

LIVES WORKING PAPER 2018 / 74

DOES VOCATIONAL EDUCATION GIVE A LABOUR MARKET ADVANTAGE OVER THE WHOLE CAREER?

A COMPARISON OF THE UNITED KINGDOM AND SWITZERLAND

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RESEARCH PAPER

<http://dx.doi.org/10.12682/lives.2296-1658.2018.74>

ISSN 2296-1658



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Abstract

Research suggests that vocational education and training (VET) tends to reduce youth unemployment by providing specific skills, thus smoothing the transition from education to work. However, we still know relatively little about whether vocational education provides higher employment rate and wages over the entire working trajectory than holders of lower education: after several years of experience, both groups may indeed have similar skills and thus similar situations on the labour market. We compare the situation in the United Kingdom and Switzerland, two countries sharing a tradition of vocational education but which differ in the specificity and standardisation of their VET system. Creating a pseudo-cohort with repeated rounds of the UK and Swiss labour force surveys, we use regression models and compare the employment rate and hourly wage of our two groups of interest: individuals with vocational education at the upper secondary level and individuals with no more than compulsory education. We find that VET graduates fare better in terms of both employment and wages over the whole career. This advantage is larger for women than men and, contrary to our hypothesis, larger in the UK than in Switzerland with respect to employment prospects.

Keywords

vocational education and training | apprenticeship | earnings | employment | life course | United Kingdom | Switzerland

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1. Introduction

Vocational education and training (VET) has several advantages, both at the individual and country level. By providing vocational skills immediately useful in a company, entry to the labour market is eased and thus helps to reduce youth unemployment (OECD 2010). Furthermore, practice as an important part of the learning process helps to increase motivation, which makes VET an interesting solution to provide education until the upper secondary level to youth having less interest or ability for academic education (Wolter and Ryan 2011). VET is thus seen as a solution against both educational dropout and youth unemployment.

However, it is not clear whether individuals with VET have a competitive advantage in the labour market during their entire career compared to people with a lower level of education. It seems indeed possible that once people without VET have acquired work experience, they catch up with the VET group.

Theory suggests two opposite hypotheses about the life-course prospects of VET: on the one hand, VET may lead to a better entry into the labour market and, through the mechanism of cumulative advantages (DiPrete and Eirich 2006), to better positions over time as compared to workers without formal qualifications. On the other hand, it is also possible that after several years of work, individuals having only compulsory education catch up with the level of practical skills of their vocationally trained colleagues, and consequently gain access to similar positions as workers with vocational education, as suggested by the human capital theory (Becker 1962).

These two hypotheses are not mutually exclusive but may vary across different institutional contexts. Indeed, labour market prospects may depend on the country and especially the level of standardisation of the VET system. A more standardised VET system may increase the transferability of competences between employers and thus the capability for holders of a VET certificate to reach better positions (Bol and Von de Werfhorst 2013). On the contrary, a less standardised VET system may provide VET graduates with a set of skills that is similar to work experience in a firm, resulting in smaller differences between holders of a VET degree and people with a lower level of education.

Rather than focusing on the difference between vocational and general education (Hanushek et al. 2017, Forster et al. 2016), this article therefore analyses the possible advantage of vocational education over lower education. Since the VET payoff may vary depending on

the context, we compare the situation in a country with a large and nationally standardised VET system – Switzerland – with a country with a less widespread and less standardised vocational system – the United Kingdom. Based on the UK Labour Force Survey 1993-2014 and the Swiss Labour Force Survey 1991-2014, we compare employment and earnings for holders of a VET certificate over their career with the prospects of workers with no more than compulsory education. We use a pseudo-cohort design and focus on people born between 1954 and 1968 in the two countries.

Our article first discusses the potential advantage of formal vocational education and training over work experience, and disentangles the labour market mechanism for holders of this type of education versus holders of no more than compulsory education. Human capital, signalling and life-course theories lead us to formulate three hypotheses. We then present the data and method, and show our results – first descriptive and then multivariate. The conclusion summarizes our key findings.

1.1 Vocational education versus work experience

Vocational education and training (VET) aims to bring practical skills to students by providing them an occupation or trade. It has the advantage of giving youth the opportunity to acquire skills useful for the labour market in real situations. This is especially the case in dual (work-based) programmes, also called apprenticeships, where young workers not only learn technical skills, such as cutting someone's hair or installing a heating system, but also how to interact with customers, colleagues and supervisors.

Several studies have shown that vocational education facilitates entry into the labour market (e.g. Shavit and Müller 1998; Müller and Gangl 2003; Breen 2005). One reason for the successful transition from education to work is that the content of the training is designed in close cooperation with employers, teaching skills that are directly applicable, and thus corresponds well to labour market demand. After the end of their training, workers are seen as immediately productive and, for this reason, can expect to find a job as easily as more experienced workers (Shavit and Müller, 2000a, p. 36).

However, education is not the only way of acquiring skills. As argued in the literature about workplace learning, workers extend their capabilities through their work (Boud and

Garrick 1999). Work experience should indeed provide employees with opportunities to learn new aspects of the job and to master them better over time. This idea is in line with human capital theory (Becker 1962), which presents work experience as an integral part of human capital. Since both VET and experience provide work-related skills, it is an open question whether vocational education still provides an advantage over workers without post-obligatory education on labour market outcomes such as employment and wages after several years of work experience. While VET tends to ease labour market entry and reduce the risk of unemployment at the beginning of the career (e.g., Ryan 2001), the advantage of obtaining a better-paid position after several years of experience is not evident. Shavit and Müller (2000b, p. 437) thus argue that [vocational education at the upper secondary level] “teaches skills that can easily be acquired on the job rather than through schooling”.

1.2 Transferability of skills and signalling

When a worker moves from one firm to another, the new employer has to estimate his or her productivity in order to determine the wage. The level of skills required for the position has to be evaluated on the basis of education and work experience. In such a situation, VET may be seen differently from work experience, since VET includes learning of not only firm-specific, but also occupation-specific skills. While learning an occupation – and not only gaining experience in a specific position – students following the VET track have the opportunity to acquire skills which are transferable to similar positions in other firms.

If employers have good reason to think a worker is able to immediately apply his or her occupational skills to a new environment, without a long period of adaptation, they are likely to pay a higher wage. Therefore, the certificate delivered at the end of VET may open the door to better-paid positions. This last point is explained by the job market signalling theory developed by Spence (1973), who argues that a certificate is a way one party (employers) can access information about another (employees).

Furthermore, according to the “positive view of tracking” (Gamoran and Mare, 1989, p. 1148), higher diplomas should be obtained by more talented students. With this argument, workers with a VET certificate should be favoured in recruitment over those with a lower level of qualification not only because the former learned certain skills during their training, but also

because the certificate signals their ability to learn. Workers without an upper secondary level certificate may thus be seen not only as persons having studied for a short period, but also as persons being unable to study for longer. Moreover, the difference may not only be perceived in terms of technical or cognitive skills, but also with respect to behaviour such as being disciplined (Shavit and Müller, 2000, p. 31) or punctual. Along the same lines, Weiss (1995, p. 135) argues that firms interpret education choices as information about unobserved attributes.

1.3 Differences over the life-course

If dual vocational education is seen as the “gold standard” to enter the labour market and reduce youth unemployment (Hoffman and Schwartz 2015), the long-term benefit of this type of education is less clear. Thanks to the specific skills learned, vocationally trained workers are likely to access qualified jobs at a young age, with higher salaries than in non-qualified jobs. However, the potential wage growth of holders of a VET degree may be limited, with small margins for improvement. If at the end of the VET, the young workers master the occupation they have learned, the potential of future improvement within the occupation may be modest. This argument is in line with the results of Hanushek and colleagues (2017) who show that after the age of 30, workers with vocational education earn less than workers with general education.

On the other hand, workers with a lower level of education – compulsory schooling or short programmes below upper secondary level – have more difficulty entering the labour market because of a (initial) lack of (recognised) skills. However, if they succeed in securing a position and have the opportunity to learn on the job, they may possibly reach a similar skill level as workers with a vocational education certificate. If their productivity is comparable, they are likely to receive a comparable wage.

This leads us to formulate a first hypothesis:

H1a: Workers with a VET certificate have an advantage in terms of employment and wages over workers with a lower level of education at the entry to the labour market, which decreases over the career as work experience increases.

On the contrary, it is also possible that workers with a VET certificate hold an advantage throughout their career. Indeed, research on the life-course has shown that careers often follow a trend of accumulation of advantages and disadvantages (DiPrete and Eirich 2006), which would lead us to expect more successful careers after a good start than after a more difficult one. Being more likely to find a good position, workers with a vocational education certificate may succeed in keeping their position or moving to another one, because their good start sends a positive signal to employers. Conversely, workers without an upper secondary degree are more likely to experience spells of unemployment at the beginning of their career, which may lead to a higher risk of unemployment during their entire career – leaving a scarring effect (Gangl 2006). Furthermore, the signal of having achieved an upper-secondary degree may be rewarded by employers not only at the beginning of the career, but also later.

This argument leads us to the opposite hypothesis:

H1b: Workers with a VET certificate benefit from a better start in their career and have a steadily increasing advantage in terms of employment and wages over workers with a lower level of education during their career.

1.4 Institutional differences of VET: specificity and standardisation

Up to now, our discussion of education and the labour market has assumed that VET systems are homogeneous across national contexts. This is not the case. Notably two institutional dimensions are important to describe the differences between national VET systems: specificity and standardisation.

Vocational education is taught in two different ways: in the firm-based dual system (apprenticeship) and in vocational schools. The dual system, where students share their time between the workplace and school, is present in countries including Denmark, Germany, and Switzerland, and is based on the principle of job-specific skills. Working in a firm as part of the training gives a specific orientation to young workers, while vocational programmes spent at school tend to focus on a wider range of occupational skills (Bol and Van de Werfhorst 2013, p.5). In a firm, apprentices solve “real tasks”, providing them not only with specific but also work-relevant skills (Breen 2005). On the other hand, curricula in vocational schools cover

more theory, but also a range of techniques which prepare students to face different situations linked to an occupation, but not to a company. If both systems prepare youth for a specific occupation, the specificity of the tasks learned varies from strong firm-specific skills in the dual system to more occupation-specific ones in vocational schools. Even if standardised dual programmes are conceived with the goal of bringing a wider range of skills than those learnt in-firm, the specificity of the skills is higher in firm-based programmes.

Another important difference between the dual system and school-based vocational programmes is the role, in the former, of an employer who hires the apprentice and follows his or her progress during the apprenticeship. Due to a first experience with an employer, the signalling of an apprenticeship is positive in terms of an employee's skills (OECD 2010, p.105). It provides future employers with a better signal about workers' skill levels and potential productivity (Breen 2005, p. 126).

The role of employers is not restricted to hiring and supervising apprentices, but also involves defining the content of the apprenticeship and the competences required to obtain a given certificate. Employers' involvement is crucial in connecting apprenticeships, and vocational education more generally, to the needs of the labour market (OECD 2010, p. 139). Defining skills that have to be learned by every apprentice to earn a VET diploma is the process of standardisation defined as "the degree to which the quality of education meets the same standards nationwide" (Allmendinger 1989, p. 233).

A standardised system not only benefits workers, who are able to leave the firm where they undertook the apprenticeship without expecting a strong reduction of their productivity and thus their wage, but is also advantageous to firms at the moment of hiring (Allmendinger 1989, p. 239). Thanks to the standardised system, employers can hire young workers knowing they have a basic level of occupational skills in their field, as well as a certain professionalism and capacity to learn.

In a system where every firm has to teach a set of abilities useful not only to the firm itself but to all the firms of the sector, workers are ready to move to a different firm at the end of their training (OECD 2010, p. 22). To increase the signalling of a given skill set, a national diploma or certificate is given at the end of the vocational education to workers able to demonstrate all the required skills. A nationally standardised vocational degree recognised by

employers helps in particular for labour market entry (Müller and Gangl 2003). Consequently, the more firms recognise the diploma or certificate, the more useful the diploma is for workers.

1.5 Comparison of two national contexts

We analyse the evolution of wages and employment over the life-course for two countries with different VET systems: the United Kingdom and Switzerland. These two countries share a tradition of vocational education, and of apprenticeships more precisely (Cörvers et al. 2011), but differ in the degree of specificity and standardisation. We observe a large and strongly standardised dual system in Switzerland, but several different programmes in the United Kingdom.

Holders of a VET diploma represent a sizable proportion of the population in the two countries, but the share of the population in this situation differs substantially. In the United Kingdom, 21 per cent of adults between 25 and 64 had vocational education at the upper secondary level as the highest level of education, against 39 per cent in Switzerland in 2014 (OECD 2015 p. 45). Not only the prevalence, but also the type of VET differs between the two countries. In Switzerland, work-based apprenticeships are the norm while in the United Kingdom, apprenticeships represent only around half of the upper secondary vocational level (own calculation. See *Data* for more details).

According to Rauner (quoted in Brockmann et al. 2008, pp. 549-550), the Swiss dual system focuses on education for an occupation, whereas the VET system in the United Kingdom is based on the certification of competences. While the Swiss system may be more efficient in preparing young workers to enter the labour market, due to a strong link between training and existing occupations, the UK system may prepare them better to face a “changing labour market” (Brockmann et al. 2008, p. 550). For this reason, Rauner calls the UK model “employability”. This difference leads to a high level of specificity for Switzerland – the highest among the OECD countries – and a low one for the United Kingdom (Bol and Van de Werfhorst 2013, p. 37).

Furthermore, the policy structure of vocational education in England and Wales is not only more complex but also less stable than in most other OECD countries (OECD 2009, p. 13). On the other hand, Switzerland benefits from a highly standardised national system, not

only regarding occupational skills but also general skills, organised in national certificates and exams.

Finally, vocational education in the United Kingdom is characterised by a lack of general education (Green 1998, Hayward et al. 2005), whereas general and professional theoretical courses represent between 20 and 40 per cent (one or two days of schooling per week) of instruction time in the vocational track in Switzerland.

Due to these differences, we formulate a second hypothesis:

H2: The employment and earnings advantage of workers with vocational education over workers with a lower level of education is larger in Switzerland than in the United Kingdom, thanks to the higher specialisation and standardisation of Switzerland's VET system.

1.6 Available empirical evidence

The question of returns to education has been widely studied from many different perspectives. In a reference review, David Card (1999) focuses on the returns to an additional year of education without distinguishing between vocational and general tracks. Furthermore, this approach does not consider the differences across the career but only looks at the average returns.

Recently, these two aspects – distinction between vocational and general education and the differences across the career – have been taken into account in two important articles. Hanushek and colleagues (2017, but circulating already in 2011 in an influential working paper) examined the labour-market advantage of vocational versus general education in 11 countries. Based on the International Adult Literacy Survey, they show that the initial advantage of vocational education decreases with age, especially in countries with a large apprenticeship system. Forster and colleagues (2016) present similar results considering the early advantage and late disadvantage of vocational education on general education, while controlling for competency and parental education. However, they do not confirm that the effect is larger in countries with a strong vocational system.

While these two articles have the advantage of covering a range of countries, they do not take into account the distinction between age effect and cohort effect: the career pattern is

obtained by adding the situation of each respondent by age. However, it is not certain that the situation of someone at 60 reflects the situation that a person of 30 in the survey will experience 30 years later. Articles following a cohort, or a pseudo-cohort, solve this problem by following an age group over time. In these situations, the observed effect is clearly an age effect, because the cohort is the same for all the observations.

Some studies examine the UK or Switzerland specifically. Dearden and colleagues (2000, 2002) show that academic qualifications have higher wage returns than vocational education in Britain. However, the authors also find that when the time needed to acquire qualifications is taken into consideration, this effect is smaller, since vocational education takes less time to complete. Brunello and Rocco (2015) examine two UK cohorts and find an early employment advantage of vocational education in comparison with academic education, which declines during the career but does not disappear. On the contrary, holders of vocational education have a disadvantage in comparison with holders of academic education in terms of wages, with lower earnings growth over the career. Similar results are presented by Weber (2011) and Korber and Oesch (2016) for Switzerland.

However, these results do not address the question of whether holders of vocational education have an advantage over individuals who have no more than compulsory education. As far as we know, two papers address this question for the United Kingdom and Switzerland. Jenkins and colleagues (2007) find mixed returns for England for vocational education at a lower level (level 2), but positive returns for vocational education at an intermediate level (level 3). In Switzerland, Weber (2011) finds that the wage growth of workers with a lower level of education than an apprenticeship is larger than for workers with an apprenticeship.

2. Data and Method

2.1 Data

Our analyses are based on the UK Labour Force Survey (UKLFS) 1993-2014 and the Swiss Labour Force Survey (SLFS) 1991-2014, pooling the available rounds. This allows us to work on large datasets taking into account a period of more than twenty years. To restrict our analysis to a more homogeneous group, we focus on one cohort. To be able to observe workers from 25 to 60, we follow the cohort 1954-1968 over the 22 (UKLFS) and 24 (SLFS) rounds. Because the same individual is not observed several times (we do not take the mini-

panel structure of the SLFS into account) we use a pseudo-cohort design. According to Deaton (1985), pseudo-panels – and pseudo-cohorts – have some advantages over “real” panels: a lower attrition rate, better representativeness (due to a larger number of observed individuals for a given number of observations) and a lower impact of measurement errors. After selecting the two educational groups of interest for this article (upper secondary vocational education and compulsory education and lower born between 1954 and 1968), the sample sizes are 214,826 for the United Kingdom and 72,945 for Switzerland.

The structure of the population in terms of educational level is not exactly the same in Switzerland and in the United Kingdom, as presented in Table 1. The main difference between the United Kingdom and Switzerland is the importance of the upper and intermediate secondary education categories (upper secondary: 20 per cent UK vs 49 per cent CH; intermediate secondary 22 per cent UK vs 4 per cent CH). If we do not distinguish between upper and intermediate secondary, the rate of secondary education is not too different in the two countries (42 per cent in the United Kingdom and 53 in Switzerland), but the share of vocational education is more than two times lower in the UK (44 per cent against 17). However, the general structure is similar, with around 30 per cent of the population highly educated (tertiary level of education) and around 15 to 20 per cent with lower education (compulsory or lower).

Table 1: Distribution of the population aged 25–60 across education in the United Kingdom and in Switzerland, cohort born 1954-1968

	United Kingdom	Switzerland
Tertiary	27%	31%
Upper secondary	20%	49%
<i>general</i>	7%	7%
<i>vocational</i>	13%	42%
Intermediate secondary	22%	4%
<i>general</i>	19%	2%
<i>vocational</i>	4%	2%
Compulsory or lower	22%	15%
Other/missing	8%	1%
<i>Total</i>	<i>100%</i>	<i>100%</i>

UK Labour Force Survey 1993–2014 (N=614,293) and Swiss Labour Force Survey 1991–2014 (N=126,859), own calculation.

Unweighted results. After verification, the proportion of each group is similar to the weighted ones.

Details of each category in Table A.1 in the Appendix

This paper focuses on vocational education at the upper secondary level, the main category for vocational education in the two countries. In the United Kingdom, the category “vocational education at the upper secondary level” is split into several programmes: trade apprenticeships representing slightly more than half the category (55 per cent), the National Vocational Qualification at level 3 (NVQ3) represents 15 per cent, the Business and Technology Education Council (BTEC) and similar 14 per cent, and the City and Guilds advanced craft 14 per cent. In Switzerland, the firm-based apprenticeship is dominant with 86 per cent of the category. The remaining 14 per cent have attended a full-time school vocational programme, which leads to the same certificate as the apprenticeship (Federal VET Diplomas).

The group of comparison for this article is holders of compulsory school level or lower education (called *lower*). It includes persons with compulsory school as the highest level of education, those who have not completed school, and those who have followed short programs giving no access to the intermediate secondary level of education. In the United Kingdom, 87 per cent of this group have attended compulsory school or less, and 13 per cent have completed a short training which is lower than secondary education such as city and guilds part 1. In Switzerland, the share of persons having attended only compulsory school or lower is 94 per cent, and only 6 per cent have completed a short training with a lower level of education.

2.2 Dependent, independent and control variables

The two dependent variables are employment and wages. Employment is calculated with a binary variable taking the value of 1 if the person works at least 8 hours per week, and 0 if the person works less than 8 hours per week or not at all (this last category includes housework, education, retirement, illness, etc.)¹. Income is measured as the hourly wage, calculated by dividing the gross annual work income by the number of hours worked (number per week multiplied by 52)². The gross annual work income corresponds to the wages of employees, without self-employed workers and employers who are not available in the UK Labour Force Survey and excluded in the Swiss Labour Force Survey. It is corrected for inflation with December 2010 as the reference. We exclude the top and lower 1 per cent of the wage distribution as well as wages of workers working less than 8 hours per week from our models.

The number of observations is lower for wages than for employment: firstly, the questions about wages are not asked in each wave of the UK Labour Force Survey and secondly, the wage variables contain a higher rate of missing data, due to the sensitivity of the questions. For this reason, annual wages are available for 34,044 individuals in the UK Labour Force Survey and 49,293 in the Swiss Labour Force Survey³.

The two key independent variables are education (vocational education versus lower education) and age (from 25 to 60). As control variables, we use the region (split into 20 regions for the United Kingdom and into the 26 cantons for Switzerland) and nationality. All results are presented separately for men and women, since labour market trajectories differ between the two groups.

2.3 Regression model and multivariate results

We calculate linear regression models to predict employment and wages by education for men and women. The equation is the same for the two dependent variables and is given as:

$$y_i = \beta_1 + \beta_2 educ_i + \beta_3 age_i + \beta_4 age_i^2 + \beta_5 age_i^3 + \beta_6 age_i^4 + \beta_7 educ_i * age_i + \beta_8 educ_i * age_i^2 + \beta_9 educ_i * age_i^3 + \beta_{10} educ_i * age_i^4 + \beta_{11} W_i + \epsilon_i$$

Where y_i is first a binary variable (0/1) measuring if the person works or not and secondly the natural logarithm of hourly wage for an individual at a given moment, W_i is a vector of controls composed of the region and nationality and ϵ_i is the error term. The two key independent variables are *educ* and *age*. The binary variable *educ* indicates whether the person has an upper secondary vocational level of education, or a lower level of education. The variable *age* indicates the age of the respondent and is developed into four forms: *age*, *age squared*, *age cubed* and *age to the power of four*. These variables enable us to account for the non-linear effect of age on the life-cycle curves in employment and wages, in particular for women. Each of the forms is then interacted with *educ*, since we expect a different age curve of the dependent variables depending on the education. We present our results graphically due to the large number of interaction terms.

2.4 Causality and selection

The level of education of an individual – upper-secondary vocational education or mandatory education – is not randomly assigned but rather the result of a selection process, driven by individual choices, personal abilities, social origin and regional circumstances. Individuals are indeed selected and select themselves into educational tracks, which tend to lead them to different situations on the labour market. For this reason, this article does not claim to identify a causal link between education and the labour market situation, but shows the difference between two groups (upper secondary vocational education and lower education) on the labour market in two different countries over the life-course. This design presents a population association and allows us to observe the differences across the life-course and the national contexts. The strategy of selecting a specific cohort (1954–1968) enables us to focus on two groups that faced the same educational and labour market context at a given age.

3. Employment trajectories in the United Kingdom and in Switzerland

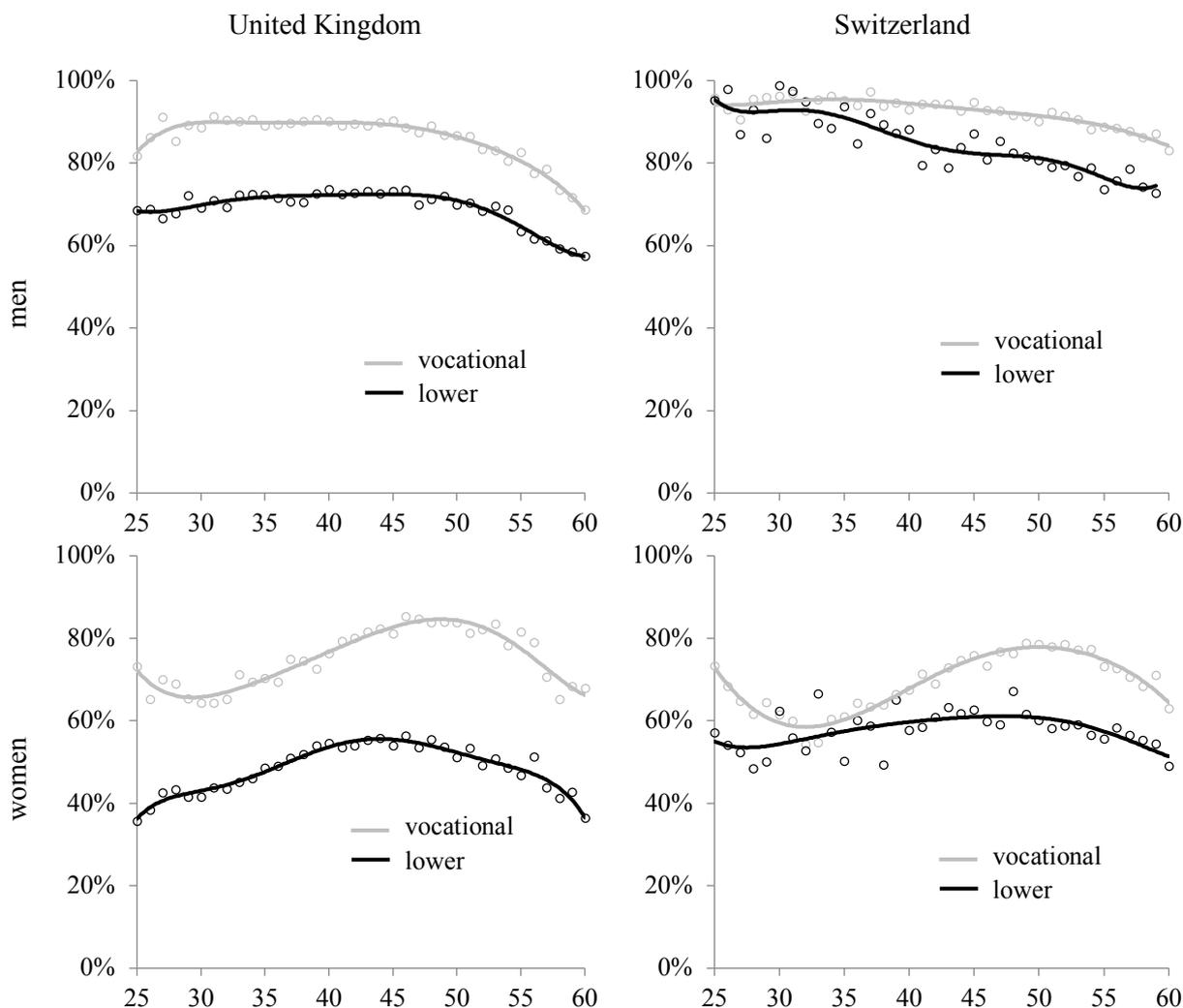
The four graphs of Figure 1 present descriptive evidence for the employment rate over the life-course for men and women, in the United Kingdom (left) and in Switzerland (right) for the two groups of interest: holders of an upper secondary vocational level of education (vocational) and holders of a compulsory school level or lower (lower).

We observe three important aspects: (i) For men and women, in Switzerland and the UK, the employment rate of holders of vocational education is higher than the employment rate of holders of lower education; (ii) this difference is greater in the United Kingdom than in Switzerland; (iii) this difference seems stable during the career in the UK, but tends to increase across the career for Swiss men, and women after the age of 35.

In the United Kingdom, the employment rate of holders of vocational education remains high during the entire career, at around 90 per cent until the age of 50 for men, and between 65 and 85 per cent for women. In comparison, the employment rate of holders of lower education follows a similar trend but lies 17 (men) to 27 (women) percentage points lower.

In Switzerland, the employment rate is comparable for the two groups of men until the age of 35 (with 95 per cent on average between 25 and 35 for holders of vocational education and 93 per cent for holders of lower education). After this period, the employment rate of

holders of lower education gradually decreases to 70 per cent at the age of 60⁴, while that of holders of vocational education remains almost constant until the age of 60.



UK Labour Force Survey 1993–2014 and Swiss Labour Force Survey 1991–2014, cohort 1954–1968

Black and grey lines represent the polynomial trend line for the respective groups.

Figure 1: Employment rate (minimum 8 hours per week) for men and women by level of education and age: upper secondary vocational education (vocational) and compulsory school or lower (lower)

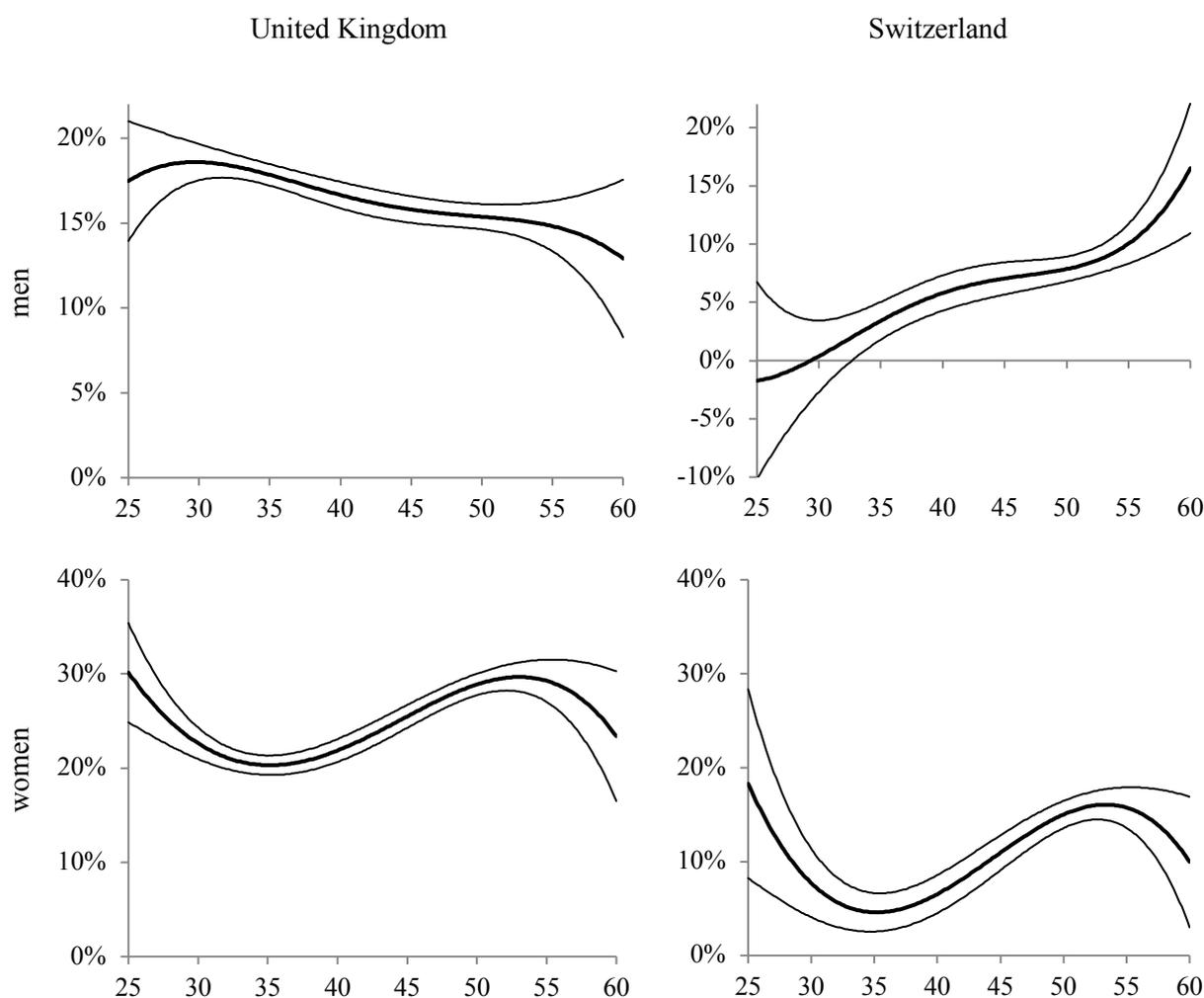
Women in Switzerland with vocational education have a similar employment rate as women with lower education during the first part of their career (around 60 per cent between 30 and 40 years old). After this period, the employment rate of women with vocational

education increases (to almost 80 per cent around the age of 50), while that of women with lower education remains basically flat at 60 per cent⁵.

The results presented here consider as workers all the persons working at least 8 hours per week. As a robustness check, we examine the employment rate for workers employed at least 20 hours per week (see Figure A.1 in the appendix). The only notable change concerns the employment rate of women which is lower with this second threshold. However, the differences between holders of vocational education and holders of lower education remain unchanged.

In the two countries, the category *upper secondary vocational education* is composed of several different diplomas (UK: apprenticeship, city and guilds advanced, BTEC and NVQ3 and CH: apprenticeship and vocational school). Figures A.2 in the appendix present the employment rate split by type of vocational track. These results are presented for the entire available population (and not only the cohort 1954-1968) to obtain a sufficient number of observations. Despite some heterogeneity among vocational education, the employment rate of the different vocational tracks is systematically higher than the employment rate of the holders of lower education over the entire career for men and women in the two countries, which validates the decision to keep the different VET tracks together. However, we observe for the UK that holders of apprenticeships have a lower employment rate than holders of other vocational education tracks, especially among women. This is not the case in Switzerland, where graduates of vocational schools and holders of an apprenticeship have similar employment rates.

We provide a more stringent test of our hypotheses by resorting to a multivariate design. We estimate the employment rate and hourly wage of each group at each age, based on linear regression models. We present the coefficients in the appendix (Tables A.2 and A.3). Figure 2 shows the advantage of vocational education, in comparison with lower education, based on these regressions (average marginal effect).



UK Labour Force Survey 1993–2014 and Swiss Labour Force Survey 1991–2014, cohort 1954–1968

Main line: average marginal effect. Thinner lines: 95% confidence intervals.

Figure 2: difference in employment by age for upper-secondary vocational relative to lower education (average marginal effects)

Overall, the employment advantage of vocational education is larger in the United Kingdom than in Switzerland, and larger for women than for men in the two countries. More specifically, for men, we can observe an opposite trend in the two countries. The advantage of holders of vocational education is high at the beginning of the career in the UK (17 percentage points) and decreases slightly during the career to 13 points. In Switzerland, there is no significant advantage of vocational education on employment at the beginning of the career for men. However, the advantage of VET increases during the career and men with vocational

education have, on average, an employment rate that is 17 percentage points higher at the age of 60.

For women, the trend over the career is similar in the two countries with the employment rate difference between the two educational groups taking the shape of a horizontal “S”: the advantage is particularly high at the age of 25, lower at 35, high again at 55, and decreases again during the last 5 years observed. However, the level of the vocational advantage for women is higher in the UK – where it fluctuates between 20 and 30 per cent – than in Switzerland – where the evolution is between 5 and 20 per cent.

4. Wage trajectories in the United Kingdom and in Switzerland

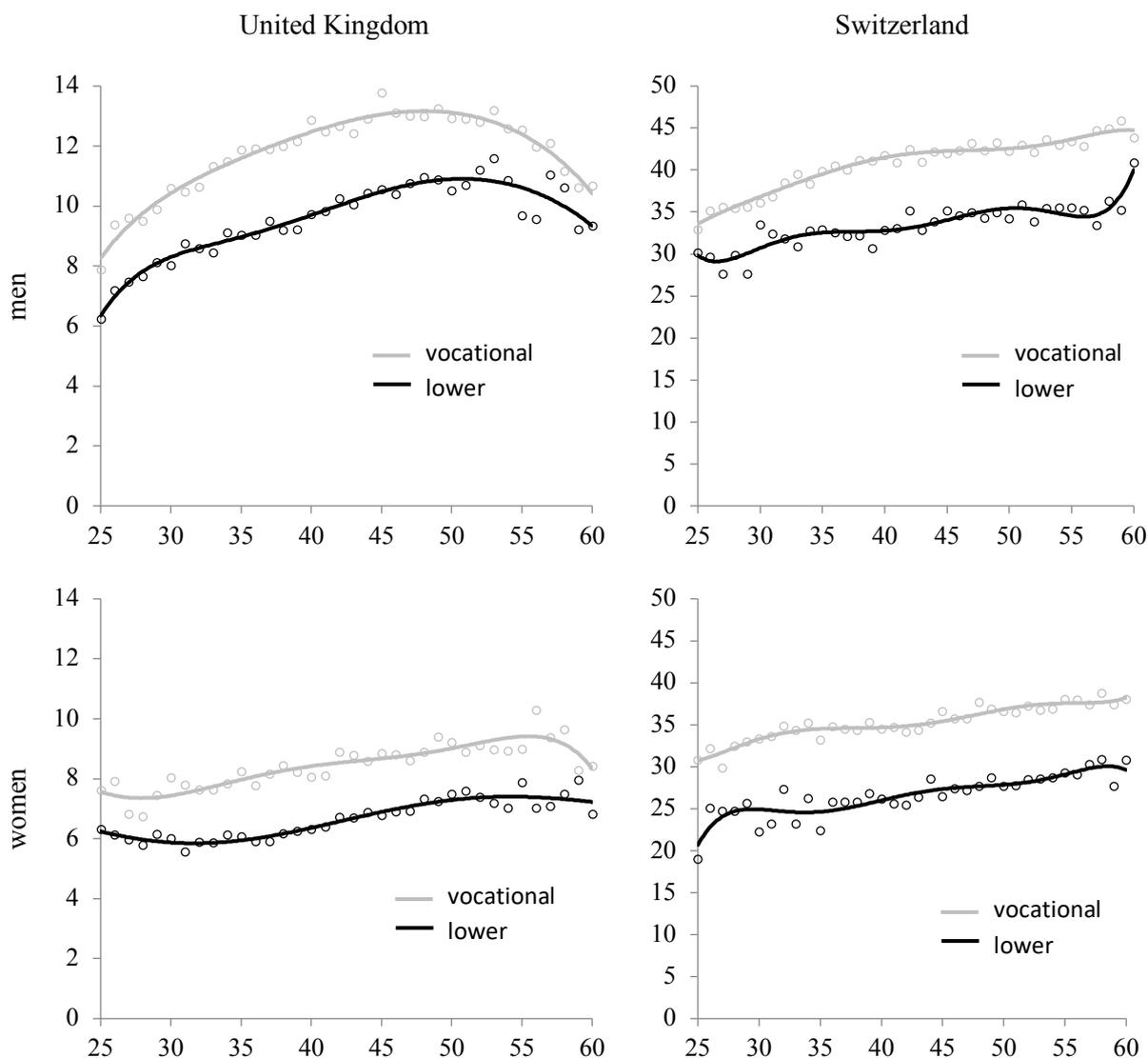
Figure 3 presents descriptive results for the hourly wage over the life-course for holders of an upper secondary vocational level of education and holders of a compulsory school level or lower. Each point represents the median hourly wage for a specific age and the line shows the general trend.

As with the employment rate, the hourly wages of holders of vocational education are higher than those of holders of lower education among men and women, in the United Kingdom and in Switzerland. Overall, the difference between holders of vocational education and holders of lower education remains rather stable across the career, but tends to be smaller at the end of the career for men in the UK. The hourly wage increases more during the career for men than for women in the two countries.

In the UK, the mean difference in the hourly wage between holders of lower education and those with upper secondary vocational education is around 20 per cent for both men and women. The difference is greater between the ages of 30 and 40 for both men and women, but never exceeds 27 per cent. Men and women are in different situations in terms of hourly wage growth during the career. Between the ages of 25 and 45, the hourly wage increases by 75 per cent for men with vocational education and by 69 per cent for men with lower education while they increase by only 27 per cent for women with vocational education, and by 19 per cent for women with lower education⁶.

In Switzerland, the mean difference between holders of vocational education and lower education is 18 per cent for men and 25 per cent for women. Contrary to the UK, the growth

of hourly wage between the ages of 25 and 60 is similar for men and women. The gender gap – which means the difference between the hourly wage of men and women – is larger for holders of lower education (-20 per cent on average) than for holders of vocational education (-14 per cent on average).



UK Labour Force Survey 1993–2014 and Swiss Labour Force Survey 1991–2014, cohort 1954–1968

Black and grey lines represent the polynomial trend line for the respective groups.

Median hourly wage for the cohort 1954–1968: UK £13, CH CHF48

Figure 3: Median hourly wage (£/hour for UK, CHF/hour for Switzerland) for men and women by level of education: upper secondary vocational education (vocational) and compulsory school level or lower (lower).

We replicate this analysis with the annual median wages (see Figure A.3 in the appendix). This second measure does not take the number of working hours into account. It is then less suitable to measure the “hourly price” (and therefore productivity), but informs us about the money wages available to the respondents. If these two indicators present very similar trends for men, the situation is slightly different for women.

To take the heterogeneity of the vocational track into account, the annual work income is also presented for the different VET tracks – for the entire available population and not only the 1954–1968 cohort, due to small numbers of observations (Figures A.4). As with employment, annual wages of holders of vocational education are systematically higher than wages of holders of lower education regardless of the type of vocational degree.

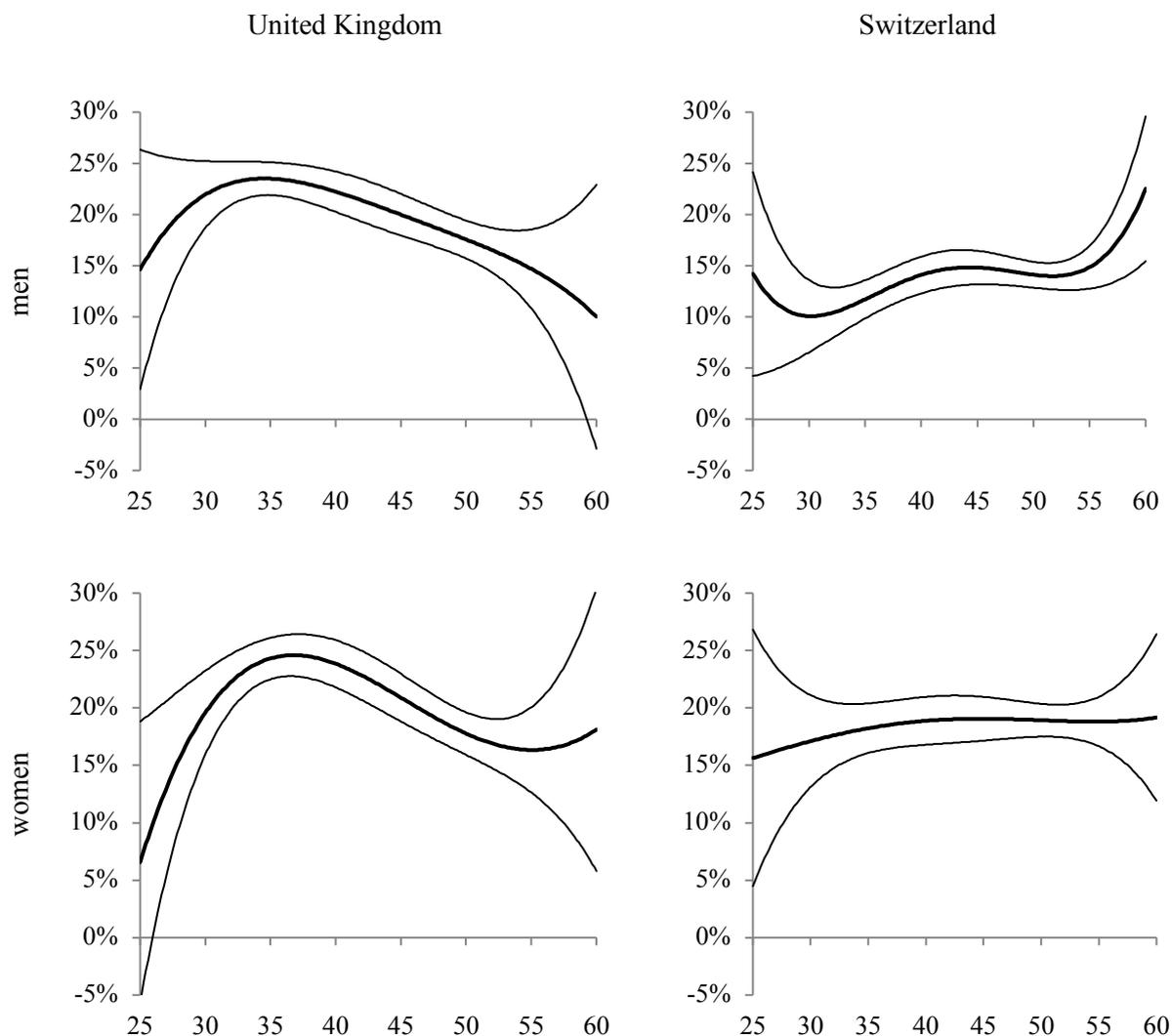
We turn again to our multivariate model and show in Figure 4 the predicted advantage of vocational education in hourly wages on lower levels of education, based on linear regression models. On average over the entire career, the wage advantage of vocational education is similar in the two countries: 18 per cent for men and women in the UK as well as for women in Switzerland, and 15 per cent for Swiss men. However, the evolution during the career differs between the two countries.

In the United Kingdom, the advantage of VET increases between 25 and 35, and decreases afterwards. The initial increase is more pronounced for women than for men (respectively from 7 per cent to 24 per cent and from 15 per cent to 24 per cent). Afterwards, the advantage decreases for men and women to about 15 per cent at the age of 55.

In Switzerland, the wage advantage of vocational education is more stable during the career. It is almost constant for women, going from 16 per cent at the age of 25 to 19 per cent at 60. This small increase is not statistically significant since the confidence intervals around the value at the age of 25 and the one at the age of 60 overlap. For men, the increase between the ages of 30 (10 per cent) and 60 (23 per cent) is statistically significant.

The advantage of vocational education on annual wage is presented in the Appendix (Figure A.5). While the observation of this measure leads us to similar conclusions than the observation of the hourly wage, we can observe one interesting difference. Men and women with lower education seem to not only receive a lower hourly wage in both country, but also

tend to work less hours per week. Therefore, the advantage of vocationally trained men becomes larger when we look at hourly than annual wages.



UK Labour Force Survey 1993–2014 and Swiss Labour Force Survey 1991–2014, cohort 1954–1968

Main line: average marginal effect. Thinner lines: 95% confidence intervals.

Figure 4: difference in hourly wage by age for upper-secondary vocational relative to lower education (average marginal effects)

5. Discussion and conclusion

The evolution of employment and wages from 25 to 60 does not follow a linear trend. Our main results are (i) a constant advantage of holders of vocational education over those with lower education in the two countries, for both men and women, and during the entire career – with rare exceptions where the difference is not statistically significant; (ii) for employment, a larger advantage of VET in the UK than in Switzerland and for women than for men; (iii) for hourly wage, a similar advantage over the career for men and women in the two countries. Let us look in greater detail at the results to answer our hypotheses about the evolution during the career.

The trend is clear for men in Switzerland, with an increase of both the advantage in terms of employment and in terms of hourly wage over the career. In this situation, having obtained a VET diploma seems to lead to a mechanism of cumulative advantage where vocationally trained men in Switzerland getting a better and better situation on the labour market in comparison with their peers without upper-secondary degree.

For women in Switzerland, the trend is different, and the underlying mechanisms may be not the same. The advantage of VET on employment rate takes a horizontal “S” shape which may be more linked to family tasks than to demand on the labour market. It seems indeed plausible that women with vocational education – with higher average salaries – have more room for manoeuvre considering their personal or household income, and modify their situation on the labour market more than those with lower education and lower average wages. This mechanism may explain the decrease of the employment rate around the age of 35 for women with vocational education and, to some extent, the stronger decrease of employment rate between 55 and 60 for Swiss women with vocational education than for those with lower education. It is indeed easier to reduce the employment rate or to stop working after a certain age – to take care of parents or grandchildren for example – if the (previous) salary is higher.

In the United Kingdom, the trend for men is different and less linear than in Switzerland. During the beginning of the career, between 25 and 35, we observe an increase in the wage advantage of vocational education, and a stable advantage in the employment rate. However, the advantage of holders of VET diminishes after the age of 35 up to the age of 60. As argued in human capital theory, the signal of a VET degree may be less important after

individuals acquire a certain amount of work experience and the difference between the two educational groups possibly decreases thanks to the more similar skills acquired by experience.

These mechanisms seem to affect women in the United Kingdom as well, at least in terms of hourly wages. As for men in the UK, the advantage of vocational education increases indeed between 25 and 35, and then decreases. However, the situation is different for employment. As for women in Switzerland, the employment rate of vocationally trained women in the UK fluctuates more over the life-course and thus seems affected by family commitments. The difference in the UK between the employment rate of vocationally trained women and women with lower education follows the same trend as in Switzerland. However, it is interesting to note that the employment advantage of VET is, on average, clearly larger in the UK than in Switzerland.

We do not have a simple answer to our first hypothesis. Results for men and women in the UK tend to confirm hypothesis H1a, which expected a decreasing advantage of vocational education over the career. However, this is only valid after the age of 35. On the contrary, results for Swiss men confirm hypothesis H1b, showing an increase of the vocational advantage over the career. For women in Switzerland, we find none of the predicted trend, but have a stable effect on wages and a horizontal “S” curve for employment. This shows the importance of accounting for the involvement of a large share of women in household tasks and family life in predicting the evolution of labour market careers.

Contrary to hypothesis H2 – expecting a larger advantage of vocational education in Switzerland than in the United Kingdom – we observe a larger advantage in the UK, especially in terms of employment. The larger difference of employment advantage may be due to a stronger selection process at the upper secondary vocational education level in the UK than in Switzerland. The proportion of the population with this level of education is indeed substantially larger in Switzerland than in the UK. However, because the difference in terms of wage is similar in the two countries, we could also interpret this result as showing an overall stronger labour demand in Switzerland for workers, even without qualification. In a context of almost full employment, as is the case in Switzerland, many employers may have no other choice than to appoint unqualified workers.

This article contributes to the field of returns to vocational education by comparing this group with holders of lower education. Our article follows a group of people born, educated

and entering the labour market at the same period over their entire career, with the method of a pseudo-cohort. This enables us, to some extent, to isolate the age effect while avoiding period effect. This has been possible by pooling data from 22 (UKLFS) and 24 (SLFS) rounds.

Our results clearly highlight the better position on the labour market for holders of vocational education than holders of lower education, in terms of employment prospects and wages over the entire career. Vocational education appears not only as a key to enter the labour market, but also a shield against non-employment and very low wages. If women's careers are more affected by family events than men's, we nevertheless observe an advantage of vocational education for both men and women.

The effort of strengthening vocational tracks in the educational system appears then as clearly relevant, not only to avoid educational drop-outs but also to offer better opportunities on the labour market to youth less interested, or having more difficulties, with general education. This conclusion can be drawn for a nationally standardised system such as Switzerland, as well as for a less standardised context such as the United Kingdom.

However, it is important to keep in mind the limitations of this article. First of all, our results do not derive from a causal design, which means this article is unable to prove that the difference between the two groups comes from the level of education. It has indeed been shown in the literature that (self) selection in educational tracks not only depends on ability, but also on other factors such as social origin (Erikson and Rudolphi 2009, Erikson and Jonsson 1996, Goldthorpe 1996). The population association presented in this article does not take this selection bias into account, due to the lack of relevant information in the datasets. Presenting a detailed, and career-long, description of the labour-market situation of the two groups appears nevertheless interesting to us.

Finally, it is also important to remember that we present respondents who entered the labour-market 30 to 45 years ago. In a context of globalisation and digitalisation, it is difficult to predict how the careers of youth entering the labour-market nowadays will evolve. However, the high employment rates of our study's cohort today – who are now in their fifties and early sixties – strongly suggest that the demand for vocationally-trained workers will not only persist, but also continue to exceed that for non-qualified workers. The challenge for governments may then be the constant modernisation of vocational systems in order to face the increasing importance of information technology in most vocational domains.

6. Notes

¹ Additional results considering workers working at least 20 hours per week are shown in the appendix.

² Additional results for annual work income are shown in the appendix.

³ Due to the availability of this information in the SLFS, we have imputed part of the missing wage data with a regression model containing age, year, canton, type of municipality, residential permit and nationality, occupation studied, hours worked, sector of activity, current occupation, and employment status. This allows us to reduce the number of missing earnings from 12,661 (12.9% of the workers) to 670 (less than 0.1%).

⁴ This decrease seems primarily to be due to an increasing rate of withdrawal from the labour market (6 per cent between 40 and 49 and 12 per cent between 50 and 60), while unemployment does not increase (7 per cent between 40 and 49 and 5 per cent between 50 and 60). However, these situations are self-reported and the number of observations per age for each category is limited.

⁵ The curve of the “lower” groups – both for men and women – is less stable, especially during the first part of the career. This is partly due to a smaller number of observations in the “lower” group than in the “vocational” one (men: 7,726 vs 25,227; women: 11,533 vs 27,981).

⁶ The decrease of the hourly wage observed for men in the UK after the age of 50 may be the result of decreasing productivity due to a difficulty to adapt to new technologies for example, but may also be due to a measurement effect. There is indeed a “mechanic” tendency of wages to decrease for older workers when observing more than one birth year cohort (here: fifteen). Because of wage growth across time, the salary at a given age of a person born several years later is on average higher than that of a person born earlier (for more details on this effect, see Baudelot 1982).

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Appendix*Tables**Table A.1: Definition of educational categories, United Kingdom and Switzerland*

	United Kingdom	Switzerland
Tertiary	higher education below degree, degree or higher	university, technical college and tertiary vocational education
Upper secondary	A level or equivalent, apprenticeship above foundation level, city and guilds advanced craft and similar	apprenticeship and baccalaureate
Intermediate secondary	GCSE A-C or equivalent, apprenticeship foundation level, city and guilds craft part 2 and similar	one or two years of internship or commercial school
Compulsory or lower	primary/compulsory school, unfinished school and no qualifications	

Table A.2: OLS regression coefficients for being in employment (min. 8 hours per week)

	men		women		
	estimate	std. e	estimate	std. e	
UKLFS	age	0.919	0.817	-3.751	0.917
	age ²	-0.364	0.301	1.418	0.338
	age ³	0.068	0.048	-0.221	0.054
	age ⁴	-0.005	0.003	0.012	0.003
	educ: voc	-1.126	1.197	1.582	1.820
	age*educ: voc	1.327	1.200	-0.765	1.827
	age ² * educ: voc	-0.487	0.443	0.061	0.674
	age ³ * educ: voc	0.077	0.071	0.024	0.109
	age ⁴ * educ: voc	-0.004	0.004	-0.003	0.006
	constant	-0.371	0.816	3.745	0.915
	Adjusted R ²	0.077		0.077	
N	114,198		98,969		
SLFS	age	1.708	2.041	-4.690	2.468
	age ²	-0.684	0.731	1.726	0.886
	age ³	0.116	0.114	-0.268	0.139
	age ⁴	-0.007	0.007	0.015	0.008
	educ: voc	1.377	2.280	2.531	2.858
	age*educ: voc	-1.645	2.229	-1.712	2.804
	age ² * educ: voc	0.688	0.802	0.354	1.011
	age ³ * educ: voc	-0.120	0.126	-0.015	0.159
	age ⁴ * educ: voc	0.008	0.007	-0.001	0.009
	constant	-0.551	2.095	5.150	2.527
	Adjusted R ²	0.057		0.041	
N	32,869		38,858		

UKLFS: UK Labour Force Survey 1993–2014

SLFS: Swiss Labour Force Survey 1991–2014, cohort 1954–1968

Controls include region and nationality.

Age variables have been divided by 10 (i.e. age 25 is expressed as 2.5, age 45 as 4.5).

Coefficients in bold are significant at $p < 0.05$.

Table A.3: OLS regression coefficients for log hourly wage

	men		women		
	estimate	std. e	estimate	std. e	
UKLFS	age	6.065	2.476	0.628	2.157
	age ²	-2.239	0.903	-0.480	0.786
	age ³	0.375	0.144	0.121	0.125
	age ⁴	-0.023	0.008	-0.010	0.007
	educ: voc	-2.850	3.504	-3.204	3.627
	age*educ: voc	2.767	3.473	2.644	3.585
	age ² * educ: voc	-0.911	1.269	-0.709	1.306
	age ³ * educ: voc	0.131	0.203	0.077	0.208
	age ⁴ * educ: voc	-0.007	0.012	-0.003	0.012
	constant	-4.262	2.501	1.720	2.183
	Adjusted R ²	0.125		0.157	
N	18,542		14,042		
SLFS	age	4.300	2.480	1.432	2.680
	age ²	-1.403	0.891	-0.448	0.959
	age ³	0.206	0.140	0.065	0.150
	age ⁴	-0.011	0.008	-0.004	0.009
	educ: voc	4.817	2.739	0.193	3.043
	age*educ: voc	-4.850	2.684	-0.123	2.972
	age ² * educ: voc	1.820	0.968	0.075	1.068
	age ³ * educ: voc	-0.295	0.152	-0.015	0.167
	age ⁴ * educ: voc	0.018	0.009	0.001	0.010
	constant	-1.339	2.540	1.623	2.756
	Adjusted R ²	0.191		0.146	
N	21,452		21,249		

UKLFS: UK Labour Force Survey 1993–2014

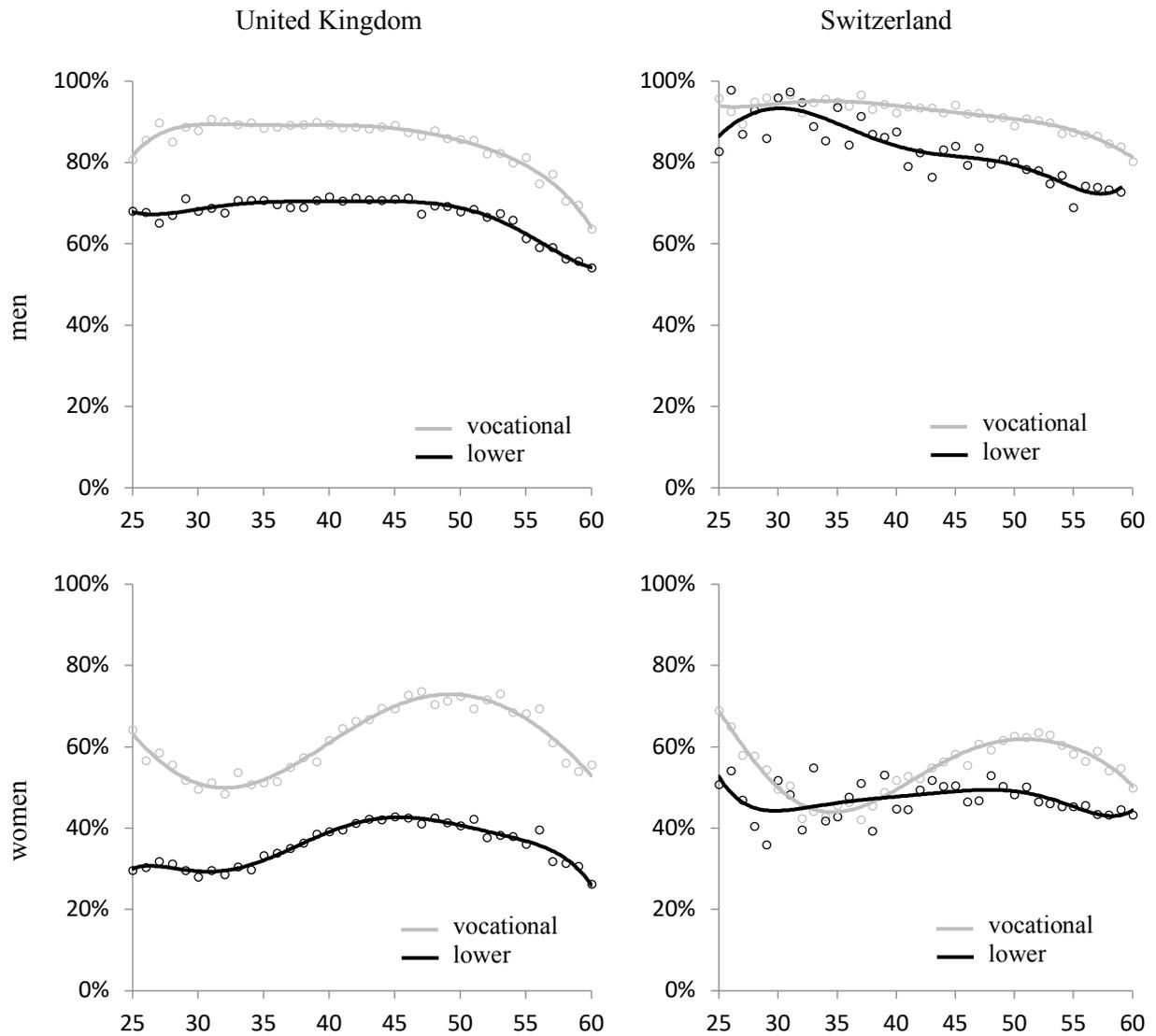
SLFS: Swiss Labour Force Survey 1991–2014, cohort 1954–1968

Controls include region and nationality.

Age variables have been divided by 10 (i.e. age 25 is expressed as 2.5, age 45 as 4.5).

Coefficients in bold are significant at $p < 0.05$.

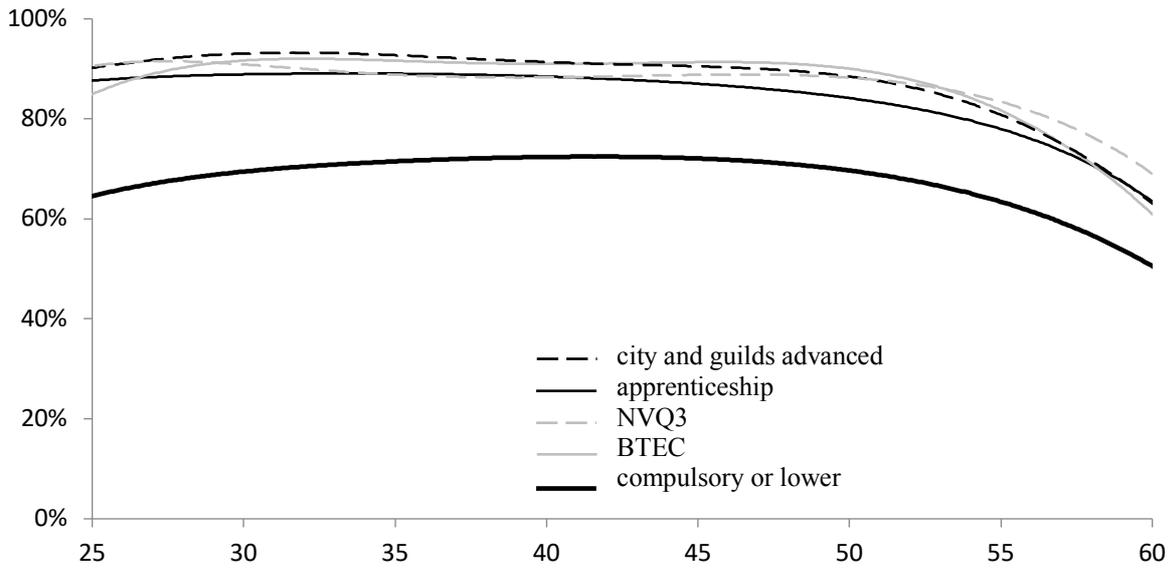
Figures



UK Labour Force Survey 1993–2014 and Swiss Labour Force Survey 1991–2014, cohort 1954–1968

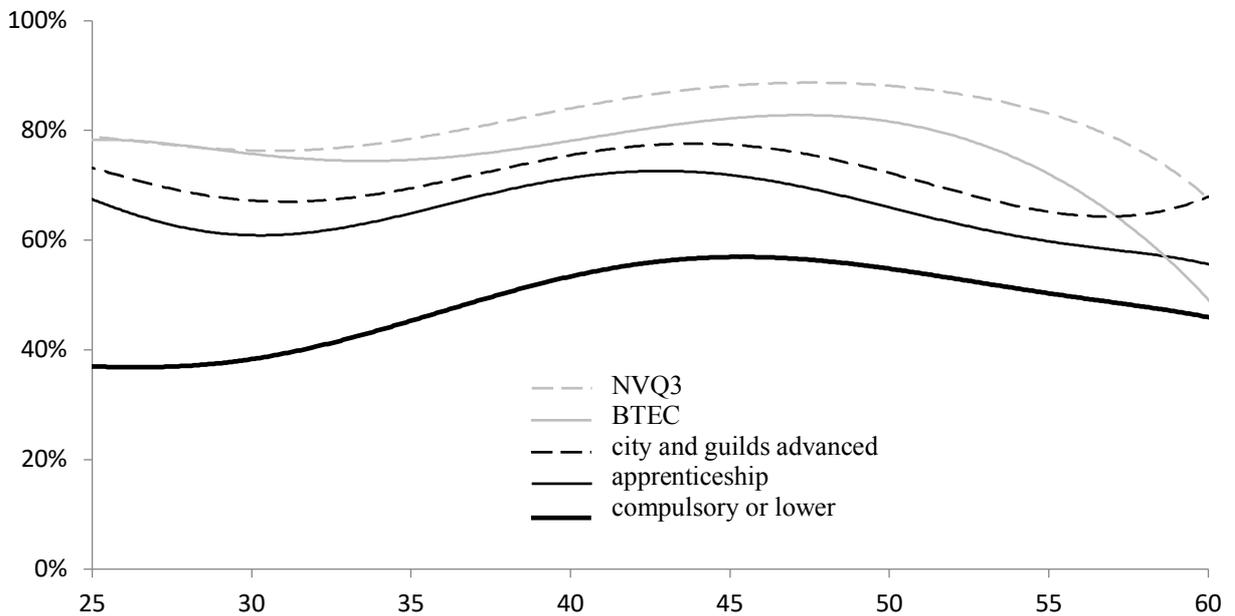
Figure A.1: Employment rate (min. 20 hours per week) for men and women by level of education: upper secondary vocational education (vocational) and compulsory school level or lower (lower)

A.2a: Men – United Kingdom



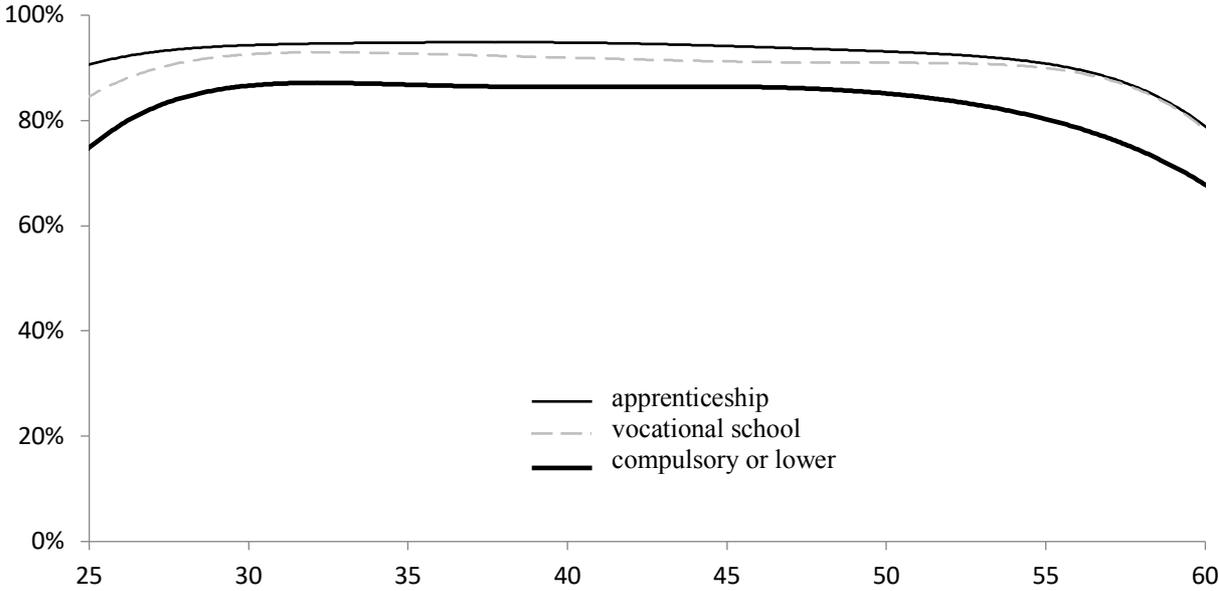
UK Labour Force Survey 1993–2014

A.2b: Women – United Kingdom



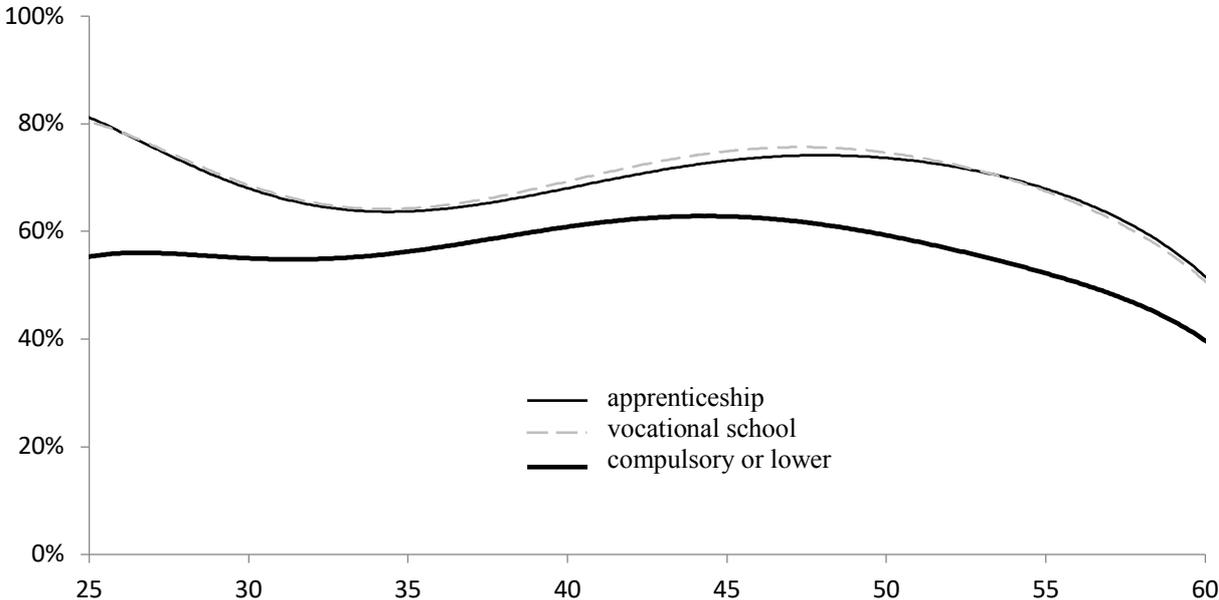
UK Labour Force Survey 1993–2014

A.2c: Men – Switzerland



Swiss Labour Force Survey 1991–2014

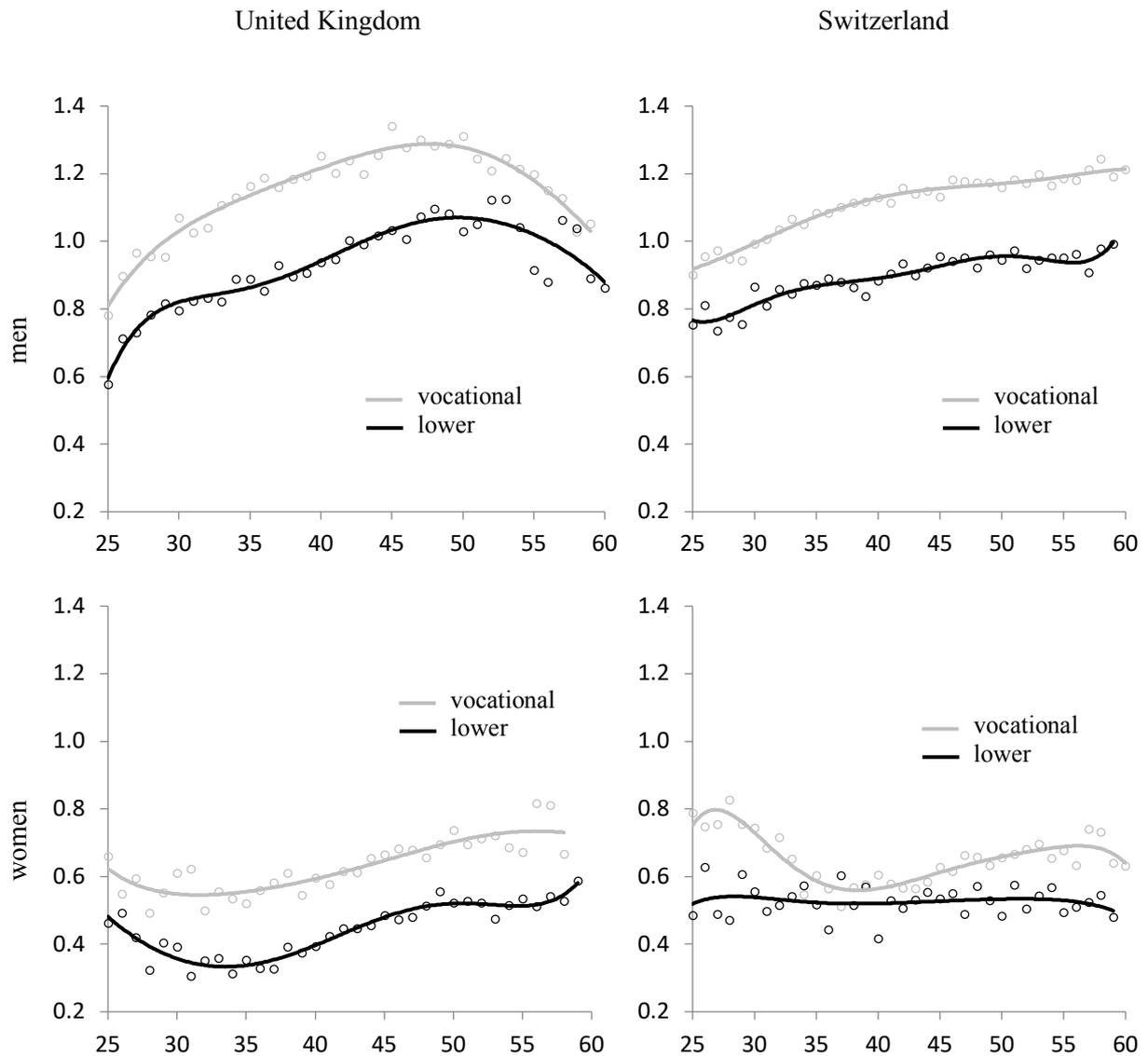
A.2d: Women – Switzerland



Swiss Labour Force Survey 1991–2014

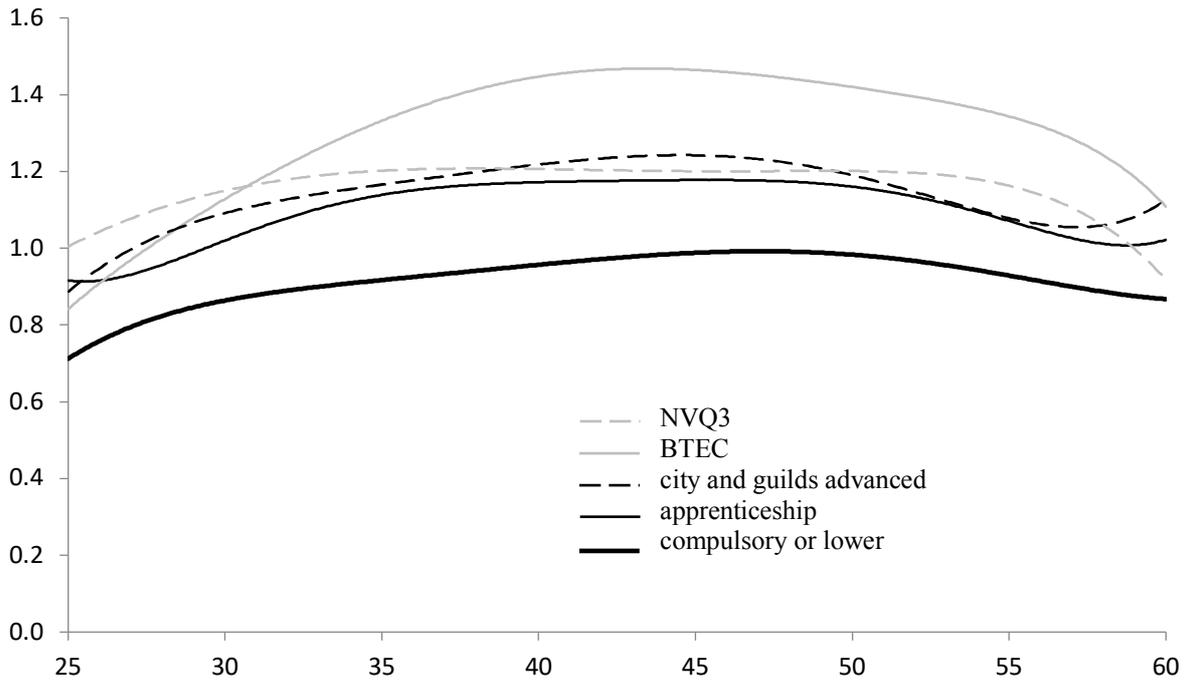
Figure A.2a-d: Employment rate (min. 8 hours per week) by type of upper secondary vocational education

It is of little interest to compare absolute wages between the United Kingdom and Switzerland, since the purchasing power and tax systems are different. For this reason, we do not present wages in real pounds or Swiss francs, but the wages relative to the national median wage in each country. The median annual wage for the cohort 1954–1968 corrected for inflation (expressed in 2010 values) is £ 21,025 in the UK for the period 1993–2014, and CHF 72,300 in Switzerland for 1991–2014. These amounts represent the benchmarks in each country (e.g. value of one).



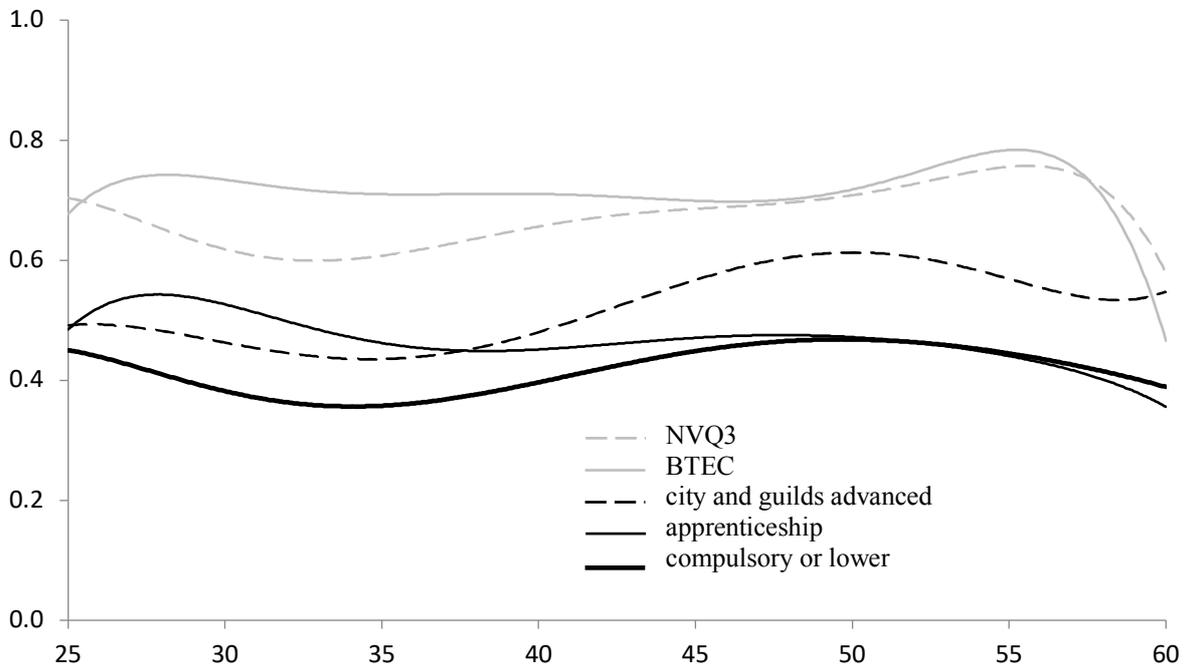
UK Labour Force Survey 1993–2014 and Swiss Labour Force Survey 1991–2014, cohort 1954–1968

Figure A.3: Median annual work income for men and women by level of education: upper secondary vocational education (vocational) and compulsory school level or lower (lower)



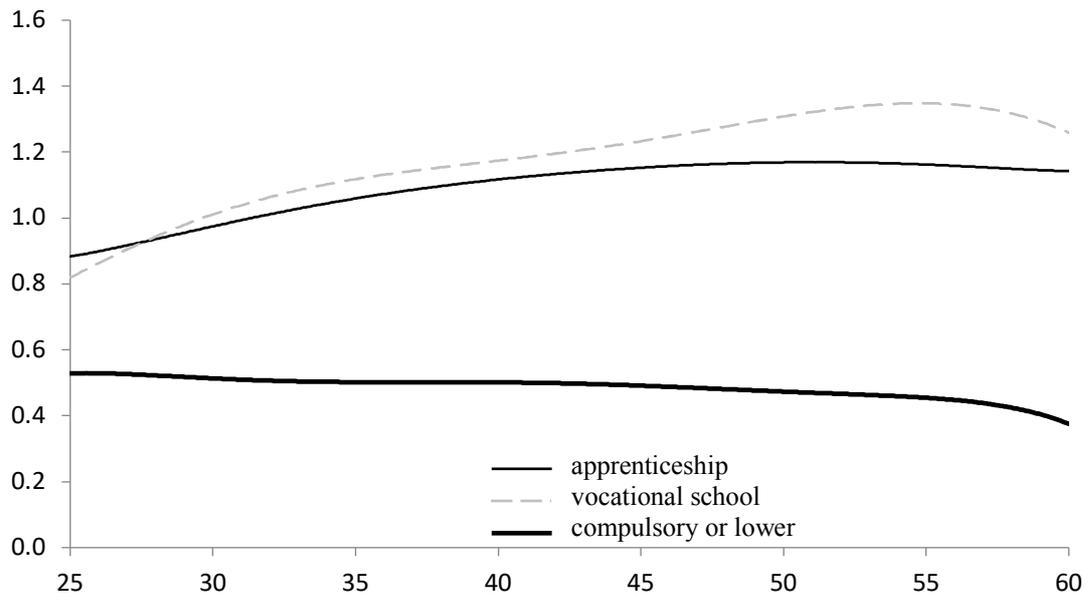
UK Labour Force Survey 1993–2014, 1 = median annual income for UK (£21,025)

A.4b: Women – United Kingdom



UK Labour Force Survey 1993–2014, 1 = median annual income for UK (£21,025)

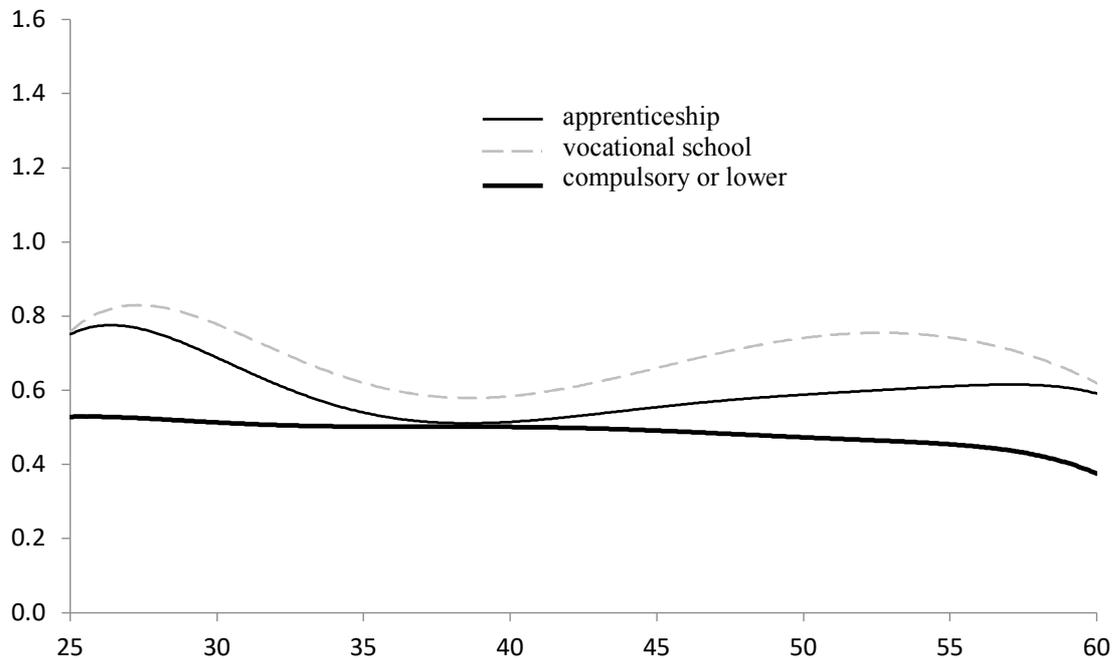
A.4c: Men – Switzerland



Swiss

Labour Force Survey 1991–2014, 1 = median annual work income for CH (CHF72,300)

A.4d: Women – Switzerland

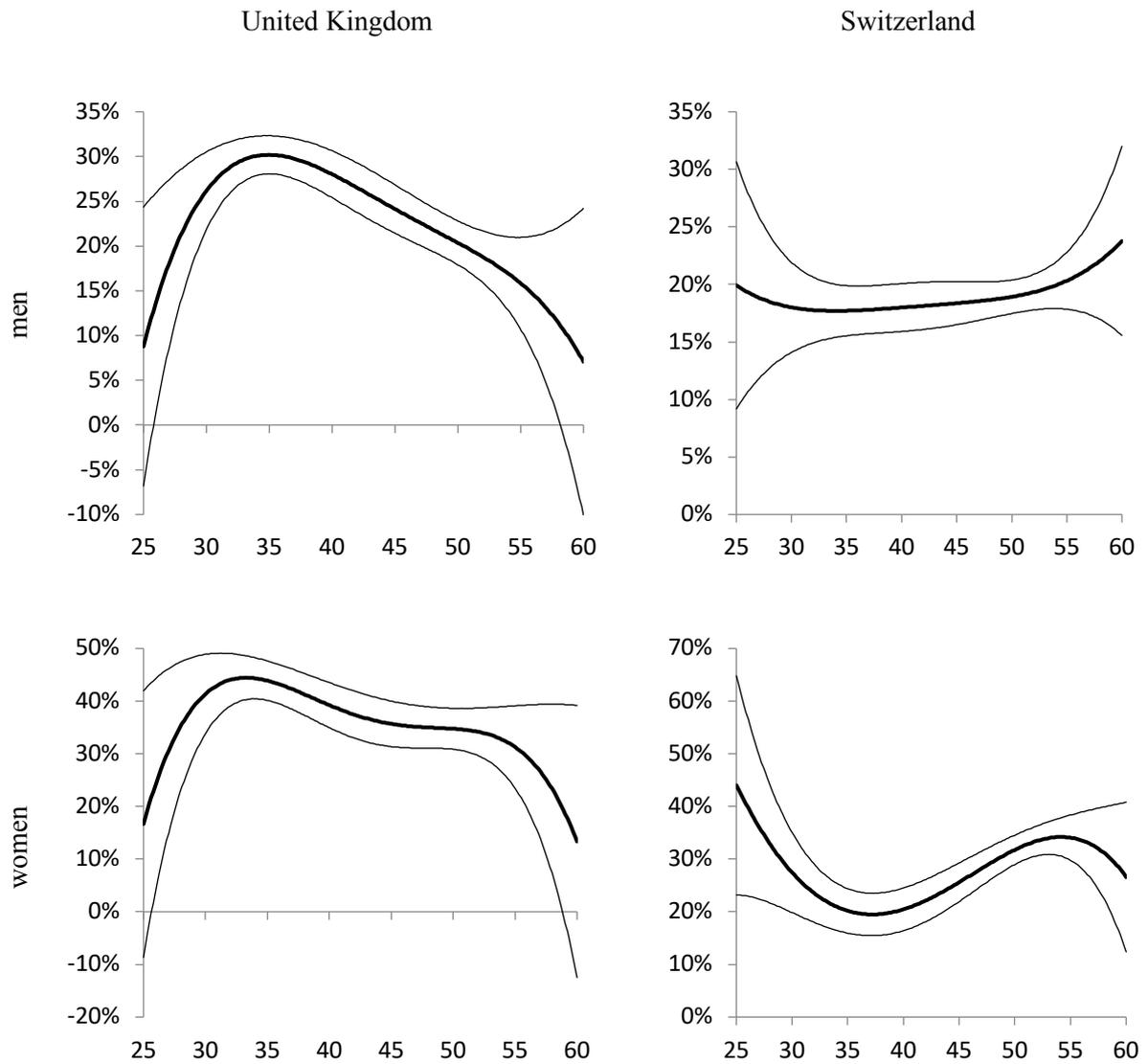


Swiss

Labour Force Survey 1991–2014, 1 = median annual work income for CH (CHF72,300)

Figure A.4: Median annual work income by type of upper secondary vocational education

A.4a: Men – United Kingdom



UK Labour Force Survey 1993–2014 and Swiss Labour Force Survey 1991–2014, cohort 1954–1968

Main line: average marginal effect. Thinner lines: 95% confidence intervals.

Figure A.5: difference in annual wages by age for upper-secondary vocational relative to lower education (average marginal effects)