



# Working Paper

Nr. 62, 2003

**Returns to Tertiary Education in  
Germany and the UK:  
Effects of Fields of Study and Gender**

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Returns to Tertiary Education in Germany and the UK: Effects of Fields of Study and Gender / Anna Kim ; Ki-Wan Kim. –

Mannheim, 2002

(Arbeitspapiere - Mannheimer Zentrum für Europäische Sozialforschung ; 62)

ISSN 1437-8574

Not available in book shops.

Token fee: € 2,60

Purchase: Mannheimer Zentrum für Europäische Sozialforschung (MZES), D – 68131 Mannheim

WWW: <http://www.mzes.uni-mannheim.de>

Editorial Note:

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## Abstract

During the last decades most industrialised countries have experienced a rapid expansion of tertiary education enrolments. The sector of tertiary education became more differentiated through the creation of many different subjects, fields and curricula of study. At the same time, men and women tend to prefer different fields of study which likely also provide different opportunities on the labour market.

In this study we examine the returns of tertiary education regarding the fields of study and gender differences in Germany and the United Kingdom. As an indicator for educational returns we take the opportunity of entering into the service classes. Given the review of different institutional arrangements we expect that the two countries have considerable differences in the linkage between tertiary education and labour market. Additionally, we expect that the different outcomes of educational credentials between female and male graduates are related to the different choices of study fields in the tertiary education. Based on the generally close linkage between the level of education and labour market in Germany and the rather weak signal function of educational credentials in the UK, we expect that firstly the overall educational returns to tertiary education would be greater in Germany, but that secondly the effects of fields of study as an additional selection factor for graduates would be greater in the UK. Results of empirical analyses confirm both of these hypotheses. An interesting result with respect to the gender differences in educational outcomes is that Germany shows a smaller gender difference in outcomes, but this rather egalitarian result disappears if the type of jobs, e.g. part-time vs. full-time jobs, is controlled for. In general, we find smaller gender differences in class outcomes in Germany than in the UK, but that is called into question by the greater likelihood of German women to be employed in part-time jobs.

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## **1 Introduction\***

During the last decades, returns to education in the labour market have been a focus of a lot of studies on social mobility (Breen et al. 1995; Müller et al. 1989; Erickson/Goldthorpe 1992; Müller 1999; Shavit/Blossfeld 1993; Shavit/Müller 1998). From these studies, two important results can be summarized. First, the relatively strong effect of educational credentials on occupational achievements has been observed in most countries and this effect seems to have increased. Second, despite the striking effect of education, the association between educational credentials and occupational achievements varies considerably across countries. It has been explained that these differences result from the different institutional arrangements of each country, which have been structured through the idiosyncratic development of national educational and occupational systems. The second finding stands against the neo-institutionalistic view on education which argues that the educational system – including organizations, school structure, curricula and the like – has converged towards a more or less universal educational regime across the world (Meyer et al. 1992), and thus encourages further investigations on how these differences between nations are to be explained.

Most previous studies on educational returns have concentrated on the relatively generalized secondary education or vocational training. On the contrary, this paper is concerned with tertiary education that has experienced a substantial expansion during the last three decades (OECD 1999: 66-70; Blossfeld 1984) but its implications for the labour market outcome of college graduates have rarely investigated in comparative research. This paper will in particular address two factors that influence educational returns; fields of study in higher education and the gender difference. The fields of study have been neglected as an important factor for determining educational returns in most studies, despite the usual assumption that they may mediate the link between the participation in higher education and the educational outcomes (cf. Müller et al. 1998: 153). A number of studies have dealt with the gender-specific choice of study fields in higher educational institutions (Bradley 2000; Jacobs 1995, 1996, Kelly/ Slaughter 1991; Lie et al. 1994), but its relationship with the labour market return has seldom been explored.

This paper investigates firstly the extent to which the fields of study mediate the linkage between educational qualifications and occupational achievement, and secondly how gender differences across the fields of study in higher education result in different occupational outcomes. Given their different institutional characteristics regarding the educational system and the labour market, we chose the United Kingdom and Germany for the comparative analysis (Marsden 1990; Müller 1994; Müller et al. 2002). Based on the generally close linkage between the educational system and the labour market in Germany and the rather weak signal function of educational credentials in the UK, we expect that

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\* This research was supported in part by the Deutsche Forschungsgemeinschaft (project: "Bildungsexpansion und soziale Reproduktion in Europa"). We thank Walter Müller and Ulrich Kohler for providing helpful comments on early drafts. The paper was presented at the ISA World Congress of Sociology in Brisbane, Australia in July 2002.

these institutional differences will bring different patterns in the placement of college graduates on the labour market. Using the Labour Force Survey 1996 for the UK and the Micro Census (*Mikrozensus*) 1996 for Germany respectively, we investigate the effect of fields of study and gender differences in higher education on the “university-work” link.

## **2 Theoretical considerations**

### **2.1 Educational returns in the labour market**

Approaches to the relationship between educational systems and labour market outcomes are generally divided into two categories (see a theoretical review in Breen et al. 1995). On the one side, the human capital theory directly relates the investment in the education with the outcome (mainly the earnings) on the labour market, based on the presuppositions of neo-classic economics. On the other side, the more sociologically oriented approach that can be named as ‘status-attainment approach’ investigates the extent to which educational credentials affect the achieved status in a given social structure, considering social origins of individuals. According to the assumptions of human capital theorists the educational returns might be determined easily by measuring the invested years for educational credentials. However, the relationship between the education and outcomes on the labour market has often proven to be non-linear, which shows the complexity of that linkage and has driven researchers towards the consideration of institutional settings in which the educational systems are shaped and interact with the labour market.

A seminal study of Maurice et al. (1986) on the recruitment mechanisms in French and German firms suggests two revealing concepts in order to grasp the national differences in the school-work linkage: the qualificational and the organizational mobility space. While in Germany the recruitment of new workers takes place on the basis of qualifications the job candidates have achieved, the French modus of recruitment tends to be determined by rather firm-specific factors, namely by the requirement of specific skills or by the preferences of employers. According to Maurice et al., this difference results from the different institutional characteristics of national educational systems; the German vocational education is more specific and skill-oriented, while the French counterpart usually tends to be general. In another comparative study on the school-work link in the USA, Germany and Norway, Allmendinger (1989) also suggests a set of categories for conceptualising institutional differences between countries. She distinguishes the standardization, which can be indicated by how far the quality of education meets the same standards nationwide, from the stratification, which can be measured by the degree of differentiation within given educational levels. In a more standardized and stratified educational system one can expect that educational credentials are more directly related to the occupational achievement. In a summary of the wide-ranged comparative studies Shavit and Müller (1998) point out the importance of the proportion of tertiary education in a given age-cohort besides these two variables. Increases in the proportion of tertiary education tend to decrease returns

to the next below educational level (mostly the highest-level secondary education or maturity qualifications). Comparative studies on educational transition in European countries have shown that there exist considerable differences in the global survival pattern between countries – i.e. the pattern with which pupils go on to the next level of education –, although the effect of class origin appears commonly (Müller/Karle 1993). According to these results the differences in educational returns between countries should be explained through the historical, institutional, or political peculiarities of each country.

Regarding educational returns and social inequality, there exist a relatively large volume of comparative empirical studies, but the results of these studies have yet not been integrated into a single theoretical framework that might be able to explain both commonalities and differences in educational returns between countries at the same time. Raftery and Hout (1993) suggested a rather mesoscopic theoretical explanation named “maximally maintained inequality” (MMI) thesis. The key point of this thesis is that the selective effect of social origin – mainly operationalized by the class positions of parents – does not necessarily diminish on the whole through the expansion of educational chance. According to the MMI thesis, advantaged classes are the first that profit from the educational expansion, and only after the enhanced chance to education has sufficiently been taken up by advantaged classes, the less advantaged ones begin to benefit from the educational expansion.

Although the MMI thesis sheds light upon the results and implications of educational expansion, especially in terms with the mobility of different social classes, it has recently been criticized, because it neglects the fact that there can exist differences and diversities even in a same educational track and also because it does not sufficiently take into account qualitative dimensions (cf. Breen/Jonson 2000; Lucas 2000). Especially Lucas (2000) proposes as alternative to the MMI thesis the thesis of “effectively maintained inequality” (EMI), according to which the advantaged groups in a given society try to get maximal advantages from the educational level above the general access as well as from the lower-level educational tracks (i.e. the higher secondary education) that have already become accessible to less advantaged classes. This thesis implies than not only the quantity of educational expansion but also its qualitative dimension – that is, how the expansion is canalised, and to what extent distinctive tracks in a given educational level are affected by it – should be taken into account.

Which implications can we derive from these theoretical discussions with respect to tertiary education? It should be noted that discussions upon the MMI and EMI thesis mainly refer to the secondary education that has been rather generalized in the second half of the 20th century in most industrialized countries. It is true that the tertiary educational institutions have widened their doors to individuals from less advantaged classes; it cannot be argued, however, that the tertiary education has been generalized to such an extent as the secondary education. Accesses to tertiary education still remain very asymmetrical with respect to social origins of students (cf. Shavit/Blossfeld 1993; Müller et al. 2002). That does not mean that the diversification and differentiation of educational tracks are unknown phenomena for tertiary education. On the contrary, we are observing the quantitative – through opening of new higher educational institutions – as well as qualitative – through reorganization

of existing institutions or introduction of new forms of institutions (for example, vocationally oriented colleges) – differentiation also in the tertiary sector (cf. Müller et al. 1997). Together with the considerable increase in the enrolment quote of age cohort into the higher education, this observation lets us suppose that the tertiary education is becoming a central theme regarding the inequality of educational chance in near future.

## **2.2 Diversification of tertiary education: Vertical and horizontal dimension**

What kind of differentiations can be observed in the system of tertiary education? How can they be related to the observed expansion of tertiary education but still persistent inequality of educational chance to various social groups?

The system of tertiary education shows a remarkable commonality with regard to the existence of two vertically structured tracks, although there exist differences between countries in their names, organisations, and finance; the higher-level institutions that are in general theoretically oriented and offer full academic courses (including post-graduated courses) on the one side, and the lower-level ones that offer, usually in a short term, practically and vocationally oriented specific courses on the other side. This differentiation is not identical to the countries (Teichler 1990, 1998). Some countries (for example the UK) have moved to extinguish or diminish hierarchical differences between the two types of institutions, which partly resulted in at least formal upgrading of lower level institutions to the positions of higher ones. In other countries like Germany, the lower level institutions have achieved better social acknowledgement not by formal reform but by their effective occupation-specific programmes. We describe this line of differentiation as a *vertical* one, because it can be observed that the social recognition and prestige of each track's grade differ more or less considerably.

In each level of tertiary education, there exists a *horizontal* differentiation, mainly along the faculties or departments. The fields of study deserve more attention, since the choice of specific fields of study seems to increasingly become an important selection criterion for future prospect of graduates, as the overall participation in the tertiary education grows. They have been neglected in sociological studies of education to large extent, perhaps because university education has been for a long time and is still strongly related to the scientific disciplines enjoying high social prestige and recognition.

For example, van de Werfhorst and Kraaykamp (2001) examine the relationship between the studied subject fields and occupational achievement by categorizing the fields of study into four types of resources – cultural, economic, communicative, and technical resource – and show that each field of study is strongly related to certain type of resource and that this relationship leads the graduates to take corresponding occupations in which their achieved resources can be applied at best (see also van de Werfhorst 2001). However, they do not expressively deal with returns of specific study fields on the labour market.

With respect to the social mobility of higher education participants, it has been observed that ascribed variables of students rarely play a significant role in the decision on the continuation of education into the tertiary level (cf. Mare 1980; Hout 1988). This result appears paradoxical, since it may be assumed that disparities across different social groups would be most prevalent in the higher education level, given the most lucrative and prestigious prospect of possessing university degree or higher. Some authors explain it with the characteristics of higher education, which allow students to adopt new and liberal perspectives upon themselves and society and thus 'liberate' them from traditional attitudes (cf. Stolzenberg 1994). The above-mentioned study of van de Werfhorst and Kraaykamp (2001) also underlines this attitude-building effect of higher education. What field one has studied is to considerable extent related to the way graduates make their occupational and private life.

The field of study affects not only the social, cultural resources of collage leavers, but also determines their economic return on the labour market in different ways. Especially in countries where the higher education institutions are rather hierarchically structured, a more differentiated structure of earnings between graduates from different study fields is observed (cf. Davies/Guppy 1997); students from fields directly related to prestigious professions or higher economic demands such as medicine, law, engineering, or business attain in general higher incomes than those from fields such as education, art and human sciences, or home economics, which are also predominantly studied by women. However, comparative studies aiming to address the expansion of tertiary education, the diversification and differentiation of its institutions, and their results upon outcomes in labour market is yet to be launched.

We distinguish in this article two dimensions – *vertical* and *horizontal* – of differentiation in tertiary education (see also Davies/Guppy 1997: 1418-9). This distinction is not a theoretical artefact, but derived from the results of previous studies on tertiary educational systems in industrialized countries. With the *vertical differentiation*, we describe the existing hierarchical structure of tertiary educational system that is most significantly characterized by divergence into lower and higher level institutions. The *horizontal differentiation* refers to the existence of different fields of study and of different programmes in a given institution (e.g. the Diploma vs. Bachelor study programme in German universities). The vertical differentiation allocates the candidates for tertiary education along a stratified structure. This dimension of differentiation is not rigid and undergoes changes, as experiences of many countries show (as example see the Israeli case in Katz-Gerro/Yaish 2000). At the same time, the entrance into subject fields often takes place by a hierarchical principle, although the subject fields are organised in principle horizontally.<sup>1</sup>

The choice of majors surely represents the desire of students to some degree, but at the same time this choice is conditioned by the existing relationship between supply (study places in the higher

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<sup>1</sup> A typical example is the German *numerus clausus*, in which the access to some fields of study related to privileged professions and thus mostly favoured by students is distributed by the credential principle. In that case, we are able to observe some degree of hierarchic organization of majors that restricts the theoretically free access to them.

educational institutions and their distribution across study fields) and demand factor (national occupational structure). In a time of “mass universities” where the tertiary education is no longer exclusive privilege for a small part of population, we can expect that possessing diploma or Bachelor’s degree alone cannot offer the employers sufficient signals for selecting the college graduates on the labour market. On this ground, it can be assumed that the fields of study might gain in importance for determining the occupational outcomes of college leavers.

### **2.3 Gender-specific participation in higher education**

It is generally observed that women and men are asymmetrically distributed across different fields of study. Despite the continuing increase of women’s participation in higher education during the last decades (Blossfeld/Hakim 1997; OECD 2001), studies on gender differences in the choice of majors show that women and men tend to choose quite different majors (see a review in Jacobs 1995, also Kelly/Slaughter 1991; Lie et al. 1994); women are more likely to be enrolled in majors such as teachers’ training, arts, humanities, and home economics, while men are over-represented in fields such as engineering, mathematics, and natural sciences. The trend of gender segregation in majors has remained very stable, despite a slight but continuous increase of women’s proportion in traditionally male-dominated majors (Bradley 2000; Jacobs 1996). An interesting finding about the gender typing of majors is that the Scandinavian countries that are known for their egalitarian policy and endeavours to diminish gender discrimination show greater gender segregation among majors, especially in engineering and natural sciences (Bradley 2000: 8-9). The national differences in detail should also be mentioned: The degree to which women and men are segregated across the fields of study varies considerably between countries (see statistics in Jacobs 1996 and OECD 1999). Gender typing seems to be a little bit stronger in industrialized countries than in developing countries, which may be partly explained by the higher proportion of women in engineering and natural sciences in the latter countries (Bradley 2000: 9-10).

The reason why the gender typing of majors takes place is explained in various ways (Jacobs 1995: 81-3). Economists tend to explain the gender-typed choice of majors by the expected incomes in the career trajectory. Women usually expect job interruption in their career and are thus more likely to choose majors that give them maximal lifetime earnings. In other words, women tend to choose fields of study in which the entry earnings are higher – despite the slow increase over years – and the cost of labour force interruption would be lower. However, empirical evidences for this explanation have rarely been provided. Women who have studied in female-dominated fields do not earn substantially more than women from male-dominated fields at the beginning of their career. On the contrary, empirical studies have found out that the majors chosen by women frequently lead to disadvantaged, less lucrative jobs in the labour market.

Some social psychologists argue that the gender-typed socialization in childhood and early school times leads women and men to choose seemingly sex-appropriate fields (cf. Betz/Fitzgerald 1987). They suppose that women and men develop different propensities for various activities and that this

affects their choice of majors later. For example, women tend to favour fields of study involving contacts with other people and nurturing, and men are inclined towards fields involving analytic thinking. Considering that in the last three decades the traditional role division by gender has greatly eroded – especially in industrialized countries –, this explanation seems to lose its power. On the basis of this change of attitudes, we should expect that men as well as women make their decisions upon field of study on the basis of similar criteria such as incomes or future career chances.

Finally, sociological approaches, a variant of which was proposed by Jacobs (1989), emphasize the effect of 'social control' during the whole life cycle on the choice of majors. This social pressure takes place not only in the phase of socialization and at schools, but continues to affect the individuals' decisions and way of life during the whole lifetime including tertiary education and, ultimately, the participation in the labour market. From this perspective, the gender typing of majors should be addressed in a broad social context and life course of individuals rather than as a particular phenomenon confined to higher education.

The relationship between distribution of genders in fields of study and their labour market participation is also of importance. Bradley (2000: 10-11) points out that the pattern of gender segregation across fields of study shows a considerable similarity to the segregation pattern in the labour market, although the decline of gender segregation in higher education is taking place faster than that in the occupational structure (Jacobs 1995; Reskin 1993). Other studies have also found that the increases of women's participation in education have necessarily not resulted in the decline of their disadvantage in the labour market; the increased presence of women in the labour market is frequently shadowed by their concentration in precarious employment forms such as part-time and fixed-term jobs (Blossfeld/Hakim 1997; Kim/Kurz 2001). An interesting finding of a study on American college students indicates that, though effects of ascribed variables (social origin or gender) are still lingering, the extent to which each variable affects the disparity in higher education is different; the social origin mainly affects the chance of entering into prestigious colleges or universities (given the strong hierarchical structure of the American universities), while the intra-institutional disparity across fields of study is considerably influenced by gender (Davies/Guppy 1997: 1433).

These results imply that the participation in the higher education and decision upon studying fields cannot be reduced to the individual preferences or choices but should be regarded as processes in which various ascribed variables may affect the participation in higher education and its returns in different ways. These effects may be strengthened by the accumulation of effects of each variable or may be reduced through compensation if they act in reverse directions. Especially the gender variable seems to influence the educational returns via detour of what specific field women and men choose. This implies that fields of study should be integrated into the analysis of educational return among college graduates, taking their interaction with gender variable into consideration. At the same time, the way women and men participate in the labour market should also be considered. Even in the case that both genders reach occupational positions almost similarly, there may exist considerable differences between them, if women are strongly concentrated on part-time or fixed-term jobs that can

be seen as having lower return comparing to the full-time ones. Given the fact that women are more likely to be employed in precarious jobs than men, the analysis of returns to tertiary education should take into account the kind of jobs women and men have.

Before we proceed to analyse returns to tertiary education in terms of fields of study and genders, it will be helpful to grasp similarities and differences in tertiary educational systems and their linkage with the labour market in the UK and Germany. This short description of institutional arrangements in the next section will serve to identify structural differences between two countries and, furthermore, to formulate hypotheses that are to be tested in the empirical part of this paper.

### **3 Systems of tertiary education in the United Kingdom and Germany**

#### **3.1 The United Kingdom**

The educational system in the UK is usually described as complex and heterogeneous. The regional differences between England, Wales, Scotland, and Northern Ireland make it more difficult to grasp the institutional characteristics of the British educational system. But these regional differences are weaker than the differences compared to other European countries. Therefore, we will concentrate on the educational system in England and Wales, mentioning some important deviations in Scotland and Northern Ireland.

Up to the middle of the 20th century, the British educational system was basically a tripartite system consisting of grammar, technical, and comprehensive modern schools, which provided different tracks of education. In this regard, some authors described the British school system as a 'sponsored' system compared to the contest model in the USA, in which the attendants of privileged grammar and private schools have had advantages in many respects (Kerckhoff/Everett 1986). From 1964 onward, the Labour government launched a series of legislative measures intending to establish a comprehensive secondary education system, since the inefficient and discriminating nature of the tripartite system had frequently been criticized. As a result, the comprehensive schools became a dominant form of the secondary educational institution by the early 1980s and the old tripartite system was destabilized (Mackinnon/Statham 1995). The 1988 Educational Reform Act is regarded as a turning-point in the current British educational policy. It encompassed the whole spectrum of schools and intended to establish a central governmental educational policy by eroding the regional self-decision on curricula and funding.

Throughout the 20th century, two main streams of the British educational policy can be identified: First, the early selection of pupils at age 11 into different educational tracks has been changed towards the more comprehensive secondary schooling up to age 16. Second, the certificates have spread so as to encompass virtually the entire population of pupils in secondary education

(Heath/Cheung 1998: 74). However, private schools that lie outside state policy intervention and in general offer an academically oriented curriculum for pupils from upper classes have been able to maintain their character as elite secondary educational institutions, despite the changes in the educational system. Pupils from private schools usually achieve the A-level more frequently than those from public ones and are over-represented in higher education, especially at highly renowned elite universities such as Oxford and Cambridge.

With respect to the vocational training, substantial changes have taken place during the last 15 years. Responding to the dissatisfaction with existing vocational education and training, a series of reforms were launched in the late 1970s and 1980s. The apprenticeship that had served as a pipeline to provide skilled workers has sharply declined both in quantity and quality. Vocational training has increasingly moved into the workplace where the labour market entrants are trained through the on-the-job training (Oulton/Steedman 1994).

In the UK, the tertiary education is divided into two sectors: further and higher education. Further education usually refers to courses of A-level standard or below, and higher education to courses above A-level or its equivalent. Access to higher education requires the GCE A-level or equivalents. From the 1960s until the early 1990s, the higher education in UK was a 'binary system' in which universities were divided from polytechnics and other colleges of higher education. Universities were indirectly financed by central government and usually enjoyed a considerable degree of autonomy, with the exception of the Open University that lies under a direct supervision of the Department of Education and Science and the Independent University of Buckingham that does not receive any governmental funding. Polytechnics and other colleges were financed and controlled by local education authorities in England and Wales and directly by the central government in Scotland. While universities could award their own degree, degrees of polytechnics and other colleges were to be certified by the Council for National Academic Awards (CNAA) (Mackinnon/Statham 1995: 88). During the 1980s, the higher education sector experienced a rapid growth, but the speed of expansion was faster in polytechnics and other colleges than in universities. In the previously mentioned 1988 Education Reform Act, this binary division was blurred in England and Wales. The Act removed the control of local agencies on polytechnics and other colleges and made them 'free-standing statutory corporations'. The binary system was further formally dissolved by the 1992 Further and Higher Education Act and its Scottish counterpart, which replaced the separate funding organizations by the unitary Higher Education Funding Councils (HEFC). The polytechnics and other colleges could then obtain the title of university, if certain criteria were fulfilled.

While there had been about 50 universities in the UK until 1992, their number increased up to over 80 in the late 1990s, which represented the upgrading of many polytechnics and other colleges towards universities. Traditionally, undergraduate courses at university required three or four years of full-time study, but this has become more flexible in recent years. Almost all universities receive central government funding. According to the OECD statistics, about 48% of a given age group went into the higher educational institutions in 1998 (OECD 2000: 157). While there still exists gender differences in

specific fields, this gender gap has, however, narrowed in recent decades. The discrepancy between genders is greater at higher degree level than at first-degree level. (Mackinnon/Statham 1995:174-6). Although a tendency towards standardisation of higher educational institutions can be observed in last two decades, there exists a hierarchical structure even among veteran universities, in which a small number of elite universities are distinguished from other regional ones. This informal stratification makes the categorisation of the British higher education more complicated.<sup>2</sup>

### 3.2 Germany

The German educational system has shown very strong continuity during the second half of the 20th century. After four years of primary school the pupils are relatively early (around age 10) selected into three different tracks: the lower secondary school (*Hauptschule*), middle school (*Realschule*), and the upper secondary school (*Gymnasium*). The *Hauptschule* provides a minimal level of academic curriculum and lasts until the end of compulsory schooling. The six-year track of *Realschule* aims to obtaining intermediate general qualification (Mittlere Reife). The nine-year track of *Gymnasium* is academically oriented and prepares the pupils for the Abitur that allows access to higher education. In recent decades, the *Hauptschule* has undergone a dramatic decline in its quality and social acceptance (Müller 1999). Whilst in 1970s school-leavers from *Hauptschule* could still obtain a vocational training place in apprenticeships, they are now frequently stigmatised as second-rate school leavers who lack competence and discipline to meet job requirements. The track of *Realschule* commonly leads the attendants to undertake an apprenticeship after leaving the school. Contrary to the British case, the apprenticeship in Germany has rarely changed in last decades. The so-called German 'dual system' of apprenticeship that combines the course at the school with the practical learning on the workplace has been considered as one of the main characteristics of German vocational education system (Blossfeld 1992; Soskice 1994). This system functions in a cooperative manner, that is, with collaboration between state and industry, which is rooted in the tradition of vocational training and personal recruitment in the guilds. *Gymnasium* provides mainly academic curriculum for the attendants aiming to preparing for *Abitur*. In the last 30 years, the proportion of pupils attending *Gymnasium* has rapidly expanded, those attending *Realschule* less drastically, yet those attending *Hauptschule* has rapidly declined (Müller 1999).

The vocational education and training in Germany are famous for their orientation towards specific skills that can directly be utilized in future jobs. It is widely recognized that the characteristics of German apprenticeship enable it to channel individuals into specific segments of the labour market (Blossfeld 1992; Müller et al. 1998: 146-7). Over 60 per cent of a given age cohort go into apprenticeships, about 30 per cent directly into tertiary education, and about 5 per cent drop out, although the figures are changing slightly (Soskice 1994: 26). A wide variety of industries take use of the apprenticeship actively. Regardless of educational reforms in 1970s and changes of industrial

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<sup>2</sup> This aspect will not be addressed directly in the empirical analysis, because the used data do not allow us to

structure, the apprenticeship plays continuously an important role at the recruitment process in skilled manual jobs and some skilled non-manual jobs. Recent years have observed that an increasing number of *Abitur*-holders go into apprenticeships (Soskice 1994, Steinmann 2000). This tendency may be explained by the risk aversion strategy of *Abitur*-holders who want to protect themselves from eventual failure in tertiary education by achieving at least one vocational qualification (Müller et al. 1998: 148-150). Other full-time vocational training institutions such as *Berufsfachschule*, *Berufsaufbauschule*, and *Fachoberschule* play a less visible role in Germany. They provide for pupils who usually finished *Hauptschule* a qualifying certificate for vocations (*Fachschule*) or certificates for entry into higher educational tracks (*Berufsaufbauschule*, *Fachoberschule*) (Brauns/Steinmann 1997: 12-13).

Compared to the UK, the higher education in Germany can be described as rather stratified. Two distinctive types of higher education institutions exist in Germany: universities for higher-level tertiary education and technical colleges (*Fachhochschule*) for lower-level. The higher education is principally free – except for few newly established private universities –, and universities and technical colleges are financed by federal and regional government (*Länder*). The requirement for entry is the passed *Abitur* for universities or the *Fachhochschulreife* for technical colleges. Universities require at least four years of study, but the actual studying time tend to be longer. The study at technical colleges takes principally three years and the time of graduation is more precisely predictable than in the case of university students. Technical colleges that were introduced late 1960s as a result of the education reform in order to provide for students more practically oriented programmes in a shorter period have experienced a kind of qualitative ‘upgrading’ in recent decades: the entry requirement has significantly raised and the social acceptance of the graduates has increased (Müller et al. 1998; for empirical evidence see Müller et al. 2002). On the whole, higher education in Germany shows a clear occupational orientation: this characteristic is prevalent not only at technical colleges setting their aim expressively in the preparation for occupations, but also at universities where the courses tend to be specific for future professions and the relationships between study fields and occupations are usually strong. The system of state examinations through which the professions and public offices are recruited connects the study in universities with occupations rather directly. As the expression “no office without proper examination” (Müller et al. 1998: 149) exemplifies, the higher education in Germany is strongly related with the bureaucratisation process since the 19th century.

### **3.3 Recent development of tertiary education in Germany and the United Kingdom**

In 1990s, the tertiary education sector has witnessed a continuing expansion in both countries through the growth in types and numbers of tertiary educational institutions as well as through increases in enrollment rates at a given age cohort. In most European countries, the proportion of a

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identify the name of graduated college.

given age cohort attending tertiary education has continuously increased, though national differences exist (Teichler 1990). This increase is more prevalent in the UK than in Germany. In 1998, entry rates to tertiary education amounted to 27% for tertiary-type B and 48% for tertiary-type A in the UK, compared to 14% for tertiary-type B and 28% for tertiary-type A in Germany (OECD 2000: 157).<sup>3</sup> The participation of a given age cohort in tertiary education is apparently higher in the UK than in Germany. Especially in the first half of the 1990s, the UK tertiary education experienced considerable quantitative expansion: During eight years from 1990 to 1997 the net entry rate of a given age cohort in the UK increased by 88%<sup>4</sup>, while the corresponding value amounted to only 6% in Germany. The higher participation rates in the UK are also observed amongst women. In 1999 the entry rates of women into tertiary-type B and tertiary-type A were 29% and 48% respectively, which are slightly higher than those of British men. Women in Germany tend to enter into tertiary-type B more frequently than men (17% versus 10%) and into tertiary-type A to approximately same extent (29% versus 28%) (OECD 2001: 158).

It is more difficult to compare statistics on graduation rates and studying time between two countries, since the kind of awarded degrees and requirements for graduation are different. According to the OECD statistics, the net graduate rate<sup>5</sup> in tertiary-type B institutions appears to be similar 1999 between the two countries in 1998 (OECD 2000: 173). In the case of tertiary-type A programmes, the UK shows a greater graduation rate than Germany, which indicates the greater proportion of first-degree holders in a given age cohort (35.1% versus 16.0%).

A majority of graduates (70%) from tertiary-type A programmes in the UK finish their study with the Bachelor's degree (also called undergraduate or first degree). Most undergraduate programmes take three years to complete in England, Wales and Northern Ireland and four years in Scotland. On the contrary, the tertiary-type A programmes leading to diploma require longer study time in Germany, normally 5-6 years.

According to the OECD statistics, the distribution of graduates across fields of study exhibits in general a similar picture in two countries, but some differences exist in specific fields. In both countries, a majority of graduates come from the fields such as health/welfare, humanities/arts/education, and social sciences/business/law/services. In Germany, graduates in engineering/manufacturing/ construction make up a greater fraction in both types of tertiary education

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<sup>3</sup> This distinction of tertiary educational programmes is designed by OECD and corresponds in general to the distinction into lower-level und higher-level tertiary education. The tertiary-type A (higher-level tertiary education) programmes are largely theory-based and are designed to provide sufficient qualifications for entry to advanced research programmes and professions. They have a minimum cumulative theoretical duration of three years' full-time equivalent and are generally offered at universities. Programmes of tertiary-type B (lower-level tertiary education) are typically shorter than those of tertiary-type A and focus on practical, technical or occupational skills for direct entry into the labour market. They have a minimum duration of two years full-time equivalent at the tertiary level (OECD 2000: 151).

<sup>4</sup> This value raises up to 101% after controlling for the demographic change in this country.

<sup>5</sup> The net graduation rate is calculated as the sum of age-specific graduation rates. It can be seen as the percentage of people with a virtual age cohort who obtain a tertiary qualification, thus being unaffected by changes in population size or typical graduation age (OECD 2000: 171).

than in the UK (OECD 2001: 171). Considering the distribution of female and male graduated across study fields, patterns already known from previous studies are confirmed (OECD 2000: 176): Women are overrepresented in fields such as health/welfare and humanities/arts/education, underrepresented in natural sciences/agriculture, mathematics/computer science, and engineering/manufacturing/construction, and both genders are to a similar extent distributed in social sciences/business/law/services. The concentration of women is especially strong in health/welfare for the UK and in humanities/arts/education for Germany. In contrast, the proportion of women in engineering/manufacturing/construction is especially low in both countries. In the UK, the number of female graduates exceeded that of men in 1999 in both types of institutions, while in Germany women are overrepresented in type B and slightly underrepresented in type A. The proportion of women who have finished postgraduate research programmes is lower than that of men in both countries.

To summarize, the systems of tertiary education in the UK and Germany show some similarities, but there exist nevertheless some structural differences. These can be observed especially in the existence of highly prestigious elite universities in the UK, which cannot be found in the rather 'egalitarian' German university system. Also the existence of technical colleges in Germany that are positioned as distinctive lower-level institutions is a great difference. In the UK, this difference has diminished at least formally, though there still exist an implicit hierarchical structure between veteran universities and newly upgraded ones (cf. Heath/Cheng 1998). Germany shows a clearly stronger linkage between the educational system and the labour market, as can be shown in the strong apprenticeship and other vocational trainings (cf. Marsden/Ryan 1995). On the contrary, the British educational system is oriented towards rather general curricula and programmes, and a great part of vocational education has been substituted by the firm-specific trainings (Müller et al. 1997). Another difference is observed in the different degrees and studying time in tertiary education; in the UK, achieving the usual highest degree before entering into labour market (first-degree) needs shorter time than in Germany. On the contrary, the higher education in Germany still preserves its exclusive character and requires longer time to achieve regular diploma. Two countries exhibit considerable differences also in the change of the labour market: The British labour market has moved fast towards liberal regime, while the cooperative model of German labour market is still lingering despite of vehement reform discussions (cf. Soskice 1999; Kim/Kurz 2001). The faster expansion of tertiary education in the UK results not only from the expansion of tertiary educational institutions and a greater enrolment rate, but it is also surely related to the liberalization and shifting of labour market towards the dominance of service sector, which has been pushed forward in last three decades with a high tempo.

## **4 Hypotheses**

In this study we examine the returns of tertiary education regarding the fields of study and gender differences in Germany and the United Kingdom. As an indicator for educational returns we take the opportunity of entering into the service classes. On the basis of the fact that the German educational

system shows in general a stronger linkage with the labour market, we expect first that the overall educational returns to tertiary education would be greater in Germany than in the UK (H1). It would not make any sense to compare absolute measures of educational returns between two countries directly, since two countries are different with respect to the educational system and the labour market structure. Hence, the outcome of tertiary education will be measured in relative term, namely by estimating to what extent holders of tertiary degrees have better chance to enter privileged classes compared to those of secondary educational credentials.

Based on the rather weak signal function of educational credentials in the UK, we expect that the effects of field of study as an additional selection factor for graduates would be greater in the UK (H2). This hypothesis may sound paradoxical at first sight; if the education is rather oriented towards general curricula, one may expect that this might lead to slight differences across fields of study in higher education. However, the theoretical discussion in the previous sections implies that, if degrees themselves cannot provide sufficient selection criteria, additional selection mechanisms should be introduced in order to 'signal' employers characteristics and qualities of job candidates. Hence, we argue that the more generally oriented the education is, the more strongly affect fields of study the return on the labour market.

We have already supposed that the gender variable may appear as an important factor to determining educational returns also in the case of tertiary education, but this influence is expected to be mainly intermediated through the gender-specific choice of study field. We expect that in both countries female college graduates achieve in general lower returns (H3). However, if one considers both effects of field and gender simultaneously, it will not be easy to draw unequivocal conclusions from the analysis, since both variables apparently interact with each other. The lower educational return of women may be caused by the general lower outcome of women on the labour market (gender effect), but also by the different pattern of distribution of each gender across fields of study that bear different occupational outcomes and career chances. On this ground, the gender effect on educational return is expected to be somewhat ambiguous in two countries; on the one hand, one may suppose that the more liberalized economy and a greater participation of women in the tertiary education in the UK would lead to less gender gap in this country. But on the other hand, one can also assume that the gender gap would be greater in the UK, if one also takes the gender-specific participation in different types of employment (e.g. part-time vs. full-time jobs) into consideration.

## **5 Data, Variables, and Methods**

For the analysis, we use the Micro Census (*Mikrozensus*) for Germany and the Labour Force Survey data for the UK, both conducted in 1996. These surveys provide detailed information on the social and economic situation of the population in each country. They allow us to compare the educational achievement of individuals, especially various fields of study in both countries.

We concentrate on mainly three variables in the analysis: gender, educational level and social status. To measure achieved social status, class position is used and coded with the EGP class scheme (Erikson/Goldthorpe 1992). In the seven-class version of the EGP scheme we mainly apply the class I (higher-grade professionals) and class II (lower-grade professionals) to measure the probability that holders of different educational credentials enter these classes compared to the probability for other classes.

**Table 1. The CASMIN scale of educational qualifications**

Qualification	Description
1ab	Level of compulsory education or below
1c	Basic vocational training above and beyond compulsory schooling
2b	Academic or general tracks at the secondary intermediate level
2a	Advanced vocational training or secondary programmes in which general intermediate schooling is combined by vocational training
2c_gen	Full maturity certificates (e.g. the <i>Abitur</i> , A-levels)
2c_voc	Full maturity certificates including vocationally-specific schooling or training (e.g. <i>Abitur</i> plus vocational training certificate, BTEC)
3a	Lower-level tertiary degrees, generally of shorter duration and with a vocational orientation (e.g. technical college diplomas, social worker or non-university teaching certificates)
3b	The completion of a traditional, academically-oriented university education

**Table 2. The EGP class scheme**

Class	Description
I	Higher-grade professionals and administrators, officials in the public sector
II	Lower grade professionals, higher-grade technicians, lower-grade administrators and officials, managers in small firms and services and supervisors of white-collar workers
IIIa	Routine non-manual employees in administration and commerce
IIIb	Routine non-manual workers in services
Ivabc	Small proprietors and artisans with or without employees, and self-employed farmers
V	Lower-grade technicians and supervisors of manual workers
VI	Skilled manual workers
VIIab	Unskilled workers including agricultural labourers

To measure educational level, we use the CASMIN scale that has been developed for international comparative researches (Shavit/Müller 1998; Brauns/Steinmann 1997). The CASMIN scale includes eight categories that distinguish hierarchical levels of educational attainment and differentiate between

general and vocational qualifications in each educational level. Among them we apply especially 3a for lower-level tertiary degree and 3b for academically-oriented university education and 2c for upper secondary educational level that will serve as reference for determining the returns of tertiary education. Taking into consideration the institutional differences in the systems of tertiary education between the two countries, we introduce an additional distinction in higher-level tertiary education for the UK, separating first-degree qualifications (3b\_first) from second-degree or higher qualifications (3b\_higher). Fields of study are coded in six categories of the college major as reported in the OECD publications (OECD 2001): Education; Humanities and Arts; Social Sciences, Business and Law; Sciences (including life sciences, physical sciences, agriculture and mathematics, and computer science); Engineering, Manufacturing and Construction; Health. Gender is operationalized with a dummy variable.

To analyse returns to tertiary education, we employ multinomial logistic regression models (ML models), using as the dependent variable categorical variables coded as service class I, service class II and other classes. ML models enable us to estimate effects of both interval and categorical independent variables on a categorical dependent variable with more than two categories (Long 1997). For the multivariate analysis we selected the economically active resident population, excluding foreigners, students, and apprentices. We also limited the population only to 25-45 years, since we are mainly concerned with the first attainment of college graduates who seem to have apparently benefited from the educational expansion.

## **6 Empirical analyses**

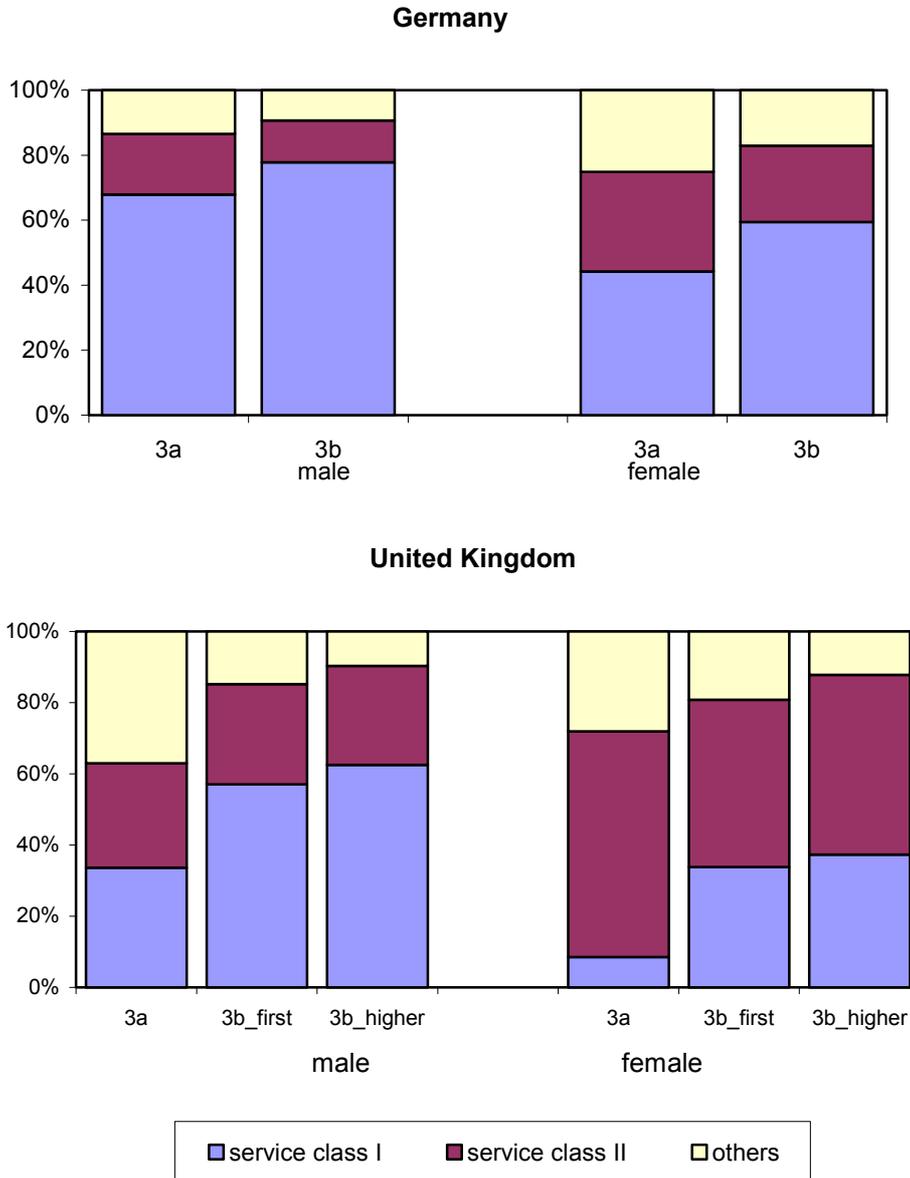
### **6.1 Some descriptive analysis**

Before we proceed to the analysis of educational return by fields of study and gender variable, reviews of some descriptive measures may give insights upon how each studied population is composed. At first, we took a view on the extent to which the holders of different degrees in tertiary education were distributed according to the EGP class scheme. Figure 1 shows distributions of graduates across classes for 3a and 3b in Germany and for 3a, 3b-first, and 3b-higher in the UK.

In both countries, it can generally be observed that the higher the educational level is, the greater becomes the proportion of being employed in service class I. For both genders, the proportion of college graduates employed in service class I is clearly greater in Germany. Men are more likely to be employed in service class I comparing to women, given that the educational level is same. However, German women show greater proportion of being employed in service class I than British women. This

result appears to coincide quite well with the expectation that educational returns to tertiary education would be greater in Germany<sup>6</sup>.

**Figure 1. Distribution of college leavers by their class positions**



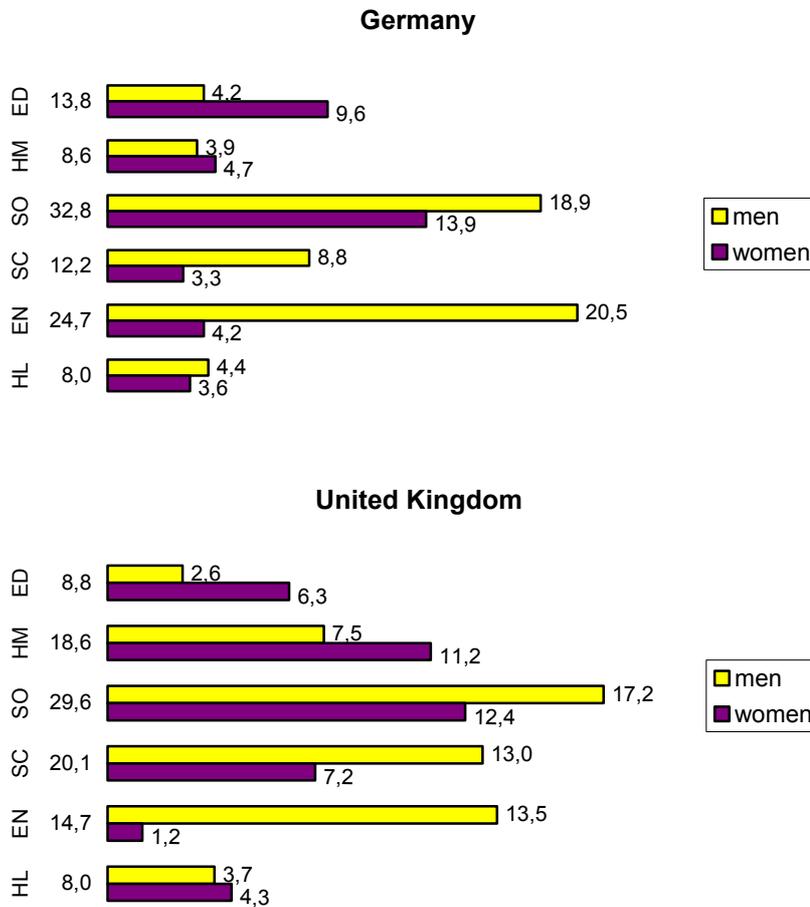
This result is similar to that from analysis conducted by Müller et al. (2002: 46-7), despite slight differences in the time point of study. Müller et al. (2002) provide an informative summary of composition of population with respect to both educational level and social classes. The UK shows a

<sup>6</sup> However, this figure should not be regarded as a definitive evidence for previously formulated hypotheses, since it is only based upon descriptive statistics and does not take other variables and their possible interactions into account.

greater proportion of the holders of tertiary education (especially in the higher level) in the population (only 25 up to 34 years) than Germany, and this difference was enlarged in a decade between mid 1980s and mid 1990s. Among three countries studied (Germany, France, and the UK), Germany shows the strongest stability in the proportion of tertiary education holders. Especially, German women were underrepresented very strongly in the higher education, which was to some extent corrected at least in the higher-level degrees in 1995. As a whole, these compositions of educational level correspond to the results of the previously mentioned OECD report that indicates the faster tempo of expansion in tertiary education (also among women) in the UK. This more 'liberalized' situation also holds for the labour market; the transition towards the service sector is more advanced in the UK, which is indicated by the higher proportion of employment population in service classes (I and II) and the increase of female employees in this sector. Considering that the placement on the labour market can be regarded as a result of matching process between the demand (structure of labour market and demand of employers on certain qualifications) and the supply side (inflow of workforces with certain educational credentials) (cf. Thurow 1975), the expansion of tertiary education seems to be at best matched with the corresponding expansion of service sector in the UK (Müller et al. 2002: 57).

We proceed further in order to look at how the tertiary education in both countries is distributed across different fields of study and how differently women and men are distributed across fields. Figure 2 in the next page shows the distribution of those with tertiary education degrees by fields of study and gender in Germany and the UK.

As a whole, the result is not substantially different from that of OECD (2001). Natural sciences and engineering make out circa 37% for Germany and 35% for the UK respectively, but the proportion of graduates in engineering is greater in Germany. Social sciences (including business and law) and education and art and humanities comprise a majority of graduates, but specific proportion of each field varies between two countries. From the viewpoint of gender segregation, natural sciences and engineering stand out as typically male-dominated fields as expected, while women are predominantly concentrated on the fields such as humanities/arts and education. In social sciences, women are slightly underrepresented, and medicine shows an almost even distribution between genders. This result shows that the distribution of higher education participants across fields of study is a little bit different between Germany and the UK, perhaps mainly because of the different orientations of higher education and different demand of economy on higher education, but the gender-specific distribution across fields of study is quite similar.

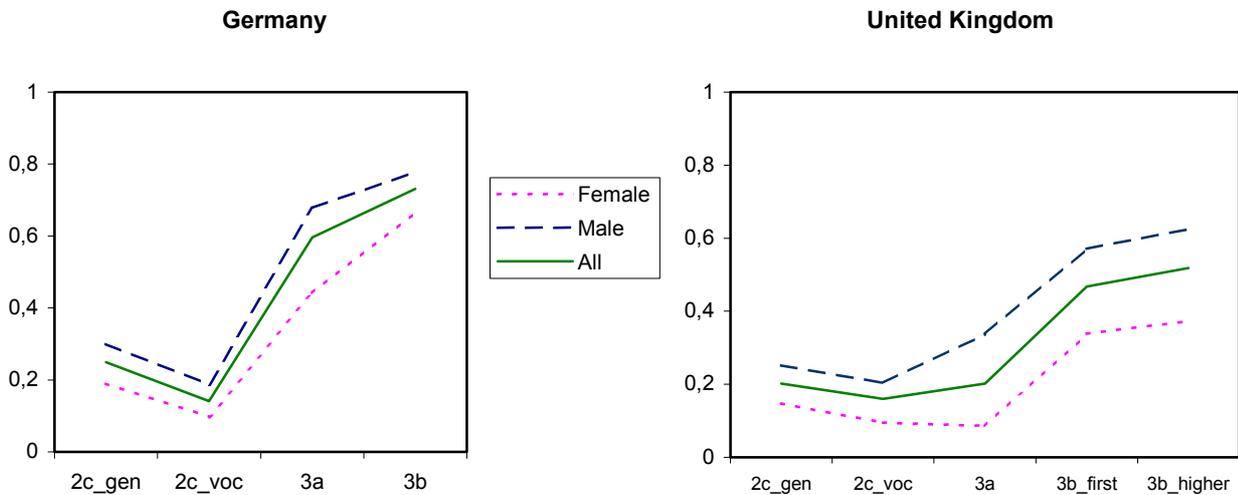
**Figure 2. Distribution of graduates by fields of study and gender (3b only)**

Note: ED = Education; HM = Humanities/Arts; SO = Social Sciences/Business/Law; SC = Science; EN = Engineering; HL = Health.

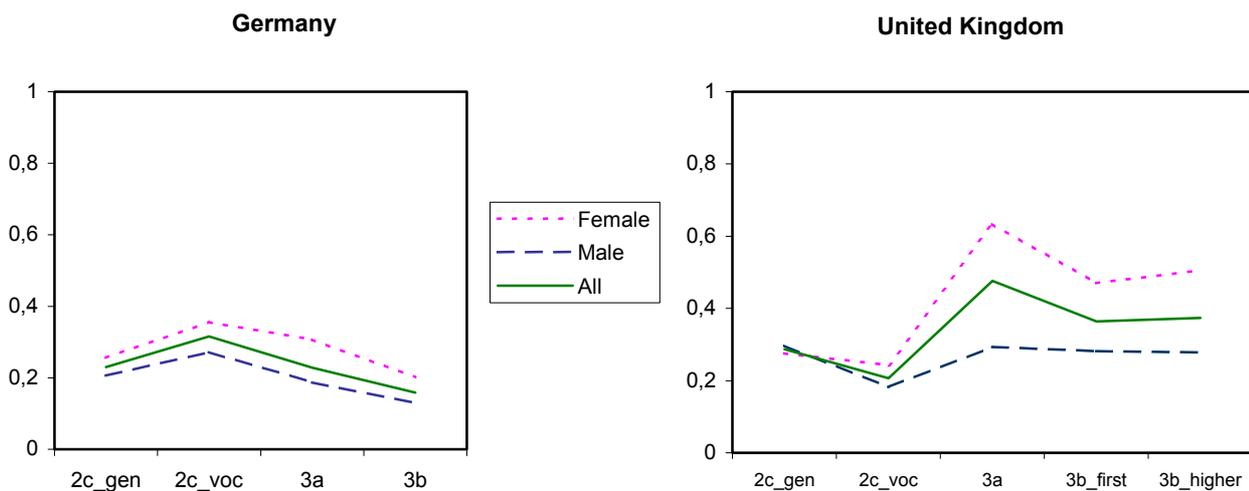
## 6.2 Returns to tertiary education compared to secondary education

Employing multinomial logistic regression models, we present in this section the result of analysis in which outcomes of different levels of tertiary education are compared to those of secondary education. As mentioned in methodical discussions, in order to take differences in the systems of tertiary education between two countries into account, we differentiated the tertiary education into the lower-level (3a: *Fachhochschule*) and higher-level programmes (3b: universities) for Germany, and the lower-level (3a: vocationally oriented colleges or other tertiary-level qualifications), first-degree (3b\_first: Bachelor's degree), and higher degree (3b\_higher: postgraduate courses) for the UK. We used as reference group for comparison those with general secondary education without vocational qualifications (2c\_gen). This analysis also contains the predicted probability of entering service classes for the people with the secondary general (2c\_gen) and vocational education (2c\_voc) in order to compare the outcomes of vocational training in both countries. Figure 3 and 4 show for men and women the estimated probability of entering into service class I and II respectively.

**Figure 3. Probability of entering the service class I by educational level**



**Figure 4. Probability of entering the service class II by educational level**



As Figure 3 shows, having tertiary education enhances the probability of entering the privileged and lucrative service class I in Germany as well as in the UK. It is also commonly observed that women are less likely to enter this class compared to men. However, the absolute probabilities vary between countries. German men as well as women with tertiary education exhibit greater probability. In other words, the tertiary education in Germany gives back on the whole better outcomes, considering the access chance to service class I. In addition, some interesting findings are to be mentioned. First, the secondary vocational education results in lower probability compared to secondary general one in both countries. This seems to be caused by the fact that finishing technical vocational education is usually related to other social classes such as self-employed or manual workers. Second, the lower-level tertiary education in Germany brings out apparently greater outcomes than the British one, converging to outcomes of first-degree holders in the UK. But this difference should be carefully

interpreted, because lower-level tertiary institutions are very different in their characteristics and social acceptance between Germany and the UK. Notwithstanding, this result implies that German technical colleges (some name themselves as 'universities of applied science') have improved their status partly up to the almost equal level of universities since their introduction in the 1970s. Considering chances of access to service class II, we observe the reversed relationship between female and male graduates. This is especially dramatic for the UK, where women with tertiary education are much more likely to be employed in service class II. The probability of entering the service class II is generally higher among the British respondents with tertiary qualifications. The secondary vocational education in Germany brings better chance to enter the service class II than secondary general one, while in the UK the secondary general education shows still greater probability.

As a whole, these results support our first hypothesis that having tertiary education will have greater outcomes in the labour market in Germany and coincide with results from previous studies on Germany and the UK (e.g. Shavit/Müller 1998; Müller et al. 2002).

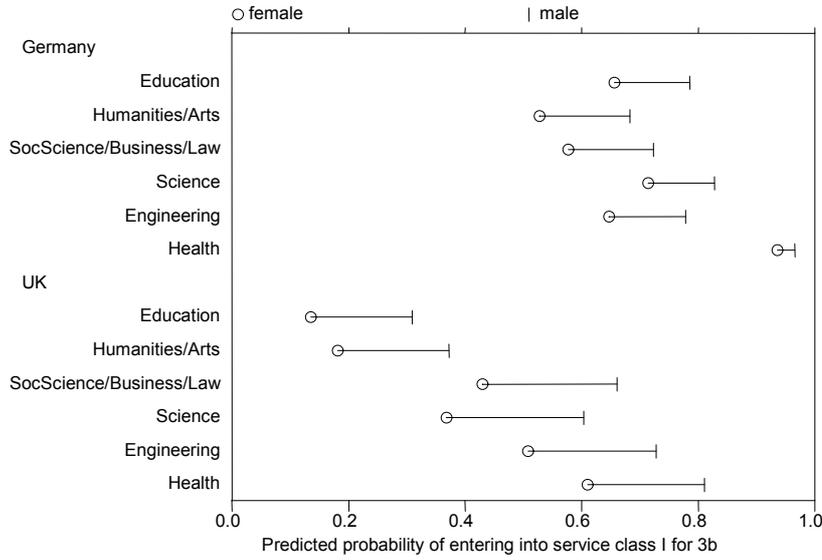
### **6.3 Fields of study and gender: Determinants for educational return**

In a next step, we examined the probability that those with each level of tertiary education enter service classes (I and II) in both countries, regarding six fields of study and gender. In Figure 5 and 6 we present the predicted probabilities of entering service classes for female and male graduates in both countries after estimating the multinomial logit model. The results of the ML-models are shown in Appendix A1. We examine here two effects, the gender and major effect, on the chance of access to service classes. Since majors of lower-level tertiary education (3a) in the UK could not be specified to a great extent in the used data<sup>7</sup>, we compared only graduates from higher-level tertiary institutions (3b) between Germany and the UK for service class I and II respectively (Figure 5 and 6). The categories for the UK in this analysis include both first-degree and second-degree or higher. Additionally, we compared the outcome of higher-level tertiary education to that of lower-level one only for Germany (Figure 7).

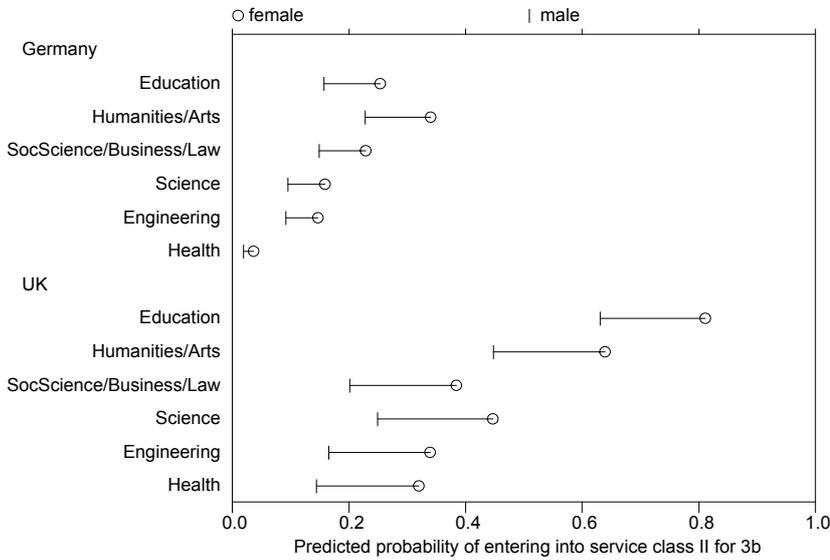
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<sup>7</sup> The British Labour Force Survey does not contain detailed information about study fields of a majority of degree holders in the lower-level tertiary education. Presumably, this cannot be reduced wholly to non-response of questionnaires, rather it seems to be related to the national-specific characteristics of British tertiary-educational institutions; for many cases, the lower-level tertiary degrees are achieved in the form of diverse qualifications, and questionnaires usually give only the name of this qualification but not its specific field. Thus, except nursing education that is seemingly well institutionalised, the field of study among holders of lower-level tertiary education in the UK could not be integrated into the analysis, while the corresponding information was almost fully available for graduates from technical colleges in Germany.

**Figure 5. Probability of entering the service class I (3b only)**



**Figure 6. Probability of entering the service class II (3b only)**

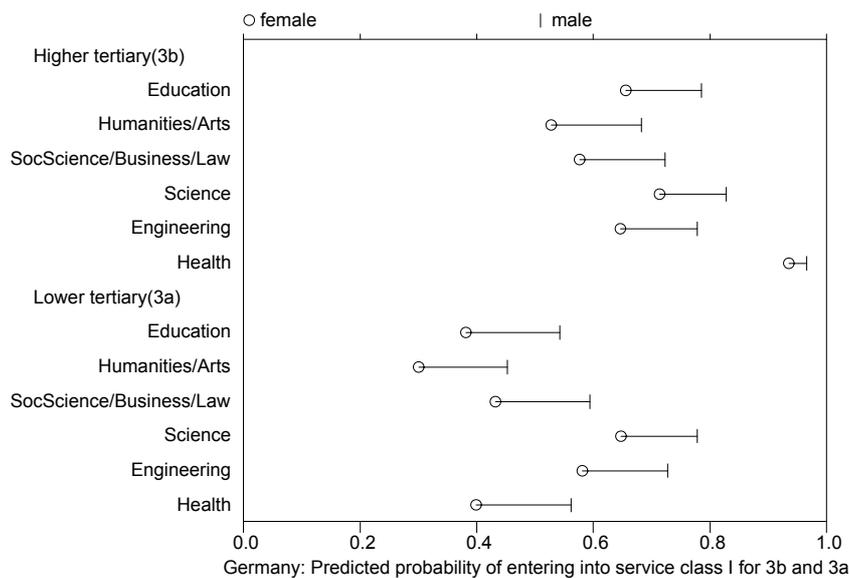


Regarding the difference between both countries, we attain the expected different educational returns across fields between two countries, which can be observed most clearly in the graph for the chance of access to service class I. In Figure 5, German graduates from all fields are more likely to be employed in service class I than their British counterparts. Especially, the British graduates from education and arts/humanities show a quite low probability.<sup>8</sup> As we expected (H 2), the difference in

<sup>8</sup> This result seems to point out not only the different institutional backgrounds in two countries but also the somewhat inconsistent categorisation of teachers into class scheme in each country.

probability across fields is greater in the UK, while in Germany graduates with different majors show relatively similar probabilities of being employed in service class I. In both countries, graduates of medicine are most likely to enter service class I and this value is extremely high for Germany. Another important result is that the differences in probability between genders are greater in the UK. According to this result, British graduates seem to be scattered more widely on the labour market both in terms of their major and gender. We will come back to this interpretation later.

**Figure 7. Probability of entering the service class I (3a and 3b for Germany only)**



The probability that college graduates enter service class II (Figure 6) is smaller in most fields of both countries than that in the case of the service class I. This result is not surprising, if one considers that having higher-level tertiary education is quite frequently related to the privileged occupational positions. However, British graduates from education and arts/humanities are strongly likely to be employed in jobs in service class II. Comparing the distribution pattern in the two countries, the probability of entering service class II is generally higher in the UK, which may be interpreted as relatively lower return of tertiary education for both genders in this country. In all fields, the relation between genders is reversed. Especially in the UK, women are more likely to have occupational positions in service class II. Differences between fields are also greater in the UK. To summarise, we could find supports for our second and third hypotheses. The absolute outcomes of tertiary education were in general greater in Germany, but the inter-field difference was greater in the UK. The latter result implies that the specific field studied in tertiary education functions as an additional factor for determining occupational positioning of graduates in the UK. Regarding gender differences, we could also find out that female graduates generally achieve lower outcomes than their male counterparts. This disparity is observed not only in the different probability of entering each service class, but also in the reversed relation between genders in service class I and II respectively.

The analysis comparing the return of lower- and higher-level tertiary education in Germany (Figure 7) shows that graduates from German technical colleges converge those from universities to a considerable extent at least with respect to the chance of access to the service class I. Comparing to the clearly lower return to the British lower-level tertiary education (cf. Figure 3), both German female and male graduates from technical colleges are more likely to enter service class I. This result is well matched with the observations indicating the qualitative upgrading of German technical colleges (cf. Müller et al. 2002). Although the direct comparison of this result with the British data was not possible and therefore the difference between the countries could not be proved, this result seems to give support for the higher return of attending German technical colleges compared to the corresponding British qualifications.

#### **6.4 Field of study or gender: Which factor matters?**

In this section, we are conducting two further analyses. One is to take the different structures of labour market into account, and the other is designed to determine the (approximate) net effect of gender after controlling for effects of majors. Figure 8 and 9 in the next page show at first the result of analysis in which the jobs in the service class I are differentiated into full-time and part-time employment status<sup>9</sup>.

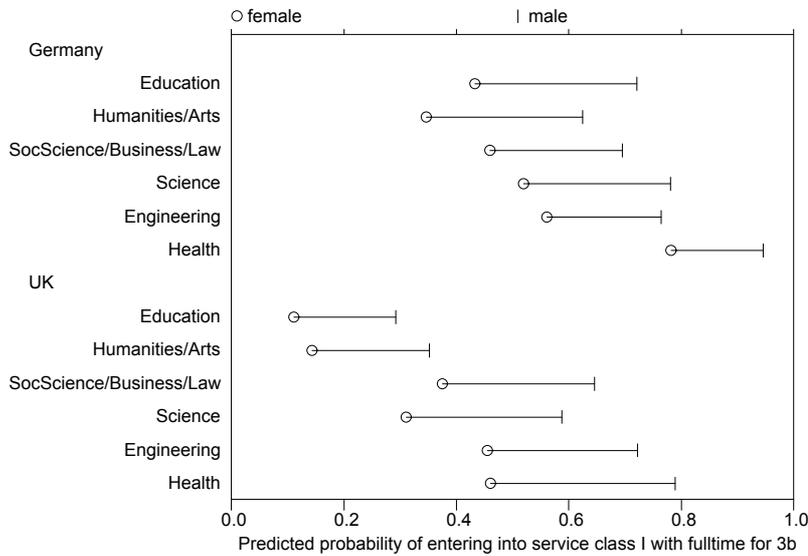
If only full-time employment is considered (Figure 8), the probability of female graduates to enter the service class I diminishes for both countries, but to a greater extent in Germany. As a result, the difference between women and men becomes similar between Germany and the UK, though the absolute access chances are still greater for German women and men. In the case of part-time employment, it is also observed that women are more likely to be employed in part-time jobs in both countries, but to a greater extent in Germany. Except for the field "health", the probability that British female graduates have part-time jobs in the service class I is considerably lower than that of German women. The probability that male graduates with higher-level tertiary qualifications have part-time jobs in the service class I appears to be negligible in both countries, which is more striking in the UK.

It is an unexpected finding that the change in gender gap is greater for Germany, if the types of employment are controlled for. According to this result, German women seem to be more willing to choose part-time jobs, even if they are highly educated. The less gender difference above observed for Germany (cf. Figure 5) is compensated by the greater likelihood of German women to have part-time jobs in order to result in similar gender gap at the end. Another interesting finding is that German female graduates with part-time jobs have frequently studied majors that are more likely to lead to jobs in public sector (e.g. education, humanities/arts, medicine, and science), but not majors usually related to private sector (e.g. social science/business/law, and engineering). This result could not be found among British women.

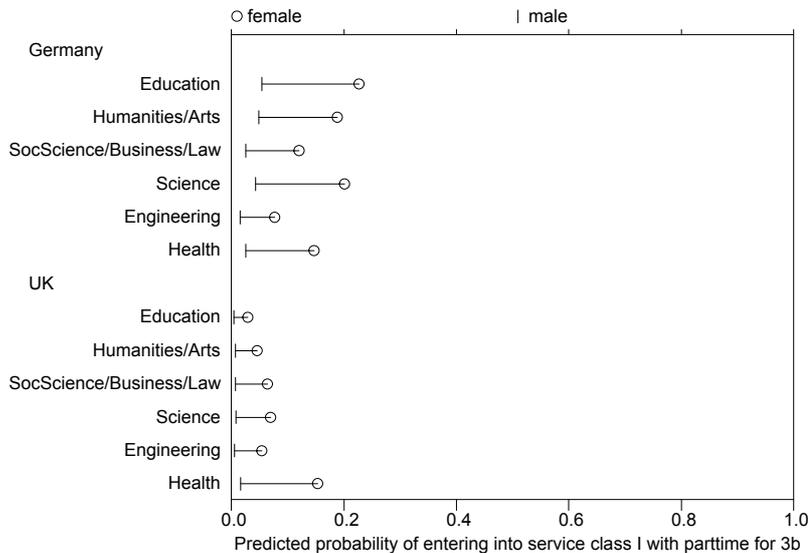
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<sup>9</sup> Results for the probability of entering full-time and part-time service class II are shown in Appendix A2 and A3 respectively. Results of multinomial logit regression are shown in Appendix A4.

**Figure 8. Probability of entering the full-time service class I (3b)**



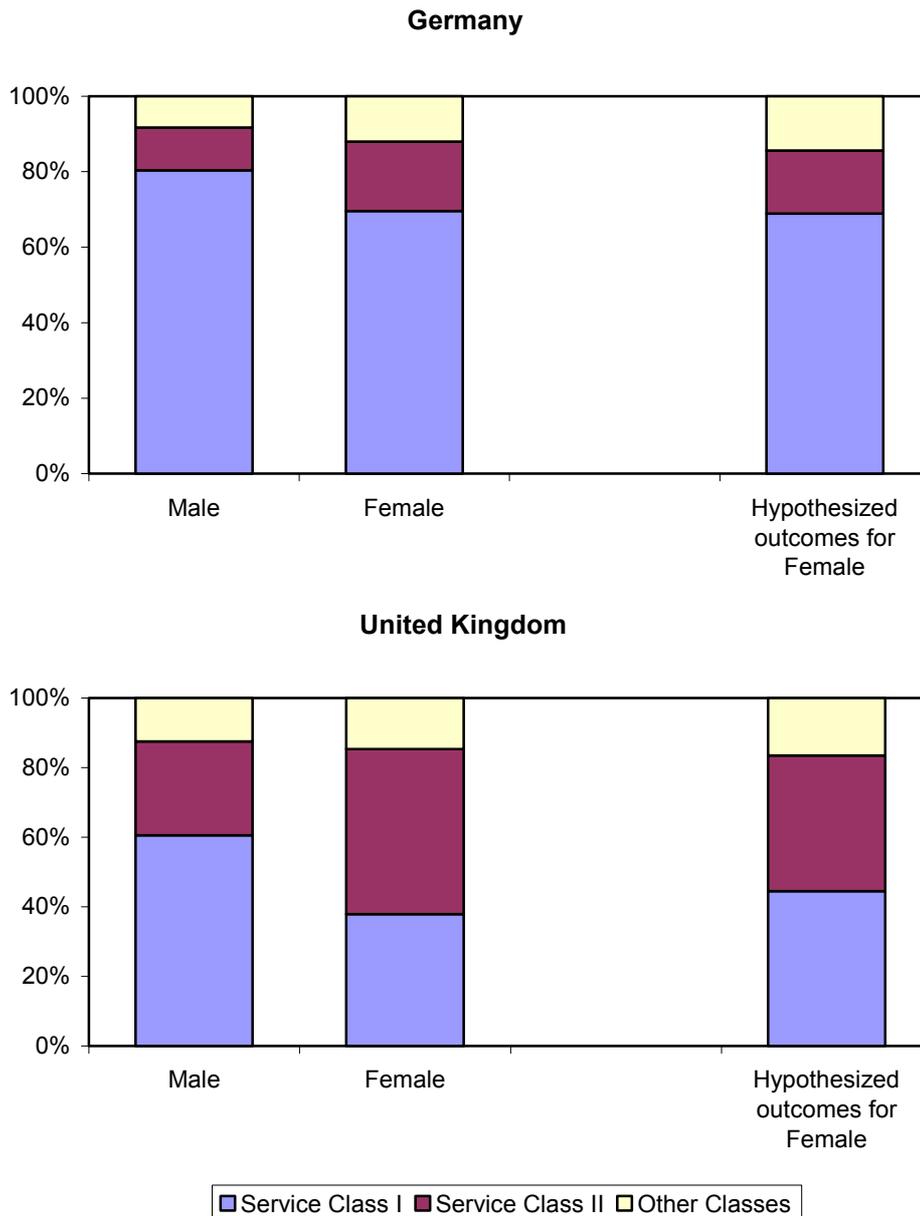
**Figure 9. Probability of entering the part-time service class I (3b)**



As discussed above, it should be noted that the field of study and the gender variable may interact. The lower outcome of graduates from certain fields may result from the really existing hierarchical structure of outcomes between majors in the labour market, but it may also be caused by the fact that women are predominant in that field. Thus the (net) gender effect can only be estimated appropriately, if the major effect is controlled for. On this ground, we analysed the estimated probability of both female and male graduates, supposing that the distribution of women across fields would be identical to that of men. Since male graduates generally achieve greater outcomes than female, the outcome

for female graduates will improve towards that of men after controlling for gender-specific distribution across fields of study, but the gender gap will not be fully eliminated. The important question is here to what extent the gender gap diminishes or widens up in each country and in which way this estimation affects the chance of access to service classes. Figure 10 shows the result of this analysis for the German and British graduates only with higher-level tertiary education (3b).

**Figure 10. Predicted labour market outcomes of women and men**



The first and second bar in Figure 10 show the access chances of female and male graduates to different class positions (service class I, II, and others) respectively, if the gender-specific choice of major is not controlled. The third bar gives the hypothetical probability of women, if they are supposed to be distributed identically across the fields of study to men. In Germany, the probability of women to enter the both service classes shows little change controlling for gender-specific choice of major, while this probability for service class I increases considerably but for service class II decreases in the UK. The overall greater access chance of German women comparing to British women as well as the smaller gender difference in Germany are also confirmed in this analysis. Controlling the gender-specific choice of major leads to an apparent change in gender difference in the UK. This result shows that the gender-specific choice of major has stronger effect on the educational return in the UK. In contrast, the gender-specific distribution across fields has not so much influence on the educational return of women and men in Germany. The greater gender gap in the UK that still remains after controlling exemplifies the greater (net) gender effect among graduates from tertiary educational institutions in this country.

## **7 Discussions**

In this paper, we examined returns to tertiary education on the labour market for Germany and the UK, especially regarding effects of fields of study and gender. On the basis of existing institutional differences in the systems of tertiary education and its linkage with the labour market between the two countries, we hypothesized that German university and college graduates would have greater return than their British counterparts, but the field of study would have a stronger effect on determining the occupational positions of graduates in the UK. We also assumed that gender differences in outcomes are to be observed commonly in both countries, but the strength of gender bias and its interaction with the choice of specific fields would be different between the two countries. Results of empirical analyses provide in many respects supports for our hypotheses; German graduates achieve apparently greater outcomes than their British counterparts, which holds for both women and men. The field of study has a greater selecting effect on the occupational positions of graduates in the UK, which coincides with the expectation from theoretical discussion that the more generally oriented the programmes in universities and colleges are, the more likely the studied field functions as additional selection criterion. With respect to gender-related hypotheses, we could find out that differences in educational returns between genders have similar patterns in the two countries, but are greater in the UK. The more detailed analysis considering also employment types has shown that German women with higher education are more willing to choose part-time jobs and that this tendency widens up the relatively small gender gap in Germany. A further analysis in which the gender-specific distribution across fields is controlled has shown that the (net) gender effect, that is the gender effect after controlling for gender-specific choice of major, is greater in the UK. These results allow us to conclude that both the major effect – i.e. what specific field women and men choose to study – and the gender effect are greater in the UK on determining the probability of entering privileged occupational positions.

The results of this study should be specified by further analyses, which will be able to address other dimensions of educational returns that could not be dealt with in this study. First, we could not consider all the aspects of institutional differences between countries. For example, the British tertiary education is characterized by the existence of an elite sector that distinguishes itself from other universities. It is expected that having studied in Oxford or Cambridge would have more far-reaching effects on outcomes in the labour market than any other factor here considered. However, we could not access to this information on the basis of the data set used in this study. It is recommended that further studies on educational returns in the UK will be equipped with this type of information that is yet seldom covered by available surveys. Second, this study lacks a comprehensive and cohesive theoretical model that might take various factors influencing educational returns and their eventual interactions into account. Among other variables, the ascribed variables such as the parental social-economic status are expected to affect the educational choice and outcome considerably, which could not be dealt with fully in this paper, since such information was not available in the used data set. The relationship between ascribed variables and choice of majors is to be explored in further studies on returns to tertiary education more specifically.

Despite these restrictions, this study could give some important implications about which role the field of study plays for the placement of graduates from tertiary educational institutions on the labour market, interacting with the gender variable. The apparent difference in educational returns between Germany and the UK seems to result from different educational systems in general as well as the tertiary education specifically, the structure of labour market, and the pattern of gender-specific division of labour in each country. Results of this paper suggest that the horizontal differentiation in tertiary education along different fields of study should be integrated into the study on returns to tertiary education in contemporary societies as an additional important factor.

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## Appendix

### Appendix A1: Individual's likelihood of entering service class I and II compared to other classes by multinomial logit regression

#### Germany

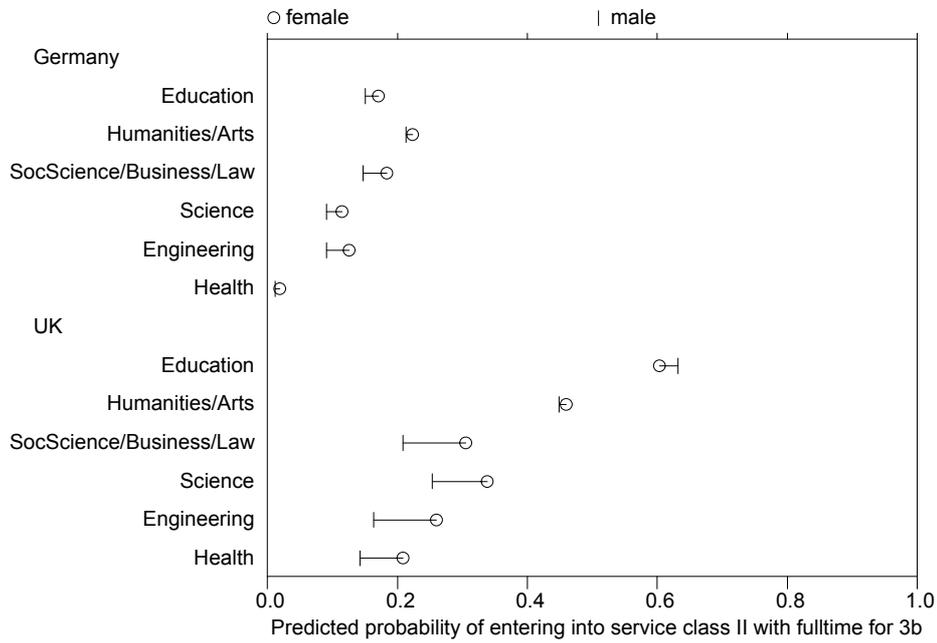
	Service Class I Other Classes		Service Class II Other Classes	
	Coefficient	S.E.	Coefficient	S.E.
Male	.645	.036	-.014 <sup>+</sup>	.036
Field of study (3b)				
Education	3.564	.089	1.610	.095
Humanities/Arts	2.967	.100	1.523	.105
SocScience/Business/Law	2.668	.060	.740	.068
Science	3.305	.094	.796	.116
Engineering	2.723	.072	.238	.097
Health	5.099	.201	.849	.261
Field of study (3a)				
Education	1.964	.148	.897	.152
Humanities/Arts	1.844	.167	1.282	.161
SocScience/Business/Law	2.321	.062	1.138	.063
Science	2.702	.124	.179 <sup>+</sup>	.174
Engineering	2.466	.064	.277	.082
Health	2.580	.320	1.702	.320
Constant	-1.580	.036	-.574	.029
N	26522			
Pseudo R <sup>2</sup>	0.1786			

#### United Kingdom

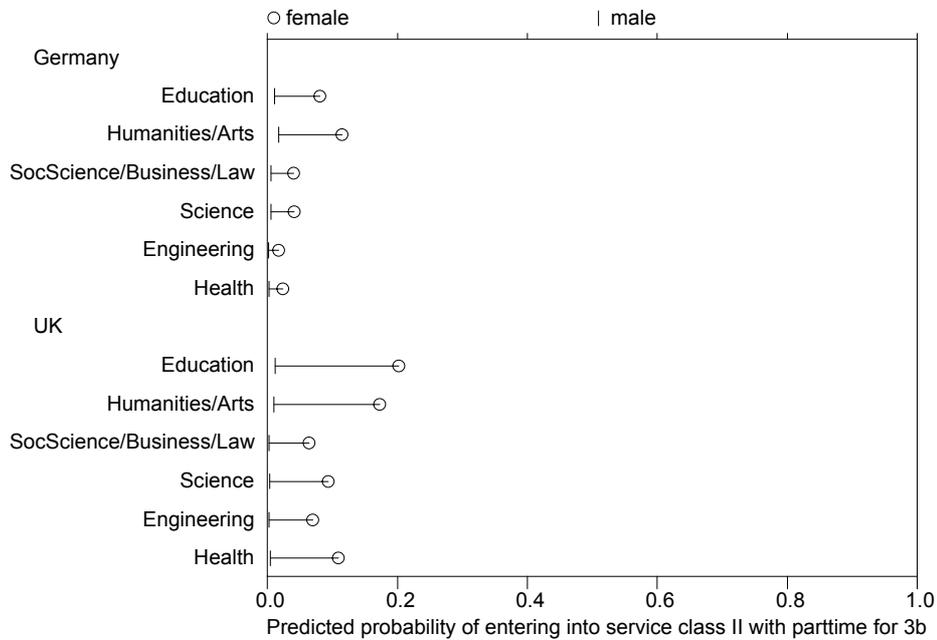
	Service Class I Other Classes		Service Class II Other Classes	
	Coefficient	S.E.	Coefficient	S.E.
Male	.722	.051	-.356	.046
3a	.291	.063	.878	.054
Field of study (3b)				
Education	2.085	.232	3.050	.211
Humanities/Arts	1.167	.108	1.604	.095
SocScience/Business/Law	1.997	.084	1.060	.089
Science	1.848	.098	1.217	.103
Engineering	2.359	.126	1.130	.146
Health	3.327	.217	1.855	.231
Constant	-1.161	.051	-.335	.043
N	12591			
Pseudo R <sup>2</sup>	0.1138			

Note: The reference group in both ML-models is the higher secondary education (2c);  
+ indicates that the coefficient is not significant on the level of .05.

**Appendix A2: Probability of entering the full-time service class II (3b)**



**Appendix A3: Probability of entering the part-time service class II (3b)**



### Appendix A4: Individual's likelihood of entering service class I and II with full- and part-time by multinomial logit regression

#### Germany

	Service Class I /Full-time	Service Class I /Part-time	Service Class II /Full-time	Service Class II /Part-time
	Other Classes	Other Classes	Other Classes	Other Classes
Male	.847 (.037)	-1.098 (.076)	.211 (.038)	-1.655 (.099)
Field of study (3b)				
Education	3.415 (.091)	4.136 (.127)	1.534 (.099)	1.847 (.131)
Humanities/Arts	2.831 (.102)	3.589 (.147)	1.439 (.110)	1.840 (.150)
SocScience/Business/Law	2.669 (.062)	2.691 (.122)	.797 (.070)	.352 (.152)
Science	3.257 (.096)	3.674 (.148)	.793 (.121)	.833 (.228)
Engineering	2.760 (.074)	2.148 (.176)	.312 (.099)	-.623 (.344)
Health	5.136 (.201)	4.832 (.236)	.457 <sup>+</sup> (.303)	1.776 (.328)
Field of study (3a)				
Education	1.691 (.162)	2.778 (.206)	.844 (.162)	1.047 (.230)
Humanities/Arts	1.717 (.175)	2.459 (.269)	1.216 (.169)	1.540 (.240)
SocScience/Business/Law	2.343 (.063)	2.162 (.133)	1.165 (.065)	.990 (.116)
Science	2.741 (.125)	2.096 (.294)	.266 <sup>+</sup> (.176)	-.959 (.719)
Engineering	2.512 (.065)	1.421 (.202)	.349 (.083)	-.677 (.311)
Health	2.550 (.329)	2.720 (.477)	1.579 (.337)	2.044 (.405)
Intercept	-1.815 (.038)	-3.182 (.086)	-.862 (.031)	-1.930 (.052)
N	26522			
Pseudo R <sup>2</sup>	0.174			

#### United Kingdom

	Service Class I /Full-time	Service Class I /Part-time	Service Class II /Full-time	Service Class II /Part-time
	Other Classes	Other Classes	Other Classes	Other Classes
Male	.883 (.053)	-1.901 (.202)	-.042 <sup>+</sup> (.048)	-2.912 (.163)
Lower Tertiary (3a)	.299 (.064)	-.262 <sup>+</sup> (.259)	.705 (.057)	1.642 (.105)
Field of study (3b)				
Education	2.042 (.236)	2.495 (.402)	3.030 (.212)	3.248 (.252)
Humanities/Arts	1.101 (.111)	1.754 (.248)	1.562 (.098)	1.897 (.154)
SocScience/Business/Law	1.999 (.085)	2.024 (.216)	1.088 (.091)	.845 (.188)
Science	1.830 (.099)	2.123 (.245)	1.207 (.105)	1.242 (.205)
Engineering	2.359 (.126)	2.010 (.429)	1.093 (.147)	1.083 (.441)
Health	3.241 (.219)	3.924 (.301)	1.744 (.238)	2.411 (.301)
Intercept	-1.322 (.053)	-3.104 (.147)	-.616 (.045)	-1.929 (.088)
N	12591			
Pseudo R <sup>2</sup>	0.128			

Note: The reference group in both ML-models is the higher secondary education (2c);  
+ indicates that the coefficient is not significant on the level of .05.