Perceptions and opinions of non-economics majors regarding economics – evidence from German survey data

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Abstract

This paper investigates whether the common factors that motivate economics majors to study economics also apply to non-economics majors. Using data from a survey of business students from Germany, this paper explores the reasons for increased interest in economics based on perceptions and opinions regarding economics. The results suggest that the influence of opinions regarding economics aligns with related research; therefore, future income and job-related expectations are also relevant motivational factors for non-economics majors. This is also true in relation to the students' perceptions of their experiences with economics lectures. The calculation of marginal effects enables additional insights into the interdependencies of the identified factors. The influences not only hold on average but also indicate a predominantly consistent pattern when moving by one point on the Likert scale.

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1. Introduction

Economics education experiences have limited significance in German secondary education curricula because economics does not constitute a mandatory subject. Instead, most young people gather economic knowledge in a more informal manner (Macha *et al* 2011). For many, the first formal encounter with economic theory and thinking occurs after enrolling at university. This not only accounts for students majoring in economics but also for the substantially larger group of non-economics majors. This group encompasses students who attend some economic lectures voluntarily or mandatorily, but for whom economics is not the main focus of their studies. In particular, introductory courses on economics are often many young people's first encounter with economic theory; this is also often their last encounter, since this is the only knowledge transfer channel in the educational lifecycle for a vast number of students.

In the winter term of 2015 and 2016, 2.76 million students were enrolled at universities in Germany; approximately 596,000 of these were studying economic and business sciences including related fields such as business and industrial engineering and business informatics. Around 433,000 were studying economics or business sciences in the narrow sense. Economics study programmes[3] consist of only 24,000 students, which is around 5.6 per cent of the total number of economics and business students. In contrast, 65 per cent, or around 280,000, of all students studying economic and business sciences in the narrow sense were majoring in business administration or another management-related study programme (Federal Statistical Office 2016).[4]

Research has generally indicated a widespread lack of economic knowledge in German society (Jappelli 2010). Studies that analyse the motivational factors of students studying economics typically either focus purely on economics majors or do not distinguish these from non-economics majors (Happ *et al* 2013; Happ *et al* 2016). The present paper addresses this gap by analysing whether the common factors that motivate economics majors to occupy themselves with economic content also applies to non-economics majors. We aim to contribute to the existing literature by improving the understanding of students' decisions to study economics, with an emphasis on the significance of economics as a subject for non-economics majors.

This paper solely focuses on the students' perspectives and their perceptions and opinions regarding economic teaching and the field of economics in general, to generate insights into the current state of economics education. We analyse a survey conducted among business students at a German university during the winter term between 2016 and 2017. The questionnaire is included in the Annex. While students of many fields of study, such as the political sciences, social sciences, information technology, or engineering have the option of taking economic courses, economics forms a mandatory minor subject for business-related study programmes. In addition, within the German higher education system, there is a clear distinction between business and (classical) economic studies; the content of which rarely overlaps more than 10 to 15 per cent. Therefore, business studies are an ideal focus group for the subsequent analysis.

The following section briefly discusses the relevant research background of the analysis, and Section 3 introduces the institutional setting and presents descriptive statistics. In Section 4, we present the empirical model and delineate the findings. Finally, Section 5 elucidates the conclusion.

2. Related Work

The justification for focusing specifically on the economics education of non-economists is based on differences in perceptions of economic issues between people with and without economics education. Research demonstrates systematically distinct opinions between economists and the general public, even when adjusting for economists' ideological and self-serving biases (Caplan

2002). Haucap and Heimeshoff (2014), as well as Haucap and Müller (2014), analyse distinctions in academia and find significant differences in economics students relative to students of different fields of study. This applies to specific characteristics; for instance, prospective economists are less trusting and less trustworthy (Haucap and Müller 2014), but they also experience a higher subjective life satisfaction, which is driven by the motivation provided by high expected future incomes and positive future job expectations (Haucap and Heimeshoff 2014). Willis and Pieper (1996) also posit that job prospects motivate students to study economics, and Robst and VanGilder (2016) contend that a high potential income motivates students to study economics. Economics graduates tend to have higher incomes relative to business graduates, and they are also less likely to work in a job related to their degree.

Denny (2014) compares economics and non-economics majors with respect to their success in introductory economics lectures. The author identifies the path-dependency of secondary school performance, particularly in mathematics, as a more important factor of success for non-economics majors than for economics majors. Furthermore, the latter receive better final grades, and their motivation and interest in economics is the essential factor distinguishing the two groups. In summary, various studies have suggested that students' opinions regarding economics, particularly concerning their future income and job prospects, are influential motivational factors.

Webber and Mearman (2012) focus on students' perceptions of economics, particularly to identify factors that induce students to demand more economics classes in their curriculum. Based on an online survey conducted among students taking economics courses in different countries and levels of study, the authors determined that Master's students are significantly less likely to want to study more economics. Students with work experience, on the other hand, are significantly more likely to want to study more economics. Additionally, students with positive perceptions of economics with respect to general interest or usefulness (e.g., 'easy to understand', 'helps future career', 'help makes better decisions') are more likely to desire more economics and vice versa. Mearman *et al* (2014) further investigate the perception issue by applying a mixed-methods approach to UK economics students. They find that students' perceptions regarding studying economics are generally somewhat negative, although they typically regard economics as a value-adding subject to study. In line with the literature discussed above, the authors also discover that the expectation of career prospects and financial benefits is positively correlated with the students' perceptions of economics.

Happ *et al* (2013) analyse the economic literacy of students studying economic sciences (including business students) in Germany. The authors identify various factors that influence scores on tests for economic and business literacy, both being adapted versions of internationally acknowledged test methods. They find that students have a high extrinsic (job-related) motivation to study economics relative to intrinsic (content-related) motivation. In a similar

study, Happ *et al* (2016) examine prior economic knowledge arising from (in Germany not systematically taught) experience from secondary school or the prior completion of a commercial vocational training or apprenticeship programme. They discover both to be influential factors, resulting in higher test scores.

In a survey of Swiss students of economics and business management, Slembeck (1993) also identifies strong extrinsic reasons to pursue the respective subject of study. Moreover, students of business management (i.e. non-economics majors) tend to harbour a less positive attitude towards economics relative to economics majors. Schaur and Watts (2010) focus on the performance of German MBA students in microeconomics and managerial economics courses. They demonstrate that MBA students with previous undergraduate studies in economics perform significantly better than students from different prior fields of study.

In summary, most research addresses questions concerning motivational factors that encourage economics majors to study economics. There is minimal research on the subject with a specific focus on non-economics majors. The relevance of filling this gap can be derived from the above-mentioned vast amount of non-economics majors who attend at least some economics lectures and typically outnumber economics majors greatly (in the case of Germany, there are nearly 12 times as many students studying business than classical economics). Therefore, this paper aims to improve our understanding of non-economics majors' choices to study economics.

The research questions addressed deviate from the multiple insights one can extrapolate from the discussed work in this analysis. This paper incorporates the significant motivational factors to study economics, job perspectives, and income and tests whether their influence also results in non-economics majors desiring more economic lectures, which we call the opinion channel. In addition, this analysis investigates whether experiences with economics contents impact non-economics majors' decisions. This is the perception channel. The opinion channel aims to assess the respondents' subjective judgements and beliefs about economics in general and the presumed effects of acquiring economic knowledge. Conversely, the perception channel intends to gather information regarding how the students perceive and evaluate current and prior encounters with economics contents in university lectures. Both channels are assumed to exert an influence on the motivation to study economics.

3. Evaluation Design and Descriptive Analysis

For the empirical analyses, we use data from a survey of business majors. The data were collected as a stratified sample of 252 out of a population of around 3,500 business students studying at a German university during the winter term between 2016 and 2017. This analysis focuses solely on business majors because introductory courses in economics are mandatory for all business-related study programmes at the university. This ensures that all data are

gathered from a homogeneous group and that all respondents are eligible within the context and scope of the analyses. The stratification was based on the individual Bachelor's and Master's study programmes. Selection criteria include the academic semesters,[5] to ensure that students of all possible academic stages are included in the survey, as well as programmes with the highest numbers of enrolled students to optimise the sample size. Additionally, the dataset was filtered for several observations to ensure the consistency of the responses. After this procedure, the sample size was reduced to n=195.[6]

The questionnaire encompasses socio-economic information to ensure that we can control for individual characteristics (cf. Q1-Q3, Annex). Additional structural data regarding the respondents' backgrounds are also collected, to be used as control variables in the econometric model; this is based on prior research, as discussed above (cf. Q4-Q14). For the questions of interest, the students were asked to rate statements about their perceptions (cf. Q15, Annex) and opinions (cf. Q16, Annex) concerning economics lectures at the university and the subsequent anticipated benefit for their future careers on a 6-point Likert scale. The questionnaire uses even numbers of evaluation categories because a mid-point category is not necessarily required in the response continuum, and central tendency bias can thereby be avoided. However, a missing central value may cause the results to have a downward (disagreement) or upward (agreement) bias. Additionally, only the endpoints are labelled because this seems to more intuitively align with an interval scale.[7]

Table 1 presents descriptive statistics for the socio-economic variables related to the current stage of advancement in the respondents' academic education, prior work experiences, gender, prior experiences in teaching with economics content, parental educational background, preferred future type of employment, and age. The data indicate that the majority of the respondents (about 75 per cent) were Bachelor students. Their distribution across odd numbers of semesters is relatively even. This is plausible because most study programmes start in a winter term, and the survey was conducted during a winter term. Of particular note, based on the specific programme, new students (first to third semester) had not necessarily attended any economic lectures thus far.[8]

The socio-economic variables further suggest that a small majority, of about 52 per cent of the respondents, are female (relative to a share of 48 per cent for all students in Germany in the winter term between 2015 and 2016), and the mean age is 22.7 years. For 59.5 per cent, neither parent has a university degree. About 22 per cent experienced the teaching of economics lessons during secondary education, while 60 per cent first encountered economics at university. When asked about their preferred future career, the majority expressed a desire to work in the private sector (55 per cent), while around one third were undecided.

To collect information regarding the first encounter with economics, this analysis has addressed the students' work experience. We distinguish whether

Table 1: Descriptive Statistics of Questionnaire

Variable	*Group*	*Frequencies*	*%*
In which semester are you currently enrolled?	1st Bachelor	47	24.1
	2nd Bachelor	7	3.6
	3rd Bachelor	48	24.6
	4th Bachelor	1	0.5
	5th Bachelor	30	15.4
	6th Bachelor	5	2.6
	7th Bachelor or more	8	4.1
	1st Master	1	0.5
	2nd Master	28	14.4
	3rd Master	18	9.2
	4th Master	1	0.5
	5th Master	1	0.5
Do you have work experience related to the economic contents of your current studies?	No	65	33.3
	Yes, other side job	5	2.6
	Yes, internship/working student	42	21.5
	Yes, dual studies	50	25.6
	Yes, apprenticeship	25	12.8
	Yes, full-time job	8	4.1
Do you have work experience not related to the economic contents of your current studies?	No	61	31.3
	Yes, other side job	51	26.2
	Yes, internship/working student	38	19.5
	Yes, dual studies	19	9.7
	Yes, apprenticeship	9	4.6
	Yes, full-time job	17	8.7
Gender	male	94	48.2
	female	101	51.8
Have you already had any economic teaching content?	No	36	18.5
	Yes, apprenticeship	4	2.1
	Yes, school	38	19.5
	Yes, university lecture	117	60.0
Do your parents possess a university degree?	No, none of them	116	59.5
	Yes, one of them	53	27.2
	Yes, both	26	13.3
Please state your preferred future type of employment	Self-employment	16	8.2
	Public Sector Job	5	2.6
	Private job	107	54.9
	Academic job	2	1.0
	Others/I don't know	60	30.8
	Non-Profit Organisation	5	2.6

Continuous Variable	Obs	Mean	Std. Dev.	Min	Max
Age	195	22.68	3.42	18	46

the experience is related or unrelated to the economic content of their current studies.[9] The data demonstrate that around one third of the students have no work experience. Within the group with work experience related to economics, 26 per cent are students who either currently are or have been enrolled in a dual studies programme. Another 22 per cent have experience as working students. Work experience unrelated to economics was mostly obtained in side jobs (26 per cent) or internships (20 per cent).

Table 2 displays the variables of interest, measured on a Likert scale from 1 (strongly disagree) to 6 (strongly agree). The focal question is as follows: "Do non-economics majors want more economic content in their studies?" About 26 per cent strongly disagree with the idea of studying more economics, while only about 7 per cent strongly agree. We aggregate answers from a scale of 1 to 3 for students who do not want to study more economics and 4 to 6 for students who are eager to have more economics teaching. This indicates that one third want more economics, and two thirds do not.

Table 2: Descriptive Statistics of Variables

Variable		*1*	*2*	*3*	*4*	*5*	*6*	*Sum*
1. Opinion variables								
More economics	Freq.	51	35	44	35	16	14	195
	%	26.2	17.9	22.6	17.9	8.2	7.2	
Better interdisciplinary comprehension	Freq.	4	17	31	54	53	36	195
	%	2.1	8.7	15.9	27.7	27.2	18.5	
Helpful for future working life	Freq.	7	31	36	48	55	18	195
	%	3.6	15.9	18.5	24.6	28.2	9.2	
Helpful for general economic and political comprehension	Freq.	6	9	27	48	53	52	195
	%	3.1	4.6	13.8	24.6	27.2	26.7	
More money	Freq.	17	49	47	48	27	7	195
	%	8.7	25.1	24.1	24.6	13.8	3.6	
2. Perception variables								
Satisfied with the quality of lecture	Freq.	6	14	29	30	38	13	130
	%	3.1	7.2	14.9	15.4	19.5	6.7	
Able to understand well	Freq.	2	18	15	32	46	17	130
	%	1.0	9.2	7.7	16.4	23.6	8.7	
Lectures too theoretical	Freq.	3	25	24	42	21	15	130
	%	1.5	12.8	12.3	21.5	10.8	7.7	
Requirements appropriate	Freq.	1	12	23	41	34	19	130
	%	0.5	6.2	11.8	21.0	17.4	9.7	
Learning success due to style of teaching	Freq.	12	26	36	27	18	11	130
	%	6.2	13.3	18.5	13.8	9.2	5.6	
Style of teaching interesting	Freq.	9	21	28	41	23	8	130
	%	4.6	10.8	14.4	21.0	11.8	4.1	

The next part focuses on the identification of potential reasons for choosing either category by assessing different statements that measure the students' perceptions and opinions regarding economics. Categories 1 to 3 are considered to indicate disagreement, and 4 to 6 indicate agreement. Around 73 per cent of the respondents regard economics as helpful for understanding other disciplines; 62 per cent expect that studying economics exerts a positive impact on their future working life, while 42 per cent believe that economics supports earning more money. Therefore, the majority of the respondents appear to have an overall positive opinion of economics.[10] They identify economics as helpful or beneficial in a certain manner.

The perception channel (i.e., how students experience how economics is taught) could offer another means to explain attitudes related to wanting more economics education. Therefore, the questionnaire also contains questions about perceptions concerning the economics lectures taught at the university. For these questions, the number of observations drops to n = 130, since some of the respondents are in an early stage of their bachelor programme and have not yet attended any economics lectures. The general quality was discovered to be high (62 per cent), and most of the students (73 per cent) feel that they are able to understand the lectures well and assess the requirements as appropriate (55 per cent). In contrast, the perception of content is rather mixed: 60 per cent believe that the lectures are overly theoretical. The style of teaching was regarded as interesting (55 per cent) but not necessarily helpful for overall learning success (43 per cent).

4. Estimation and Results

In the following section, we assess the influence of factors concerning the perceptions and opinions of economics taught to non-economics majors. Our variable of interest is whether a student wants to study more economics. Since the answer is measured on a Likert scale, we apply ordered logistic regression, following Webber and Mearman (2012), Mearman *et al* (2014) and Robst and VanGilder (2016). We develop two models, to analyse the opinion variables in model 1 and the perception variables in model 2. Table 3 presents the results for both models. As discussed above, the number of observations decreases from 195 to 130 when focussing on perception. For that reason, the preferred specification for all variables that do not concern perception is the first model. In addition to the variables displayed in Table 3, we use *age*, *age squared*, the stage of advancement in academic education measured as a respondent's current Bachelor's or Master's *semester*, as well as *work experience not related to economics content* as control-variables in both models. None show a pattern of significant influence in the model, which aligns with the related findings of Mearman *et al* (2014). In contrast to Webber and Mearman (2012), we do not find Master's students to be significantly less likely to want to study more economics.

The results suggest that students with work experience from a dual studies programme (internship or working students) which is related to the economics

Table 3: Ordered Logistic Regression Output

Variables/Groups		*Regression 1*		*Regression 2*	
		coef	*Odd*	*coef*	*Odd*
Do you have work experience related to the economic contents of your current studies?	No	Reference			
	Yes, other side job	1.507 (1.043)	4.511	0.892 (1.483)	2.440
	Yes, internship/working student	0.843 (0.497)*	2.323	0.416 (0.623)	1.516
	Yes, dual studies	0.892 (0.428)**	2.440	0.291 (0.613)	1.337
	Yes, apprenticeship	0.559 (0.518)	1.749	0.480 (0.658)	1.616
	Yes, full-time job	–2.072 (1.022)**	0.126	–3.491 (1.564)**	0.030
Gender	female		Reference		
	male	0.531 (0.309)*	1.701	–0.231 (0.418)	0.794
Have you already had any economic teaching content?	No		Reference		
	Yes, Apprenticeship	–0.386 (0.976)	0.680	–0.138 (1.289)	0.871
	Yes, School	1.082 (0.469)**	2.951	0.042 (0.907)	1.043
	Yes, University Lecture	–0.702 (0.510)	0.496	–0.849 (0.757)	0.428
Do your parents possess a university degree?	No, none of them		Reference		
	Yes, one of them	–0.020 (0.354)	0.980	–0.259 (0.461)	0.772
	Yes, both	–0.495 (0.445)	0.609	0.360 (0.706)	1.433
Please state your preferred future type of employment	Private Job		Reference		
	Self-employment	–1.050 (0.617)*	0.350	–1.123 (0.819)	0.325
	Public Sector Job	–1.563 (1.013)	0.210	–1.430 (1.131)	0.239
	Academic job	1.793 (1.632)	6.005	–1.728 (1.709)	0.178
	Others/I don't know	–0.311 (0.354)	0.733	–0.237 (0.466)	0.789
	Non-Profit Organization	–0.557 (1.213)	0.573	1.498 (1.199)	4.474
Better interdisciplinary comprehension (1–6)		–0.140 (0.165)	0.870		
Helpful for future working life (1–6)		0.664 (0.190)***	1.944		
Helpful for general economic and political comprehension (1–6)		0.337 (0.156)**	1.400		
Earn more money later (1–6)		0.294 (0.143)**	1.342		
Positive perception index (1–6)				0.778 (0.226)***	2.177
Lectures too theoretical (1–6)				–0.337 (0.164)**	0.714
Cut 1		9.450 (5.351)		–4.075 (7.707)	
Cut 2		10.603 (5.361)		–2.909 (7.696)	
Cut 3		11.894 (5.374)		–1.832 (7.694)	
Cut 4		13.214 (5.389)		–0.736 (7.697)	
Cut 5		14.277 (5.403)		0.182 (7.697)	
Pseudo R^2		0.1507		0.1235	
Log Likelihood		–281.15167		–192.60359	
LR chi^2		99.75***		54.25***	
Observations		195		130	

Notes: Ordered logistic regression. Dependent variable: "I would like to study more economics". Included, but not displayed are age, squared age, current bachelor's or master's semester and work experience not related to economic contents as control-variables in both models. None of them shows a pattern of significant influence. ***, ** and * represent statistical significance at the 1 per cent, 5 per cent and 10 per cent levels, respectively.

content of the current studies are 2.4 (2.3) times more likely to want to study more economics relative to those with no work experience. In contrast, students with prior full-time work experience are about eight times less likely to want to study more economics. Additionally, weak support has been found to support the fact that the frequently discussed gender gap in economics, or the persistent difference of male and female students studying economics (Dynan and Rouse 1997; Asarta *et al* 2014; Happ *et al* 2016), also applies to non-economics majors.

Male students are 1.7 times more likely to want to study more economics relative to female students. In addition, past economics experience exerts a significant influence. Respondents with prior experience of learning economics at secondary school are about three times more likely to want to study more economics relative to those who have not. Happ *et al* (2016) also demonstrated that prior school experience in economics is a relevant factor when analysing various determinants of the success of subsequent economic studies. Unlike those authors, we cannot confirm the same conclusion regarding prior experiences arising from apprenticeships and vocational training. The academic background of the parents does not appear to be decisive. The coefficients suggest that students whose parents do not have a university degree are more likely to want to study more economics, relative to those with one parent or both parents holding a university degree. However, both variables are statistically insignificant. Some influence is found with respect to the desired future type of employment. Students who want to be self-employed in the future are about 2.9 times less likely to want to study more economics than those who would like to work in a private sector job. Those pursuing the remaining employment types and undecided students do not exhibit any significant distinction.

Next, we analyse the influence of overall opinions regarding the field of economics on the desire of non-economics majors to study more economics and their general appreciation of economics as a teaching subject. The four variables analysed as predictors are first examined for possible multicollinearity. The paired correlation coefficients in Table 4 indicate possible multicollinearity. However, further testing suggests that the multicollinearity problem should not be too great.[11]

Table 4: Correlations Matrix

	Interdisciplinary Comprehension	Future working life	Economic and political comprehension	More money
Interdisciplinary comprehension	1.0000			
Future working life	0.6517	1.0000		
Economic and political comprehension	0.5909	0.6293	1.0000	
More money	0.3554	0.5337	0.3444	1.0000

The estimation suggests that the highest level of significance (at the 1 per cent level) is for the statement that economics is *helpful for future working life.* If the approval of this statement increases by one point on the Likert scale, then the probability of strongly agreeing to want more economic studies is 1.9 times greater relative to all other outcomes of the dependent variable. This also applies to the statements *helpful to earn more money later* and *helpful for general economic and political* comprehension (i.e. intradisciplinary comprehension), which both are statistically significant at the 5 per cent level. An increase in the approval that studying economics is *helpful for general economic and political comprehension* (*helps to earn more money later*) by one point leads to a 1.4-times higher (1.3 times higher) probability of strongly agreeing to want more economics studies relative to all other outcomes. In summary, income and job perspectives are pivotal in the motivation to study economics, even for non-economics majors, which aligns with the related findings of Willis and Pieper (1996), Happ *et al* (2013), Haucap and Heimeshoff (2014), Mearman *et al* (2014) and Robst and VanGilder (2016). We also find the students' view on intradisciplinary, but not interdisciplinary, comprehension to be influential on the significance of economics as a field of study.

As the variables associated with positive perception, *satisfaction with quality*, *able to understand*, *requirements appropriate*, *learning success,* and *interesting style of teaching* are highly correlated and multicollinearity cannot completely be ruled out, we create an index, the positive perception index (ppi). The remaining variable, *too theoretical*, is anticipated to exert a negative influence on the dependent variable and is separately included in model 2 of the regression. Both variables are significant and exhibit coefficients as expected. If positive perception, measured by the positive perception index, rises by one point, then it is 2.2 times more likely that the student will strongly agree to want to study more economics, while this is 1.4 times less likely if the perception that economic lectures are overly theoretical increases by one point.[12]

To extend this analysis, we also determine the marginal effects of selected opinion and perception variables, displayed in Table 5 and Table 6, respectively. The calculation is based on regression 1 in Table 5 and regression 2 in Table 6. The tables show the average slopes (dy/dx) for all outcomes of the dependent variable *more economics* (1="strongly agree"; 6="strongly disagree") given the different outcomes of one specific independent variable (e.g. *Helpful for future working life* in Table 5 Column 1). All other variables in the model are held at their means.

Table 5 entailed an analysis of the two opinion variables that display the highest levels of significance, namely *helpful for future working life* and *helps to earn more money*. If respondents' average opinion that economics is expected to be helpful for future working life increases by one point on the Likert scale, then it is on average 9.3 per cent less likely that the respondent will strongly disagree to want to study more economics. In addition, if *helpful for future working life* increases by one point, then it is about 3.8 per cent more likely

that the respondent will strongly agree to *more economics*. Equivalently, if the opinion that economics *helps to earn more money* increases by one point, then it is 4.1 per cent less likely that a non-economics major will strongly disagree with *more economics*, while it is 1.7 per cent more likely that he or she will strongly agree. For both variables, the sign of the dy/dx-coefficient changes at outcome 3 from negative to positive, which is also accompanied by a loss in the level of significance. This is somewhat counterintuitive to the expectation that the typical survey respondent categorises the 6-point Likert-scale symmetrically in a 'do not agree' (points 1-3) and an 'agree' (points 4-6) range. Since only the endpoints were labelled in the questionnaire, it appears possible that the average respondent interpreted the scale in a manner such that a 3 already means 'agree a little'.

Table 5: Average Marginal Effect of Opinion Variables

		Helpful for future working life		Helps to earn more money later	
		dy/dx	Std. Err.	dy/dx	Std. Err.
strongly disagree	1	–0.0926***	0.0255	–0.0410**	0.0197
	2	–0.0222***	0.0076	–0.0098*	0.0052
	3	0.0102*	0.0057	0.0045	0.0031
	4	0.0370***	0.0112	0.0164**	0.0083
	5	0.0299***	0.0104	0.0133*	0.0070
strongly agree	6	0.0377***	0.0129	0.0167*	0.0087

***, ** and * represent statistical significance at the 1, 5 and 10% levels, respectively.

The marginal effects are also illustrated in Figure 1. It demonstrates the probabilities of different outcomes of the *more economics* variable given every possible outcome of the respective independent variable. All other variables in the model are held at their means. On the left side, the blue dots, for example, indicate the probabilities of outcome 1 (strongly disagree) for *more economics* given different outcome levels of *helpful for future working life*. Accordingly, when selecting 1 (strongly disagree) for *helpful for future working life*, the probability of also selecting 1 (strongly disagree) to want to study *more economics* is around 60 per cent, while it is below 10 per cent for choosing a 6 (strongly agree).

The average slopes of the near-linear curves are equal to the dy/dx-values of Table 5. For both graphs, there are two lines with negative slopes on average (i.e. with declining probabilities) the more a student agrees with the statement of the independent variable, and four lines with positive slopes (i.e. with increasing probabilities), respectively. The former is true for outcomes 1 and 2 of both independent variables, and the latter applies for outcomes 4 to 6. Therefore, both independent variables exhibit a positive relationship with the dependent variable *more economics*. The turning point from declining to increasing probabilities of wanting to study more economics when the opinion about economics is increasing is at outcome 3.

Figure 1: Predictive Margins of Opinion Variables

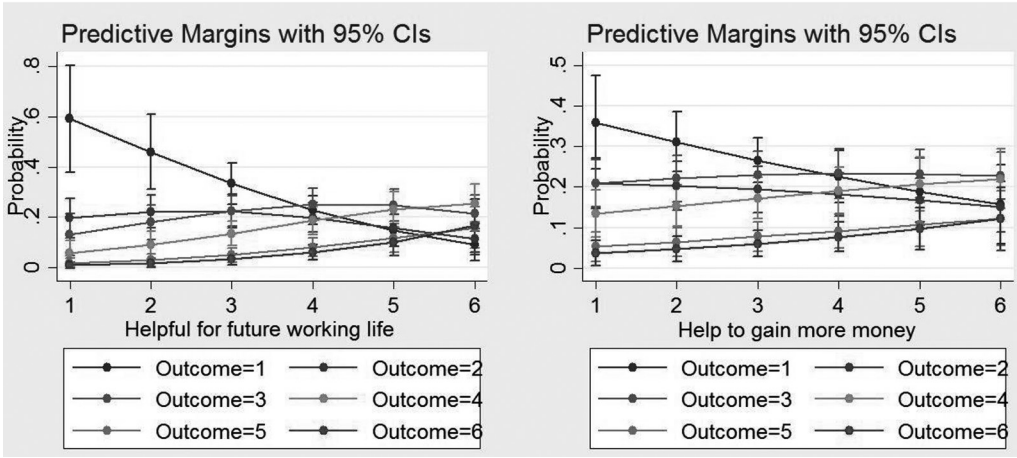


Table 6 indicates the respective marginal effects for the two perception variables, the *positive perception index (ppi)* and the question of economics being *too theoretical*, which is associated with a negative perception. If the ppi increases by one point on the Likert scale, then it is on average 11.7 per cent less likely that a respondent will strongly disagree with wanting to study *more economics*, while it is 4.8 per cent more likely that he or she will strongly agree. In contrast, if the approval of the perception that economics is *too theoretical* increases by one point, then it is on average 5.1 per cent more likely that this coincides with a strong disagreement with wanting to study *more economics*. Simultaneously, the strong agreement (i.e. a 6 on the Likert-scale) to want to study *more economics* is around 2.1 per cent less likely. Again, the marginal effects indicate relationships with signs as expected and, consistent with the marginal effect of the opinion variables, the turning point occurs at outcome 3.

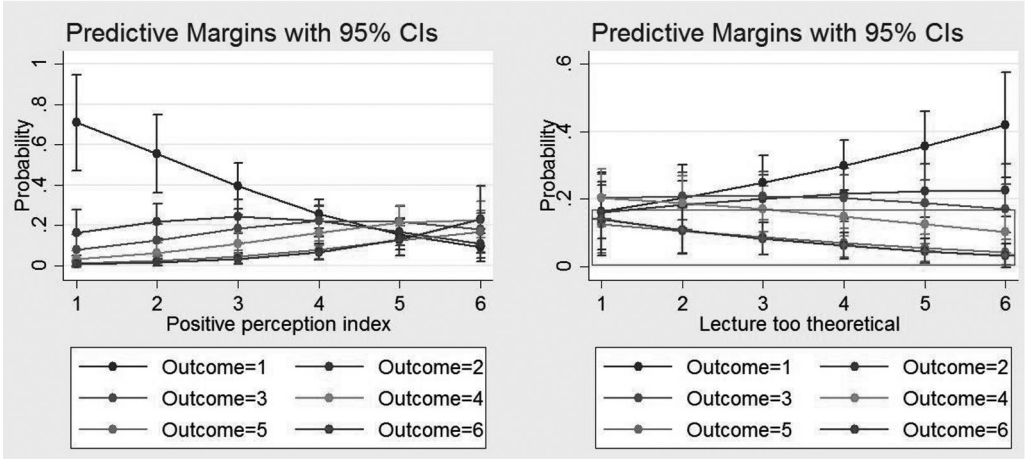
Table 6: Average Marginal Effects of Perception Variables

		Positive perception index		Too theoretical	
		dy/dx	Std. Err.	dy/dx	Std. Err.
strongly disagree	1	–0.1168***	0.0332	0.0506**	0.0238
	2	–0.0297***	0.0107	0.0129*	0.0075
	3	0.0157	0.0098	–0.0068	0.0048
	4	0.0461***	0.0146	–0.0200*	0.0104
	5	0.0363***	0.0136	–0.0157*	0.0086
strongly agree	6	0.0484***	0.0179	–0.0210*	0.0113

***, ** and * represent statistical significance at the 1, 5 and 10% levels, respectively.

As above, this pattern can be verified when examining the probabilities of the different outcomes of the *more economics* variable for every possible outcome of the two perception indicators, as illustrated in Figure 2. The blue dots, which represent the probabilities to strongly disagree (outcome 1) with wanting to study *more economics,* display a near-linear decreasing trend for increasing approval of positive perceptions (left graph), whereas they exhibit a near-linear increasing trend for a more negative perception of economics (right graph). The exact opposite holds true, albeit with a less steep slope, when considering the probabilities of strongly agreeing (outcome 6) to want to study *more economics*. While outcomes 2 to 5 of the *more economics* variable are not necessarily as expected in each individual movement of the outcomes of the perception variables, the average slopes match the overall anticipation. Therefore, the analysis generally confirms intuitive expectations regarding how perception influences the desire to study *more economics*. Finally, the change in average slopes, i.e. from declining to increasing probabilities of wanting to study *more economics* occurs at outcome 3, which is consistent with the findings from the analysis of the opinion variables.

Figure 2: Predictive Margins of Perception Variables



5. Conclusion

While research concerning factors that influence students' decisions to study economics typically focuses on economics majors, this article has concentrated on the much larger group of non-economics majors. Using data from a questionnaire conducted among business students, the statistical estimation performed above analyses whether the frequent findings based on economics majors can be confirmed for non-economics majors.

The analysis has identified several interesting findings. It has yielded some support that the well-known gender gap among economics majors also holds for non-economics majors. In addition, students with work experience from a dual studies programme and with prior experience of economics from secondary education have been shown to have more positive attitudes regarding economics. Therefore, a possible policy recommendation would be to promote the first encounter with economics content prior to attending university (e.g. by introducing or extending economics as a school subject).

Future income expectations and job perspectives, the opinion channel, are relevant motivational factors that encourage non-economics majors to study economics. The analysis of students' perceptions of learning economics also yields results, as expected. An index combining the elements of satisfaction with quality, comprehension, appropriateness of requirements, as well as expected learning success due to style of teaching and general interest in teaching style, exert a positive impact on the prospect of pursuing more economic studies, while the opposite is found to be true for negative perceptions of economics being evaluated as too theoretical. Marginal effects were calculated to gain more detailed insights into the most significant factors identified reflecting both the opinions and perceptions of economics. The influences were found not only to hold on average, but also to exhibit a largely consistent pattern when moving by one point on the Likert scale, thereby indicating the robustness of the findings.

In conclusion, we identify our results to be in line with the related research. The relevant factors that influence economics majors to study economics also apply to non-economics majors. This is particularly true for factors related to opinions and perceptions of economics as a field of study. The positive and negative factors of teaching and curriculum affect both groups of students alike. The ongoing discussion of change and improvement to the teaching of economics, such as more pluralistic content or a stronger reference to reality, also applies to non-economics majors.

Our study focuses on data only from German students; therefore it cannot be presumed that these results also apply to different countries with different educational systems in general. But since non-economics majors typically form a significant group of students in many countries, and since our reasoning does not include German-specific factors, there is no reason to assume that our implications may not hold for different countries.

This analysis only sheds a first light on the meaning of economics for the significant group of non-economics majors. There are multiple conceivable approaches for future research to extend insights regarding the matter. These include analyses of classes in which economics majors and non-economics majors are taught together, to test for differences in the magnitude of the effects between the two groups. Furthermore, as the results presented here are from a questionnaire conducted at only one university, future studies could investigate whether the findings can be replicated in a more diverse sample

composed of several universities. Lastly, in addition to the sole student's perspective, future analyses could account for the lecturers' perspectives on economics as a non-major field of study.

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Endnotes

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3. Which are called "Volkswirtschaftslehre" in German and focus on teaching content such as micro- and macroeconomics, economic theory and policy, econometrics, public finance etc.

4. Teaching contents in business studies comprise of e.g. marketing, accounting, banking and finance, corporate taxation, operations management etc.

5. Study programmes in Germany are predominantly divided into semesters, typically a winter and a summer semester. Bachelor degree studies usually range from 6 to 8 semesters, Master degree studies from 2 to 4 semesters.

6. To control for consistency of the replies, we asked the statements "I would like to have a higher amount of economics during my studies" and "I would like to have a lower amount of economics during my studies". We dropped all observations where students gave simultaneously a 4 or more on a Likert-scale from 1 (strongly disagree) to 6 (strongly agree) for both questions.

7. On the discussion of different types of Likert-scales, see for example Weijters *et al* (2010).

8. Since we interviewed students from different study programmes and semesters the number of economic lessons attended so far and hence their learning experience could vary. To include this in the empirical analysis, we control for the students' type of prior economic knowledge and also if they acquired any knowledge at all.

9. The intention of the question is to distinguish work experience from jobs with no specific necessity to apply economic knowledge from jobs where prior acquired economic knowledge is substantial. We are aware that the respondents might answer based on a subjective assessment but do not think that this has a significant impact on the power of our analysis

10. These results do not necessarily contradict the low percentage (33.3 per cent) of students who want to study more economics, as a student with a positive opinion regarding economics might be satisfied with the current amount of economic content.

11. To test for multicollinearity between the independent variables, we also ran an OLS regression using the same variables and determined the VIF-values afterwards. A maximal VIF-value of about 3 can be observed, which is clearly below the critical value of 10 (cf. Wooldridge 2013). However, note that, included separately in the model, each

of the four variables has a positive coefficient significant at the 1 per cent-level, such that the probability of students wanting to study more economics rises with an increase in each of those variables. If all variables are put together as in the model, the effect of each of the variables is at least minimally alleviated. The statement *that economic content is helpful for interdisciplinary comprehension even loses* its significant influence.

12. Note that *too theoretical* and the positive perception index have a correlation coefficient of -0.47. Also, in regression 2 no critical VIF-Value occurred (maximum of 2). Therefore, the multicollinearity problem should not be too great here.

References

Asarta C J, Butters R and Thompson E (2014) 'The Gender Question in Economic Education: Is it the Teacher or the Test?', *Perspectives on Economic Education Research*, 9, 1-19.

Caplan B (2002) 'Systematically Biased Beliefs about Economics: Robust Evidence of Judgemental Anomalies from the Survey of Americans and Economists on the Economy', *The Economic Journal*, 112(479), 433-458.

Denny E (2014) 'Factors influencing the performance of non-economics majors in an introductory economics course', *International Review of Economics Education*, 17, 1-16.

Dynan K E and Rouse C E (1997) 'The Underrepresentation of Women in Economics: A Study of Undergraduate Economics Students', *Journal of Economic Education*, 28, 350-368.

Federal Statistical Office (2016) Studierende an Hochschulen - Wintersemester 2015/2016, Fachserie 11 Reihe 4.

Happ R, Förster M and Zlatkin-Troitschanskaia O (2016) 'Assessing the previous economic knowledge of beginning students in Germany: Implications for teaching economics in basic courses', *Citizenship, Social and Economics Education*, 15, 45-57.

Happ R, Schmidt S and Zlatkin-Troitschanskaia O (2013) 'Der Stand des wirtschaftswissenschaftlichen Fachwissens von Bachelorabsolventen der Universität und der Fachhochschule' in Faßhauer U, Fürstenau B and Wuttke E (eds) *Jahrbuch der berufs und wirtschaftsp*ädagogischen Forschung [Yearbook of Vocational and Management Training], Opladen: Budrich.

Haucap J and Heimeshoff U (2014) 'The happiness of economists: Estimating the causal effect of studying economics on subjective well-being', *International Review of Economics Education*, 17, 85–97.

Haucap J and Müller A (2014) 'Why are Economists so Different? Nature, Nurture and Gender Effects in a Simple Trust Game', DICE Discussion Paper No. 136, Düsseldorf Institute for Competition Economics.

Jappelli T (2010) 'Economic Literacy: An International Comparison', *The Economic Journal*, 120(548), 429-451.

Macha K, Neubauer M, Rehm M and Schuhen M (2011) 'Informelles Lernen und Ökonomische Bildung', Siegener Beiträge zur Ökonomischen Bildung, No. 1/2011.

Mearman A, Papa A and Webber D J (2014) 'Why do Students Study Economics?', *Economic Issues*, 19, 119-147.

Robst J and VanGilder J (2016) 'Salary and job satisfaction among economics and business graduates: The effect of match between degree field and job', *International Review of Economics Education*, 21, 30-40.

Schaur G and Watts M (2010) 'Not Such Innocents Abroad?', *Journal of Economic Education*, 41, 3-14.

Slembeck T (1993) *Volkswirtschaftslehre – Lehre und Lernen an Hochschulen: fachdidaktische Analyse, Ziele und Konzepte*, Alsbach/Bergstr.: Leuchtturm-Verlag.

Webber D J and Mearman A (2012) 'Students' perceptions of economics: identifying demand for further study', *Applied Economics*, 44, 1121-1132.

Weijters B, Cabooter E and Schillewaert N (2010) 'The effect of rating scale format on response styles: The number of response categories and response category labels', *International Journal of Research in Marketing*, 27, 236–247.

Willis R A and Pieper P J (1996) 'The economics major: a cross-sectional view', *Journal of Economic Education*, 27, 337–349.

Wooldridge J M (2013) *Introductory Econometrics. A Modern Approach*, Mason: South-Western Cengage Learning.

Annex

Survey questionnaire (adjusted translation, the original survey was conducted in German)

1. What is your gender?
   - Female
   - Male
   - Others
2. How old are you? _____
3. In which country did you achieve your university entrance qualification?

   _____
4. What is your course of studies?

   _____
5. In which semester are you currently enrolled? (when participating in a master's programme, please count only the semesters since beginning the master's studies)
   - 1st
   - 2nd
   - 3rd
   - 4th
   - 5th
   - 6th
   - 7th or more
6. Do your parents possess a university degree?
   - Yes, both
   - Yes, one of them
   - No, none of them

7. Do you have work experience related to the economic contents of your current studies? (Multiple choices possible)
   - Yes, full-time job
   - Yes, apprenticeship
   - Yes, dual studies
   - Yes, internship/working student
   - Yes, other side job
   - No
8. Do you have work experience not related to the economic contents of your current studies?
   - Yes, full-time job
   - Yes, apprenticeship
   - Yes, dual studies
   - Yes, internship/working student
   - Yes, other side job
   - No
9. Have you ever aspired or finished an economics / business related degree prior to your current studies? (Multiple choices possible)
   - Apprenticeship
   - Studies
   - Vocational diploma
   - No
10. Have you already had any economic teaching content? (Multiple choices possible)
   - Apprenticeship
   - School
   - University Lecture
   - No
11. From which sources did you obtain further information about economic content besides your studies? (Multiple choices possible)
   - Books
   - Magazines
   - Online (videos, blogs, etc.)
   - Clubs/ Initiatives / Communities
   - Other, please specify: _____
   - None
12. Please state your preferred future type of employment:
   - Self-employed
   - Public sector
   - Private sector
   - Academic institution (research / teaching)
   - Non-profit organisation
   - I do not know / other
13. Are there any (further) economic lectures planned within the scope of your current studies?
   - no, none
   - yes, one
   - yes, several
   - I do not know

14. Did you attend any economic lectures in your current studies?
    - no, none
    - yes, one
    - yes, several

15. Please assess the following statements addressing your previous lectures in economics using a scale from 1 (strongly disagree) to 6 (strongly agree)
    a) I am satisfied with the quality of the previous economy lecture(s).
    b) I was able to understand the content of the previous economy lecture(s) well.
    c) I perceived the economy lecture(s) as too theoretical.
    d) I perceived the requirements in the economy lecture(s) as appropriate.
    e) The style of teaching essentially influenced my learning success.
    f) I perceived the style of teaching as interesting.

16. Please assess the following statements addressing economics in general using a scale from 1 (strongly disagree) to 6 (strongly agree)
    a) I think the economic content is helpful for my interdisciplinary comprehension during my studies.
    b) I think the economic content is helpful for my future working life.
    c) I think the economic content is helpful for my general economic and political comprehension (political decision, crises, news).
    d) I think my knowledge in economy will help me to earn more money later.
    e) I would have expected a bigger part of economy during my studies.
    f) I would like to have a higher amount of economics during my studies.
    g) I would like to have a lower amount of economics during my studies.
    h) I perceive the extent of the previous economics lectures as optimal.
    i) I think a higher amount of economics lectures would be useful for a later master's degree.