

Fischer, Mira; Kauder, Björn; Potrafke, Niklas; Ursprung, Heinrich

**Working Paper**

## Does the Field of Study Influence Students' Political Attitudes?

CESifo Working Paper, No. 5545

**Provided in Cooperation with:**

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Fischer, Mira; Kauder, Björn; Potrafke, Niklas; Ursprung, Heinrich (2015) : Does the Field of Study Influence Students' Political Attitudes?, CESifo Working Paper, No. 5545

This Version is available at:

<http://hdl.handle.net/10419/123187>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



# Working Papers

[www.cesifo.org/wp](http://www.cesifo.org/wp)

## Does the Field of Study Influence Students' Political Attitudes?

Mira Fischer  
Björn Kauder  
Niklas Potrafke  
Heinrich W. Ursprung

CESIFO WORKING PAPER NO. 5545

CATEGORY 2: PUBLIC CHOICE

OCTOBER 2015

*An electronic version of the paper may be downloaded*

- *from the SSRN website:* [www.SSRN.com](http://www.SSRN.com)
- *from the RePEc website:* [www.RePEc.org](http://www.RePEc.org)
- *from the CESifo website:* [www.CESifo-group.org/wp](http://www.CESifo-group.org/wp)

ISSN 2364-1428

# Does the Field of Study Influence Students' Political Attitudes?

## Abstract

We investigate whether the field of study influences university students' political attitudes. To disentangle self-selection from learning effects, we first investigate whether the fields of study chosen by the incoming students correlate with their political attitudes. In a second step we explore how the political attitudes change as the students progress in their studies. Our results are based on a German pseudo-panel survey, the sample size of which exceeds that of comparable student surveys by an order of magnitude. We find systematic differences between the students' political attitudes across eight fields of study. These differences can in most cases be attributed to self-selection. A notable exception is economics. Even though self-selection is also important, training in economics has an unambiguous influence on the political attitudes: by the time of graduation, economics students are about 6.2 percentage points more likely than they were as freshmen to agree with liberal-democratic policy positions.

JEL-Code: A130, A220, D720, Z130.

Keywords: indoctrination, nature versus nurture, field of study, political socialization, political attitudes, economics.

*Mira Fischer*  
*University of Cologne*  
*Department of Management*  
*Albertus-Magnus-Platz*  
*Germany – 50923 Cologne*  
*Mira.Fischer@uni-koeln.de*

*Björn Kauder*  
*Ifo Institute – Leibniz Institute for*  
*Economic Research*  
*at the University of Munich*  
*Poschingerstrasse 5*  
*Germany – 81679 Munich*  
*kauder@ifo.de*

*Niklas Potrafke*  
*Ifo Institute – Leibniz Institute for*  
*Economic Research*  
*at the University of Munich*  
*Poschingerstrasse 5*  
*Germany – 81679 Munich*  
*potrafke@ifo.de*

*Heinrich W. Ursprung*  
*University of Konstanz*  
*Department of Economics*  
*Box 138*  
*Germany – 78457 Konstanz*  
*Heinrich.Ursprung@uni-konstanz.de*

## **1. Introduction**

Political economists usually assume that observed heterogeneity in political attitudes reflects different economic interests, a view that plainly contradicts John Maynard Keynes' famous dictum "that the power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas" (General Theory, chapter 24, part V). If it is true that political attitudes are, at least to some extent, independent of a person's vested interests, investigating the formation of ideology-based political attitudes emerges as an important topic of political-economic research. Our study investigates how ideologies are embraced by analyzing empirically the role of education in shaping political attitudes. In particular, we ask whether the field of study influences university students' political attitudes. This research question has already been addressed half a century ago by George Stigler (1959) who has appreciated the complexity of the issue by remarking that "(t)he isolation of the net effect of scientific training upon the policy views of a man is a most difficult task."

We propose that early adulthood is a particularly interesting period of life for studying political socialization because political attitudes are unlikely to consolidate before the age at which young people have seriously discussed political issues for some time and have had the opportunity to exercise political rights. Political attitudes may, of course, be largely based on more fundamental values that become settled at an earlier age; examples are political trust and attitudes towards immigrants, both of which have been shown to be already well established by the age of 14 (Hooghe and Wilkenfeld, 2008). The process of bundling individual value judgments into comprehensive ideologies requires however time; early adulthood is therefore certainly a good candidate for the age at which political attitudes begin to solidify.

Assuming that the possibly immature political attitudes of high school graduates are already sufficiently strong, it is to be expected that students select themselves into academic programs that correspond, either in the subject matter or in the ensuing profession, with their political attitudes. This kind of self-selection would imply that the students' political attitudes vary across fields of study already among the incoming students. Our first hypothesis thus puts forward that self-selection into academic programs according to political attitudes is likely to be manifest in all fields of study.

When do now ideology-based political attitudes begin to consolidate? We hypothesize that the political preferences of young adults may still undergo systematic changes as they progress in their university studies. If political attitudes have not settled by the age at which university students usually commence their studies, the question arises as to whether the observed subsequent changes in political attitudes systematically depend on the students' field of study. Our second hypothesis maintains that in disciplines that provide deeper insights into the modes of social interaction, the workings of political processes, the codification and enforcement of public policies, and the overall effects of these policies, a systematic influence of the university training on the students' political attitudes is to be expected. Since economics deals with all of these four issues, we hypothesize that economics students are especially likely to integrate their newly acquired expertise into their political attitudes. For other academic disciplines that focus more on social interaction (social sciences), political processes (political science), codification and enforcement (law), or the effects of specific policies (health policy in medicine, environmental policies in engineering, etc.) it is much less apparent that students realign their political attitudes with their newly acquired knowledge.

We test these hypotheses with the help of an extensive pseudo-panel survey of German university students. Starting in the academic year 1982/83, twelve waves of the survey have been conducted up to now. All waves, with the exception of the last one (in 2012/13), comprise data on more than 8000 students. The number of observations in our data set thus exceeds the sample size of comparable student surveys by an order of magnitude. Exploiting the large number of observations and covariates, we find systematic differences between the students' political attitudes across eight fields of study. These differences can in many cases be attributed to self-selection of the students into fields of study that they deem congruent with the political attitudes they hold when entering university. Even though self-selection also plays an important role in economics, the subsequent professional training has, in contrast to other academic disciplines, an unambiguous and rather strong influence on the economics students' political attitudes as they progress in their professional training. This last result thus corroborates the main hypothesis advanced by George Stigler in 1959.

## **2. Related literature**

### *2.1 Political socialization*

Our study is closely related to the issue of political socialization which has been investigated in political sociology, developmental psychology, and political science. The political socialization literature is especially concerned with the long-term shift in the significance of structural, ideological, and issue or candidate-specific determinants of voting behavior. Empirical studies reveal that the structural divisions in societies, such as class and religion, still play a significant role in general elections, as do ideological (left-right) orientations. The quantitative influence of these factors has, however, declined after the end of the cold war.

The decline of “cleavage politics” (Franklin, 1992) is, to some extent, a consequence of generational replacement. Van der Brug (2010, 602-3), for example, conjectures that “people do not only ‘get stuck in their ways’ in terms of party preferences, values, or the propensity to turn out to vote. They also get used to evaluating parties by certain criteria”. The generation that was politically socialized in an environment characterized by a clear class or religious stratification still votes in line with these structural considerations, whereas the generation that grew up after 1950 in an environment in which parties competed with ideological arguments tends to put more weight on the ideological dimension of voting. The voting behavior of the youngest generation born after 1970 appears to correspond best to the model of voting behavior embraced by the rational choice school, i.e. these voters tend to apply a case by case evaluation of government performance, candidate ability, and, in referenda, the specific issues at hand. The political socialization literature thus establishes that the political environment prevailing in a voter’s formative years has a distinct influence on his or her voting behavior. This imprint is perhaps not indicative of the voter’s political attitudes for the rest of his or her life; but it will, to some extent, determine how he or she will evaluate the political issues which are to be resolved by an election or a referendum. The period in which political attitudes were formed therefore influences the voters’ reasoning and subsequent behavior (Sears and Valentino, 1997; Franklin, 2004; Hatemi et al., 2009).

## 2.2 *The effects of training in economics*

The second strand of literature that is closely related to our study is a hobby horse of economists; it investigates whether economists are different. The dimensions in which economists have been suspected to be different are manifold. First of all, economists have investigated whether studying economics has a significant impact on how the market allocation mechanism and its basic principles are appraised (Whaples, 1995; Haucap and Just, 2010; Goossens and Méon, 2013). Focusing on economic policies instead of theory, Caplan (2007) compares non-economists' and Ph.D. economists' responses to a large number of economic policy questions and finds that Ph.D. economists base their beliefs on logic and evidence, whereas the general public holds systematically biased beliefs. Moreover, he shows that these differences can be attributed to the economists' training; i.e. the differences in opinion are not a consequence of a self-serving bias, nor can they be explained by the economists' political ideology (Caplan, 2002). Second, since modern economics curricula put more emphasis on the literature deriving from the *Wealth of Nations* than on the literature in the tradition of the *Moral Sentiments*, naïve economics students may be suspected to confuse descriptive economic theories of human behavior with normative instruction (Rubinstein, 2006). Many studies have therefore explored whether economists are more selfish than their fellow students (Marvell and Ames, 1981; Selten and Ockenfels, 1998; Bauman and Rose, 2011). A third line of investigation goes even further and asks whether economists, in an overzealous attempt to conform to a misconceived notion of the selfish *homo economicus*, are more prone to violate well established and generally acknowledged ethical and legal norms (Frank et al., 1993; Yezer et al., 1996; Frank and Schulze, 2000). The general picture that emerges from this literature has not changed much since Kirchgässner's (2005) survey in which he summarizes the conflicting evidence by observing "that at least in some respect, and especially with respect to their perception of economic mechanisms, political economists are different".

Given the long catalog of attributes that have been studied in the attempt to delineate how economists function, it is surprising that political ideologies have not been analyzed in great detail since George Stigler observed in the late 1950s that academic economists espouse distinctive conservative political attitudes. Nowadays, as documented by Klein and Stern (2006), the stance of American economists appears to have somewhat softened; but

economists still do not support the Democrats as fervently as other social scientists.<sup>1</sup> To be sure, some studies pursue, in principle, the same objective as we do. These studies infer, however, political attitudes from answers to a set of questions related to economic policies such as policies favoring or opposing intervention in free markets (Scott and Rothman, 1975; Luker and Proctor, 1981; Elchardus and Spruyt, 2009). These studies are, therefore, closer to the line of research attempting to establish a relationship between the field of study and the students' evaluation of economic policies. Gandal et al. (2005), however, compare economists and other social scientists with respect to value priorities that are more closely related to political ideologies (hedonism, power, achievement, benevolence, and universalism).

Our basic research question is actually more closely related to the social psychology literature that investigates the influence of higher education on the students' socio-political attitudes. This literature has a long and distinguished tradition which is admirably surveyed in Hastie (2008). It focuses on the hypothesis that the college experience has a liberalizing effect. Social liberalism has been identified with such characteristics as tolerance for minority groups and acceptance of nontraditional roles of women, and the lack of social liberalism with support for the death penalty, authoritarianism, ethnocentrism, dogmatism, and prejudice. Liberalization has also been defined as support for left-wing economic positions; but these attitudes were again elicited by questions about welfare legislation, organized labor, social injustice, and economic poverty, i.e. questions that do not clearly discriminate between political orientation, moral concerns, and economic efficiency. At any rate, the social psychology approach is more broadly construed than the economic approach and the studies usually rely on much smaller sample sizes and less rigorous statistical methods. The social psychology literature has, however, addressed all the issues that have also been investigated in the economic literature: differences between disciplines, self-selection versus socialization, and indoctrination versus mere training effects. Moreover, the social psychology literature has raised issues that have so far escaped the map of the economics profession: the most prominent one arguably being the issue of persistence.

---

<sup>1</sup> Berggren et al. (2009) provide similar empirical evidence for Sweden.

Interesting as they are, all of these contributions thus do not add up to a systematic and reasonably encompassing empirical investigation of the relationship between academic training in economics and the development of political ideologies.

### *2.3 Self-selection, socialization, and gender*

Apart from investigating whether economists are indeed different, two further themes of the literature on the behavioral characteristics of economists are significant for our investigation. The first issue concerns the causes of the observed differences. Are economists different because their training makes them different, or have they become economists precisely because they were already different when they chose to study economics? In other words, are economists special because of self-selection or because of their socialization and acquired expertise?

Some of the studies that identify differences between economists and some comparison group go on to investigate the reasons for the observed differences. The established method of distinguishing between the selection and socialization hypotheses is to use a set-up with two points of time, one before the students have been exposed to economic reasoning and one afterwards; but studies distinguishing more points of time also exist. The upshot of these investigations is that economics students, as they progress in their studies, do not change their behavior: they do not become less generous, less altruistic, or more corrupt.<sup>2</sup> When it comes to the appreciation of economic insights, some learning effects can, however, be identified.

The second accessory theme that relates to our study concerns gender: do male and female economists behave differently? In their solidarity game, Selten and Ockenfels (1998), for example, found that male economists are less generous than students who do not study economics, but female economists are not. They interpret this evidence to imply that the gender effect on generosity is a general phenomenon, whereas the learning effect is restricted to males. Frank and Schulze (2000) find a slightly different gender pattern in their field experiment: male economics students turned out to be the most corrupt, male non-economists

---

<sup>2</sup> Interestingly, Bauman and Rose (2011) show that even though economics majors do not change their social behavior, non-majors become less altruistic if exposed to introductory and intermediate microeconomics courses. It thus appears that exposure to the economic way of thinking has some effect on the students' behavior if their value system does not already embrace the normative implications that they perceive to follow from the newly acquired expert knowledge.

the least, and female students appear to be moderately corrupt independent of their field of study.

### **3. Institutions and Data**

We use data from a student survey administered by the Research Group on Higher Education which is supported by Germany's Federal Ministry of Education and Research. Beginning in the winter semester of 1982/83, data on about 8000 university students have been collected every two or three years. Students studying at German universities, institutes of technology (technical universities: TU) and universities of applied science are asked to answer questions about their socio-economic background, motivation, expectations, strategies, and how satisfied they are with student life. The survey also contains questions about life style and political attitudes. Multrus (2004) notes that the dataset is representative for German students regarding the distribution of basic attributes such as gender, field of study, and age.

The questions inquiring about the students' political attitudes were first included in the second wave and have been asked ever since. The dataset contains 100,420 observations collected in twelve waves and comprises 1032 variables, most of which were included in several waves. The students are always asked in the winter semester.<sup>3</sup> Because most students begin to study in winter, the dataset contains about three times as many students whose record shows an odd number of semesters than students with an even number of semesters. Students whose record shows an even number of semesters may, for example, have changed their field of study, have served in the army, or have had a baby. This group of students is, for that reason, quite heterogeneous and differs from the much larger group of students whose records shows an odd number of semesters. We therefore focus in our baseline model on the "regular" students and refer to results based on larger samples in the section on robustness tests.

The prescribed period of undergraduate study in Germany has been nine semesters and has now, because of the Bologna reform, been reduced to six semesters. We therefore focus on students who have not studied longer than nine semesters. In the robustness tests section, we also refer to results that take longer periods of study into account. We also exclude students

---

<sup>3</sup> In Germany the academic year is divided in two semesters, the winter semester and the summer semester.

who were older than 23 years when they began to study and students who are younger than 18.

The questionnaire distinguishes eight fields of study: humanities, social sciences, law, economics, medicine, engineering, natural sciences, and other subjects. About 15% of the students studied humanities, 9% social sciences, 7% law, 15% economics, 9% medicine, 22% engineering, 18% natural sciences, and 4% other subjects. The term “economics” refers to both economics and business students who, in Germany, attend the same courses in their basic studies.

We focus on Christian-conservative, liberal-democratic, green, and social-democratic attitudes because these are the political positions advocated by the four major parties that have held seats in the German federal parliament (Bundestag) for the last 30 years: the Christian-conservative CDU/CSU, the liberal-democratic FDP, the social-democratic SPD, and the green “Alliance ‘90/The Greens”. Restricting our investigation to the four main political positions in contemporary Germany guarantees that the students’ responses are reasonably well informed. Two clarifications with respect to terminology are called for. First, we use the continental European terminology that identifies the term “liberal” with *freedom from excessive government intervention*. German liberal-democrats stand in the tradition of 19<sup>th</sup> century classical liberalism and represent in many respects the direct opponents of social-democratic positions that endorse expansive government and the welfare state, i.e. political positions which, in the United States, are referred to as “liberal”. Moreover, liberal-democrats are not to be confused with libertarians who, in the United States, advocate an extreme form of minimal government with rather modest electoral success. Unlike the American libertarians, the German liberal-democrats acknowledge that the state needs to provide the economy with a regulatory order to preserve a healthy level of competition;<sup>4</sup> they also support a moderate level of public services. This well-balanced platform has a considerable electoral appeal that translates into a sizable vote share and, from time to time, participation in government coalitions at the state (Länder) and federal level. In any event, in order to avoid confusion, we do not use the term “liberal” but rather “classical liberalism” or “liberal-

---

<sup>4</sup> In this respect the liberal-democrats are influenced by the economic philosophy of *Ordoliberalism* deriving from the Freiburg School of economics. This school is usually associated with the Nobel laureate Friedrich von Hayek and with providing the academic foundation of the social market economy that has brought about the German “economic miracle” after World War II.

democratic” to refer to the policy position that aims to maximize freedom from government restrictions of individual behavior and economic relationships between private persons. Second, for lack of a better term, we use the adjective “green” to describe the political attitude that advocates the ideology of environmentalism. This terminology does however not imply that attitudes towards green policies directly translate into equivalent attitudes towards the German green party which is called “Alliance ‘90/The Greens”; one can advocate green policies without endorsing this party.

The survey asks the students to express their views concerning these four political positions on an integer scale ranging from strongly disagree (1) to strongly agree (7). It is important to note that students express their views on the four political positions separately. The exact wording is the following: “Characterizing your overall political attitude, to what extent do you agree with the positions of the following basic political orientations, and to what extent do you disapprove of them?” The students were also asked to express their political views on a left-right scale. We use the left-right variable to delineate our political attitudes variables (which refer to complex political ideologies) from a more general but less informative concept of political orientation.

#### **4. Political attitudes and selection into fields of study**

##### *4.1 Descriptive statistics*

To investigate the high school graduates’ self-selection into fields of study, we examine the students’ political attitudes in their first university semester. Table 1a reports the mean scores of the students’ political attitudes towards the four political positions, detailed for the eight fields of study (we use here 9135 observations for which the political attitudes variables and the entire set of explanatory variables in the econometric model are available; the sample becomes larger when we exclude individual explanatory variables). Table 1a also reports the deviations of the field-specific mean scores from the mean across all fields of study, and the field-specific root mean squared deviations (RMSD) across the four political attitudes.

Overall, the figures reported in Table 1a indicate that German students are more in favor of social-democratic and green than of Christian-conservative and liberal-democratic policy positions. Moreover, the figures show that students who have chosen to study humanities,

social sciences, or natural sciences are less in favor of the Christian-conservative and liberal-democratic policy positions than the average student, but are more in favor of green and, apart from the natural science students, also more in favor of social-democratic positions. By contrast, students who have chosen to study law, economics, and medicine are more in favor of Christian-conservative and liberal-democratic policy positions than the average student, but are less in favor of social-democratic and, apart from the medical students, also less in favor of green positions. Because engineering students are, as a group, most akin to the average student as far as our crucial liberal-democratic attitudes variable is concerned, we use the engineering students as our reference group. The root mean squared deviation (RMSD) is however minimized for the natural science students. The students studying “other disciplines” are a rather heterogeneous group; we therefore abstain from interpreting the results relating to this mixed bag of academic disciplines.

Since our survey contains a large number of potential covariates of political attitudes we now use an econometric model to firmly establish the correlation between the students’ political attitudes and their self-selection into fields of study.

#### 4.2 The econometric model

Because the four political attitudes variables are categorical (values from 1 to 7), we specify an ordered probit model of the form:

$$\text{POLITICAL ATTITUDE}_{ij} = \sum_k \delta_{jk} \text{FIELD}_{ik} + \sum_l \zeta_{jl} x_{il} + u_{ij}$$

with  $i = 1, \dots, 10014$ ;<sup>5</sup>  $j = 1, \dots, 4$ ;  $k = 1, \dots, 7$ ;  $l = 1, \dots, 48$ ; (1)

where  $\text{POLITICAL ATTITUDE}_{ij}$  is the attitude of individual  $i$  towards policy position  $j$  (strongly disagree, ... , strongly agree). We distinguish between Christian-conservative, liberal-democratic, social-democratic, and green attitudes.  $\text{FIELD}_{ik}$  are dummy variables for each field of study. We chose ENGINEERING as the reference category.  $x_{il}$  are the control

---

<sup>5</sup> We have a maximum of 10,014 observations when we use the attitudes towards the Christian-conservative ideology as our dependent variable and include only the fields of study control variables (similar to Column 1 in Table 2a).

variables. We include four socio-demographic control variables: a gender dummy variable (FEMALE=1), an East/West Germany dummy variable (EAST GERMANY=1), a dummy variable when the father is a blue collar worker, and a dummy variable when the father is self-employed. We include three economic control variables: the students' high-school diploma grades, which we use as a measure of the students' general prospects in their professional career, a dummy variable capturing their present financial situation (FINANCIAL PRESSURE=1), and a dummy variable that indicates whether a student can conceive of becoming self-employed.<sup>6</sup> Since political attitudes vary across regions and time we include fixed university effects and dummy variables for the different survey waves in all of our regressions. The estimates do, however, not change significantly when the fixed effects are not included.

Estimating the ordered probit model with robust standard errors for the four political positions, we obtain eight tables of coefficient estimates and marginal effects. To save space, we present and discuss the results regarding the economics students' attitudes towards the liberal-democratic policy position in greater detail, and present only the results of our preferred specifications for the other students and political positions.

### *4.3 Liberal-democratic attitudes*

Table 2a presents the coefficient estimates of the students' support of the liberal-democratic policy position. Column (1) shows the results when only the field of study dummy variables are included, column (2) shows the results when the socio-demographic variables are added, and column (3) when the economic variables are added. The benchmark estimates, when all variables are included, are reported in column (4). All regressions include university and wave dummies.

The coefficients of the LAW, ECONOMICS and MEDICINE variables have a positive sign and are statistically significant at the 1% level in columns (1) to (4). This means that the incoming law, economics, and medical students are more prone to espouse liberal-democratic

---

<sup>6</sup> The variables describing the students' financial situation and their attitude towards becoming self-employed are categorical in the dataset (six or seven categories). For parsimony reasons we do not include dummy variables for each category of these explanatory variables in the baseline model. Inferences regarding the effect of other explanatory variables do however not change when we include dummy variables for each category of answers.

policy positions than the engineering students (reference category). The coefficients of the HUMANITIES and SOCIAL SCIENCES variables have a negative sign and are, in the benchmark regression (4), statistically significant at the 1% level (Social Sciences) and at the 10% level (Humanities). Not surprisingly, incoming humanities and social science students are less prone to espouse liberal-democratic policy positions than engineering students. In this respect, the incoming natural science students are very much alike the humanities and social science students; the NATURAL SCIENCES variable attains statistical significance at the 10% level when the full set of explanatory variables is included. The estimates of the variable OTHER SUBJECTS indicate that the political attitudes towards the liberal-democratic policy position of these “other” incoming students cannot be distinguished from those of the incoming engineering students. It is, however, well possible that the students studying the various disciplines relegated to this category are quite different from the engineering students and that the small size of the estimated coefficient reflects a non-representative mean.

Table 2b reports the marginal effects that correspond to our benchmark regression which includes all control variables, i.e. the regression in column (4) of Table 2a. Table 2b has seven columns because the dependent variable assumes seven different values. The marginal effects reported in columns (1) to (7) show by how much (in percentage points) the probability of incoming economics students ticking category (1) to (7) differs as compared to incoming engineering students. The marginal effects of the LAW, ECONOMICS, and MEDICINE variables are statistically significant at the 1% level and have a negative sign in columns (1) to (4) and a positive sign in columns (5) to (7), indicating that these incoming students disagree less with liberal-democratic policies, and agree more with these policies than engineering students. The numerical meaning of the effects is, for example, that the probability of law students ticking category 6 (agree with liberal-democratic policy position) is 4.18 percentage points higher than for engineering students. The probability of economics students ticking category 6 is 4.25 percentage points higher, and for a medical student it is 3.77 percentage points higher. By contrast, the marginal effects of the HUMANITIES and SOCIAL SCIENCES variables point in the opposite direction: humanities and social science students disagree more with liberal-democratic policies, and agree less with these policies than engineering students. The numerical effect, and in the case of the humanities students also the statistical significance, are, however, smaller than in the case of the law, economics, and

medical students: the probability of humanities (social science) students to tick category 6 is 1.51 (2.79) percentage points lower than for engineering students. The `NATURAL SCIENCES` variable indicates that natural science students' attitude towards liberal-democratic positions closely resembles the attitudes of the humanities and social science students.

The estimated coefficients of the socio-economic control variables in our benchmark regression (Table 2a, column 4) are in line with the expected effects. Before interpreting these estimates, we turn however to the regression results reported in columns (5) to (9) that shed some additional light on the field-specific support of liberal-democratic policies, and to the regression results reported in columns (10) to (12) in which we estimate the support for the other three policy positions.

#### *4.4 Sub-samples*

Our benchmark model (4) includes students studying at universities, institutes of technology, and universities of applied science. Because the curricula at universities of applied science are much more closely related to specific job profiles than the curricula offered by traditional universities and institutes of technology, we restrict in regression (5) the sample to students studying at universities and institutes of technology. The estimated self-selection effects remain unaffected by this sample restriction. The estimates of the coefficients of the `LAW`, `ECONOMICS`, `MEDICINE`, and `SOCIAL SCIENCES` variables change very little and remain statistically significant at the 1% level. The estimates of the other field variables also remain largely unchanged; the `NATURAL SCIENCE` variable, however, loses statistical significance.

Restricting the sample to female students in column (6) and to male students in column (7) again shows that the self-selection into `LAW`, `ECONOMICS`, and `MEDICINE` is robust. Female students who favor liberal-democratic policies also select themselves readily into these three disciplines. Interestingly, however, incoming female humanities and social science students do not appear to share their male peers' aversion against liberal-democratic policies. Two explanations spring to mind. The first one is that male high school graduates who decide to study subjects that are dominated by female students only do so if they have adopted an

identity that is not only in line with but actually overemphasizes the perceived identity of a social science student. The second explanation is that female students are attracted to the socio-political aspect of classical liberalism that has always stressed gender equality and specific women's rights, such as the right to abort, whereas male social science students are repelled by the economic aspect of classical liberalism, which they probably deem to give rise to an unsocial society. The second interpretation appears more likely considering that we observe a similar pattern in the male dominated natural sciences.

#### *4.5 Alternative dependent variables*

To check the robustness of our benchmark result (4) in Table 2a, we replace in column (8) our dependent variable measuring the support of the liberal-democratic position with a dependent variable that measures the students' support of policies protecting the free market and private entrepreneurship. The FREE MARKET variable thus only captures the *economic* aspects of classical liberalism. The results indicate that economic liberalism is an important element of classical liberalism, but German incoming students appear to be well aware that classical liberalism entails more than advocating free markets and free entrepreneurship. In particular, three results emerge. First, incoming economics students are not only more likely to support liberal-democratic policies than the reference engineering students; they also are more likely to favor free markets. Second, incoming law and medicine students support the liberal-democratic position mainly because of the socio-political dimension of classical liberalism. With respect to their evaluation of economic liberalism, these students are not different from engineering students. Third, students who begin to study humanities, social sciences, natural science, or one of the "other" fields are significantly more adamant in rejecting economic liberalism than incoming engineering students. All in all, these results indicate that the surveyed students are very well able to differentiate between two closely related concepts of political ideology which in turn suggests that our dependent variable (LIBERAL-DEMOCRATIC ATTITUDES) is indeed meaningful.

A second robustness test of our results is presented in column (9) of Table 2a. Here we use a dependent variable measuring the students' political ideology in a one-dimensional policy space. The students are asked the following question: "How would you classify your political

position between left and right? As compared to most people in this country I am, politically speaking, rather to the left (1), ... , right (7).“ The estimates reported in column (9) are well in line with the estimates resulting from our benchmark regression (4): students who begin to study humanities, social sciences and natural sciences are more to the left of the political spectrum than incoming engineering students; law and economics students are more to the right. Medicine students see themselves in the political center even though they lean more towards the liberal-democratic position than the engineering students. These results again indicate that our baseline ideology measure is well in line with this alternative measure but captures a more complex mindset than the simple one-dimensional left-right policy space.

#### *4.6 Christian-conservative, green, and social-democratic attitudes*

The regression results reported in columns (10)-(12) parallel our benchmark regression (4) but replace the dependent variable (LIBERAL-DEMOCRATIC ATTITUDES) by the attitudes towards Christian-conservative, green, and social-democratic policies. The pattern that emerges from these estimates reveals that the relationship between the incoming students’ political attitudes and their self-selection into fields of study is perfectly coherent and comprehensible.

Table 2c provides an impression of the magnitude of the self-selection effect. We only report the marginal effects for students answering that they agree with the respective policy position (category (6) in the catalog ranging from 1 (do not agree at all) to 7 (completely agree)). The marginal effects for categories (1) to (5) and (7) are perfectly in line with the marginal effects for category (6). The reported marginal effects refer to the regressions (4), (10), (11) and (12) in Table 2a. The first column in Table 2c therefore duplicates column (6) in Table 2b.

Column (2) shows that students who just begin to study law, economics, and medicine are significantly more in favor of Christian-conservative policies than our benchmark group, the engineering students. The probability of an incoming law student to agree with the Christian-conservative ideology is 4.27 percentage points higher than for an engineering student; for an economics student it is 4.76 percentage points, and for a medical student 2.35 percentage points higher. As compared to the engineering students, the incoming humanities, social science, natural science, and “other” students are all much less enthusiastic about Christian-

conservative policies. The patterns of the field-specific support for the liberal-democratic and Christian-conservative ideologies are very similar. The incoming students have, however, a much more differentiated appreciation of the two left-wing policy positions. The green political attitudes are an almost perfect mirror image of the liberal-democratic and Christian-conservative positions. But only the social science and economics students have clear left-right preferences. The other students do not measure the two left ideologies with the same yardstick.

#### *4.7 The estimated effects of the covariates*

We now turn to the estimates of the socio-economic covariates (Table 2a). The first four variables capture the incoming students' social and demographic background. The estimated coefficient of the FEMALE variable indicates that women are less in favor of the liberal-democratic ideology than men. This is corroborated by the estimates in columns (8) and (9) that show that female students are less in favor of free market policies and are on average further to the left of the political spectrum than their male peers. The picture is supported by the estimated effects of being female on the other three policy positions: female students are also less in favor of the Christian-conservative ideology and more in favor of the green and social-democratic ideologies. The fact that women usually espouse more leftist policies than men is well known and has been explained by the greater economic vulnerability of women (see, for example Lott and Kenny, 1999).

The EAST GERMANY dummy variable does not turn out to have a statistically significant effect on political attitudes, indicating that differences between East and West Germany are less pronounced across students than across the population at large.

Students whose father is a blue collar worker are less favorably disposed towards the liberal-democratic policy position, free market policies, and right-wing policies. They are also less favorably disposed towards Christian-conservative policies, and more in favor of social-democratic policies. Furthermore, it transpires that students with a working class background are not especially prone to support the green ideology even though the German green party has a slant towards heavy-handed state intervention in all policy fields. The opposite picture emerges for students whose father is self-employed. The estimated coefficients of the

FATHER BLUE COLLAR and FATHER SELF-EMPLOYED variables indicate that the students' family background (working vs. middle or upper class) influences their political attitudes. This influence can be explained by class specific socialization processes. Alternatively, the students may still identify with their parents' position in life because their well-being may still depend on their parents' income.

The second set of three socio-economic covariates captures the incoming students' economic interests. The estimated coefficient of the FINANCIAL PRESSURE variable has a negative sign and is, with one notable exception, statistically significant for all specifications that explain liberal-democratic attitudes or the two proxies we used for these attitudes (columns (1) through (9) in Table 2a). The estimated coefficient of the FINANCIAL PRESSURE variable is also negative and statistically significant in specification (10) that explains Christian-conservative attitudes. The mirror image on the left side of the political spectrum reinforces these findings: financially pressured students lean towards the green and social-democratic ideologies. The only exception to this very plausible and neat picture can be found in the regression results documented in column (6) of Table 2a. Female students' attitudes towards liberal-democratic policies do not appear to be influenced by current financial distress; financially distressed female students are, however, less likely to champion Christian-conservative attitudes and are more likely to support green and social-democratic policies (results not shown). Since relatively few women endorse the liberal-democratic ideology, it appears that those who do are likely to be stalwart supporters of classical liberalism who are not dissuaded by transitory financial hardship.

The next variable was introduced to measure expected long term economic success. For the long-run expectations we use the students' average grade in their high-school diploma (Abitur). High-school grades are a reasonably good predictor of lifetime economic success, albeit not an ideal one (Schwerdt and Woessmann, 2015). The high-school diploma grade does not appear to capture the incoming students' long-run labor market expectations: The grades are not correlated with liberal-democratic attitudes and negatively correlated with the other three political attitudes, implying that academically successful high school students evaluate most policy positions more favorably than academically weak high school graduates. Note, that in Germany low grades are good grades and that in the survey all four policy positions can be evaluated independently. We interpret this result to indicate that

intellectually more perceptive students are less subject to political apathy than high school graduates who obtained worse grades. In any event, these results need to be interpreted very cautiously because the grades in the high school leaving exam determine to some extent the student's choice of the field of study. Academically strong students select themselves into especially challenging disciplines that are avoided by weaker high school graduates, and weak high school graduates are actually excluded from some fields because of an official entry barrier (numerus clausus). Because of this caveat, the estimate of the puzzling positive and statistically significant relationship between GRADE and advocacy of free markets is hard to interpret. We shall return to the GRADE variable when we restrict the sample to students in specific fields of study; these estimates are not contaminated by the indirect links via the choice of the field of study.

The coefficient estimate of the FUTURE SELF EMPLOYMENT variable finally shows that students who contemplate becoming self-employed are more likely to espouse liberal-democratic policies and to favor free markets than students who anticipate a professional career as an employee. Incoming students who anticipate to spend their professional lives as employees are however more likely to endorse social-democratic policies. This pattern makes perfect sense in the German political landscape, in which the liberal-democrats are, at least in economic policy issues, the direct opponents of the social-democrats. All these observations can be attributed to economic self-interest. Whereas someone whose employment prospects do not look bright or suffers from material hardship will appreciate the securities of an extended welfare system, someone who expects to be a net contributor to the system opposes it.

### **5. Self-selection or socialization?**

In this section we analyze whether the students' political attitudes change as a consequence of the training in their specific field of study. Again, we first present and discuss the descriptive statistics.

### 5.1 Descriptive analysis

In Table 1a we have reported the average rating of the four policy positions – which range from 1 (strongly disagree) to 7 (strongly agree) – by all incoming (first semester or freshman) students grouped in the eight fields of study. Figure 1 reports how the field-specific averages of the students' ratings of these party positions change in the course of their studies as compared to the values reported in Table 1a.

In the first two panels of Figure 1 we grouped together fields of studies with similar rating patterns across time. The first panel shows that medical and law students have hardly changed their political attitudes during their university studies. The changes in political attitudes as compared to the initial values never exceed 0.1 rating points which amounts to about 2.5% of the average rating. Also humanities, engineering, and natural and social science students exhibit a similar development of their political views as they progress in their respective studies. The curves depicted in the second panel of Figure 1 appear to indicate that these students have become somewhat disenchanted with the liberal-democratic and Christian-conservative policy positions and have, as a consequence, turned towards social-democratic and, in particular, green political views.

In contrast to the political persistence of the medical and law students, and the rather slight polarization of the engineering, humanities, natural science, and social science students, the economics students' political attitudes do appear to change more dramatically during the course of their studies: the further economics students progress in their studies, the more they appear to favor liberal-democratic and Christian-conservative policies. Economics students also become more favorably disposed towards green policies which are advocated in Germany by the left-wing party *Alliance '90/The Greens*. By contrast, economics students appear to turn away from social-democratic policy positions as they become more proficient in their chosen field of study.

Table 1b mirrors the information provided in Table 1a for the students who are about to graduate. It documents that graduating economics students have become more different in their political attitudes as compared to the average student. Only in one out of four political attitudes the graduating economists are not deviating more from other graduating students than incoming economics students deviate from other incoming students: the economic

students' relative attitudes towards the green political ideology appears not to change in the course of their studies. With the exception of medical and engineering students, the university experience appears to de-homogenize the students' political attitudes as documented by the increasing root mean squared deviations (RMSD). This is perhaps an indication for the “liberalizing” effect that socio-psychologists attribute to attending university.

In the following we focus on the economics students by using an econometric model to explore whether the marked changes in political attitudes suggested by the descriptive statistics are really due to the students' advancing in the economics curriculum and not because of incidental changes in other factors that co-determine political attitudes. That is, we discuss the results for the economics students in detail and only briefly refer to the respective results relating to the other fields of study.

## 5.2 Econometric analysis

We specify an ordered probit model of the form:

$$\text{POLITICAL ATTITUDE}_{ijm} = \beta_{jm} \text{SEMESTER}_{im} + \sum_{lm} \zeta_{jlm} x_{ilm} + u_{ijm}$$

with  $i = 1, \dots, 9354$ ; <sup>7</sup>  $j = 1, \dots, 4$ ;  $l = 1, \dots, 48$ ;  $m = 1, \dots, 8$  (2)

where  $\text{POLITICAL ATTITUDE}_{ijm}$  is the political attitude of individual  $i$  (studying field  $m$ ) towards policy position  $j$ .  $\text{SEMESTER}_{im}$  is the number of semesters that individual  $i$  has been enrolled in field  $m$ . The set-up of this ordered probit model is similar to the ordered probit model in equation (1), the difference being that we now analyze the sub-samples pertaining to each field of study  $m$  individually.

We estimate the model with robust standard errors for the eight fields of study and the four political ideologies. We present and discuss the results relating to the economics students' attitudes towards the liberal-democratic ideology in some detail and discuss the results for the other fields of study and ideologies in a more cursory manner.

---

<sup>7</sup> We have a maximum of 9354 observations when we use the engineering students' attitudes towards the Christian-conservative ideology as our dependent variable (similar to Column 1 in Table 3a).

### *5.3 Benchmark results: Changes in liberal-democratic attitudes*

The first four columns in Table 3a show the coefficient estimates of model (2) for economics students ( $m$ =economics) and liberal-democratic attitudes ( $j$ =liberal-democratic). All regressions in Table 3a contain wave and university dummies. In column (1) only the SEMESTER variable is included. In column (2) the socio-demographic variables are added, and in column (3) the economic variables. Column (4) shows the results of our preferred specification containing all covariates. The coefficient estimates of all covariates remain stable across the four specifications and the pattern of these estimates is perfectly in line with the estimates obtained in the regressions that explore the self-selection effects reported in Table 2a. The only exception makes the estimate of the influence of the grade in the high-school diploma. The estimated coefficient of this variable is now negative in all specifications and statistically significant at the 1% level, indicating that academically successful economics students, i.e. students who have especially bright long-term career expectations, are more likely to espouse liberal-democratic policies. Most importantly however, the estimates of the coefficient of the SEMESTER variable show that the economics students' support of liberal-democratic positions increases significantly in the course of their studies. This finding strongly supports our hypothesis that training or socialization effects are indeed at work.

The results shown in columns (5) and (6) are also based on our preferred specification (4), the sample is however restricted to female and male (economics) students, respectively. It transpires that the training effects identified in our benchmark regression (4) are not gender-specific. Female students are just as susceptible to nurture effects as their male peers. In order to test for robustness, we again replace the dependent variable LIBERAL-DEMOCRATIC by the related ideological concepts "protection of free markets and private entrepreneurship" and "being more right-wing than the population at large". The results are reported in columns (7) and (8). The pattern of the influence of the covariates is almost perfectly in line with the estimates of our benchmark regression (4) and the crucial variable SEMESTER is again positive in column (7) corroborating our finding that studying economics has an influence on the students' appreciation of liberal-democratic tenets, in this case on the students' support of free markets and entrepreneurship. Interestingly, however, the economics curriculum does not make economics students adopt more right-wing policy views (column 8). Once more, it

becomes apparent that classical liberalism and right-wing ideologies are quite different political concepts.

#### *5.4 Controlling for survivor bias and crowding-in bias*

Since we use a pseudo-panel we cannot rule out that our results are influenced by systematic changes in the sample. Two concerns arise. First, economics students may drop out of university or change their field of study either because they realize that they can no longer put up with the political views held by their professors and peers or, even worse, because they fail exams as a consequence of their political incongruence. If these effects were at work, our estimates would suffer from a survivor bias: advanced students are more likely to endorse liberal-democratic policies simply because students who hold these attitudes are more likely to survive and advance in their course of study. Second, it is also possible that students who change from another field of study to economics are predominantly students whose political attitudes blend in with the perceived political attitudes of the economics profession. This “crowding-in” effect would have the same consequences as the survivor bias.

To check whether our inferences are influenced by a survivor bias, we exclude all economics students from the sample who declare not to be satisfied with the grades they have obtained so far in the course of their studies. Since students who are satisfied with their grades are not likely to drop out of the program, we can pretty much rule out a survivor bias in this restricted sample. The results are shown in column (9) of Table 3a. The estimates of this regression are perfectly in line with our benchmark estimates. The estimated size of the coefficient of the semester variable in particular is of the same order of magnitude and remains statistically significant at the 1% level.

We can also rule out a “crowding-in effect”. In column (10) we show the results of a regression in which we restricted the sample to students who have not changed their field of study. Again the coefficient estimates are very close to the estimates of the benchmark regression (4).

### 5.5 *Indoctrination versus learning*

Having shown that studying economics has a robust influence on the students' political views, we now turn to investigating potential reasons behind this training effect. Socialization effects relating to training in economics are sometimes called *indoctrination* effects (Mariani and Hewitt, 2008). This term suggests that the changes in the students' mindsets are caused by brainwashing. It is of course conceivable that economics students become inclined to espouse liberal-democratic policy positions because market-oriented professors hammered these ideas into their brains. A priori, it is however not at all clear whether this is the case. An alternative interpretation would be that students acquire information that induces them to realign their political attitudes with their newly acquired knowledge. In this case, the training effect should rather be referred to as a *learning* effect.

We therefore tested whether the influence of the training in economics on the students' political attitudes depends on the ideological beliefs of the professors teaching at the respective universities. To do so, we asked a group of German economics professors to classify the economics departments in our sample for the period 1985-2010 as left-wing, neutral, or right-wing.<sup>8</sup> On the basis of this classification we re-estimate our benchmark regression for these respective subgroups. The results reported in column (11) of Table 3a show that economics students studying at non-right-wing departments have become more attached to classical liberalism as they progressed in their studies. For the departments classified as right-wing (see column 12) the effect is smaller; this might however be a consequence of the rather small sample size. In any event, our results certainly do not appear to be driven by indoctrination at "right-wing" economics departments.<sup>9</sup>

---

<sup>8</sup> Our experts have either held a full professorship for more than 20 years in Germany or have worked at one of the universities in our sample. The experts classified the departments as follows. Left-wing: TU Berlin (till 1995), Oldenburg, Kassel, and Regensburg; right-wing: Frankfurt (since 1991), Freiburg, Magdeburg, and Karlsruhe; neutral: Bochum, TU Dresden, Duisburg-Essen, Hamburg, Kaiserslautern, Leipzig, LMU Munich, Potsdam, and Rostock. We classified the University of the Saarland, which was included only in the last wave, as neutral.

<sup>9</sup> When we restrict the model to include only departments classified as left-wing, the semester variable is statistically significant at the 10% level and shows that students studying at left-wing departments also become more attached to classical liberalism.

### *5.6 Changes in Christian-conservative, Green, and social-democratic attitudes*

The regression results reported in Table 3a clearly indicate that studying economics has an influence on the students' perception of classical liberalism: economics students become increasingly supportive of liberal-democratic policies as they progress in their studies. The question now arises as to the political-economic significance of this learning effect (as compared to the statistical significance) and whether economics students also change their political attitudes towards the other three policy positions. Furthermore, one would like to know whether the other fields of study also influence the students' political attitudes. To answer these questions we estimated all 32 benchmark models (four political attitudes in eight fields of study), i.e. the models corresponding to regression (4) in Table 3a, and computed the marginal effects of the semester variable. Table 3b reports the marginal effects for category (6), i.e. for agreeing with the respective policy position.

The probability of an economics student to agree with the liberal-democratic policy position increases by 0.7 percentage points each semester. Assuming that a student studies for nine semesters the probability that he or she agrees with liberal-democratic policies will therefore increase between matriculation and graduation on average by 6.2 percentage points. But this is not the only change in the political attitudes of economics students. It turns out that economics students also become "greener" and less inclined to agree with social-democratic policies. The econometric results relating to the other fields of study indicate that these students' political attitudes change much less than the economists' attitudes. To be more precise, the political attitudes of individual students may change a great deal, but these changes are less synchronized with their immediate peers. Only the economics students appear to change their political attitudes in conjunction with their fellow economics students. In this respect, economics students are thus clearly different. This is not to say that we have not identified any socialization effects in the other fields of study. But these effects are smaller and do not encompass the whole political spectrum. The increasing support of green policies, in particular, appears to be a quite general phenomenon among German students and is therefore not likely to be much influenced by subject-specific socialization effects.

## **6. Additional robustness tests**

We submitted all of our results to rigorous robustness tests using different specifications of our regressions and different samples.

In section 4.5 we have shown how our estimates change if the students' proclaimed support of policies protecting the free market and private entrepreneurship is used as a substitute for liberal-democratic attitudes. In the same vein, we have compared the following pairs of dependent variables: green attitudes and favoring environmental protection over economic growth, Christian-conservative attitudes and advocating the protection of the traditional family, and social-democratic attitudes and advocating welfare state policies. We have done that for the self-selection as well as for the socialization effects. In a further attempt to check the robustness of our political attitudes variables we have merged the seven attitudes categories ranging from strongly disagree to strongly agree into three categories. We also replaced the SEMESTER variable by dummy variables for the individual semesters. None of these robustness tests indicates any severe fragility of our results.

In our baseline estimates we have only included students whose records show an odd number of semesters, but we have also estimated our results for the entire sample. Up to very recent times, the standard period of study in Germany has been nine semesters. We have therefore focused on students who have not studied longer than nine semesters. As a robustness test we have however re-estimated the results by using a larger sample that also includes students who have studied up to eleven semesters. The changes in students' appreciation of liberal-democratic and green attitudes remain economically and statistically significant; the effect of studying economics on social-democratic attitudes, however, loses statistical significance.

In section 4.4 we have shown that the self-selection behavior of university students does not differ from the self-selection behavior of students studying at universities of applied sciences. In terms of socialization, the two groups are however different. Students studying at universities of applied science did hardly change their political attitudes in the course of studying. The identified socialization effects are therefore driven by students studying at traditional universities and institutes of technology. We speculate that this is so because universities of applied science are basically schools that prepare their students for specific jobs. Their curricula are, as a consequence, geared towards providing job-specific

information; developing and critically assessing abstract or general ideas that may change the students' mindset are part of the syllabi reserved to students studying at traditional universities and institutes of technology.

## **7. Conclusions**

Our finding that university students select themselves into fields of study that correspond to the values they have acquired before making this first important career choice is perfectly in line with the extensive literature that investigates to what extent economists are special and why they are special. The contribution of our study in this respect consists in having shown that the value judgments that influence the student's choice of his or her field of study also influence his or her political attitudes. To a large extent, students enrolled in different fields of study thus hold different values and behave differently because of self-selection which, in turn, is mainly driven by socialization before they reach adulthood.

Much more novel is our second result. We have shown that university students' political attitudes can be systematically influenced by the chosen academic program, implying that political attitudes are still malleable at the age of early adulthood. We have been able to establish this result in particular for economics students. We have, of course, no grounds to believe that the political socialization of students who study other disciplines is more consolidated when they enter college; the factors influencing their political socialization while studying appear however to be less synchronized with their fellow students.

We have thus shown that economics students are quite special in terms of their political attitudes because of self-selection *and* socialization effects. Our preferred interpretation of the socialization result is not that economics students are brainwashed or indoctrinated by their instructors. The available empirical evidence rather suggests that economics students acquire analytical tools that make them see the world in a different light. We thus agree with George Stigler who firmly believed that the cause of the economists' political "conservatism" derives from their training: "It simply becomes impossible for the trained economist to believe certain absurd arguments which are, however, often used in the political discourse with resounding success" (Stigler, 1959, section III). Our empirical results support Stigler's view: The observed systematic change in political attitudes of economics students most likely originate in the

informational content of the economics curriculum which changes the way in which the students derive their political attitudes from their more basic value system. In particular, we have shown that the empirical evidence is not indicative of an external selection effect: the changes in political attitudes do not appear to emerge because students who embrace political attitudes that deviate from the value judgments of the average economist are likely to fail more often than their better adapted peers.

One can, of course, always think of alternative explanations of what is driving the socialization effect in the professional training of economists. An alternative interpretation could, for example, be construed by observing that academic progress is not only associated with human capital accumulation and group-specific socialization but also with advancing, time-wise, towards professional life with the attendant vested interests. Freshman students can, without much concern, express any political ideology in order to parade or gratify some adopted identity. As graduation and job market interviews approach, such expressive rhetoric may become more costly because it can no longer be explained as a peccadillo of youth. Changes in expressed political preferences may therefore simply reflect opportunism. Again following Stigler (1959), we do, however, not accord much credibility to the argument that economists need to sell their souls to the capitalists in order to succeed. Because, as Stigler argues, “(t)he current rates of pay for good economists are much below what I would assume to be the going price for a soul“ (p. 528). In this respect, not much has changed in the last fifty years.

### **Acknowledgements**

We would like to thank Tino Bargel, Arye Hillman, James R. Hines Jr., Hans Simeaner, David Stadelmann, and conference participants at the International Conference on Public Finance, Public Economics, and Public Policy, CCSS (Calcutta), the International Institute of Public Finance (Dublin), the Silvaplana Workshop on Political Economy (Pontresina), the Verein für Socialpolitik (Düsseldorf), the World Public Choice Society (Miami, USA), and seminar participants at the University of Cologne, Göttingen, Konstanz, Leipzig, Mannheim, Munich, Osnabrück, Paris, Sheffield, the IFN Stockholm, and the ifo Institute for their helpful comments.

## References

- Bauman, Yoram and Elaina Rose (2011). Selection or indoctrination: Why do economics students donate less than the rest? *Journal of Economic Behavior & Organization* 79, 318-327.
- Berggren, Niclas, Henrik Jordahl and Charlotta Stern (2009). The political opinions of Swedish social scientists. *Finnish Economic Papers* 22, 75-88.
- Caplan, Bryan (2002). Systematically biased beliefs about economists: Robust evidence of judgemental anomalies from the survey of Americans and Economists on the Economy. *Economic Journal* 112, 433-458.
- Caplan, Bryan (2007). *The myth of the rational voter: Why democracies choose bad policies*. Princeton, Princeton University Press.
- Carter, John R. and Michael D. Irons (1991). Are economists different, and if so, why? *Journal of Economic Perspectives* 5, 171-177.
- Elchardus, Mark and Bram Spruyt (2009). The culture of academic disciplines and the socio-economic attitudes of students: A test of selection and socialization effects. *Social Science Quarterly* 90, 446-460.
- Frank, Robert H., Thomas Gilovich and Dennis T. Regan (1993). Does studying economics inhibit cooperation? *Journal of Economic Perspectives* 7, 159-171.
- Frank, Björn and Günther G. Schulze (2000). Does economics make citizens corrupt? *Journal of Economic Behavior & Organization* 43, 101-113.
- Franklin, Mark N. (1992). The decline of cleavage politics. In: M. Franklin, T. Mackie, and H. Valen (eds.), *Electoral Change: Responses to Evolving Social and Attitudinal Structures in Western Nations*. Cambridge, Cambridge University Press.
- Franklin, Mark N. (2004). *Voter turnout and the dynamics of electoral competition in established democracies since 1945*. New York, Cambridge University Press.
- Frey, Bruno S. and Stephan Meier (2003). Are political economists selfish and indoctrinated? Evidence from a natural experiment. *Economic Inquiry* 41, 448-462.

Gandal, Neil, Sonia Roccas, Lilach Sagiv and Amy Wrzesniewski (2005). Personal value priorities of economists. *Human Relations* 58, 1227-1252.

Goossens, Amélie and Pierre-Guillaume Méon (2013). “*This is an economist’s argument!*” *The impact of studying economics and other disciplines on the belief that market transactions make everyone better off*. Centre Emile Bernheim, Solvay Brussels School of Economics and Management, February 2013.

Hastie, Brianne (2007). Higher education and sociopolitical orientation: The role of social influence in the liberalization of students. *European Journal of Psychology of Education* 22, 259-274.

Hatemi, Peter K., Carolyn L. Funk, Sarah E. Medland, Hermine M. Maes, Judy L. Silberg, Nicholas G. Martin and Lindon J. Eaves (2009). Genetic and environmental transmission of political attitudes over a life time. *Journal of Politics* 71, 1141-1156.

Haucap, Justus and Tobias Just (2010). Not guilty? Another look at the nature and nurture of economics students. *European Journal of Law and Economics* 29, 239-254.

Hooghe, Marc and Britt Wilkenfeld (2008). The stability of political attitudes and behaviors across adolescence and early adulthood: A comparison of survey data on adolescents and young adults in eight countries. *Journal of Youth and Adolescence* 37, 155-167.

Kirchgässner, Gebhard (2005). (Why) are economists different? *European Journal of Political Economy* 21, 543-562.

Klein, Daniel B. and Charlotta Stern (2006). Economists’ policy views and voting. *Public Choice* 126, 331-342.

Lott, John R., Jr. and Lawrence W. Kenny (1999). Did women’s suffrage change the size and scope of government? *Journal of Political Economy* 107, 1163-1198.

Luker, William and Wanda Proctor (1981). The effect of an introductory course in microeconomics on the political orientation of students. *Journal of Economic Education* 12, 54-57.

Mariani, Mack D. and Gordon J. Hewitt (2008). Indoctrination U? Faculty ideology and changes in student political orientation. *Political Science & Politics*, 773-783.

- Marwell, Gerald and Ruth E. Ames (1981). Economists free ride, does anyone else? *Journal of Public Economics* 15, 295-310.
- Multrus, Frank (2004). *Fachkulturen: Begriffsbestimmung, Herleitung und Analysen*. Dissertation, University of Konstanz.
- Rubinstein, Ariel (2006). A sceptic's comment on the study of economics. *Economic Journal* 116, C1-C9.
- Schwerdt, Guido and Ludger Woessmann (2015). The information value of central school exams. *IZA Discussion Paper* 9122.
- Scott, James H., Jr., and Mitchell P. Rothman (1975). The effect of an introductory economics course on student political attitudes. *Journal of Economic Education* 6, 107-112.
- Sears, David O. and Nicholas A. Valentino (1997). Politics matters: Political events as catalysts for preadult socialization. *American Political Science Review* 91, 45-65.
- Selten, Reinhard and Axel Ockenfels (1998). An experimental solidarity game. *Journal of Economic Behavior & Organization* 34, 517-539.
- Stigler, George (1959). The politics of political economists. *Quarterly Journal of Economics* 73, 522-532.
- Van der Brug, Wouter (2010). Structural and ideological voting in age cohorts. *West European Politics* 33, 586-607.
- Whaples, Robert (1995). Changes in attitudes among college economics students about the fairness of the market. *Journal of Economic Education* 26, 308-313.
- Yezer, Anthony M., Robert S. Goldfarb and Paul J. Poppen (1996). Does studying economics discourage cooperation? Watch what we do, not what we say or how we play. *Journal of Economic Perspectives* 10, 177-186.

Figure 1: Changes in political attitudes as compared to the first semester.

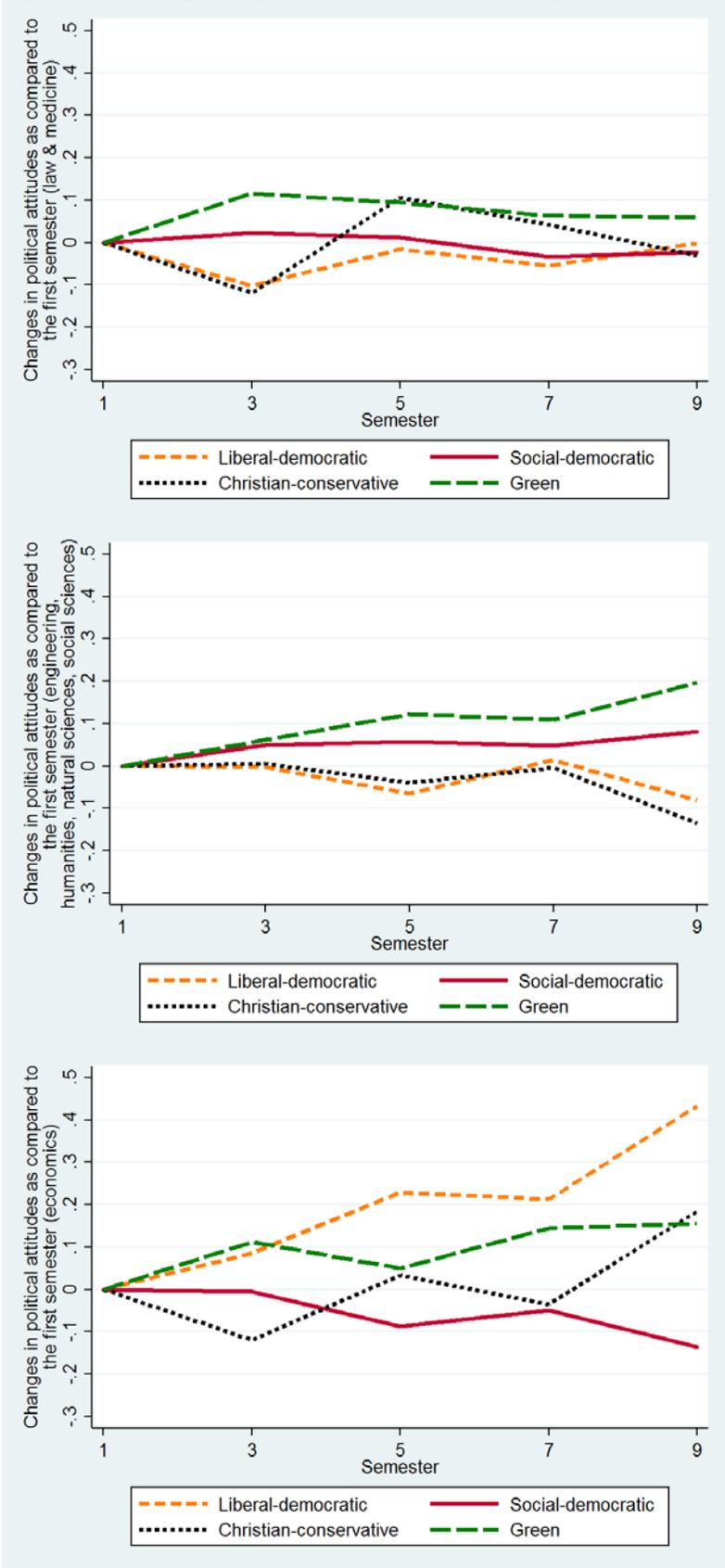


Table 1a: Descriptive statistics.

Political attitudes and fields of study: first semester students.

Mean values. Deviations from the total means in parentheses.

	Liberal- democratic	Christian- conservative	Social- democratic	Green	RMSD
Humanities	3.84 (-0.21)	3.20 (-0.39)	4.82 (0.14)	4.76 (0.39)	0.30
Social sciences	3.68 (-0.37)	2.99 (-0.60)	4.96 (0.28)	5.03 (0.66)	0.50
Law	4.35 (0.30)	3.97 (0.38)	4.54 (-0.14)	3.82 (-0.55)	0.37
Economics	4.37 (0.32)	4.12 (0.53)	4.56 (-0.12)	3.84 (-0.53)	0.41
Medicine	4.34 (0.29)	3.88 (0.29)	4.65 (-0.03)	4.40 (0.03)	0.15
Engineering	4.05 (0.00)	3.75 (0.16)	4.62 (-0.06)	4.18 (-0.19)	0.13
Natural sciences	3.95 (-0.10)	3.39 (-0.20)	4.66 (-0.02)	4.48 (0.11)	0.11
Other subjects	3.89 (-0.16)	3.44 (-0.15)	4.58 (-0.10)	4.65 (0.28)	0.18
Total	4.05	3.59	4.68	4.37	0

Notes: Values between 1 (do not agree at all) and 7 (fully agree)

Table 1b: Descriptive statistics.

Political attitudes and fields of study: ninth semester students.

Mean values. Deviations from the total means in parentheses.

	Liberal- democratic	Christian- conservative	Social- democratic	Green	RMSD
Humanities	3.75 (-0.32)	3.09 (-0.44)	4.92 (0.21)	4.93 (0.41)	0.35
Social sciences	3.51 (-0.56)	2.77 (-0.76)	5.02 (0.31)	5.05 (0.53)	0.55
Law	4.45 (0.38)	4.03 (0.50)	4.51 (-0.20)	3.92 (-0.60)	0.45
Economics	4.80 (0.73)	4.30 (0.77)	4.43 (-0.28)	3.99 (-0.53)	0.58
Medicine	4.24 (0.17)	3.77 (0.24)	4.64 (-0.07)	4.42 (-0.10)	0.15
Engineering	3.98 (-0.09)	3.60 (0.07)	4.67 (-0.04)	4.45 (-0.07)	0.06
Natural sciences	3.88 (-0.19)	3.27 (-0.26)	4.79 (0.08)	4.71 (0.19)	0.19
Other subjects	3.90 (-0.17)	3.17 (-0.36)	4.79 (0.08)	4.93 (0.41)	0.29
Total	4.07	3.53	4.71	4.52	0

Notes: Values between 1 (do not agree at all) and 7 (fully agree)

Table 2a: Ordered Probit Regression Results.

Dependent Variables: Support of liberal-democratic positions (columns 1 to 7), support for other political positions (columns 10 to 12).

University and wave dummy variables included in all specifications.

	(1) Liberal- democratic	(2) Liberal- democratic	(3) Liberal- democratic	(4) Liberal- democratic	(5) Liberal- democratic (excludes univ. of applied sc.)	(6) Liberal- democratic (female students)	(7) Liberal- democratic (male students)	(8) Free market	(9) More right- wing than compatriots	(10) Christian- conservative	(11) Social- democratic	(12) Green
Humanities	-0.132*** (-3.30)	-0.0923** (-2.21)	-0.119*** (-2.80)	-0.0856* (-1.95)	-0.0791* (-1.66)	0.0572 (0.84)	-0.300*** (-4.47)	-0.430*** (-9.25)	-0.414*** (-8.71)	-0.255*** (-5.72)	0.0242 (0.54)	0.217*** (4.89)
Social sciences	-0.219*** (-5.21)	-0.177*** (-4.05)	-0.201*** (-4.51)	-0.162*** (-3.51)	-0.147*** (-2.70)	-0.0624 (-0.92)	-0.339*** (-4.32)	-0.550*** (-11.29)	-0.587*** (-11.67)	-0.368*** (-7.98)	0.129*** (2.73)	0.406*** (8.89)
Law	0.228*** (4.18)	0.241*** (4.36)	0.207*** (3.71)	0.221*** (3.91)	0.226*** (3.80)	0.259*** (3.02)	0.208*** (2.61)	0.0322 (0.51)	0.176*** (2.95)	0.215*** (3.62)	-0.0866 (-1.43)	-0.390*** (-6.78)
Economics	0.248*** (6.83)	0.251*** (6.84)	0.223*** (6.01)	0.227*** (6.07)	0.248*** (5.38)	0.176*** (2.61)	0.274*** (5.92)	0.210*** (5.10)	0.250*** (6.29)	0.241*** (6.53)	-0.0745** (-1.97)	-0.281*** (-7.71)
Medicine	0.232*** (4.66)	0.250*** (4.94)	0.183*** (3.53)	0.201*** (3.81)	0.203*** (3.65)	0.266*** (3.33)	0.191** (2.49)	-0.0269 (-0.48)	0.00133 (0.02)	0.121** (2.29)	-0.0612 (-1.15)	-0.0373 (-0.69)
Natural sciences	-0.100*** (-2.70)	-0.0823** (-2.18)	-0.0788** (-2.03)	-0.0670* (-1.71)	-0.0593 (-1.39)	0.0252 (0.36)	-0.112** (-2.33)	-0.305*** (-7.27)	-0.254*** (-6.02)	-0.199*** (-5.13)	-0.0797** (-2.03)	0.0981** (2.45)
Other subjects	-0.0818 (-1.37)	-0.0517 (-0.85)	-0.0621 (-1.00)	-0.0295 (-0.47)	-0.122 (-1.30)	-0.0426 (-0.48)	0.0104 (0.10)	-0.241*** (-3.81)	-0.120* (-1.92)	-0.107* (-1.78)	-0.128** (-2.14)	0.205*** (3.29)
Female		-0.0960*** (-4.17)		-0.0938*** (-3.89)	-0.0746*** (-2.81)			-0.0993*** (-3.85)	-0.134*** (-5.18)	-0.129*** (-5.29)	0.0711*** (2.95)	0.198*** (8.16)
East Germany		0.0345 (0.51)		0.0179 (0.25)	0.0508 (0.63)	-0.0853 (-0.96)	0.219* (1.82)	-0.0661 (-1.04)	-0.0198 (-0.28)	-0.00931 (-0.14)	-0.0771 (-1.07)	0.0707 (1.02)
Father blue collar w.		-0.144*** (-5.07)		-0.131*** (-4.42)	-0.0699** (-2.10)	-0.120*** (-2.84)	-0.149*** (-3.55)	-0.0775** (-2.45)	-0.0690** (-2.17)	-0.109*** (-3.67)	0.115*** (3.83)	-0.0388 (-1.30)
Father self-employed		0.299*** (6.09)		0.286*** (5.64)	0.277*** (4.85)	0.216*** (2.99)	0.343*** (4.78)	0.269*** (4.61)	0.240*** (4.54)	0.298*** (5.84)	-0.276*** (-5.50)	-0.198*** (-3.99)
Financial pressure			-0.141*** (-4.93)	-0.115*** (-3.97)	-0.117*** (-3.54)	-0.0449 (-1.13)	-0.184*** (-4.32)	-0.120*** (-3.93)	-0.209*** (-6.72)	-0.247*** (-8.51)	0.0713** (2.43)	0.114*** (3.99)
High-school grade			-0.0193 (-1.05)	-0.0250 (-1.34)	-0.0308 (-1.51)	0.0324 (1.16)	-0.0630** (-2.52)	0.0684*** (3.43)	0.0345* (1.72)	-0.0365* (-1.94)	-0.0378** (-2.01)	-0.0796*** (-4.24)
Future self-employed			0.123*** (5.13)	0.0959*** (3.94)	0.111*** (4.13)	0.0876** (2.54)	0.108*** (3.04)	0.138*** (5.29)	-0.00345 (-0.13)	-0.0166 (-0.68)	-0.120*** (-4.79)	0.0302 (1.22)
Observations	9975	9814	9234	9091	7413	4298	4793	8378	8099	9128	9090	9121
Chi <sup>2</sup>	466.3	536.9	471.3	522.5	418.2	183.1	420.4	1029.2	825.6	828.4	359.7	894.3
Partial R <sup>2</sup>	0.0129	0.0154	0.0142	0.0163	0.0158	0.0119	0.0232	0.0371	0.0315	0.0243	0.0119	0.0263

*t* statistics in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 2b: Marginal effects.

Support of liberal-democratic positions. Effects refer to our benchmark regression (4) in Table 2a.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Humanities	0.0107* (1.86)	0.0111* (1.93)	0.00877** (1.99)	0.00168*** (2.99)	-0.0112* (-1.90)	-0.0151** (-1.99)	-0.00603** (-2.05)
Social sciences	0.0214*** (3.19)	0.0213*** (3.43)	0.0161*** (3.71)	0.00152** (2.10)	-0.0217*** (-3.34)	-0.0279*** (-3.68)	-0.0107*** (-3.92)
Law	-0.0228*** (-4.59)	-0.0270*** (-4.14)	-0.0242*** (-3.78)	-0.0123*** (-2.61)	0.0250*** (4.53)	0.0418*** (3.76)	0.0197*** (3.30)
Economics	-0.0242*** (-6.77)	-0.0281*** (-6.29)	-0.0247*** (-5.84)	-0.0114*** (-4.07)	0.0263*** (6.69)	0.0425*** (5.83)	0.0195*** (5.22)
Medicine	-0.0211*** (-4.37)	-0.0247*** (-4.00)	-0.0219*** (-3.69)	-0.0105*** (-2.59)	0.0230*** (4.31)	0.0377*** (3.67)	0.0175*** (3.28)
Natural sciences	0.00830* (1.65)	0.00869* (1.69)	0.00691* (1.73)	0.00149** (2.22)	-0.00868* (-1.68)	-0.0119* (-1.73)	-0.00480* (-1.77)
Other subjects	0.00362 (0.46)	0.00382 (0.46)	0.00306 (0.47)	0.000721 (0.55)	-0.00380 (-0.46)	-0.00527 (-0.47)	-0.00214 (-0.48)
N	9091	9091	9091	9091	9091	9091	9091

*t* statistics in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 2c: Marginal effects of ticking category 6 (agree with the respective ideology).  
The effects refer to the regressions reported in columns (4), (10), (11), and (12) of Table 2a.

	(1) Agree with liberal- democratic ideology	(2) Agree with Christian- conservative ideology	(3) Agree with social- democratic ideology	(4) Agree with green ideology
Humanities	-0.0151** (-1.99)	-0.0452*** (-6.12)	0.00589 (0.54)	0.0555*** (4.88)
Social sciences	-0.0279*** (-3.68)	-0.0621*** (-9.02)	0.0314*** (2.74)	0.102*** (9.12)
Law	0.0418*** (3.76)	0.0427*** (3.46)	-0.0211 (-1.44)	-0.0935*** (-7.40)
Economics	0.0425*** (5.83)	0.0476*** (6.21)	-0.0181** (-1.97)	-0.0695*** (-7.97)
Medicine	0.0377*** (3.67)	0.0235** (2.22)	-0.0149 (-1.15)	-0.00946 (-0.70)
Natural sciences	-0.0119* (-1.73)	-0.0359*** (-5.34)	-0.0194** (-2.03)	0.0250** (2.45)
Other subjects	-0.00527 (-0.47)	-0.0195* (-1.84)	-0.0309** (-2.16)	0.0525*** (3.31)
N	9091	9128	9090	9121

*t* statistics in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3a: Ordered Probit Regression Results.  
Main dependent Variable: Economics students' support of liberal-democratic positions.  
University and wave dummy variables included in all specifications.

	(1) Liberal- democratic	(2) Liberal- democratic	(3) Liberal- democratic	(4) Liberal- democratic	(5) Liberal- democratic (female students)	(6) Liberal- democratic (male students)	(7) Free market	(8) More right- wing than compatriots	(9) Liberal- democratic (only confident students)	(10) Liberal- democratic (no transfer only)	(11) Liberal- democratic (no right- wing departments)	(12) Liberal- democratic (only right- wing departments)
Semester	0.0265*** (5.19)	0.0262*** (5.10)	0.0318*** (6.12)	0.0314*** (6.00)	0.0411*** (4.73)	0.0252*** (3.82)	0.0324*** (5.51)	-0.00540 (-0.97)	0.0284*** (3.91)	0.0313*** (5.45)	0.0358*** (5.91)	0.0193* (1.83)
Female		-0.284*** (-10.14)		-0.295*** (-10.16)			-0.205*** (-6.37)	-0.217*** (-6.75)	-0.302*** (-7.37)	-0.285*** (-8.76)	-0.286*** (-8.76)	-0.324*** (-5.14)
East Germany		-0.0882 (-0.89)		-0.109 (-1.06)	-0.154 (-1.09)	-0.0126 (-0.09)	-0.0398 (-0.45)	-0.0785 (-0.87)	-0.302* (-1.92)	-0.0833 (-0.72)	-0.0927 (-0.90)	
Father blue collar w.		-0.216*** (-5.88)		-0.198*** (-5.19)	-0.251*** (-4.28)	-0.170*** (-3.31)	-0.0999** (-2.40)	-0.199*** (-4.78)	-0.160*** (-2.88)	-0.227*** (-5.34)	-0.187*** (-4.36)	-0.240*** (-2.88)
Father self-employed		0.307*** (6.26)		0.304*** (6.08)	0.240*** (2.62)	0.331*** (5.62)	0.390*** (6.16)	0.328*** (6.30)	0.291*** (4.26)	0.326*** (5.90)	0.319*** (5.46)	0.248*** (2.61)
Financial pressure			-0.200*** (-5.47)	-0.156*** (-4.16)	-0.0690 (-1.23)	-0.214*** (-4.15)	-0.0745* (-1.81)	-0.222*** (-5.26)	-0.121** (-2.08)	-0.167*** (-3.98)	-0.173*** (-4.11)	-0.0950 (-1.14)
High-school grade			-0.0950*** (-3.94)	-0.129*** (-5.28)	-0.0900** (-2.25)	-0.141*** (-4.57)	0.0186 (0.69)	0.0228 (0.86)	-0.126*** (-3.76)	-0.148*** (-5.51)	-0.136*** (-4.82)	-0.108** (-2.18)
Future self-employed			0.248*** (7.77)	0.180*** (5.46)	0.121** (2.54)	0.250*** (5.34)	0.239*** (6.60)	0.132*** (3.60)	0.198*** (4.25)	0.191*** (5.21)	0.171*** (4.55)	0.217*** (3.15)
Observations	6304	6225	6060	5986	2316	3670	5464	5297	3145	4861	4497	1489
Chi <sup>2</sup>	333.9	533.2	436.0	630.0	.	.	816.8	445.3	1240.9	553.0	452.6	159.0
Partial R <sup>2</sup>	0.0130	0.0216	0.0182	0.0265	0.0215	0.0239	0.0356	0.0194	0.0278	0.0286	0.0250	0.0279

*t* statistics in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3b: Marginal effects of the semester variable. Support of political positions (category 6 = agree).  
 Results refer to an ordered probit model including all explanatory variables as compared to Table 3a column (4).

	(1) Liberal-democratic	(2) Christian-conservative	(3) Social-democratic	(4) Green
Humanities	-0.000854 (-1.06)	-0.000886 (-1.14)	0.00226* (1.73)	0.00395*** (2.97)
Social sciences	-0.00142 (-1.47)	-0.00115 (-1.42)	0.00273 (1.58)	0.00168 (0.96)
Law	0.00129 (0.88)	0.000461 (0.30)	-0.000462 (-0.29)	0.00126 (0.82)
Economics	0.00686*** (5.93)	0.00133 (1.09)	-0.00274** (-2.14)	0.00257** (2.40)
Medicine	-0.000895 (-0.69)	0.000465 (0.36)	-0.000924 (-0.54)	0.000192 (0.12)
Engineering	0.0000482 (0.06)	-0.000747 (-0.90)	0.000312 (0.30)	0.00300*** (2.76)
Natural sciences	-0.000149 (-0.19)	-0.000718 (-0.99)	0.00276** (2.35)	0.00400*** (3.35)
Other subjects	-0.0000193 (-0.01)	-0.00159 (-1.08)	0.00338 (1.29)	0.000774 (0.28)
Control variables	Yes	Yes	Yes	Yes

*t* statistics in parentheses, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$