 3, 6 and 7 show the development of the differences between EM and IE students over time. Analysis of the failure rate reveals that the difference has been smaller in all first semester exams after introduction of the mentoring. This is also true for the Business Studies III exam in the second semester. These results are suggestive of a positive impact of the mentoring on the failure rate. However, in the next section I use statistical analyses to establish whether this relationship is significant and holds up to the inclusion of control variables.

### **3.2 Utilization of the Mentoring**

In addition to the data of the LUH-controlling, I use data from a questionnaire in which EM students were asked how they used and how they perceived the mentoring program. The questionnaires were given to students in the beginning of several randomly chosen lectures from June to August 2012. More than 400 EM students from the 2009 to 2011 cohorts filled in the questionnaire. However, this sample may not be representative of the students who started EM and received the mentoring



in these cohorts because only students who are still enrolled and attend the lectures were reached by the described data collecting procedure.

Table 3 reports the descriptive outcomes of the survey. The questionnaire contains four groups of questions: The first set of questions investigates the number of appointments, the relation to the mentor and the perceived effectiveness of the mentoring program. Secondly, the questionnaire contains questions about the student characteristics, including the characteristics which are available from LUH-Controlling. Thirdly, the students are asked for their family's educational background. In the last set of questions, the students give information about their study performance and failed exams in the first year.

The first column in Table 3 shows the results for the students of all cohorts. The next columns report the results separated for the cohorts 2008, 2009 and 2010. The first row describes that in each year about 90 percent of the students had at least one appointment with their mentor and participated in the mentoring program. On average the number of appointments was approximately two in each year. This is less than expected since the mentoring calendar schedules three compulsory appointments. The explanation for this gap might be that the questionnaire only asks for personal appointments. It is likely that a third appointment is substituted by an e-mail contact or an informal meeting and therefore it is not documented in the questionnaire. Analyzing the students' perception of the mentoring program reveals that the students judge the characteristics of the mentor best. In contrast, they are most critical with its usefulness.

A comparison between the survey sample and the first year EM students reveals that the survey sample contains fewer characteristics which are supposed to be related to failure and bad performance. It is likely that students with these characteristics are exmatriculated or they do not attend the lectures. The percentage of female students is similar between the data sets despite some differences between the cohorts. In addition to the characteristics which are available in the exam data set, I obtained information about the educational background of the student's family. This information reveals that the majority of students have a non-academic family background. These students especially might get less advice from their family than

necessary for a successful university study. Mentoring could fill this gap. In the survey sample the failure rates in any exam are lower than in the actual first year exams. This lower failure rate also shows both, the selectivity of the sample and that students who fail an exam in the first semester are very likely to drop out or abstain from the lectures. Unfortunately, it was not possible to obtain data of students who dropped out or do not attend the lectures.

Table 3: Descriptives of the Mentoring Questionnaire

	Cohort							
	Overall		2008		2009		2010	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<b><i>Mentoring Utilization</i></b>								
At Least one Appointment	0.91	0.3	0.90	0.4	0.89	0.3	0.92	0.3
Number of Appointments	2.08	0.8	1.87	0.7	2.01	0.8	2.28	0.7
<b><i>Mentoring Perception</i></b>								
Relation to Mentor	2.72	1.0	2.66	0.9	2.68	0.9	2.77	1.0
Usefulness of Mentoring	4.11	0.9	4.01	0.9	4.15	0.9	4.13	0.9
Overall Benefit	3.60	1.2	3.47	1.2	3.62	1.2	3.61	1.2
Overall Grade	3.56	1.2	3.42	1.2	3.52	1.2	3.62	1.2
<b><i>Mentor Characteristics</i></b>								
Mentor Female	0.35	0.5	0.41	0.5	0.33	0.5	0.33	0.5
Mentor Orientation Week Adviser	0.62	0.6	0.63	0.6	0.67	0.7	0.59	0.6
<b><i>Student Characteristics</i></b>								
Female	0.51	0.5	0.49	0.5	0.56	0.5	0.48	0.5
HS Degree in Hannover	0.46	0.5	0.50	0.5	0.48	0.5	0.44	0.5
Regular HS Degree	0.80	0.4	0.85	0.4	0.77	0.4	0.80	0.4
Foreign Citizenship	0.06	0.2	0.09	0.3	0.05	0.2	0.04	0.2
HS GPA	2.47	0.5	2.41	0.5	2.44	0.5	2.53	0.5
HS GPA lowest Decil	0.09	0.3	0.07	0.2	0.07	0.3	0.12	0.3
Age in Years	23.11	1.5	23.99	1.2	23.26	1.3	22.46	1.5
<b><i>Family Characteristics</i></b>								
Father College Degree	0.38	0.5	0.45	0.5	0.33	0.5	0.38	0.5
Mother College Degree	0.26	0.4	0.34	0.5	0.21	0.4	0.27	0.4
No Siblings at College	0.55	0.5	0.51	0.5	0.53	0.5	0.59	0.5
<b><i>Failure Rate</i></b>								
Business Studies I	0.08	0.3	0.08	0.3	0.07	0.2	0.09	0.3
Business Studies II	0.02	0.1	0.02	0.1	0.01	0.1	0.02	0.1
Economics I	0.06	0.2	0.05	0.2	0.08	0.3	0.06	0.2
Business Studies III	0.06	0.2	0.06	0.2	0.11	0.3	0.03	0.2
Economics II	0.03	0.2	0.05	0.2	0.03	0.2	0.03	0.2
At least one Fail	0.20	0.4	0.22	0.4	0.25	0.4	0.14	0.4
Observations	459		111		152		187	

Notes: *Relation to Mentor* is an index of four questions concerning identification, mutual trust, competency and cooperativeness. The scale reaches from 1 to 5 with 1 indicating the best relation. *Usefulness of Mentoring* is an index of four questions which ask if the mentoring motivated to study, improved grades, reduced isolation and helped to pass the exams. The scale reaches from 1 to 5 with 1 indicating most useful. The scale for *Overall Benefit* reaches from 1 to 5 with 1 indicating the greatest benefit. The scale for *Overall Grade* reaches from 1 to 6 with 1=very good and 6=insufficient. High School GPA ranges from 1.0 to 4.0 where 1.0 is the best grade.

Table 4 presents the results of multivariate regression analysis which investigate factors influencing the use and perception of the mentoring program. In the first column the dependent variable indicates whether the student had at least one appointment with the mentor. The analysis reveals that foreign citizenship and a failed exam are significantly related to refusing participation in the program, whereas a female mentor increases the participation rate.

Table 4: Factors which Influence Utilization and Perception of the Mentoring

	(1) At least one Appointment	(2) Number of Appointments	(3) Relation to Mentor	(4) Usefulness of Mentoring
Cohort 2009	0.009 (0.038)	0.146 (0.103)	0.009 (0.127)	0.087 (0.124)
Cohort 2010	0.026 (0.038)	0.447*** (0.103)	0.091 (0.131)	0.062 (0.127)
Female	0.043 (0.027)	0.175** (0.076)	0.018 (0.099)	0.045 (0.096)
HS Degree in Hannover	-0.009 (0.026)	-0.107 (0.076)	-0.067 (0.098)	0.029 (0.091)
Regular HS Degree	-0.016 (0.031)	-0.070 (0.101)	0.019 (0.122)	0.150 (0.124)
Age in Years	-0.001 (0.007)	0.002 (0.022)	-0.035 (0.028)	-0.005 (0.025)
Foreign Citizenship	-0.165* (0.094)	-0.596*** (0.205)	-0.090 (0.275)	-0.222 (0.316)
HS GPA	0.042 (0.035)	-0.166* (0.091)	-0.175 (0.118)	-0.055 (0.113)
HS GPA lowest Decil	-0.072 (0.071)	0.256 (0.182)	0.244 (0.213)	0.131 (0.203)
At least one Failure	-0.078* (0.043)	0.150 (0.109)	0.033 (0.137)	-0.213* (0.125)
No Academic Background	-0.016 (0.029)	0.110 (0.079)	-0.054 (0.100)	-0.066 (0.099)
Mentor Female	0.054** (0.027)	0.079 (0.077)	0.015 (0.104)	-0.058 (0.100)
Mentor Orientation Week Adviser	-0.039 (0.027)	0.113* (0.063)	-0.144* (0.084)	-0.141* (0.079)
Observations	426	388	395	390
$R^2$	0.06	0.12	0.03	0.03

Notes: All models report OLS estimates. Robust standard errors in parenthesis. *At least one appointment* is a binary variable which gets 1 if at least one appointment between mentor and mentee was conducted. Models 2-4 only include students with at least one appointment. Relation to Mentor is an index of four questions concerning identification, mutual trust, competency, cooperativeness. The scale reaches from 1 to 5 with 1 indicating the best relation. Usefulness of Mentoring is an index of four questions which ask whether the mentoring motivated to study, improved grades, reduced isolation and helped to pass the exams. The scale reaches from 1 to 5 with 1 indicating most useful. No Academic Background is 1 if parents and siblings without college education. High School GPA ranges from 1.0 to 4.0 where 1.0 is the best grade.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

In the second column the dependent variable is the number of appointments between mentor and mentee. Female students use the mentoring more often than their male counterparts. This is in line with results of Angrist et al. (2009) who

even find a higher gender difference. Nevertheless, in the Hanover Mentoring the difference is also relevant with about 10 percent more appointments for women. Another finding is that foreigners do not only refuse participation more often, but also take a second or third appointment less often if they participate. Furthermore, students from the 2010 cohort use the mentoring more often than the previous cohorts. Since there is no change in the structure of the program, the more frequent appointments could be partly explained by a lower recall bias. Therefore, it might be that the real number of appointments in the years before was also higher. Finally, students with a lower high school GPA use the mentoring less often and the number of appointments increase if the mentor was the orientation week adviser.

Although the statements about the number of appointments are not provable, there is no reason to expect that female or foreign students give more or less precise answers than male or local students. Therefore, the differences between the genders and the nationalities are trustworthy, although it is not clear if the total amount of visits is correct. Statements by the mentors about the appointment frequency are weak because there is no report system for the mentoring. However, the comparison with the record keeping of several mentors reveals the same picture. Another validity problem is that students who have failed an exam are underrepresented in the survey compared to failure rates in the first year exams. The same is true for foreign students. As both characteristics are correlated to non participation, it might be that the actual participation rate of all enrolled first semester students is smaller than 90 percent.

The perceived usefulness of the mentoring and the relation to the mentor are the dependent variables in columns three and four. Like the number of appointments, both increase if the mentor is the orientation week adviser. This is in line with the expectations that a longer and more intensive relationship between mentee and mentor has a positive effect. Therefore, it is likely that also the other features of the mentoring like compulsory appointments, a low mentor-to-mentee ratio and graduate mentors are recognized and positively valued by the students. Furthermore, students who have failed an exam rate the mentoring more useful. This indicates that bad performing students are more reliant on advice and, therefore, these stu-

dents benefit most of the mentoring. However, it also indicates that the overall value of the usefulness of the mentoring might be downward biased because of the sample selectivity.

## 4 Effects of the Mentoring Program on Exam Outcomes

### 4.1 Evaluation Framework

I use the model in Equation 1 to test the first descriptive impression from the previous sections more formally:

$$Y_{it} = \alpha + \beta_1 \text{Mentoring}_t + \beta_2 EM_i + \tau(\text{Mentoring}_t \times EM_i) + \gamma X_{it} + \epsilon_{it} \quad (1)$$

$Y_{it}$  is student  $i$ 's exam outcome in year  $t$  ( $t = 2006, 2007, 2008, 2009, 2010$ ), while  $\text{Mentoring}_t$  and  $EM_i$  are dummy variables indicating the year of examination (1, if the exam was taken after the implementation of the mentoring in 2008 or later) and the students' program (1, if EM),  $X_{it}$  denotes a set of control variables, and  $\epsilon_{it}$  an idiosyncratic error term. In this model,  $\beta_1$  captures the time-specific variation affecting students in both programs,  $\beta_2$  the time invariant group-specific effects,  $\tau$ , the effect of the reform, and the vector  $\gamma$ , the effects of the control variables. Besides year dummies, I use the above mentioned variables, gender, HS-degree in Hanover, HS-degree at a "Gymnasium", citizenship, HS-GPA, duration since HS-degree and age in years in order to account for further differences between the groups and to improve the precision of my estimates.<sup>3</sup>

Considering the design of the program, I expect that the mentoring has the biggest effect on the failure rate. In line with the failure rate the grades will improve, too. However, it is also possible that students in the higher range of the grade distribution benefit from the mentoring. In addition, the mentoring could reduce the rate of students who are absent from the exams because the mentors could relax students who are scared of the exams. Nevertheless, it might also be that the mentees have additional information about examination regulations due to the

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<sup>3</sup>For the outcomes *Failure* and *Absence* I estimate linear probability models. I replicated the analysis using a Probit model and find very similar results. For the outcome variable *Grades* I use OLS models. I replicated the analysis using a Tobit model since the grade 5.0 is the corner for all exams with less than 50 percent points. The Tobit estimates lead to larger coefficients, but do not change significance levels.

mentoring and therefore they use the possibility of a medical certificate more often.

## 4.2 Results Main Exams

I start my analysis with the failure rate in the first semester exams. Here the main focus lies on the Business Studies I exam which is written by both the EM and IE students in the first semester. Table 5 shows the estimates of Equation 1 for this exam. The model in Column 1 only includes year dummies as controls, whereas the model in Column 2 includes the whole set of controls. The coefficient in the first row of Column 1 shows that the difference in the failure rate between EM and IE students decreases by 12.0 percentage points after the implementation of the mentoring. Including control variables increase this effect to 15.4 percentage points. The estimations for the other two first semester exams (Economics I and Business Studies II) confirm the results. However, the magnitude of the effects are smaller than in Business Studies I. The difference in the failure rate decreases by nine percentage points after implementation of the mentoring in both classes. However, in these exams only one pre-mentoring period is available because IE students take these exams in their third semester. This makes the estimations less reliable than in the Business Studies I exam.

The program variable and the other control variables show the expected influence on the failure rate. The coefficient of the program variable in the second row reveals that IE students fail less often than EM students. The failure rate is positively correlated with a higher HS-GPA, with the age of the student and with foreign citizenship. In contrast, a HS-degree at a "Gymnasium" and a short period between HS-degree and study start decreases the probability to fail the exam. Gender of the student is the only variable which does not influence the failure rate in the same direction for all exams. Female students fail more often in Economics I and less often in Business Studies II.

Table 5: Mentoring Effects on First Semester Failure Rates

	(1)	(2)	(3)	(4)	(5)	(6)
	Failure Business Studies I		Failure Economics I		Failure Business Studies II	
Mentoring $\times$ EM	-0.120*** (0.042)	-0.154*** (0.041)	-0.090** (0.041)	-0.097** (0.043)	-0.086*** (0.031)	-0.087*** (0.027)
EM	0.186*** (0.035)	0.165*** (0.035)	0.278*** (0.036)	0.212*** (0.040)	0.225*** (0.027)	0.220*** (0.025)
Female		0.008 (0.019)		0.080*** (0.020)		-0.045*** (0.017)
HS Degree in Han.		-0.007 (0.018)		0.017 (0.019)		0.009 (0.017)
Regular HS Degree		-0.053** (0.023)		-0.073*** (0.024)		-0.028 (0.020)
Foreign Citizenship		0.150*** (0.037)		0.141*** (0.039)		0.158*** (0.036)
HS GPA		0.105*** (0.019)		0.111*** (0.021)		0.041** (0.019)
Durat. since HS Deg.		-0.027*** (0.009)		-0.003 (0.009)		0.000 (0.009)
Age in Years		0.026*** (0.008)		0.008 (0.008)		0.015** (0.008)
$R^2$	0.03	0.07	0.04	0.09	0.04	0.09
Observations	2529	2379	1902	1814	1905	1816

Notes: Robust standard errors in parentheses. All models include year dummies. Han.=Hannover, HS=High School; Durat.= Duration, Deg.=Degree

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Next, I examine the effect of the mentoring on the failure rate in the second semester final exams. In these exams the mentoring could have an effect because fewer students fail in the first semester and therefore less students have to take the re-take exam in the second semester. Thus, the students have more time to prepare for the second semester final exams. Additionally, the acquired non-academic skills could have an effect on the results. However, after introduction of the mentoring program students with lower abilities could reach the second semester exams and therefore the results could be worse after implementation of the mentoring. However, the estimations in Table 6 reveal that the mentoring also decreases the failure rate in the Business Studies III by 6.5 percent points. In the Economics II exam there is no effect on failure. The controls have similar signs as in the first semester exams, despite the fact that in both exams female students fail less often.

The Tables 15 and 16 in the Appendix D examine the effects on grades. In Business Studies I the difference in the grades also decreases significantly after in-

Table 6: Mentoring Effects on Second Semester Failure Rates

	(1)	(2)	(3)	(4)
	Failure Business Studies III		Failure Economics II	
Mentoring $\times$ EM	-0.077** (0.035)	-0.065* (0.035)	0.034 (0.032)	0.026 (0.033)
EM	0.111*** (0.027)	0.083*** (0.028)	0.054* (0.028)	0.046 (0.032)
Female		-0.082*** (0.017)		-0.025 (0.016)
HS Degree in Hannover		-0.002 (0.017)		0.005 (0.015)
Regular HS Degree		-0.067*** (0.022)		-0.035* (0.019)
Foreign Citizenship		-0.003 (0.032)		-0.035 (0.026)
HS GPA		0.101*** (0.018)		0.061*** (0.016)
Duration since HS Degree		-0.031*** (0.009)		-0.018** (0.008)
Age in Years		0.031*** (0.007)		0.022*** (0.008)
$R^2$	0.01	0.08	0.02	0.05
Observations	2026	1920	1555	1496

Notes: Robust standard errors in parentheses. All models include year dummies.

HS=High School

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

introduction of the mentoring. Again, including the control variables increases this effect. The grades of the other first semester exams improve, however not significantly. The grades are mainly influenced by the same factors as the failure rate. The grades in Business Studies III are also positively affected by the mentoring, although the effect gets statistically insignificant if controls are included. The grades in Economics II decrease significantly after introduction of the mentoring. However, the comparison group are fourth semester IE students and only one cohort before introduction of the mentoring is available.

Finally, the rate of absent students is not affected by the introduction of the mentoring (see Tables 17 and 18 in Appendix D). Absence because of illness is supposed to be a random event and therefore absent rates should be slightly correlated with any characteristic. However, foreign citizenship and HS-degree in Hanover are strongly positively correlated with being absent. For foreign students, postpon-



ing exams could be rational if they have language difficulties which they hope to overcome fast. For students with a HS-degree in Hanover the rate could be higher because they already know doctors who easily testify a medical certificate. In the Business Studies III exam the mentoring also slightly increases the probability of students to be absent.

Overall, in four out of five exams the mentoring decreased the failure rate difference between EM and IE students. Effects are strongest in first semester exams when the mentoring takes place. Especially in the Business Studies I, exam the mentoring almost equalizes the difference in the failure rate between EM and IE students. The effect in percentage points is not that strong for the other two first semester exams. However, looking at the percentage failure reduction reveals that in all exams the decrease range is between 27 and 37 percent. In line with the expectations the results are more mixed in the second semester. Nevertheless, there is still a significant decrease of the failure rate in the Business Studies III exam which is the exam in the focus of investigation at the second semester. However, the failure rate in Economics II is not positive and the grades even decline.

### **4.3 Heterogeneous Effects**

This section analyzes whether certain subgroups benefit more from the mentoring program. The main focus lies on the question whether the program has different effects on men and women. A stronger effect for women would be in line with findings in other studies ([Angrist et al., 2009](#)) as well as with the higher use of the mentoring by female students. Additionally, I investigate the effects on students with a HS-GPA in the lowest quartile because poor performance at high school may be related to a non-academic family background for which the mentoring is expected to be beneficial. Finally, I investigate the effect on students without a German citizenship. For these students, I expect smaller effects of the mentoring because of their lower participation rates.

Table 7: Heterogeneous Mentoring Effects on Failure Rate

	(1)	(2)	(3)	(4)	(5)
	Failure Rate				
	Busin. St. I	Busin. St. II	Econ. I	Busin. St. III	Econ. II
Heterogeneous Effects: Gender					
Mentoring $\times$ EM	-0.140*** (0.048)	-0.046 (0.036)	-0.103** (0.049)	-0.020 (0.044)	0.028 (0.037)
Mentoring $\times$ EM $\times$ Female	-0.040 (0.101)	-0.063 (0.056)	0.061 (0.122)	-0.126* (0.074)	0.050 (0.108)
Observations	2379	1816	1814	1920	1496
Heterogeneous Effects: Lowest Quartile					
Mentoring $\times$ EM	-0.095** (0.047)	-0.076*** (0.029)	-0.052 (0.050)	-0.042 (0.037)	0.025 (0.035)
Mentoring $\times$ EM $\times$ Lowest Quartile	-0.201** (0.095)	-0.034 (0.067)	-0.144 (0.095)	-0.086 (0.090)	-0.002 (0.093)
Observations	2379	1816	1814	1920	1496
Heterogeneous Effects: Foreign Citizenship					
Mentoring $\times$ EM	-0.171*** (0.042)	-0.090*** (0.027)	-0.121*** (0.042)	-0.046 (0.036)	0.023 (0.037)
Mentoring $\times$ EM $\times$ Foreign Citizenship	0.200 (0.174)	0.124 (0.108)	0.330* (0.182)	-0.244* (0.125)	0.065 (0.060)
Observations	2379	1816	1814	1920	1496

Notes: Robust standard errors in parentheses. All models include year dummies, all available controls and interactions of the subgroup variable with the program and the mentoring variable. All Models use failure rate as dependent variable. Busin. St. = Business Studies, Econ.= Economics.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 7 shows the mentoring effects on heterogeneous subgroups. The table presents only the effects on the failure rate. The effects on the other exam outcomes are comparable to the presented effects. These results are available on request. The estimates include all available covariates. However, Table 7 only reports the interaction term between EM and the period in which the mentoring was offered and additionally the interaction of this term with gender, low HS-GPA or foreign citizenship.

For gender the estimates reveal that only for Business Studies III the effect for women are significantly higher than for men. Nevertheless, in the two business exams in the first semester the effect is also stronger for women but not significantly. It seems that at least for the business exams the women benefit more from the mentoring. However, the gender effects are lower than expected. For students with a HS-GPA in the lowest quartile the picture is different. Although a significantly

stronger effect only occurs at Business Studies I, the coefficients for all other exams show a decrease, too. For students with a foreign citizenship the results are as expected. In four of the five exams the effect of the mentoring is lower for these students. However, the effect is only statistically significant in Economics I. Only in Business Studies III in the second semester the effect of the mentoring is higher for students without a German citizenship.

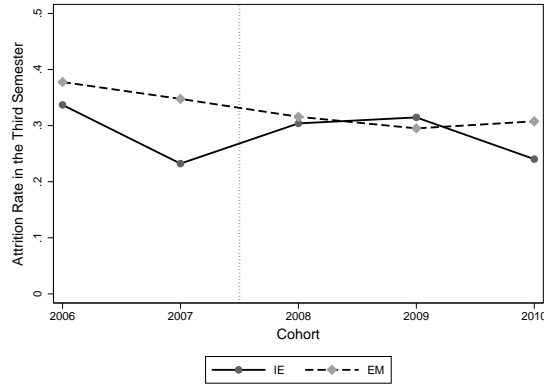
Overall, the coefficients in the three subgroups have mostly the expected signs. Probably most interesting is the fact that in line with the lower participation in the mentoring the foreign students benefit less of the mentoring. This is another evidence for effectiveness of the mentoring if students participate. Nevertheless, foreign students are a small subgroup leading to large standard errors of the estimates and although the size of the coefficients is large they lack statistical significance.

#### 4.4 Effects on Attrition

This section analyzes the effects of the mentoring on students' attrition. I consider attrition rates for the second (nine months after the start of the first semester) and third semester (15 months after the start of the first semester) exams. In order to calculate the attrition rate, the first semester exam gives the number of students who start their degree. Because all students are automatically signed up for the exams, the number of drop out students results from the difference between the students who are signed for the exams in the first and in the later semesters. Like in the other analyses, the difference in the differences between EM and IE students since the introduction of the mentoring gives the treatment effect. However, in this estimation I can not control for the characteristics because I do not have any information about the students who drop out, but only about the total number.

Figure 4 illustrates the share of students who drop out before the third semester exam. It reveals that the attrition rate is between 25 percent and 40 percent in all cohorts and in both degrees. Table 8 shows the results of the mentoring on attrition using Equation 1. In this estimation the dependent variable is 1 if a student dropped out. The coefficient in the first row presents the mentoring effect. For the second semester exams, the difference in the attrition rate between EM and IE

Figure 4: Attrition Third Semester



Note: The figure reports the rate of first semester students which are not enrolled for the exams in the third semester.

Table 8: Mentoring Effects on Attrition

	(1) Attrition second Sem.	(2) Attrition third Sem.
Mentoring $\times EM$	0.003 (0.037)	-0.061 (0.045)
EM	0.086*** (0.031)	0.080** (0.037)
Constant	0.168*** (0.031)	0.306*** (0.037)
Observations	2529	2529
$R^2$	0.01	0.01

Notes: Robust standard errors in parentheses. All models include year dummies. The dependent variable is the rate of first semester student who are not enrolled for the exams in the second or third semester.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

remains constant after implementation of the mentoring. However, the difference decreases by 6.1 percentage points in the third semester. Nevertheless, this effect is not statistically significant. The second row shows that EM students drop out more often than IE students which is also visible in Figure 4.

It is surprising that the mentoring does not affect attrition rates although it reduces the failure rates. However, the reduction in the third semester could be an indicator that an effect on attrition develops with time. A reason for this might be that students with low interest in EM drop out in the first year independent whether or not they have failed exams in the first year. In contrast, students who drop out in later semesters do this because they have failed exams in the first year and the pressure of re-take and final exams get too high. This pressure could be reduced

due to the lower fail rates in the first year and therefore effects on attrition start to occur in the second year. Interestingly, for the third semester the results are as high as in [Bettinger and Baker \(2011\)](#) where the mentoring effects on attrition also lie in a range between five and seven percentage points.

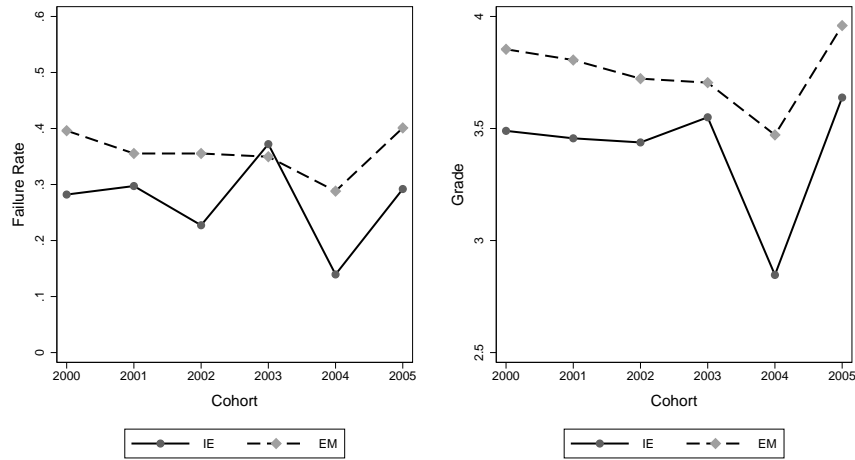
## 5 Robustness Checks

To interpret the estimated effects as causal, certain assumptions must hold. Firstly, I assume that two cohorts before the introduction of the mentoring and three cohorts after the introduction are enough time periods to show that a change between the exam outcomes of IE and EM students is not random. To proof that a decrease in the difference between IE and EM students is unusual, the results of the diploma programs can give further insights. Table 5 indicates that the differences between EM and IE are quite stable over the years in the diploma exam outcomes. Only in 2003 the difference in the failure rate and in the grades decreases strongly. However, in this year the EM students did not suddenly improve, rather the IE students did worse. This is a different picture than after introduction of the mentoring when the difference decreases because of an improvement of the EM students. Therefore, the diploma results present another evidence that the equalization in the exam outcomes between IE and EM students is not random, but the mentoring caused the change. Table 19 gives the numerical values of the diploma exam outcomes.

Secondly, I assume that the other classes in the syllabus of the IE and EM degree have not changed before and after the introduction of the mentoring. If this was the case, the students could reallocate their time resources for the classes and this could cause the equalization in the exam outcomes. This assumption concerns Mathematics I and II for the EM students and the engineering classes for the IE students. In none of the exams I find a change in the curriculum, the structure of the exam or in the lecturers. Therefore, it is unlikely that the IE students put more effort in the engineering classes and, because of this, less effort in an economics and management class. The same holds for the EM students in mathematics.

Thirdly, I assume no further support than the mentoring for the EM students and

Figure 5: Differences between EM and IE in Diploma Program



Note: The figure reports the failure rate and the grades for IE and EM diploma student.

no decrease in the study situation for the IE students. As I described above, all additional policies which the faculty introduced with the money of the tuition are open for all students. It is unlikely that the study situation decreased at the engineering faculty because budget allocation to the faculty has not changed. Furthermore, one could argue that the exam correctors favor EM students in the economics and management classes. It is unlikely that this is the case because the correction is almost anonymous. In addition, it is most likely, if the correctors have preferences for EM students, that these preferences also persisted before the introduction of the mentoring.

Fourthly, differences should not diverge as long as the mentoring is offered to EM students. Furthermore, each cohort after introduction of the mentoring should benefit by the mentoring in the same size. Looking at the descriptive statistics, this is most arguable for the Business Studies I exam in the 2010 cohort. In this year the difference in the failure rate between IE and EM students increases in comparison to the 2008 and 2009 cohort. Therefore, I conduct a placebo tests to investigate if the change in the difference is statistically significant. The first two columns in

Table 9 compare the difference between the pre-mentoring cohorts 2006 and 2007 with 2010. In Column 1 the effect is not significant. However, including controls (column 2) changes the picture and the difference reduces significantly. Column 3 and column 4 investigate the difference between the 2008 and 2009 cohorts and the 2010 cohort. The estimates reveal that the change in the difference is not significant and goes towards zero if controls are included (column 4). The results indicate that a change in the students characteristics, most likely the high school GPA (2.15 for IE students in 2010 whereas the average for all years is 2.26), causes the smaller mentoring effects for the 2010 cohort.

Table 9: Placebo Test Business Studies I

	(1)	(2)	(3)	(4)
	Failure Rate		Failure Rate	
2010 $\times$ EM	-0.065 (0.055)	-0.135** (0.054)	0.081 (0.051)	0.035 (0.051)
EM	0.186*** (0.035)	0.158*** (0.036)	0.040 (0.029)	0.007 (0.031)
Controls	No	Yes	No	Yes
Observations	1490	1364	1584	1522
$R^2$	0.03	0.07	0.01	0.05

Notes: Column (1) compares the cohort 2010 with the pre-mentoring cohorts 2006 and 2007. Column (2) includes the available controls. Both models include year dummies for 2007 and 2010. Column (3) compares the cohort 2010 with the post-mentoring cohorts 2008 and 2009. Column (4) includes available controls. Both models include year dummies for 2009 and 2010. Robust standard errors in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Finally, I assume that the unobserved differences in the characteristics between IE and EM students are constant over the cohorts. I cannot prove this with the available data which does not include, for example, family background. Nevertheless, the difference of the characteristics which are observed in the data do not change significantly. Therefore, there is no reason for suggesting that this is the case for characteristics which are not observed.

## 6 Conclusion

This paper reports on a natural experiment that investigated the effects of a high quality mentoring program on students' first year study success. The mentoring

consists of scheduled, compulsory, face-to-face appointments between the student and a graduated member of the faculty. For the evaluation of the effectiveness, I used the fact that students in an economics and management degree and students in an industrial engineering degree take the same exam, whereas only the economics and management students received the mentoring. Student questionnaires reveal that the participation rate in the mentoring is very high, although the students take less appointments than scheduled by the structure of the program.

I find that the effects on the first semester exam outcomes are large and significant, while the effects are smaller in the second semester. These effects occur, although the students judge the usefulness of the mentoring as low. Female students take more appointments and they benefit more from the mentoring in some exams. Furthermore, the mentoring lowers the attrition rate after 12 months. However, this effect is small and not statistically significant. This shows that many students drop out, although the mentoring caused more students to pass the first semester exams.

One interpretation of the findings is that students' drop out is independent of whether or not they have passed the first semester exams; rather they realize EM is not the right subject for them. In this case the mentoring is useful as well because students who quit have passed more exams. This could lead to shorter study duration if these students change the subject or they will receive higher salaries if they apply for a job. The strong effects on the failure rate and the small effect on the attrition rate could also be explained due to EM students who failed the exam in the first attempt and then passed the re-take exam before the introduction of the mentoring. After introduction of the mentoring these students pass the exams in the first attempt. Therefore, before the introduction of the mentoring the failure was the nudge which the students needed. However, if this is the case, the mentoring should lead to shorter study durations and better results in later semesters because less time is claimed for the re-take exams and therefore more time is available for the preparation for the final exams.

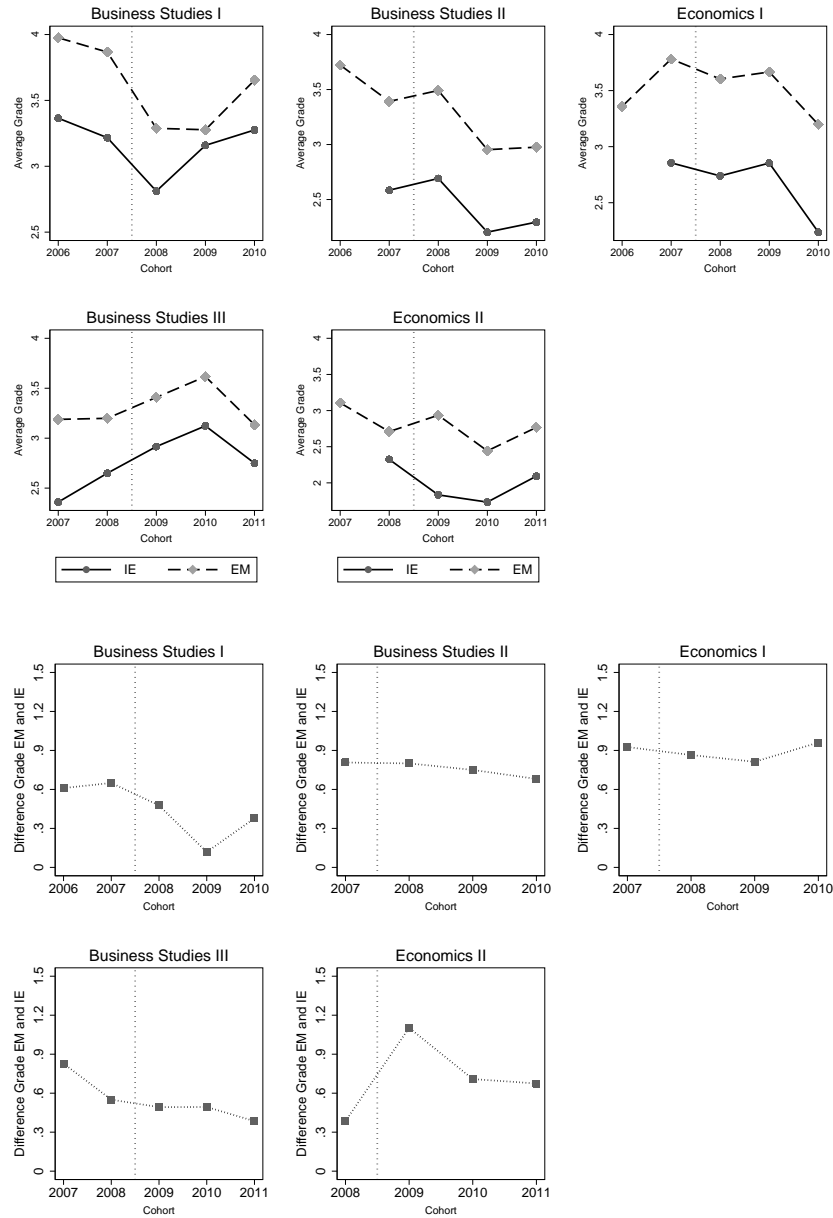
Overall, it seems that the mentoring can improve the study results, and because the intervention is not costly, it seems more efficient than other policies like financial rewards or class size reductions. Therefore, one could argue that more resources



should be allocated from lectures to mentoring programs. However, the analyzed mentoring program obtained certain high-quality characteristics which are not common to usual mentoring programs. Therefore, further research should investigate which characteristics are most beneficial and which mentoring dosage is optimal.

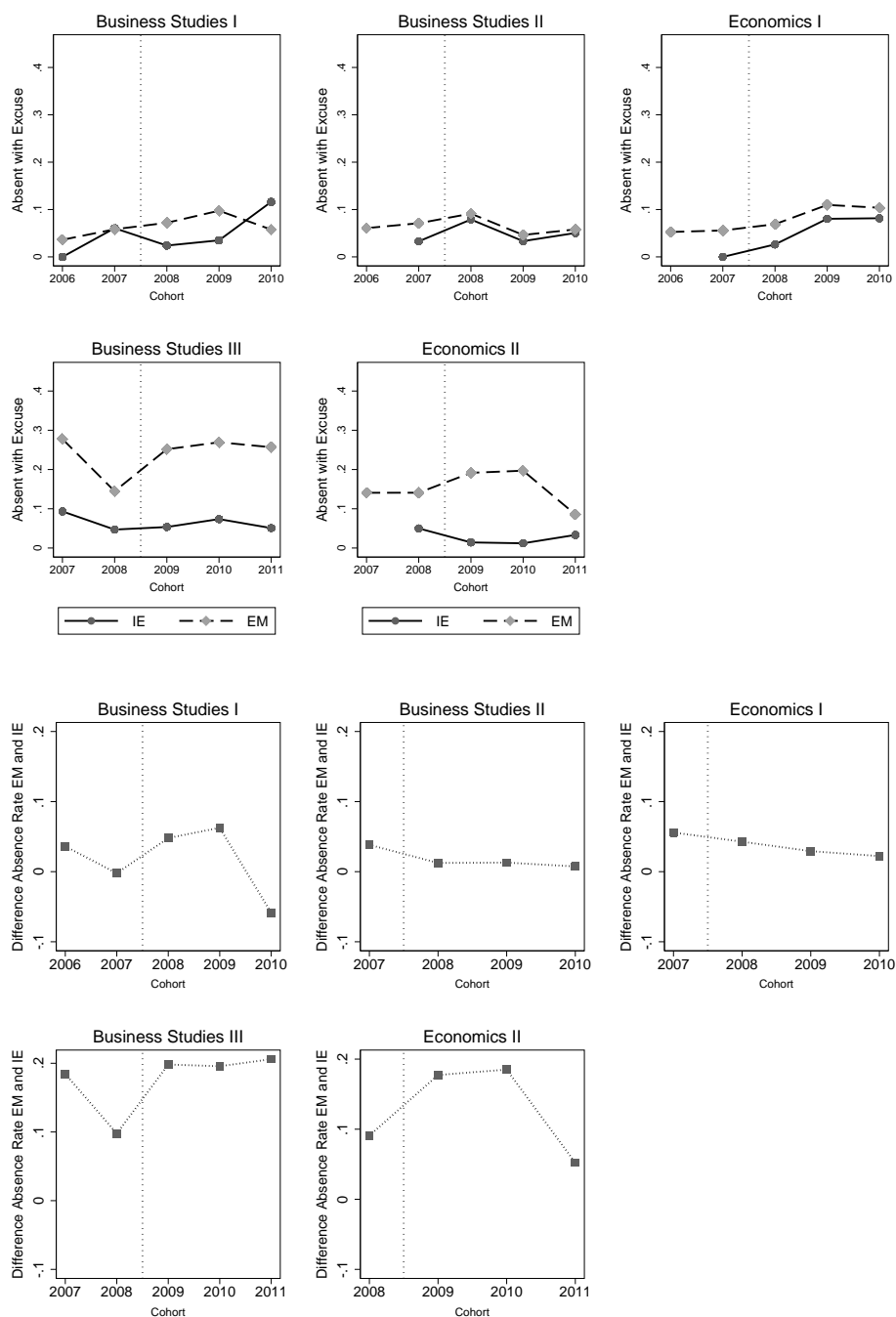
## 7 Appendix

Figure 6: Grades



Note: The figures in the first two rows report the average grades of IE (solid line) and EM (dashed line) students. The figures in the last two rows report the difference of the average grades between IE (solid line) and EM (dashed line) students. The vertical line indicates the introduction of the mentoring program. Grades range from 1.0 to 5.0 where 1.0 is the best grade and 4.0 is lowest grade to pass the exam.

Figure 7: Absent with excuse



Note: The figures in the first two rows report the absence rate of IE (solid line) and EM (dashed line) students. The figures in the last two rows report the difference of the absence rate between IE (solid line) and EM (dashed line) students. The vertical line indicates the introduction of the mentoring program.

Table 10: Student Characteristics Business Studies I

	Pre-Mentoring						Post-Mentoring						Total Post		Diff.			
	2006			2007			2008			2009						2010		
	IE	EM		IE	EM		IE	EM		IE	EM		IE	EM		IE	EM	
<i>Exam Results</i>																		
Percent Fail	0.23 (0.42)	0.41 (0.49)		0.21 (0.41)	0.40 (0.49)		0.18 (0.38)	0.25 (0.43)		0.22 (0.41)	0.22 (0.42)		0.20 (0.40)	0.32 (0.47)		0.20 (0.40)	0.27 (0.44)	-0.12
Absent with Excuse	0.00 (0.00)	0.04 (0.19)		0.06 (0.24)	0.06 (0.23)		0.02 (0.15)	0.07 (0.26)		0.03 (0.18)	0.10 (0.30)		0.12 (0.32)	0.06 (0.23)		0.06 (0.23)	0.08 (0.26)	0.01
Grade	3.37 (1.05)	3.98 (1.03)		3.22 (1.19)	3.87 (1.16)		2.81 (1.26)	3.29 (1.27)		3.16 (1.20)	3.28 (1.20)		3.28 (1.17)	3.65 (1.15)		3.08 (1.22)	3.41 (1.22)	-0.30
<i>Characteristics</i>																		
Female	0.18 (0.39)	0.49 (0.50)		0.22 (0.42)	0.44 (0.50)		0.25 (0.43)	0.50 (0.50)		0.22 (0.41)	0.47 (0.50)		0.15 (0.36)	0.42 (0.49)		0.20 (0.40)	0.46 (0.50)	0.00
HS Degree in Han.	0.35 (0.48)	0.45 (0.50)		0.24 (0.43)	0.40 (0.49)		0.38 (0.49)	0.51 (0.50)		0.35 (0.48)	0.45 (0.50)		0.37 (0.49)	0.44 (0.50)		0.29 (0.46)	0.46 (0.50)	-0.04
Regular HS Degree	0.74 (0.44)	0.65 (0.48)		0.82 (0.39)	0.70 (0.46)		0.77 (0.42)	0.71 (0.45)		0.78 (0.41)	0.62 (0.49)		0.76 (0.43)	0.73 (0.45)		0.77 (0.42)	0.69 (0.46)	0.02
Foreign Citizenship	0.18 (0.39)	0.16 (0.37)		0.13 (0.34)	0.12 (0.33)		0.10 (0.31)	0.15 (0.35)		0.10 (0.30)	0.11 (0.31)		0.08 (0.27)	0.06 (0.25)		0.16 (0.36)	0.10 (0.31)	0.03
HS GPA	2.30 (0.48)	2.69 (0.47)		2.20 (0.41)	2.55 (0.50)		2.22 (0.51)	2.62 (0.48)		2.30 (0.49)	2.65 (0.48)		2.15 (0.46)	2.60 (0.50)		2.22 (0.49)	2.62 (0.49)	0.04
Durat. since HS Degree	1.23 (2.27)	1.69 (2.81)		1.32 (1.97)	1.60 (2.80)		1.06 (1.78)	1.46 (2.13)		1.07 (2.33)	1.47 (1.91)		0.74 (1.09)	1.26 (1.88)		0.96 (1.83)	1.40 (1.97)	0.08
Age in Years	21.16 (2.78)	21.90 (3.14)		21.28 (2.15)	21.77 (3.45)		20.88 (2.03)	21.53 (2.48)		21.04 (2.61)	21.51 (2.17)		20.50 (1.70)	21.22 (2.31)		20.82 (2.17)	21.42 (2.32)	-0.01
N	92	360		99	394		125	361		143	410		129	416		397	1187	

Notes: Mean coefficients; standard deviations in parentheses; HS=High School. *Diff.* indicates the difference of the differences between IE and EM in Pre-Mentoring and Post-Mentoring. Grades range from 1.0 to 5.0 where 1.0 is the best grade and 4.0 is lowest grade to pass the exam. High School GPA ranges from 1.0 to 4.0 where 1.0 is the best grade.

Table 11: Student Characteristics Business Studies III

	Pre-Mentoring						Post-Mentoring						Diff.									
	2007			2008			2009			2010				2011			Total Pre			Total Post		
	IE	EM		IE	EM		IE	EM		IE	EM			IE	EM		IE	EM		IE	EM	
<i>Exam Results</i>																						
Percent Fail	0.08 (0.27)	0.19 (0.39)		0.08 (0.28)	0.19 (0.40)		0.13 (0.34)	0.16 (0.37)		0.16 (0.37)	0.25 (0.43)	0.15 (0.36)	0.08 (0.27)	0.19 (0.39)	0.15 (0.36)	0.18 (0.38)	-0.08					
Absent with Excuse	0.09 (0.29)	0.28 (0.45)		0.05 (0.21)	0.16 (0.36)		0.07 (0.26)	0.26 (0.44)		0.08 (0.27)	0.28 (0.45)	0.07 (0.25)	0.07 (0.25)	0.21 (0.41)	0.07 (0.26)	0.27 (0.44)	0.06					
Grade	2.36 (1.12)	3.19 (1.26)		2.65 (1.07)	3.21 (1.18)		2.92 (1.13)	3.41 (1.04)		3.12 (1.12)	3.62 (1.22)	2.78 (1.14)	2.52 (1.10)	3.20 (1.21)	2.94 (1.14)	3.39 (1.14)	-0.23					
<i>Characteristics</i>																						
Female	0.16 (0.37)	0.48 (0.50)		0.21 (0.41)	0.45 (0.50)		0.26 (0.44)	0.51 (0.50)		0.21 (0.41)	0.46 (0.50)	0.17 (0.38)	0.19 (0.39)	0.46 (0.50)	0.21 (0.41)	0.47 (0.50)	-0.01					
HS Degree in Han.	0.37 (0.49)	0.46 (0.50)		0.25 (0.43)	0.41 (0.49)		0.34 (0.48)	0.50 (0.50)		0.34 (0.48)	0.46 (0.50)	0.37 (0.48)	0.31 (0.46)	0.43 (0.50)	0.35 (0.48)	0.47 (0.50)	0.00					
Regular HS Degree	0.81 (0.39)	0.66 (0.47)		0.82 (0.38)	0.70 (0.46)		0.77 (0.42)	0.73 (0.44)		0.77 (0.42)	0.63 (0.48)	0.75 (0.43)	0.82 (0.39)	0.68 (0.47)	0.77 (0.42)	0.70 (0.46)	0.07					
Foreign Citizenship	0.15 (0.36)	0.16 (0.37)		0.13 (0.34)	0.11 (0.32)		0.11 (0.31)	0.13 (0.34)		0.10 (0.30)	0.09 (0.28)	0.11 (0.25)	0.14 (0.35)	0.14 (0.34)	0.10 (0.30)	0.10 (0.29)	0.00					
HS GPA	2.30 (0.50)	2.65 (0.49)		2.18 (0.42)	2.56 (0.46)		2.18 (0.49)	2.60 (0.48)		2.27 (0.50)	2.62 (0.47)	2.15 (0.48)	2.24 (0.46)	2.60 (0.47)	2.20 (0.49)	2.61 (0.48)	0.05					
Durat. since HS Degree	1.05 (1.93)	1.51 (2.06)		1.32 (1.88)	1.49 (2.25)		1.17 (1.89)	1.45 (2.29)		1.01 (1.34)	1.37 (1.70)	0.86 (1.24)	1.19 (1.90)	1.50 (2.16)	1.01 (1.51)	1.37 (1.93)	0.08					
Age in Years	21.32 (2.22)	22.19 (2.49)		21.60 (1.78)	22.05 (2.81)		21.28 (1.97)	21.88 (2.37)		21.33 (1.70)	21.96 (2.39)	21.08 (2.27)	21.47 (2.00)	22.12 (2.67)	21.23 (1.80)	21.84 (2.34)	-0.04					
N	75	270	85	297	297		112	286	122	334	118	327	160	567	352	947						

Notes: see Table 10.

Table 12: Student Characteristics Economics I

	Pre-Mentoring				Post-Mentoring								Total Post		Diff.
	2007		2008		2009		2010		Total Pre						
	IE	EM	IE	EM	IE	EM	IE	EM	IE	EM	IE	EM			
<i>Exam Results</i>															
Percent Fail	0.05 (0.22)	0.33 (0.47)	0.08 (0.27)	0.29 (0.45)	0.08 (0.27)	0.26 (0.44)	0.03 (0.17)	0.21 (0.41)	0.05 (0.22)	0.33 (0.47)	0.06 (0.24)	0.25 (0.43)	0.06 (0.24)	0.25 (0.43)	-0.09
Absent with Excuse	0.00 (0.00)	0.06 (0.23)	0.03 (0.16)	0.07 (0.25)	0.08 (0.27)	0.11 (0.31)	0.08 (0.28)	0.10 (0.31)	0.00 (0.00)	0.06 (0.23)	0.07 (0.25)	0.10 (0.30)	0.07 (0.25)	0.10 (0.30)	-0.03
Grade	2.86 (0.97)	3.78 (1.08)	2.74 (0.98)	3.60 (1.12)	2.85 (1.02)	3.67 (1.06)	2.24 (0.95)	3.20 (1.24)	2.86 (0.97)	3.78 (1.08)	2.58 (1.02)	3.49 (1.16)	2.58 (1.02)	3.49 (1.16)	-0.01
<i>Characteristics</i>															
Female	0.20 (0.40)	0.44 (0.50)	0.20 (0.40)	0.50 (0.50)	0.29 (0.46)	0.47 (0.50)	0.17 (0.38)	0.42 (0.49)	0.20 (0.40)	0.44 (0.50)	0.22 (0.41)	0.46 (0.50)	0.22 (0.41)	0.46 (0.50)	0.00
HS Degree in Han.	0.41 (0.50)	0.40 (0.49)	0.24 (0.43)	0.51 (0.50)	0.33 (0.47)	0.45 (0.50)	0.37 (0.48)	0.44 (0.50)	0.41 (0.50)	0.40 (0.49)	0.32 (0.47)	0.46 (0.50)	0.32 (0.47)	0.46 (0.50)	0.15
Regular HS Degree	0.82 (0.39)	0.70 (0.46)	0.83 (0.38)	0.71 (0.45)	0.79 (0.41)	0.62 (0.49)	0.80 (0.41)	0.73 (0.45)	0.82 (0.39)	0.70 (0.46)	0.79 (0.40)	0.68 (0.47)	0.79 (0.40)	0.68 (0.47)	0.01
Foreign Citizenship	0.16 (0.37)	0.12 (0.33)	0.13 (0.34)	0.15 (0.36)	0.08 (0.27)	0.11 (0.31)	0.09 (0.29)	0.07 (0.25)	0.16 (0.37)	0.12 (0.33)	0.10 (0.30)	0.11 (0.31)	0.10 (0.30)	0.11 (0.31)	0.05
HS GPA	2.25 (0.48)	2.55 (0.50)	2.18 (0.43)	2.61 (0.49)	2.15 (0.48)	2.65 (0.48)	2.28 (0.44)	2.60 (0.49)	2.25 (0.48)	2.55 (0.50)	2.20 (0.45)	2.62 (0.49)	2.20 (0.45)	2.62 (0.49)	0.12
Durat. since HS Degree	0.66 (1.25)	1.60 (2.80)	1.33 (1.89)	1.50 (2.24)	1.15 (2.04)	1.47 (1.91)	0.92 (1.17)	1.25 (1.87)	0.66 (1.25)	1.60 (2.80)	1.15 (1.75)	1.44 (2.04)	1.15 (1.75)	1.44 (2.04)	-0.65
Age in Years	21.44 (1.42)	21.81 (3.45)	22.18 (1.81)	21.60 (2.53)	21.77 (2.18)	21.55 (2.18)	21.84 (1.69)	21.24 (2.31)	21.44 (1.42)	21.81 (3.45)	21.95 (1.95)	21.52 (2.45)	21.95 (1.95)	21.52 (2.45)	-0.80
Observations	61	394	76	362	87	410	98	414	61	394	261	1186	261	1186	

Notes: see Table 10.

Table 13: Student Characteristics Business Studies II

	Pre-Mentoring				Post-Mentoring								Diff.
	2007		2008		2009		2010		Total Pre		Total Post		
	IE	EM	IE	EM	IE	EM	IE	EM	IE	EM	IE	EM	
<i>Exam Results</i>													
Percent Fail	0.02 (0.13)	0.24 (0.43)	0.07 (0.25)	0.24 (0.42)	0.00 (0.00)	0.12 (0.32)	0.03 (0.17)	0.16 (0.37)	0.02 (0.13)	0.24 (0.43)	0.03 (0.18)	0.17 (0.38)	-0.08
Absent with Excuse	0.03 (0.18)	0.07 (0.26)	0.08 (0.27)	0.09 (0.29)	0.03 (0.18)	0.05 (0.21)	0.05 (0.22)	0.06 (0.23)	0.03 (0.18)	0.07 (0.26)	0.07 (0.26)	0.07 (0.25)	-0.04
Grade	2.58 (0.80)	3.39 (1.18)	2.69 (0.91)	3.49 (1.09)	2.20 (0.72)	2.95 (0.99)	2.29 (0.93)	2.98 (1.20)	2.58 (0.80)	3.39 (1.18)	2.38 (0.89)	3.13 (1.13)	-0.06
<i>Characteristics</i>													
Female	0.20 (0.40)	0.44 (0.50)	0.20 (0.40)	0.50 (0.50)	0.28 (0.45)	0.47 (0.50)	0.17 (0.38)	0.42 (0.49)	0.20 (0.40)	0.44 (0.50)	0.21 (0.41)	0.46 (0.50)	0.00
HS Degree in Han.	0.41 (0.50)	0.40 (0.49)	0.24 (0.43)	0.51 (0.50)	0.34 (0.48)	0.45 (0.50)	0.37 (0.49)	0.44 (0.50)	0.41 (0.50)	0.40 (0.49)	0.32 (0.47)	0.46 (0.50)	0.15
Regular HS Degree	0.82 (0.39)	0.70 (0.46)	0.83 (0.38)	0.71 (0.45)	0.79 (0.41)	0.62 (0.49)	0.80 (0.40)	0.73 (0.45)	0.82 (0.39)	0.70 (0.46)	0.78 (0.41)	0.68 (0.47)	0.02
Foreign Citizenship	0.16 (0.37)	0.12 (0.33)	0.13 (0.34)	0.15 (0.35)	0.09 (0.29)	0.11 (0.31)	0.09 (0.29)	0.07 (0.25)	0.16 (0.37)	0.12 (0.33)	0.12 (0.33)	0.11 (0.31)	0.03
HS GPA	2.25 (0.48)	2.55 (0.50)	2.18 (0.43)	2.62 (0.48)	2.17 (0.50)	2.65 (0.48)	2.27 (0.45)	2.60 (0.49)	2.25 (0.48)	2.55 (0.50)	2.21 (0.46)	2.62 (0.49)	0.11
Durat. since HS Degree	0.66 (1.25)	1.60 (2.80)	1.33 (1.89)	1.46 (2.13)	1.23 (2.10)	1.47 (1.91)	0.91 (1.16)	1.25 (1.87)	0.66 (1.25)	1.60 (2.80)	1.24 (1.84)	1.42 (2.00)	-0.76
Age in Years	21.44 (1.42)	21.80 (3.45)	22.16 (1.82)	21.56 (2.47)	21.82 (2.20)	21.54 (2.18)	21.82 (1.68)	21.24 (2.31)	21.44 (1.42)	21.80 (3.45)	22.01 (1.99)	21.50 (2.42)	-0.87
Observations	61	394	76	361	90	410	99	414	61	394	265	1185	

Notes: see Table 10.

Table 14: Student Characteristics Economics II

	Pre-Mentoring				Post-Mentoring								Total Post		Diff.
	2008		2009		2010				2011		Total Pre				
	IE	EM	IE	EM	IE	EM	IE	EM	IE	EM	IE	EM			
<i>Exam Results</i>															
Percent Fail	0.05 (0.22)	0.09 (0.28)	0.04 (0.20)	0.16 (0.36)	0.01 (0.11)	0.08 (0.28)	0.02 (0.15)	0.11 (0.31)	0.05 (0.22)	0.09 (0.28)	0.02 (0.15)	0.11 (0.32)	0.05 (0.22)	0.09 (0.28)	0.05
Absent with Excuse	0.95 (0.22)	0.85 (0.36)	0.99 (0.12)	0.81 (0.39)	0.99 (0.11)	0.79 (0.41)	0.96 (0.20)	0.90 (0.30)	0.95 (0.22)	0.85 (0.36)	0.98 (0.15)	0.84 (0.37)	0.95 (0.22)	0.85 (0.36)	0.04
Grade	2.37 (0.88)	2.72 (1.01)	1.84 (1.03)	2.95 (1.29)	1.72 (0.71)	2.44 (1.20)	2.11 (0.90)	2.77 (1.17)	2.37 (0.88)	2.72 (1.01)	1.89 (0.89)	2.71 (1.23)	2.37 (0.88)	2.72 (1.01)	0.47
<i>Characteristics</i>															
Female	0.20 (0.40)	0.44 (0.50)	0.21 (0.41)	0.51 (0.50)	0.24 (0.43)	0.46 (0.50)	0.18 (0.39)	0.45 (0.50)	0.20 (0.40)	0.44 (0.50)	0.21 (0.41)	0.47 (0.50)	0.20 (0.40)	0.44 (0.50)	0.02
HS Degree in Han.	0.41 (0.50)	0.41 (0.49)	0.24 (0.43)	0.50 (0.50)	0.35 (0.48)	0.45 (0.50)	0.38 (0.49)	0.44 (0.50)	0.41 (0.50)	0.41 (0.49)	0.33 (0.47)	0.46 (0.50)	0.41 (0.50)	0.41 (0.49)	0.13
Regular HS Degree	0.84 (0.37)	0.69 (0.46)	0.86 (0.35)	0.73 (0.45)	0.85 (0.36)	0.63 (0.48)	0.83 (0.38)	0.75 (0.43)	0.84 (0.37)	0.69 (0.46)	0.84 (0.36)	0.70 (0.46)	0.84 (0.37)	0.69 (0.46)	0.01
Foreign Citizenship	0.16 (0.37)	0.12 (0.33)	0.10 (0.30)	0.14 (0.34)	0.06 (0.24)	0.09 (0.29)	0.09 (0.28)	0.07 (0.26)	0.16 (0.37)	0.12 (0.33)	0.08 (0.27)	0.10 (0.30)	0.16 (0.37)	0.12 (0.33)	0.06
HS GPA	2.23 (0.47)	2.57 (0.47)	2.18 (0.43)	2.61 (0.49)	2.13 (0.46)	2.61 (0.48)	2.25 (0.43)	2.58 (0.50)	2.23 (0.47)	2.57 (0.47)	2.19 (0.44)	2.60 (0.49)	2.23 (0.47)	2.57 (0.47)	0.07
Durat. since HS Degree	0.61 (1.26)	1.49 (2.28)	1.21 (1.64)	1.51 (2.49)	0.99 (1.67)	1.39 (1.72)	0.84 (1.09)	1.27 (1.78)	0.61 (1.26)	1.49 (2.28)	1.00 (1.47)	1.38 (2.01)	0.61 (1.26)	1.49 (2.28)	-0.50
Age in Years	21.79 (1.36)	22.04 (2.80)	22.37 (1.56)	21.90 (2.49)	21.99 (1.70)	21.92 (2.28)	22.17 (1.67)	21.64 (2.25)	21.79 (1.36)	22.04 (2.80)	22.16 (1.65)	21.82 (2.34)	21.79 (1.36)	22.04 (2.80)	-0.59
N	60	298	70	287	83	340	90	327	60	298	243	954	60	298	

Notes: see Table 10.



Table 15: Mentoring Effects on First Semester Grades

	(1)	(2)	(3)	(4)	(5)	(6)
	Grade Business St. I		Grade Economics I		Grade Business St. II	
Mentoring $\times$ EM	-0.315*** (0.117)	-0.394*** (0.110)	-0.044 (0.153)	-0.162 (0.137)	-0.069 (0.136)	-0.165 (0.123)
EM	0.630*** (0.092)	0.458*** (0.091)	0.926*** (0.135)	0.730*** (0.124)	0.807*** (0.121)	0.797*** (0.115)
Female		0.069 (0.051)		0.221*** (0.052)		-0.322*** (0.050)
HS Degree in Han.		-0.003 (0.048)		0.031 (0.050)		0.011 (0.049)
Regular HS Degree		-0.203*** (0.058)		-0.304*** (0.060)		-0.253*** (0.058)
Foreign Citizenship		0.622*** (0.092)		0.648*** (0.097)		0.670*** (0.100)
HS GPA		0.549*** (0.054)		0.660*** (0.058)		0.428*** (0.057)
Durat. since HS Degree		-0.119*** (0.024)		-0.075*** (0.025)		-0.020 (0.028)
Age in Years		0.082*** (0.019)		0.055*** (0.020)		0.052** (0.026)
$R^2$	0.07	0.16	0.13	0.26	0.11	0.23
Observations	2374	2245	1750	1677	1785	1708

Notes: Standard errors in parentheses. All models include year dummies. Only students who were not absent are included.

Table 16: Mentoring Effects on Second Semester Grades

	(1)	(2)	(3)	(4)
	Grade Business Studies III		Grade Economics II	
Mentoring $\times$ EM	-0.219*	-0.184	0.425***	0.347**
	(0.130)	(0.123)	(0.144)	(0.140)
EM	0.675***	0.475***	0.385***	0.238*
	(0.106)	(0.105)	(0.124)	(0.125)
Female		-0.279***		-0.069
		(0.057)		(0.064)
HS Degree in Hannover		0.057		0.026
		(0.055)		(0.060)
Regular HS Degree		-0.287***		-0.311***
		(0.071)		(0.073)
Foreign Citizenship		0.410***		-0.188
		(0.120)		(0.117)
HS GPA		0.667***		0.583***
		(0.061)		(0.066)
Duration since HS Degree		-0.129***		-0.054**
		(0.028)		(0.027)
Age in Years		0.098***		0.070***
		(0.018)		(0.021)
$R^2$	0.07	0.21	0.09	0.18
Observations	1630	1559	1355	1306

Notes: Robust standard errors in parentheses. All models include year dummies. Only students who were not absent are included.

Table 17: Mentoring Effects on First Semester Absent Rates

	(1)	(2)	(3)	(4)	(5)	(6)
	Absent Business St. I		Absent Economics I		Absent Business St. II	
Mentoring $\times$ EM	0.002 (0.020)	0.000 (0.018)	-0.025 (0.021)	-0.020 (0.021)	-0.027 (0.030)	-0.020 (0.032)
EM	0.016 (0.015)	0.005 (0.013)	0.056*** (0.012)	0.061*** (0.016)	0.038 (0.026)	0.043 (0.030)
Female		0.017* (0.010)		-0.009 (0.013)		-0.001 (0.012)
HS Degree in Han.		0.030*** (0.010)		0.021* (0.013)		0.003 (0.011)
Regular HS Degree		-0.001 (0.011)		-0.012 (0.016)		-0.014 (0.013)
Foreign Citizenship		0.089*** (0.025)		0.132*** (0.033)		0.116*** (0.030)
HS GPA		0.017 (0.012)		0.023 (0.014)		-0.005 (0.013)
Durat. since HS Degree		0.000 (0.005)		-0.007 (0.008)		-0.002 (0.007)
Age in Years		0.006 (0.004)		0.012** (0.006)		0.009* (0.005)
$R^2$	0.01	0.03	0.01	0.05	0.01	0.04
Observations	2529	2379	1902	1814	1905	1816

Notes: Robust standard errors in parentheses. All models include year dummies.

Table 18: Mentoring Effects on Second Semester Absent Rates

	(1)	(2)	(3)	(4)
	Absent Business Studies III		Absent Economics II	
Mentoring $\times$ EM	0.061*	0.058*	0.043	0.041
	(0.032)	(0.031)	(0.038)	(0.040)
EM	0.139***	0.104***	0.091***	0.054
	(0.026)	(0.027)	(0.035)	(0.039)
Female		0.022		0.025
		(0.019)		(0.019)
HS Degree in Hannover		0.024		0.034*
		(0.018)		(0.018)
Regular HS Degree		-0.063***		-0.024
		(0.023)		(0.023)
Foreign Citizenship		0.221***		0.120***
		(0.041)		(0.040)
HS GPA		0.057***		0.074***
		(0.020)		(0.020)
Duration since HS Degree		0.003		0.003
		(0.009)		(0.009)
Age in Years		0.002		0.005
$R^2$	0.05	0.09	0.03	0.07
Observations	2026	1920	1555	1496

Notes: Robust standard errors in parentheses. All models include year dummies.

Table 19: Differences between EM and IE in Diploma Program

Year	N		Failure Rate			Grade		
	EM	IE	EM	IE	Diff.	EM	IE	Diff.
2000	457	39	0.40	0.28	0.12	3.85	3.49	0.36
2001	537	74	0.36	0.30	0.06	3.81	3.46	0.35
2002	574	66	0.36	0.23	0.13	3.72	3.44	0.28
2003	552	86	0.35	0.37	-0.02	3.70	3.55	0.15
2004	583	86	0.29	0.14	0.15	3.47	2.85	0.62
2005	536	113	0.40	0.29	0.11	3.96	3.64	0.32

Note: Diff. reports the difference between EM and IE students.

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