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Business Cycles and School-to-Work Transitions for Vocational Students: The Role of General Skills and Educational Opportunities^{*}

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Abstract

This paper examines whether general skills and universal access to higher education (HE) shape vocational students' school-to-work transitions during recessions. We study how increased unemployment affects post-completion outcomes across institutional regimes that differ in curricular emphasis on general skills and access to HE – allowing us to identify effects of general skills alone and combined with HE access. Relative to a setting with limited general skills and no universal HE access, combining general skills with universal HE access more than halves labour-market scarring on earnings over the first six years after completion. General skills alone do not meaningfully affect labour-market scarring.

Keywords: Dual vocational systems, general skills, access to higher education, business cycle fluctuations, scarring effects

JEL Codes: I28, I24, I21

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I. Introduction

Vocational education and training (VET) enrolls approximately 36.7% of 15- to 19-year-olds in the OECD (OECD, 2023).¹ This makes the design of vocational education an important policy issue. A central challenge is balancing the provision of occupation-specific skills, which provide a smooth school-to-work transition, with general skills, which may enhance adaptability to changing labour market conditions. However, the extent to which individuals can utilise these general skills may depend on their educational opportunities, which can vary substantially across countries and over time. In this paper, we study whether a greater emphasis on general skills in vocational education mitigates labour-market scarring during economic downturns, and whether providing vocational graduates with universal access to higher education (HE) further reduces such scarring effects.

While existing research has primarily examined how labour-market institutions affect scarring effects (Genda et al., 2010; Cockx and Ghirelli, 2016), less attention has been paid to the role of education system design.² We address this gap by exploiting three distinct institutional regimes in the Norwegian vocational system that differ in their emphasis on general skills and the availability of pathways to HE:

1. **Pre-1994 system:** Vocational education focuses primarily on field-specific theoretical instruction combined with practical training through school workshops or apprenticeships (Bertrand et al., 2021), with no universal pathway to HE.

¹ See Figure 1.

² However, some research investigating the importance of general or occupation-specific skills when exposed to business-cycle fluctuations for individuals already in the labour market, which provides mixed results: Eggenberger et al. (2022) find that those in occupations with more occupation-specific skills are more vulnerable to labour market shocks. Hall (2016) on the other hand finds that an educational reform in Sweden that increased the general component of vocational education did not impact individuals' exposure to the 2008-2010 recession. A finding she attributes to the lower upper secondary school completion induced by the education reform.

2. **Post-1994³ system without universal HE access:** The 1994 reform increases the emphasis on general education within vocational programmes but does not provide universal access to an academic supplementary year, which, upon completion, grants eligibility for HE.
3. **Post-1994 system with universal HE access:** From 2014 onward, students completing vocational education are granted a legal right to an academic supplementary year offered by upper secondary schools. Completion of this programme qualifies students for entry into HE on the same terms as those in the academic track.

This staggered policy change—introduction of general skills in 1994 and universal access to an academic supplementary year in 2014—allows us to separately identify the contribution of general skill acquisition alone and combined with access to further education. For each institutional regime, we exploit within local labour market (LLM) variation in unemployment rates across cohorts at the time individuals complete vocational education, conditional on unemployment rate at enrolment. This approach compares individuals completing vocational education in the same local labour markets but facing different labour market conditions at the time of completion.

Comparing outcomes across institutional settings, we find that individuals completing vocational education during the most recent regime—combining an emphasis on general skills with universal access to the academic supplementary year—experience the most favourable outcomes when graduating in periods of high unemployment. Higher unemployment redirects a substantial share of individuals into HE, resulting in a smaller increase in the share of

³ The 1994 reform introduced general education as a key component in vocational education (Bertrand et al., 2021), requiring students to complete a common core in mathematics, science, and social science. The system followed a dual model, combining two years of school-based instruction with two years of apprenticeship with practical on-the-job training. In 2021 less than half (about 40%) of vocational upper secondary school students across OECD countries were enrolled in such dual systems (OECD, 2023).

individuals neither in education nor work and weaker scarring effects on earnings relative to earlier regimes. Relative to a setting with limited general skills and no universal HE access, scarring effects on earnings over the first six years after completion are more than halved. Our results also suggest that universal HE access had an equalising effect across socioeconomic groups. In contrast, increasing the emphasis on general skills without expanding access to further education—as in the 1994 reform—does not appear to improve outcomes.

This paper contributes to several strands of the literature. First, we contribute to the literature on VET and labour market trajectories (Hampf and Wößmann, 2017; Hanushek et al., 2017) by examining how labour market trajectories are affected by the inclusion of general skills and access to further education. In contrast to existing research, which primarily compares systems that differ in the extent of industry-based training, we examine how access to higher education (HE) mediates this relationship. Second, we contribute to the literature on scarring effects (Oreopoulos et al., 2012; Schwandt and von Wachter, 2019; von Wachter, 2020) by examining how these are affected by features of the education system. While the existing literature has primarily emphasised the role of labour market institutions (Genda et al., 2010; Cockx and Ghirelli, 2016), we show that both general skill provision and access to further education play a role in mitigating scarring effects.

Overall, our results show that vocational systems that combine general skill development with accessible pathways to further education are better able to shield vocational students from adverse labour market conditions at labour market entry. We interpret these findings as evidence of the importance of education system design. Given that the Norwegian vocational system shares several institutional features with vocational systems in other OECD countries, these findings have implications beyond the Norwegian context.

II. Institutional background

The Norwegian school system

Norwegian compulsory education covers ten years of schooling, and students typically complete lower secondary school at 16. Upon applying to upper secondary education, students can choose the academic or vocational track, and about 50% of each cohort enrol in the vocational track.

Vocational education: The vocational education system follows a dual model, combining two years of school-based instruction with two years of apprenticeship providing on-the-job training. After completing the apprenticeship period, students must pass a practical examination to obtain their trade certificate, which marks the completion of vocational education.

Currently, vocational students choose between nine programmes in the first year⁴: 1) Electrical Engineering; 2) Design and Crafts; 3) Healthcare, Child and Youth Development; 4) Building and Construction; 5) Agriculture, Fishing and Forestry; 6) Restaurant and Food Processing; 7) Service and Logistics; 8) Technological and Industrial Production; and 9) Media and Communication.⁵ After completing the first year of the school-based component, students choose a further specialisation that prepares them for specific apprenticeships.

We focus on two major institutional changes in the Norwegian vocational system. First, the 1994 reform increased the emphasis on general education within vocational programmes. Second, from 2014 onward, vocational graduates were granted a universal right to enroll in an academic supplementary programme offered by upper secondary schools. Completion of this

⁴ The structure of vocational programs underwent some changes during our study period. To ensure consistency over time, we applied a crosswalk—details can be found in online Appendix B.

⁵ Although Media and Communication is formally classified as a vocational track, in practice, few students end up with vocational qualifications (Frøseth & Vibe, 2014).

programme grants access to HE. These changes created variation in both the general skill content of vocational education and access to further education.

The 1994 reform – increased emphasis on general skills: Prior to 1994, vocational education varied in structure across programmes and placed greater emphasis on occupation-specific skills. The 1994 reform standardised the structure of vocational programmes and introduced a stronger emphasis on general education. With this reform, general education was included as a key component in vocational education (Bertrand et al., 2021), requiring students to complete a common core in mathematics, science, and social science. The reform also formalised the current dual model of two years of school-based instruction followed by two years of apprenticeship training.

Access to HE before 2014: Historically, access to HE after the completion of vocational education has been little streamlined and dependent on trade certificate. Prior to the 1994 reform, there was no unified pathway for obtaining access to HE after completing vocational education. Depending on their track, students could gain entry to specialised HE programmes or enrol in academic supplementary programmes offered at different education levels. Another alternative was to enrol in the first year of the academic track, thus moving horizontally in the education system.

Following the 1994 reform, access to HE required obtaining a General Higher Education Entrance Qualification (GHEEQ) (Hovdhaugen et al., 2025). For students in the vocational track, this could be obtained by completing an academic supplementary year provided by upper secondary schools. This qualified them for entry into HE on the same terms as students from the academic track. However, this supplementary year was primarily designed for students who switched to the academic track before completing vocational education. For individuals who had already completed vocational education, access to this programme prior to 2014 depended on regional availability and administrative discretion. Although for some students completing

specific specialisations within specific tracks, there were opportunities to pursue a GHEEQ by completing specially tailored courses. In addition, following the 1994 reform, individuals who had completed vocational education had no legal right to further upper secondary education, restricting their ability to move horizontally within the education system (NOU 2018: 15).

Additional pathways to HE were introduced in the early 2000s. One such pathway is the vocational route⁶, which allows applicants with specific trade certificates to gain direct admission to selected bachelor's programmes, most notably in engineering.⁷ Another pathway operates through Higher vocational education (HMET), which has offered GHEEQ since 2009 (NOU 2022:17). However, this option is only available to holders of certain trade certificates and requires two years of study.⁸

Overall, although several pathways to HE existed, access was neither streamlined nor universally available to all vocational graduates, as it depended on regional availability and educational specialisation.

Universal access to HE after 2014: This changed for individuals completing vocational education from 2014 onwards. From 2014, vocational graduates obtained a legal right to enroll in the academic supplementary year, granting universal access to HE (Prop. 68 L, 2013–2014).

Importantly, this legal right affected individuals completing vocational education from 2014 onwards, while earlier cohorts faced limited and regionally determined access to the academic supplementary programme. This institutional change therefore provides a source of variation in access to higher education for otherwise comparable vocational graduates.

Finally, while the introduction of this legal right represents the most important institutional change during our study period, the HMET system also underwent consolidation and standardisation in the early 2000s. This process gradually expanded the number of

⁶ In Norwegian this is referred to as “Y-veien”

⁷ This route remains small, accounting for only 0.5% of HE students in 2023 (Schmees, et al., 2025a).

⁸ In practice, not many students pursued this path (Schmees et al., 2025b).

programmes (Høst and Michelsen, 2021), making HVET a somewhat more relevant pathway to further education towards the end of our sample period.

Business cycle fluctuations and schooling

The state of the local labour market can impact students' decisions to stay in school (Becker, 1964). According to human capital theory, there are two opposing effects. First, the opportunity cost of time spent in school is higher in times of lower unemployment. If individuals put a higher value on short-term rewards, they may be more inclined to work instead of staying in school. Second, if these labour market opportunities are also suggestive of increased returns to schooling, this creates incentives to stay in school. In times of higher unemployment, there are fewer job opportunities, which may increase students' interest in staying in education. The returns to additional schooling may also be lower during these periods, which can reduce the overall incentive to remain in school. However, during periods of high unemployment many of these decisions may be outside individuals' control.

The extent to which vocational education equips students with the necessary skills to pursue further studies, as well as the opportunities available for continuing education, can also vary significantly across systems. Similar to Germany's vocational system, Norway's current system combines classroom learning with employer-based apprenticeships (OECD, 2025; Martin, 2011). However, the German vocational system arguably places greater emphasis on occupation-specific skills compared to Norway's post-1994 reform system. Furthermore, while access to higher education is theoretically possible in Germany, it remains highly limited in practice (Schmees et al., 2025a).

III. Data, Sample Selection and Descriptive Statistics

Data

We use Norwegian register data with personal identifiers that allow us to merge information from different registers and to link children and parents. The registers contain information on background characteristics and educational attainment and labour-market outcomes.

We use the information on individuals' municipality of residence at age 16 to define their local labour market (LLM). The 428 municipalities that existed in 2013 are grouped into 160 LLMs based on commuting patterns according to the LLMs defined by Gundersen and Juvkam (2013).

The unemployment rate, expressed as a share of the labour force, is only available at the national level. We therefore construct a measure of local labour-market conditions using municipality-level information on unemployment. Specifically, we divide the yearly average number of unemployed individuals by the total number of individuals aged 16–66.⁹ We then multiply this ratio by 100. This measure allows us to capture cohort-specific variation in local labour-market conditions at the time individuals complete vocational education, which is the key source of identifying variation in our empirical analysis. Because not all individuals aged 16–66 participate in the labour force, this measure likely understates the unemployment rate. However, this does not pose a concern for our analysis, as our focus is not on the level of unemployment but on within LLM variation in unemployment over time, which captures transitory fluctuations in local labour-market conditions.

We use the following individual-level background characteristics: gender, minority background, and parental education. Parental education is measured in the year the individual turns 16, which corresponds to the year individuals typically enter upper secondary education.

⁹ This information comes from the Norwegian Agency for Shared Services in Education and Research (Sikt) which maintains a database of municipality-level information.

Minority background is defined as born in Norway to two foreign-born parents (descendants) or born abroad to two foreign-born parents (immigrants). Parental education, based on the highest level of education completed by the parents, is categorised into four groups: compulsory education or less, upper secondary education, HE, and a category for missing information on parental education. As parental education has risen substantially over time with increased HE participation, we also use parental earnings rank as a proxy for socio-economic background. The earnings rank is based on all individuals in the same birth cohort and gender as the parent.

The individual-level data include information on educational trajectories (up to 2022), earnings (up to 2022), and employment (up to 2023). Using this data, we investigate the longer-run impact of economic conditions at the time individuals complete vocational education on 1) employment status, 2) earning, and 3) educational activities.

Throughout the paper, we index outcomes relative to the year of vocational completion (t). We measure educational activity and earnings from year t to $t+5$, allowing us to measure educational outcomes within six years of completion. Because employment data are available for a longer period, we measure employment outcomes up to year $t+6$.

Employment: We define an indicator variable equal to 1 if the individual is registered as employed in year t up to $t+6$. Employment is measured annually as of the third week in November. Vocational students typically complete their education before the summer. As a result, employment observed in year t largely reflects post-completion labour-market outcomes.

Earnings: Adverse economic conditions at labour-market entry may affect not only employment prospects but also earnings. This can occur through periods of non-employment or through lower wages due to poorer job matches or slower human-capital accumulation. To evaluate this impact, we use information on annual pension qualifying earnings year-by-year

from the year they complete vocational education (year t) up to five years after completion ($t+5$).¹⁰

Educational activities: To increase their prospects on the labour market, and as an alternative to not working or taking a lower paid job, individuals may move into different types of educational activities. We have year-by-year information on enrolment and highest complete education, measured annually as of October 1. We distinguish between different types of educational activities: upper secondary education, the academic supplementary year, HVET, and HE. Due to data availability, we can follow all individuals in our sample from t to $t+5$. This allows us to examine whether increased unemployment at the time of completion affects the highest education level attained within six years of completion.

Not in education or work: By combining the information on education and employment, we also create indicator variables for individuals who are neither enrolled in education nor employed at time t to $t+5$.

Sample selection

Our sample consists of individuals who completed the vocational track between 1989 and 2017. We restrict the sample to individuals who enrolled in upper secondary education at the normal age, defined as 15–17. We only include individuals who completed a vocational degree within 6 years of enrolling in vocational education.¹¹

The exact structure of the different vocational programmes changed somewhat during our empirical period. To keep the sample consistent across time periods, our starting point is the nine vocational tracks that exist in the last year of our empirical period: 1) Electrical Engineering, 2) Design and Crafts, 3) Healthcare, Child and Youth Development, 4) Building

¹⁰ This includes all income from business or work.

¹¹ It is important to note that although 50% of a cohort enrolls in the vocational track, many either drop out or switch tracks, resulting in only around 25% of each vocational cohort completing their education on time (<https://www.ssb.no/utdanning/videregaende-utdanning/artikler/alle-med-yrkesfaglig-utdanning-i-norge-er-i-jobb>). Consequently, when we restrict our sample to individuals who complete a vocational degree within six years, we are capturing about 25% of a cohort.

and Construction, 5) Agriculture, Fishing and Forestry, 6) Restaurant and Food Processing, 7) Service and Logistics, 8) Technological and Industrial Production, and 9) Media and Communication. Each of these tracks includes vocational educations with distinct six-digit codes based on the Norwegian Standard Classification of Education (NUS2000) system. These codes represent different specialisations within each track. Across time periods, individuals are assigned to one of the nine tracks listed above, based on the six-digit code of the vocational education they completed.¹²

Although Media and Communication is formally classified as a vocational track, in practice, few students end up with vocational qualifications (Frøseth and Vibe, 2014).¹³ As a result, we exclude individuals who completed this program from our sample.

Our focus is on how business-cycle fluctuations affect vocational students' outcomes across different educational contexts. We therefore limit our sample to individuals who complete tracks where the majority typically secure their first employment in the private sector, which is generally considered more vulnerable to business-cycle fluctuations. As a result, we exclude individuals from the Healthcare, Child, and Youth Development track, as approximately 70% of them secure their first employment in the public sector. For the remaining tracks, the corresponding proportion finding private sector employment is about 85% for Electrical Engineering, 95% for Design and Crafts, 91% for Building and Construction, 90% for Agriculture, Fishing and Forestry, 86% for Restaurant and Food Processing, 86% for Service and Logistics, and 90% for Technological and Industrial Production¹⁴.

In addition, to ensure that we are in fact including tracks where employment opportunities vary over the business cycle, we check how much post completion employment

¹² For more details on this crosswalk, refer to Online Appendix B.

¹³ E.g., following the 1994 reform, only a small proportion of these students pursued an apprenticeship after completing the school-based component of vocational education. Instead, most students enrolled directly in the academic supplementary year after completing the school-based portion of the program, subsequently transitioning to higher education.

¹⁴ This is based on own calculations from individuals completing the vocational track in the 2015-2017 period.

rates vary with the LLM unemployment rate at completion. To achieve this, we run a regression using employment at t to $t+6$ as dependent variables, while unemployment at the time of completion and enrollment, along with year and LLM fixed effects, serve as the independent variables. Coefficients on unemployment at completion are shown in Table 1. Based on this, we restrict our sample to individuals completing the following five most exposed tracks: 1) Building and construction, 2) Electrical engineering, 3) Agriculture and Fisheries, 4) Service and logistics, and 5) Technology and manufacturing. In Online Appendix G, we present the average effects across all eight tracks, with the results discussed in the *Robustness* subsection.

[Table 1]

Finally, we divide our sample into three groups to compare findings across the three distinct time periods in the vocational system:

1. Completed in the pre-1994 system: Individuals enrolling in vocational education between 1988 and 1993. At the time, vocational education mainly focused on theoretical instruction in a specific field, combined with practical training through school workshops or apprenticeships. Access to HE was not universally available.
2. Completed between 1998 and 2013: Individuals enrolling in vocational education no earlier than 1994 and completed between 1998 and 2013. This refers to the post-Reform 1994 education system, which incorporates a common core curriculum in mathematics, science, and social science. Access to HE was not universally available.
3. Completed between 2014 and 2017: This refers to the post-Reform 1994 education system, which incorporates a common core curriculum in

mathematics, science, and social science. Access to HE was universally available through the completion of an academic supplementary program.

We assign individuals to these three groups based on the year they first enrolled in the particular vocational education and/or the year of completion. Individuals who enrolled before 1994 are in group 1. Those who enrolled in 1994 or later but completed before 2013 are in group 2. Those who completed between 2014 and 2017 are in group 3.

Descriptive statistics

Tables C1 and C2 in the online Appendix present descriptive statistics on outcome variables and observable characteristics by completion period. Post-completion educational activities vary across periods, reflecting differences in the institutional availability of further education pathway. Two features of the sample are worth noting. First, since parental education levels have risen substantially over time¹⁵, we conduct subgroup analyses based on parental earnings terciles instead, which are noticeably more stable across periods. Parental earnings terciles are determined based on the parental earnings rank in the year the individual turned 16. The ranking and division into terciles are calculated within the same birth cohort and gender as the parent. Second, males are overrepresented throughout the period.

IV. Empirical Methodology

Our empirical strategy exploits variation in local labour-market conditions across cohorts within the local labour markets at the time individuals complete vocational education. Specifically, we compare individuals completing vocational education in the same local labour markets who faced similar economic conditions at enrolment but different unemployment rates

¹⁵ This reflects demographic changes seen at the population level during this period. This means that parental education level as a measure of socio-economic background poses challenges when comparing individuals with parents of differing education levels across time periods. For example, the group of individuals with less-educated parents in the earlier period will be qualitatively different from those with less-educated parents in the later period. See online Appendix C for details.

at the time of completion. This approach allows us to isolate the effect of transitory labour-market conditions at the time of completion. By examining how these shocks affect cohorts completing vocational education under different institutional regimes, we assess how the design of vocational education systems influences labour-market scarring.

Our empirical strategy thus exploits within-region, across-cohort variation in the local unemployment rate—conditional on the unemployment rate at enrollment—using the following empirical specification:

$$y_{icl} = \alpha + \beta_1 u_{cl}^c + \delta u_{cl}^e + \mu_l + \gamma_c + x_i + \varepsilon_{icl}, \quad (1)$$

Where y_{icl} is the outcome of individual i in cohort c who resides in the LLM l . u_{cl}^c refers to the unemployment rate faced by cohort c in LLM l upon completing vocational education and is our coefficient of interest. It captures the effect of a one-percentage-point increase in the local unemployment rate at the time of completion. Similarly, u_{cl}^e refers to the unemployment rate at enrolment.¹⁶ Our baseline specification includes cohort fixed effects (γ_c), which capture the common cohort effects across regions, and local labour market (μ_l) fixed effects, which capture cohort-invariant differences in the selection into the vocational track between regions (LLMs). In addition, we include individual-level controls for baseline characteristics (x_i) such as gender, minority background, and indicators for parental education level. We use robust standard errors to correct for heteroskedasticity and cluster the standard errors at the LLM level.

We implicitly assume that transitory changes in the unemployment rate after enrolment in the vocational track do not affect selection into completion. Under this assumption, individuals who complete under different economic conditions are comparable. To assess whether this assumption is reasonable, we examine whether predetermined (observable) individual characteristics respond to increases in the unemployment rate at completion.

¹⁶ We measure the unemployment rate at the time individuals enrolled in the vocational track they eventually completed.

In Table 2 we present the results from regressions where we replace the outcome measures, y_{ict} , in equation (1) with the various predetermined characteristics. Out of the 42 coefficients, only four are significant, and three of the four are only significant at the ten per cent level. Overall, this is more or less what is expected to happen by chance. This suggests that, by including LLM and cohort fixed effects and controlling for the unemployment rate at enrolment, we compare similar students who happen to make their school-to-work transition at different stages of the business cycle. While our sample is restricted to individuals who completed a vocational degree within six years of enrolment, the absence of systematic variation in observable characteristics with the unemployment rate at completion provides some reassurance that selective completion is unlikely to be a major driver of our results.

[Table 2]

V. Results

This section presents the effects of economic conditions at the time of vocational completion on employment, earnings, and educational outcomes. We begin by analysing the average impact of increased unemployment at completion on employment, educational activity, the share not in education, and work and earnings by completion period. We then provide subgroup-analyses by socio-economic background, proxied by mother’s earnings tercile when the individual was 16. Finally, in the *Robustness* subsection, we present a robustness check addressing a potential concern that our results may be driven by differences across time periods in which vocational tracks are exposed to business cycle fluctuations. Specifically, we report results for the same vocational track across all time periods.

In each subsection, we first present the effects of unemployment at completion on employment from year t to $t+5$. Because the employment effects of increased unemployment vary across reform periods (and across subgroups), comparing the raw coefficients on educational participation and log earnings is difficult to interpret directly. These coefficients

reflect both differences in educational contexts and differences in the initial impact on employment across time periods.

To facilitate comparison across periods and subgroups, we scale the coefficients on educational outcomes, not in education or work, and log earnings by the initial effect on employment (employment in year t), where all coefficients come from estimating Equation 1 with the various outcomes as dependent variables.¹⁷ The scaled coefficients are multiplied by 100, so that dichotomous dependent variables are expressed in percentage-point units. These coefficients can therefore be interpreted as the percentage-point change in the share of individuals pursuing a given activity following a one-percentage-point decrease in employment. For example, if we observe a 0.8 pp increase in the share of individuals enrolling in the academic supplementary year, this implies that 80% of the reduction in employment translates into additional enrolment in the academic supplementary year.

Average effects

In this subsection, we first present the average effect of an increase in the unemployment rate on employment. We then report the scaled effects on enrolment in the academic supplementary year, transition to (and completion of) HE, and earnings, which facilitate comparisons across institutional contexts.

Employment: Table 3 presents the average impact on employment of a 1 pp increase in the unemployment¹⁸ rate. Employment is measured annually each November, in the years

¹⁷ Effects on the “raw” coefficients are shown in the online appendices D, F, and H, J.

¹⁸ To assess the empirical variation underlying our estimates, we compute the residual variation from regressing unemployment at completion on unemployment at enrollment, conditional on year and region fixed effects. For the pooled sample, the standard deviation of residual unemployment at completion is approximately 0.45 percentage points, meaning a 1 pp change lies roughly 2 standard deviations from the mean. During this period about 3.5% of graduates experiencing a residual shock of 1pp or more in absolute value. Since this estimate partly reflects cross-period variation, we also report these figures by period. For graduates completing under the pre-1994 system, 1 SD corresponds to 0.39 pp, with 1.7% experiencing a shock of 1 pp or more. For those completing between 1998 and 2013, the corresponding figures are 0.31 pp and about 0.9% experiencing a shock of 1 pp or more. For the final period, they are 0.33 pp and 2.4%. Across all periods, a 1 pp change thus lies roughly 2.5–3 standard deviations from the mean. We nonetheless report effects per 1 pp for interpretability, which is consistent with what is typically done in existing literature.

following completion of vocational education. The results are displayed separately for each period. Note that employment in year t is measured in November, while students typically complete before the summer, meaning the year t coefficient likely represents the very short-term effects.

From the table, we observe that in the first period, a 1 pp increase in the unemployment rate reduces the share of individuals registered as employed in the year they complete their vocational education (year t) by 4 pp. For those completing after the 1994 reform but before universal access to HE (Panel B), the corresponding reduction is 4.9 pp. For those completing after the 1994 reform, during the period with universal access to HE through the academic supplementary programme (Panel C), the reduction increases to 5.9 pp.¹⁹

Typically, the negative effects of increased unemployment only last for two to three years (columns 1-3).²⁰ However, this varies by time of completion, where the negative impact on employment lasts longer during the mid-period. This is the post-reform period that offered the fewest opportunities to pursue further education. In contrast, although the largest negative employment effect in year t is observed in the final period, the effect fades more quickly. This discrepancy may reflect differences in educational opportunities across time periods, as the latter period offered accessible educational pathways for individuals unable to find

¹⁹ The effect of a one pp increase in the unemployment rate on year t employment is larger in the final period than in the two preceding periods. While we do not have a definitive explanation, two potential mechanisms are worth noting. First, universal HE access may itself contribute to this pattern: when labour market conditions deteriorate, students in the final period may immediately redirect into the academic supplementary year rather than attempting to enter the labour market, mechanically producing a larger negative employment effect at year t . Second, the same aggregate increase in unemployment may have heterogeneous effects depending on which industries or sectors are most affected. If the rise in unemployment in the final period was disproportionately concentrated in industries that typically employ apprentices, we would expect a stronger impact on this group relative to a comparable increase in unemployment driven primarily by contractions in other sectors.

²⁰ One concern is that the observed fadeout reflects path dependency in unemployment rates, whereby individuals graduating in periods of low unemployment subsequently face worsening labour-market conditions. In this scenario, the fadeout would be explained by declining employment rates among those graduating during low unemployment, rather than by individuals graduating during high unemployment catching up. However, in Online Appendix M, we provide analyses indicating that the employment rates of those completing during periods of relatively high unemployment gradually converge to the employment levels of those completing during periods of relatively low unemployment.

employment. If periods of inactivity hinder re-entry into the labour market relative to remaining in education, cross-period differences in educational opportunities may explain the observed pattern.

Finally, even though the negative impact on employment lasts only two to three years, this may mask scarring effects on earnings caused by factors such as poorer job matches, human capital depreciation during periods of inactivity, and other related mechanisms. We return to this issue when analysing the impact on earnings.

[Table 3]

Education: Figure 2 illustrates the scaled average effects on: a) enrolment in upper secondary education (excluding the academic supplementary programme), which reflects the horizontal movement within the education system; b) enrolment in HVET; c) enrolment in academic supplementary programmes; and d) enrolment in and completion of higher education (HE). The results are presented year by year and across the three time periods.²¹

In terms of educational participation, there are notable differences across time periods. Individuals completing the pre-Reform 1994 system respond to increased unemployment and lower employment rates by pursuing further education, although not in the same year as completion. This delay may reflect limited and less streamlined access to further education. Their primary response is to move horizontally within the education system. A 1 pp reduction in employment in year t leads to a 0.2–0.3 pp increase in enrolment in upper secondary education (excluding the academic supplementary programme) during years $t+1$ to $t+3$. There is no notable change in the share of individuals enrolling in HVET, only a 0.1 pp increase in enrolment in the academic supplementary programme in year $t+1$. Similarly, there is a 0.1 pp

²¹ Table equivalents are shown in online Appendix E.

increase in enrolment and completion of HE, but these effects are mostly statistically insignificant.

For individuals completing their education in the post-Reform 1994 system, but before universal access to HE was introduced, a 1 pp decrease in employment in year t leads to a 0.1 pp increase in enrolment in an academic qualification programme in year t , although this effect is not statistically significant. Additionally, we observe a 0.1–0.2 pp increase in enrolment in HE during years $t+1$ to $t+3$. There is also a 0.1 pp increase in HE completion within six years of completion ($t+5$). However, this effect is also not statistically significant. No measurable impacts are observed on enrolment in HVET or upper secondary education. The latter reflects the lack of a legal right to pursue a new upper secondary degree upon completion. Increased enrolment in HE, despite little impact on enrolment in an academic supplementary programme, could be the result of individuals gaining access to specific HE programmes through the so-called vocational route, which allows applicants with specific trade certificates to gain direct admission to selected bachelor's programmes.

For individuals completing their education in the most recent period, we observe the strongest and most sustained educational effects of a 1 pp reduction in employment at the time of completion. These individuals completed the same type of vocational education as those in the mid-period. However, unlike those in the mid-period, they completed at a time when the academic supplementary programme was universally accessible to all vocational graduates.

A 1 pp reduction in employment in year t results in a 0.4 pp increased enrolment in the academic supplementary programme in the same year, enrolment in HE increases by 0.3–0.4 pp in years $t+1$ to $t+3$, and the share of individuals completing HE increases by 0.3 pp by year $t+5$. Notably, we also observe a 1 pp increase in enrolment in HE in year t , similar to the mid-period. This may reflect the use of the vocational route, as discussed above. We also observe an increase in enrolment in HVET in year t to $t+1$ of about 0.2 pp. This may be due to the expansion

of HVET programmes over time, reflecting their increased relevance as a pathway for further specialisation among vocational graduates in the final period.

Taken together, these results show that increased unemployment at completion leads more individuals into HE in the period with universal access to the academic supplementary year, while having little effect in earlier periods without streamlined access to HE.

[Figure 2]

Not in education or work and earnings: Figure 3 shows the corresponding scaled results for a) the proportion of individuals neither in education nor work and b) log earnings. Results are shown separately year by year since completion (denoted t) and for the three time periods.

The differences in educational responses across time periods translate into corresponding differences in the share of individuals neither in education nor work. A 1 pp reduction in employment in the year of completion (year t) leads to a 0.8 pp increase in the share of individuals neither in education nor work for those completing in the pre-reform 1994 period, 0.7 pp for those completing in the post-reform period but before universal access to HE, and only 0.4 pp for individuals completing in the final period, which saw universal access to the academic supplementary programme. As time passes from the year of completion, the coefficients on the increase in the share of individuals in neither education nor work remain elevated for a longer period for those in the first two periods. This is consistent with the results showing that they had a weaker response in terms of participation in educational activities.²²

Overall, these results suggest that access to further education is important, as the weakest impact of increased unemployment on the share not in education nor work occurs in

²² For those completing in the last period, with universal access to HE, the share of individuals not in education or work is reduced at $t+1$ and beyond. This suggests that increased unemployment at completion induces a shift into longer-term educational participation, beyond individuals who would otherwise be unable to find employment.

the period with universal access to the academic supplementary programme—and thereby to HE.

Panel b of Figure 3 shows the impact on log earnings, presented year by year, as well as the sum of log earnings over the period from t to $t+5$.²³ Since the earnings coefficients are scaled by the initial employment effect in year t , the cross-period comparison holds constant the initial employment reduction. The scaled effects indicate a significantly larger negative impact on earnings in the year of completion (year t) for individuals in the pre-reform period. Specifically, a 1 pp decrease in employment corresponds to a 3.8% reduction in earnings, compared to a 1.5–1.7% reduction in the two post-reform periods.²⁴ Notably, the estimates for the two post-reform periods are similar in size and statistically indistinguishable, with largely overlapping confidence intervals. The similar scaled estimates in year t across the two post-reform periods—both substantially smaller than in the pre-1994 period—may reflect differences in educational content before and after 1994, which is reflected in smaller earnings losses among those finding employment.

Beyond year t , the scaled earnings coefficients capture both the extensive margin (employment) and earnings differences among the employed, over the period $t+1$ to $t+5$. Both margins can be affected by the year t activity – what individuals do if they are unable to find work directly after completing their degree, which varies systematically across institutional settings. As shown in Figure 3, Panel A, the increase in the share of individuals neither in employment nor education in year t per 1 pp reduction in employment is substantially smaller in the period with universal HE access than in the two preceding periods. To the extent that

²³ As an alternative to using log earnings, which excludes individuals with zero earnings, we employed normalised earnings. This approach instead uses earnings, scaled by the mean earnings, to include individuals with 0 earnings. The results from both approaches, unscaled, are presented in Online Appendix Tables D7 and D8. Using normalized earnings instead of log earnings as the dependent variable does not meaningfully alter the results.

²⁴ Table D7 of the online Appendix presents the average unscaled effects on log earnings by period. Considering the overall effect for t to $t+5$, a 1 pp increase in the unemployment rate is associated with a 3.7% reduction in log earnings under the pre-1994 system, compared to reductions of 5.4% and 2.5% in the first and second post-reform periods, respectively.

periods of inactivity hinder labour market re-entry relative to remaining in education, cross-period differences in educational opportunities may help explain the divergence in earnings trajectories beyond year t .

Interestingly, as we move away from the year of completion, the negative effects on earnings in the pre-reform and post-reform periods begin to converge by year $t+1$. However, between years $t+2$ and $t+4$, the largest negative impact is observed for those completing in the mid-period—i.e., among individuals who completed in the post-reform period but lacked universal access to an academic supplementary program. This is also the group which has the weakest response in terms of educational participation, as shown in Figure 2. This left a larger share of individuals neither in education nor employment for longer.

The overall effect on earnings over the period from t to $t+5$ shows that a 1 pp decrease in employment in year t leads to a 0.9% reduction in earnings for individuals in the first period, a 1.1% reduction for individuals in the mid-period, and a 0.4% reduction for individuals in the final period. While increased educational participation may generate short-run earnings losses due to lock-in effects, our results suggest that these are outweighed by improved earnings among those who find employment or more individuals finding work.

Overall, these results suggest that combining general skill development with accessible pathways to HE mitigates the scarring effects of completing vocational education during adverse economic conditions. However, given our comparative design, we cannot fully rule out alternative explanations.

[Figure 3]

Subgroup analyses

We examine how these effects vary by socio-economic status (SES), using mothers' earnings rank in the year the individual turned 16. Mothers' earnings rank is used instead of fathers'

because fewer individuals have missing information on mothers' earnings compared to fathers' earnings. Table 4 provides the results of 1 pp increase in the LLM unemployment rate at completion by mothers' earnings tercile and completion period.²⁵

[Table 4]

The table does not reveal a consistent pattern indicating that the initial effects on employment in year t vary systematically by mothers' earnings tercile. Similarly, in year $t+1$, the size of the coefficients does not exhibit systematic variation by earnings tercile in Panels A and B. In Panel C, a 1 pp increase in the unemployment rate corresponds to a 1.8 pp and 1.4 pp reduction in employment for individuals in the first and third earnings terciles, respectively. The coefficient is only statistically significant for the first earnings tercile, which could reflect a smaller sample size in the third earnings tercile. We do not observe any negative effect for individuals in the second tercile.

Figure 4 shows the scaled effect on enrolment in the academic supplementary programme by completion period and mothers' earnings tercile.²⁶ One noticeable distinction between Panel B (reflecting outcomes under the post-reform system when there was no universal access to the academic supplementary program) and Panel C (representing outcomes during the period of universal access) is the patterns of enrolment in the academic supplementary program. In Panel B, a 1 pp decrease in employment in year t corresponds to a 0.2 pp increase in enrolment in the academic supplementary programme, but only for individuals whose mothers are in the third earnings tercile. In contrast, during the period of universal access (Panel C), there is an increased enrolment in the academic supplementary program in year t across all earnings terciles. However, the response is more pronounced for individuals in the third earnings tercile, with an increase of approximately 0.7 pp, compared to

²⁵ Unscaled coefficients for the other outcomes are provided in online Appendix H.

²⁶ Online Appendix I includes all the table equivalents corresponding to the figures that display the scaled coefficients for the various outcomes

a smaller increase of 0.3–0.4 pp for individuals with mothers in the first and second earnings terciles.

[Figure 4]

This pattern is consistent with the results for enrolment in and completion of higher education (HE) shown in Figure 5. In Panel C we observe an increase in enrolment and completion across all earnings terciles from year $t+1$ and onwards. Although the coefficients are largest—and only consistently statistically significant—for individuals in the lowest and highest earnings tercile. For these individuals, a 1 pp decrease in employment results in a 0.4 pp increase in the share completing HE within six years. The corresponding effect for individuals in the second earnings tercile is 0.2 pp. In Panel B, there is a 0.3 pp increase in HE completion among those in the third earnings tercile. In contrast, for individuals in the first and second earnings terciles, the coefficient for HE completion is close to zero and not statistically significant. For individuals who completed during the pre-reform period in 1994 (Panel A), there is no statistically significant effect on HE completion within six years.

[Figure 5]

Figure 6 presents the scaled coefficients for the share of individuals neither in education nor work. A 1 pp decrease in employment in year t leads to an increased share of individuals not in education or work during the same year. However, in Panel C, the coefficients are smaller and relatively similar in magnitude across mothers' earnings terciles, compared to Panel A and B. This is consistent with the patterns on educational participation displayed in Figures 4 and 5. Furthermore, one year later, the initial effect largely fades for individuals completing during this period.

Overall, with respect to the share of individuals neither in education nor work, the findings on average effects hold across SES groups. Specifically, the weakest effects are

observed in the post-reform period with universal access to the academic supplementary programme, and this holds across all earnings terciles.

[Figure 6]

Figure 7 displays the scaled coefficients for log earnings from year t to year $t+5$, as well as the total earnings over this period. The pattern is consistent with what we observed for the overall effect above. Notably, the impact on total earnings in panel C appears similar across mothers' earnings tercile, with confidence intervals largely overlapping. The point estimates do, however, suggest that earnings effects are more evenly distributed across SES groups in both post-reform periods relative to the pre-1994 period, particularly in the years immediately following completion. Given the imprecision of the estimates, this pattern should be interpreted with caution.

[Figure 7]

Overall, the results suggest that universal HE access had an equalising effect across socioeconomic groups, with a meaningful share of the overall improvement in outcomes driven by improved labour market resilience among the lowest-SES youth. Prior to the 2014 reform, both enrolment in the academic supplementary programme and subsequent HE completion were concentrated among higher-SES students. Universal access extended both responses to the lowest earnings tercile, with HE completion effects of comparable magnitude across the first and third terciles.

Robustness

Overall, our findings suggest that combining general skill development with accessible pathways to HE mitigates the scarring effects of completing vocational education during adverse economic conditions. However, the observed differences across time periods may reflect variation in which vocational tracks are exposed to business cycle fluctuations. In

addition, our results may be sensitive to the composition of vocational tracks included in the analysis.

We provide two types of robustness checks to address these concerns. First, we address the potential concern that the differential effects across institutional regimes could partly reflect differences in which vocational tracks are exposed to business cycle fluctuations in each period, rather than genuine regime-level differences. To this end, we present results for the same vocational track over time, ensuring comparability across cohorts. The Electrical Engineering track is particularly well-suited for this purpose: it has a large sample size, which ensures precision, and exhibits consistent cyclical sensitivity across all periods, with significant negative employment effects of completing in a high-unemployment labour market in each period. Second, we assess the sensitivity of our results to sample selection by presenting estimates that include all vocational tracks.

Electrical Engineering Track: Table 5 presents the impact on employment in year t to $t+6$ of a 1 pp increase in the unemployment rate at completion. The pattern aligns with the findings for the overall sample in Table 3. Although the largest negative impact on employment is observed in the final period (Panel C), this effect diminishes rapidly, dropping to less than one-third of its initial magnitude by year $t+1$.

[Table 5]

Figure 8 shows the scaled effect on a) enrolment in upper secondary education (excluding academic supplementary year), b) enrolment in the academic supplementary programme, and c) enrolment and completion of HE by completion period for individuals completing the Electrical Engineering track. The results are consistent with the findings for the overall sample shown in Figure 2. In the pre-1994 period, individuals primarily respond to increased

unemployment by moving horizontally within the education system. For those completing between 1998 and 2013—the post-reform period without universal access to the academic supplementary programme—there is some evidence of increased participation in HE, but no significant effect on HE completion. In the final period, a 1 pp decrease in employment in year t led to a 0.4 pp increase in enrolment in the academic supplementary programme and a 0.2 pp increase in HE completion within five years. The coefficients are similar in magnitude to those found for the overall sample, where the increase in HE completion for the last period was slightly higher at 0.3 pp.

[Figure 8]

Figure 9 shows the scaled average effects on a) neither in education nor work, and b) log earnings by completion period for individuals completing the Electrical Engineering track. The pattern is consistent with our findings for the overall sample in Figure 3.

Taken together, comparisons within the same vocational track over time align with the baseline results in the *Average effects* subsection and indicate that combining general skill development with access to further education enhances vocational students' ability to adjust to adverse labour-market conditions.

[Figure 9]

All vocational tracks combined: As an additional robustness check, we assess the sensitivity of our findings to sample selection by presenting results that include all vocational tracks. Specifically, this includes individuals completing 1) Design and Crafts, 2) Healthcare, Child and Youth Development, and 3) Restaurant and food processing, which were excluded

from our baseline sample. The unscaled results are shown in online Appendix F, and the scaled results are shown in online Appendix G.

Because this specification includes tracks that are less exposed to business-cycle fluctuations, the negative employment effects reported in Appendix Table F1 are smaller than in the baseline sample. However, when considering the scaled effects on the other outcomes, as presented in Figures G1 and G2 in the online Appendix, the results are consistent with our main findings. This suggests that our main results are not driven by sample selection and are robust to the inclusion of vocational tracks with different exposure to business-cycle fluctuations.

VI. Conclusion

This paper examines how the inclusion of general skills and access to HE for individuals completing vocational education influences school-to-work transitions. We do so by comparing school-to-work transitions at time of increased unemployment for individuals who completed vocational education during three distinct periods in the Norwegian vocational system: i) the pre-1994 system, in which vocational education focused mainly on theoretical instruction within specific fields combined with practical training through school workshops or apprenticeships, with no universal pathway to HE; ii) the post-1994 system without universal HE access, in which the 1994 reform introduced a stronger emphasis on general education within vocational programmes but did not provide universal access to HE; and iii) the post-1994 system with universal HE access, under which, beginning in 2014, students completing vocational education obtained a legal right to enrol in a one-year academic supplementary programme providing eligibility for HE.

We find no meaningful differences in terms of scarring effects between individuals completing vocational education in the first two periods. However, when comparing individuals

completing in the post-1994 system, before and after the introduction of universal access to the academic supplementary programme, we find that those completing under the latter system fare better. Specifically, they experience smaller short-term increases in the share of individuals not in education or work, as well as reduced scarring effects on earnings. Moreover, our results suggest that universal HE access had an equalising effect across socioeconomic groups. These results are consistent with a mechanism in which universal access to HE allows vocational graduates to reallocate into further education during economic downturns, thereby reducing the risk of labour-market inactivity and mitigating long-run scarring effects.

While our comparative design does not allow us to fully rule out alternative explanations, the evidence points to the importance of combining general skill development with accessible pathways to HE in shaping school-to-work transitions. More broadly, our findings highlight the role of education system design in mediating the consequences of labour-market entry conditions. However, more research on the optimal design of vocational education systems is needed.

References

- Altonji, J. G., Kahn, L. B., and Speer, J. D. (2016), Cashier or consultant? Entry labor market conditions, field of study, and career success, *Journal of Labor Economics* 34, S361-S401.
- Becker, G. S. (1965), A Theory of the Allocation of Time, *The Economic Journal* 75, 493-517.
- Bertrand, M., Mogstad, M., and Mountjoy, J. (2021), Improving educational pathways to social mobility: evidence from Norway's reform 94, *Journal of Labor Economics* 39, 965-1010.
- Bol, T. and Van de Werfhorst, H. G. (2013), Educational systems and the trade-off between labor market allocation and equality of educational opportunity, *Comparative Education Review* 57, 285-308.
- Brunner, B. and Kuhn, A. (2014), The impact of labor market entry conditions on initial job assignment and wages, *Journal of Population Economics* 27, 705-738.
- Cockx, B. and Ghirelli, C. (2016), Scars of recessions in a rigid labor market, *Labour Economics* 41, 162-176.
- Eggenberger, C., Janssen, S., and Backes-Gellner, U. (2022), The value of specific skills under shock: High risks and high returns, *Labour Economics* 78, 102187.
- Frøseth, M. W. and Vibe, N. (2014), Fem år etter grunnskolen. Kompetanseoppnåelse i videregående opplæring og overgangen til videre utdanning og arbeid før og etter

- Kunnskapsløftet (Five years after lower secondary school: Competence attainment in upper secondary education and the transition to further education and work before and after the Knowledge Promotion reform), NIFU-rapport 3/2014.
- Genda, Y., Kondo, A., and Ohta, S. (2010), Long-term effects of a recession at labor market entry in Japan and the United States, *Journal of Human Resources* 45, 157-196.
- Gundersen, F. and Juvkam, D. (2013), Inndelinger i senterstruktur, sentralitet og BA-regioner (Classification of centre structure, centrality, and commuting-based regions), NIBR-report 2013:1.
- Hall, C. (2016), Does more general education reduce the risk of future unemployment? Evidence from an expansion of vocational upper secondary education, *Economics of Education Review* 52, 251-271.
- Hampf, F. and Wößmann, L. (2017), Vocational vs. General Education and Employment over the Life Cycle: New Evidence from PIAAC, *CESifo Economic Studies* 63, 255-269.
- Hanushek, E. A., Schwerdt, G., Wößmann, L., and Zhang, L. (2017), General education, vocational education, and labor-market outcomes over the lifecycle, *Journal of Human Resources* 52, 48-87.
- Hovdhaugen, E., Nyen, T., and Skålholt, A. (2025), Avoiding tracking? Vocational students who take the supplementary programme for university admission, *Nordic Journal of Vocational Education and Training* 15, 76-99.
- Høst, H. and Michelsen, S. (2021), The Norwegian vocational college: heterogenous aggregate of intermediate educations, or a parallel pillar to higher academic education?, *Berufs- und Wirtschaftspädagogik – online* 39, 1-15.
- Martin, C. J. (2011), Political institutions and the origins of collective skill formation systems, in M. R. Busemeyer and C. Trampusch (eds.), *The Political Economy of Collective Skill Formation*, Oxford: Oxford University Press (2011).
- NOU 2018:15, Kvalifisert, forberedt og motivert. Et kunnskapsgrunnlag om struktur og innhold i videregående opplæring (Qualified, prepared and motivated: An evidence base on the structure and content of upper secondary education), Kunnskapsdepartementet, Oslo.
- NOU 2022:17, Veier inn – ny modell for opptak til universiteter og høyskoler (Ways in: A new admissions model for universities and university colleges), Kunnskapsdepartementet, Oslo.
- OECD (2023), *Education at a Glance 2023*, OECD Indicators, OECD Publishing, Paris.
- OECD (2025), *Vocational Education and Training Systems in Nine Countries*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris.
- Oreopoulos, P., von Wachter, T., and Heisz, A. (2012), The short- and long-term career effects of graduating in a recession, *American Economic Journal: Applied Economics* 4, 1-29.
- Prop. 68 L (2013–2014), Proposisjon til Stortinget (forslag til lovvedtak): Endringer i opplæringslova, privatskolelova og folkehøyskolelova (leksehjelp m.m.) (Proposition to the Storting (bill): Amendments to the Education Act, the Private Education Act and the Folk High Schools Act (homework help, etc.)), Kunnskapsdepartementet, Oslo.
- Schmees, J. K., Migura, T., Esmond, B., Frommberger, D., and Smeplass, E. (2025a), Challenges in the Transition From Apprenticeships to Higher Education in England, Germany, and Norway, *Social Inclusion* 13.
- Schmees, J. K., Smeplass, E., Skålholt, A., Hovdhaugen, E., and Imdorf, C. (2025b), Pathways to higher education for vocationally qualified students. The case of Norway, *Nordic Journal of Studies in Educational Policy* 11, 93-106.
- Schwandt, H. and von Wachter, T. (2019), Unlucky cohorts: Estimating the long-term effects of entering the labor market in a recession in large cross-sectional data sets, *Journal of Labor Economics* 37, S161-S198.

- Skans, O. N. (2011), Scarring effects of the first labor market experience, IZA Discussion Paper 5565.
- Speer, J. D. (2016), Wages, hours, and the school-to-work transition: the consequences of leaving school in a recession for less-educated men, *The B.E. Journal of Economic Analysis & Policy* 16, 97-124.
- Streeck, W. (2011), Skills and Politics: General and Specific, in M. R. Bussemeyer and C. Trampusch (eds.), *The Political Economy of Skill Formation*, Oxford: Oxford University Press (2011).
- Umkehrer, M. (2019), Heterogenous Effects of Entering the Labor Market During a Recession—New Evidence from Germany, *CESifo Economic Studies* 65, 177-203.
- von Wachter, T. (2020), The persistent effects of initial labor market conditions for young adults and their sources, *Journal of Economic Perspectives* 34, 168-194.
- Wozniak, A. (2010), Are College Graduates More Responsive to Distant Labor Market Opportunities?, *Journal of Human Resources* 45, 944-970.

Figures

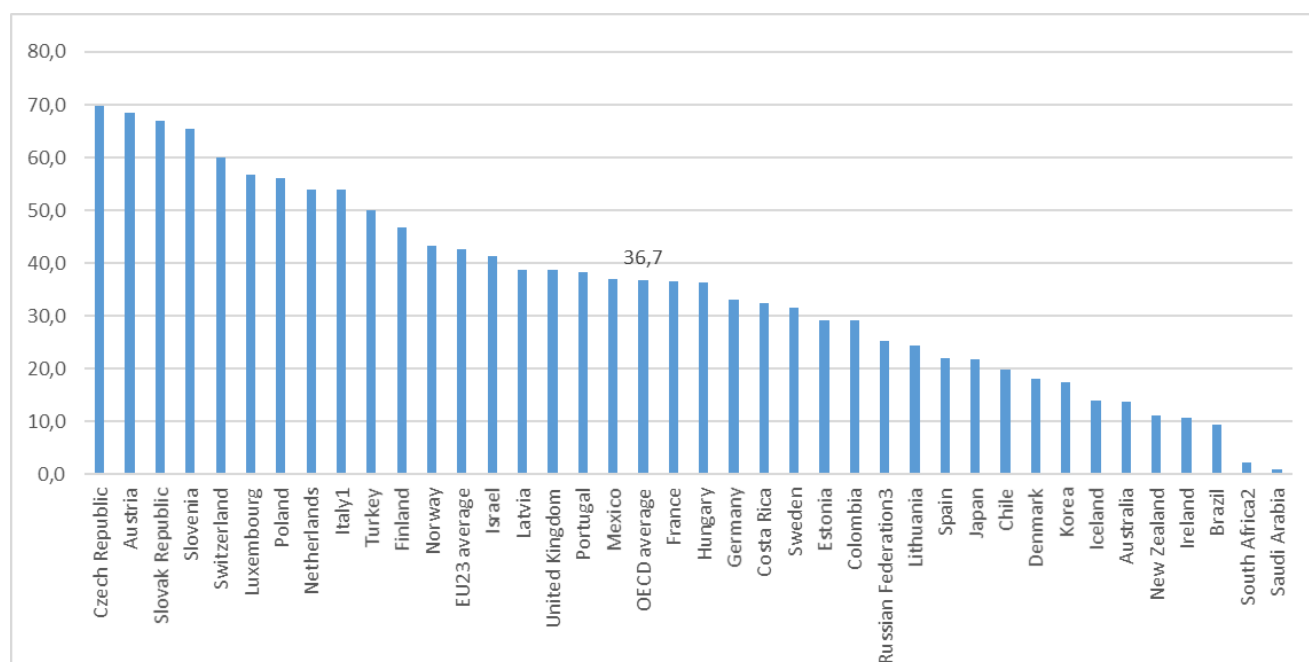


Figure 1 Share of upper secondary students enrolled in vocational education in 2018 across OECD countries.

Note: The figure shows the enrolment for students aged 15–19.

Source: OECD (2020), “Share of upper secondary students enrolled in vocational education and training programmes, by age group (2018): Full- and part-time students enrolled in public and private institutions”, in *Education at a Glance 2020: OECD Indicators*, OECD Publishing, Paris, <https://doi.org/10.1787/78ebddaf-en>.

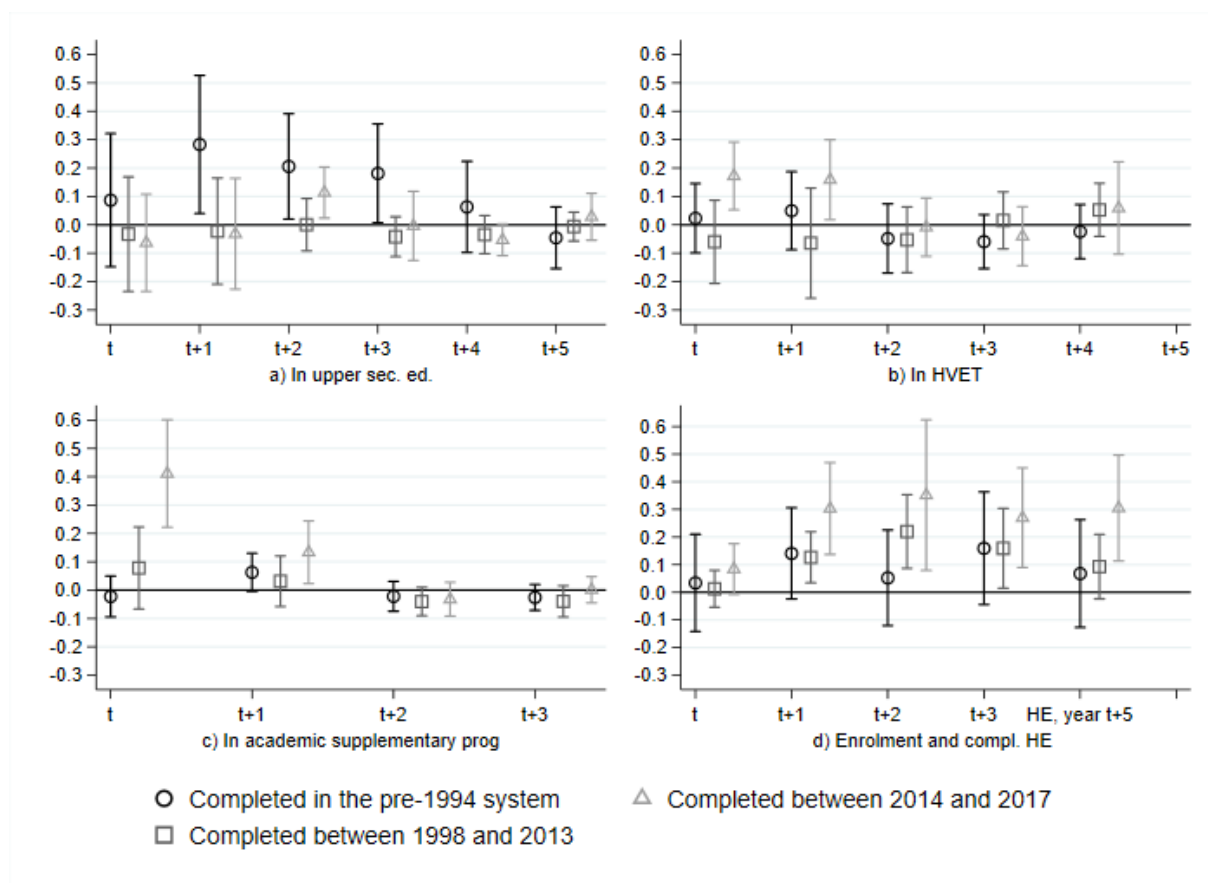


Figure 2 Scaled average effects on a) enrolment in upper secondary education (excl. academic supplementary year), b) enrolment in HVET, c) academic supplementary year, and e) enrolment and completion of HE by completion period

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for.

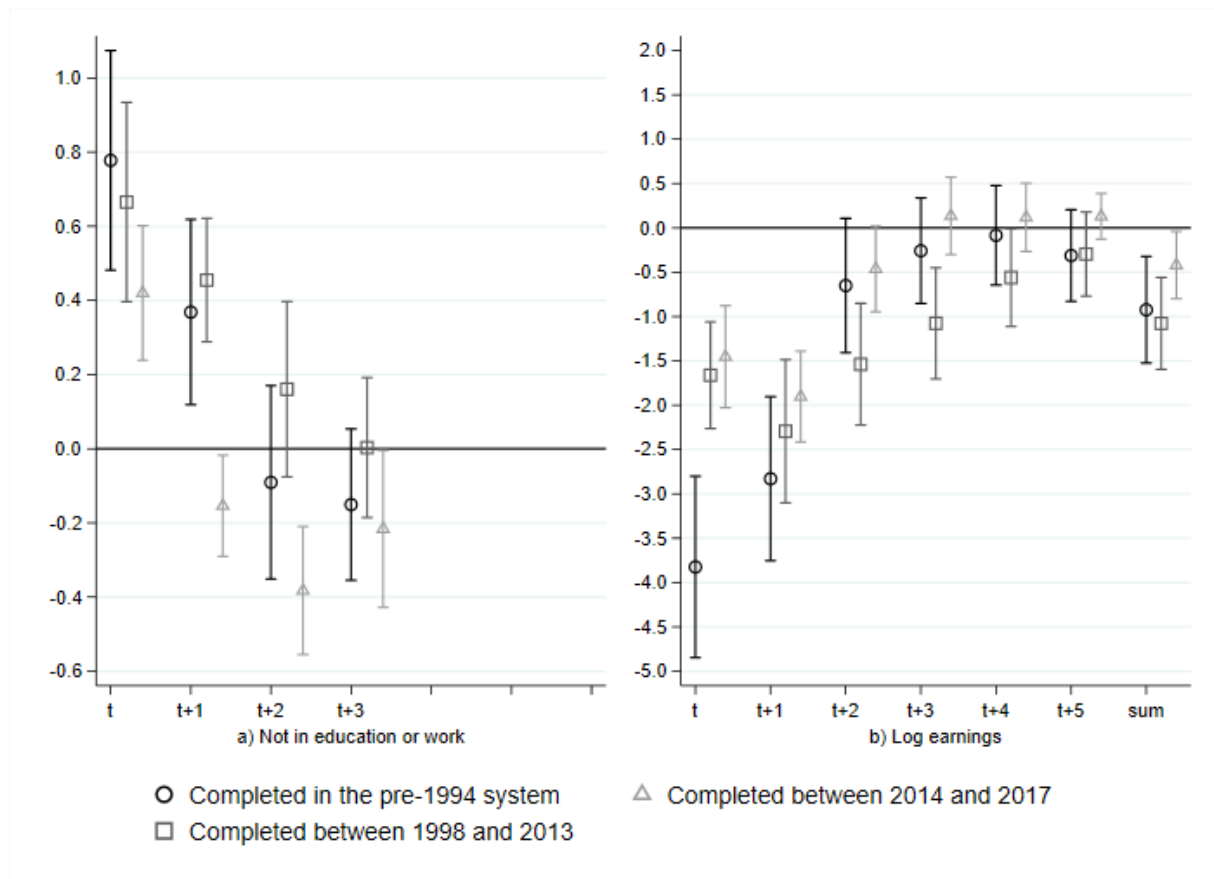


Figure 3: Scaled average effects on a) not in education and work, and b) log earnings by completion period

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for.

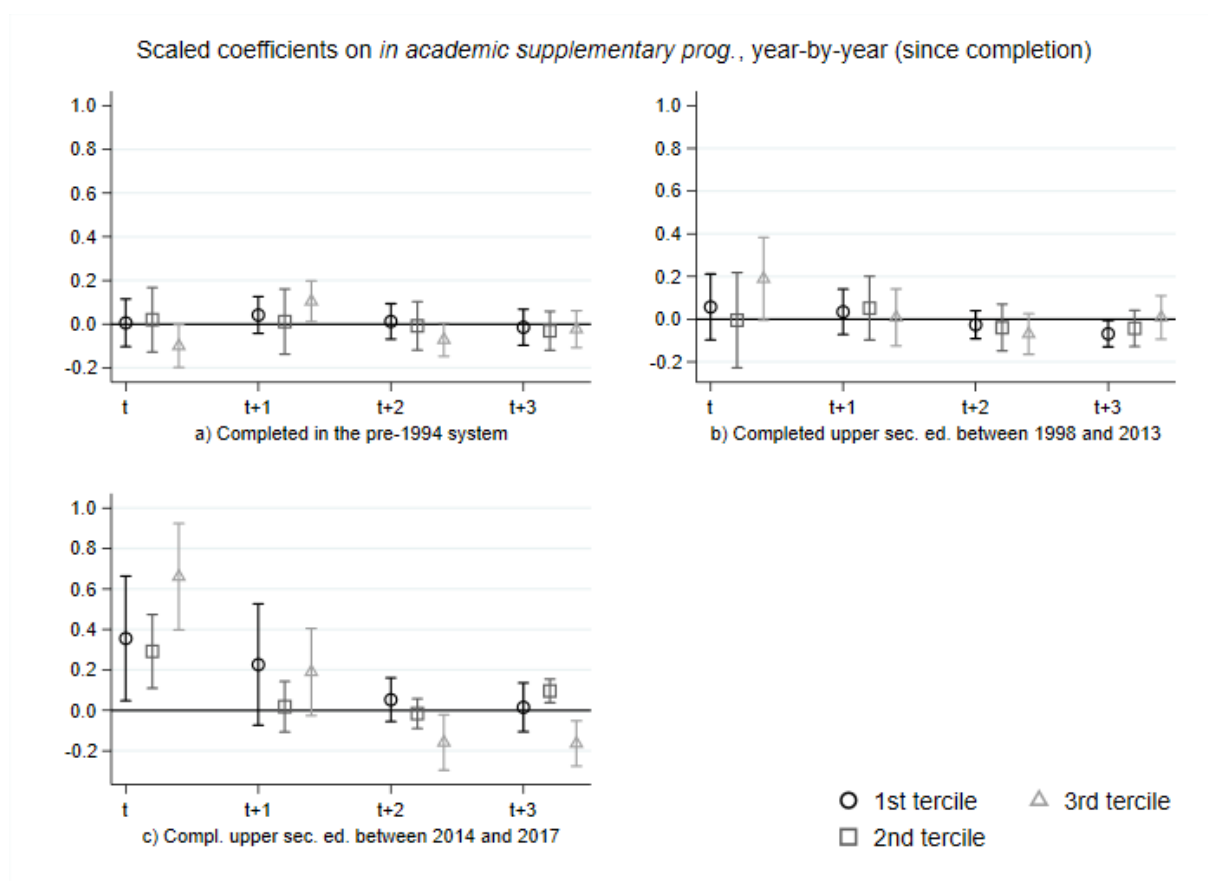


Figure 4 Scaled effect on enrolment in academic supplementary programme by completion period and mothers' earnings tercile

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome, year since completion (year t), and mothers' earnings tercile, and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for.

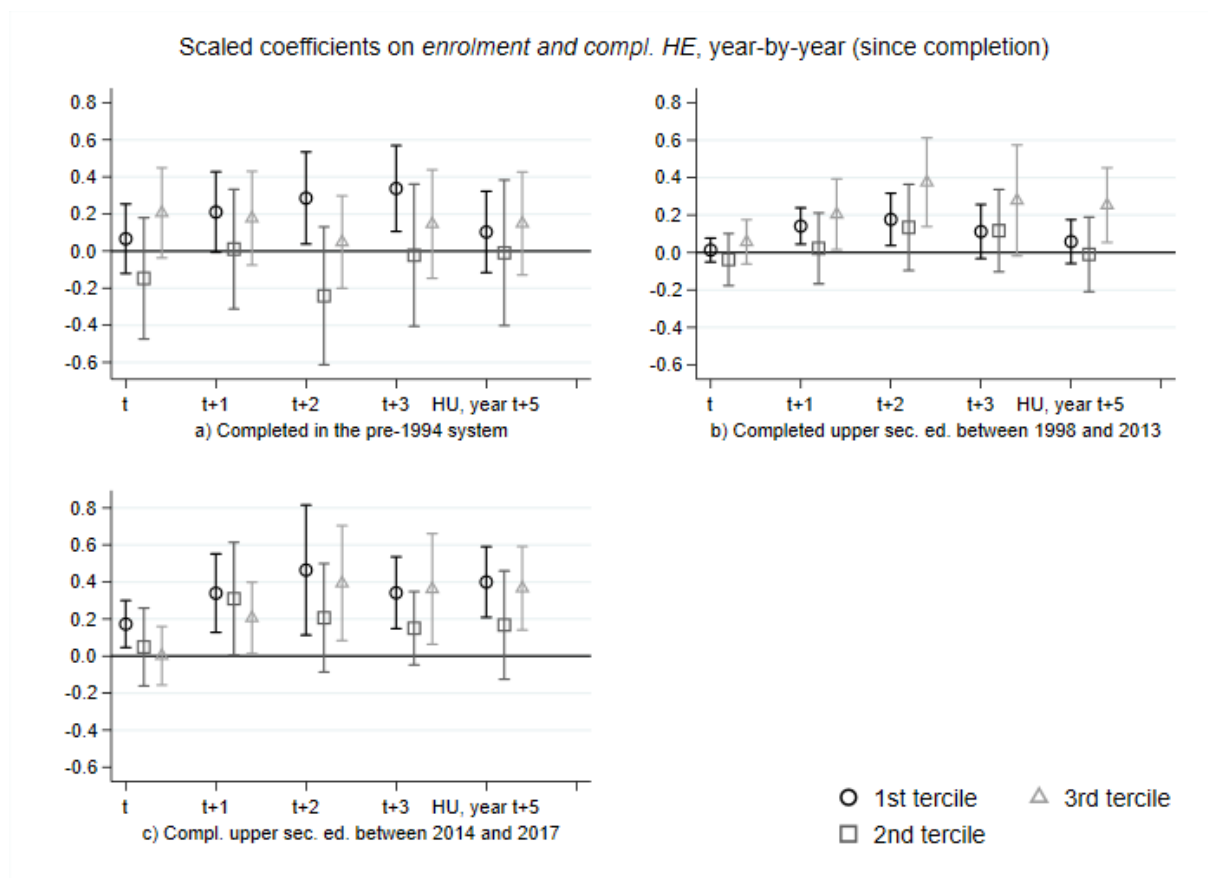


Figure 5 Scaled effect on enrolment and completion of HE by completion period and mothers' earnings tercile

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome, year since completion (year t), and mothers' earnings tercile, and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for.

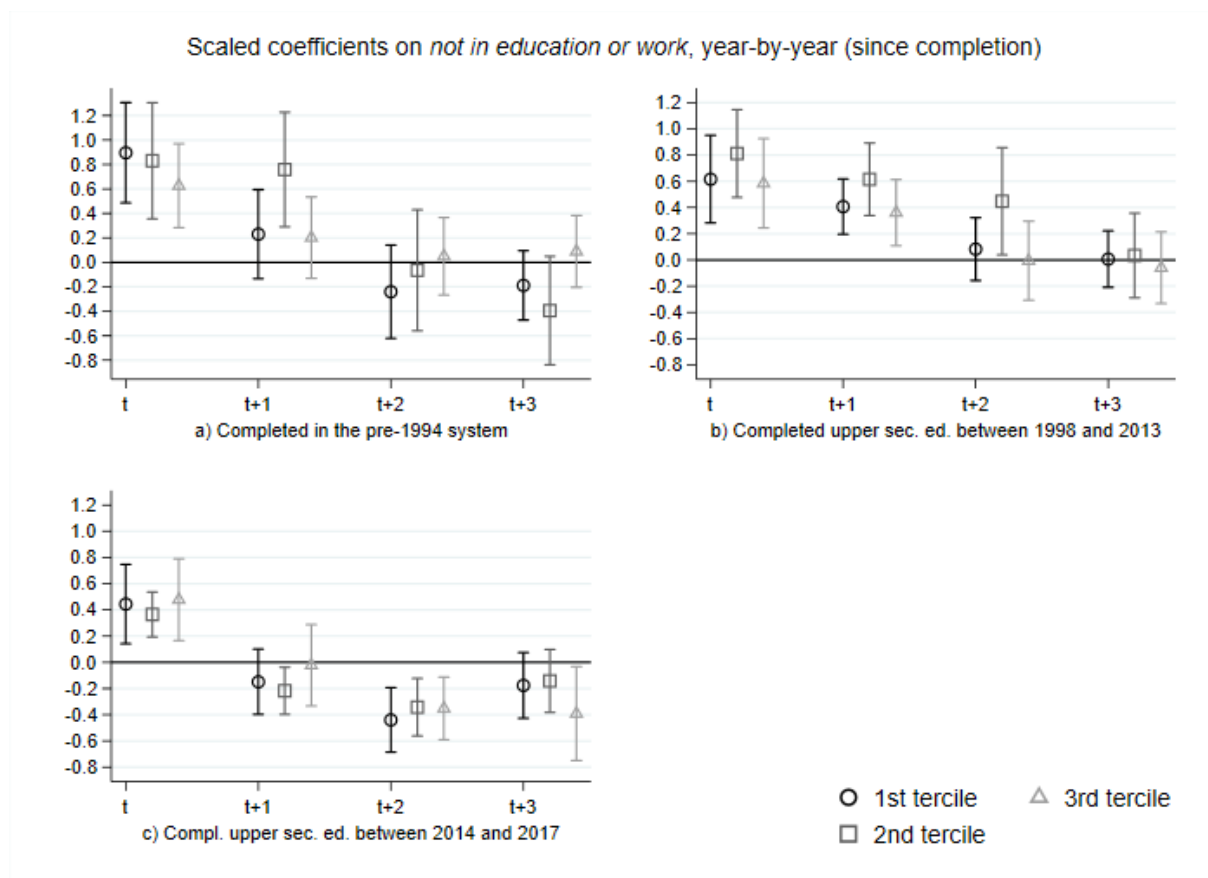


Figure 6 Scaled effects on not in education or work by completion period and mothers' earnings tertile

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome, year since completion (year t), and mothers' earnings tertile, and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. Mothers' earnings tertile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for.

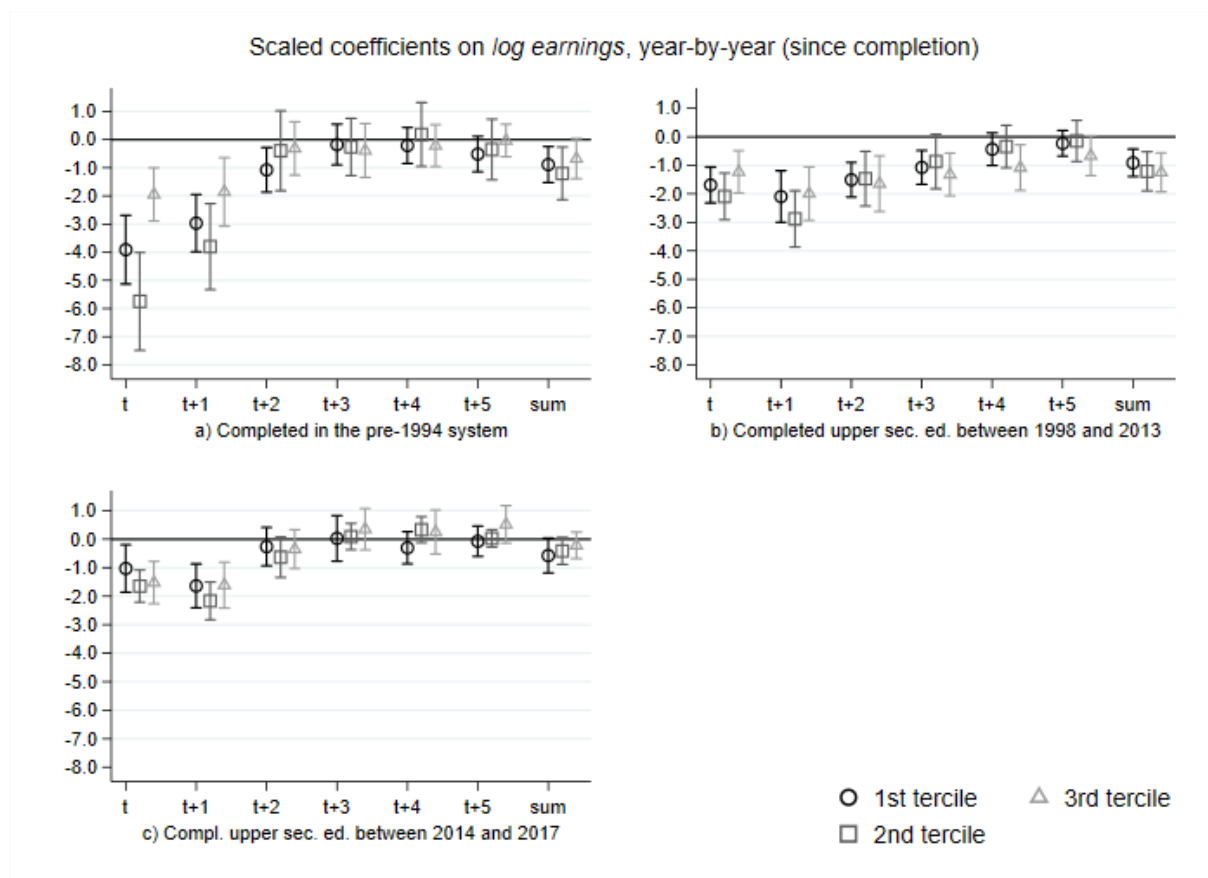


Figure 7 Scaled effects on log earnings by completion period and mothers' earnings tercile

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome, year since completion (year t), and mothers' earnings tercile, and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for.

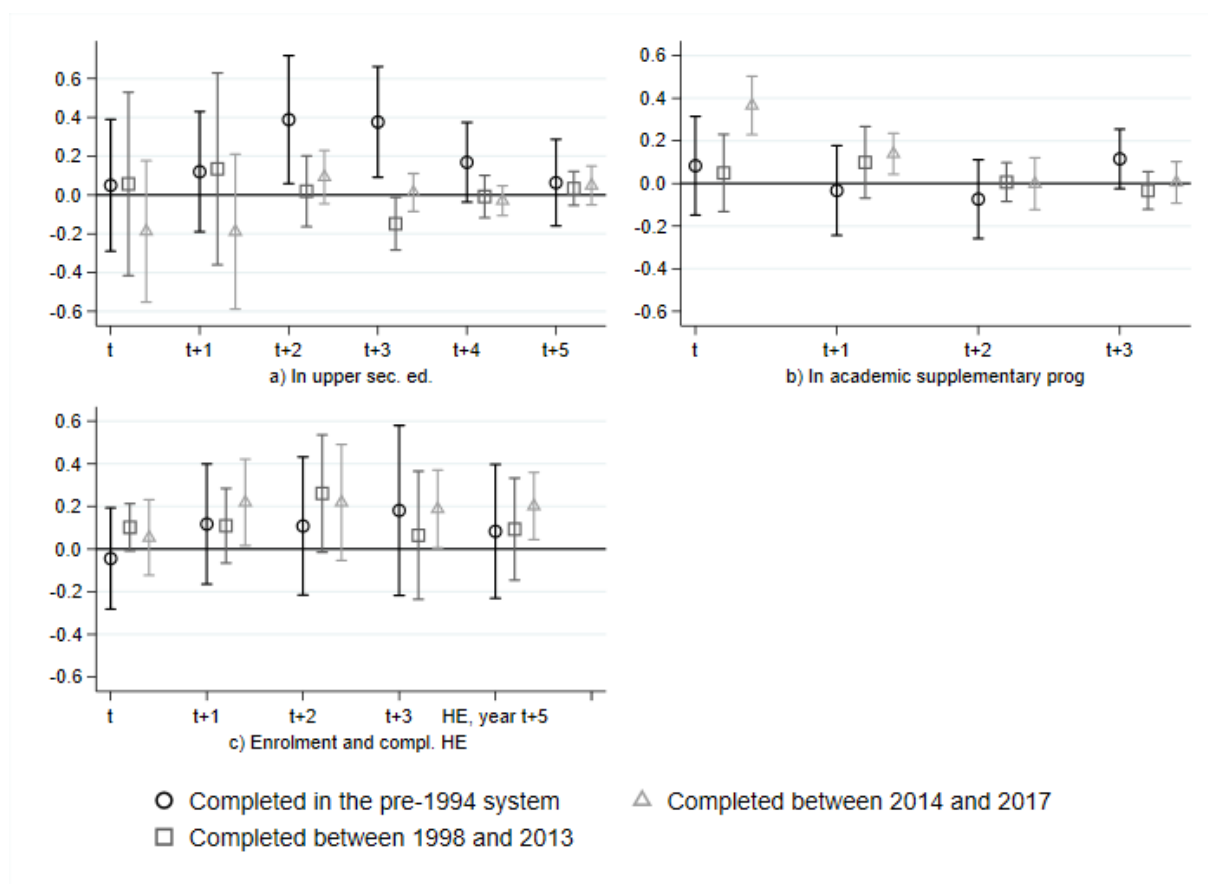


Figure 8 Scaled average effects on a) enrolment in upper secondary education (exl. academic supplementary year), b) academic supplementary year, and e) enrolment and completion of HE by completion period for individuals completing the Electrical engineering track

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1), for individuals completing the Electrical Engineering track. These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for.

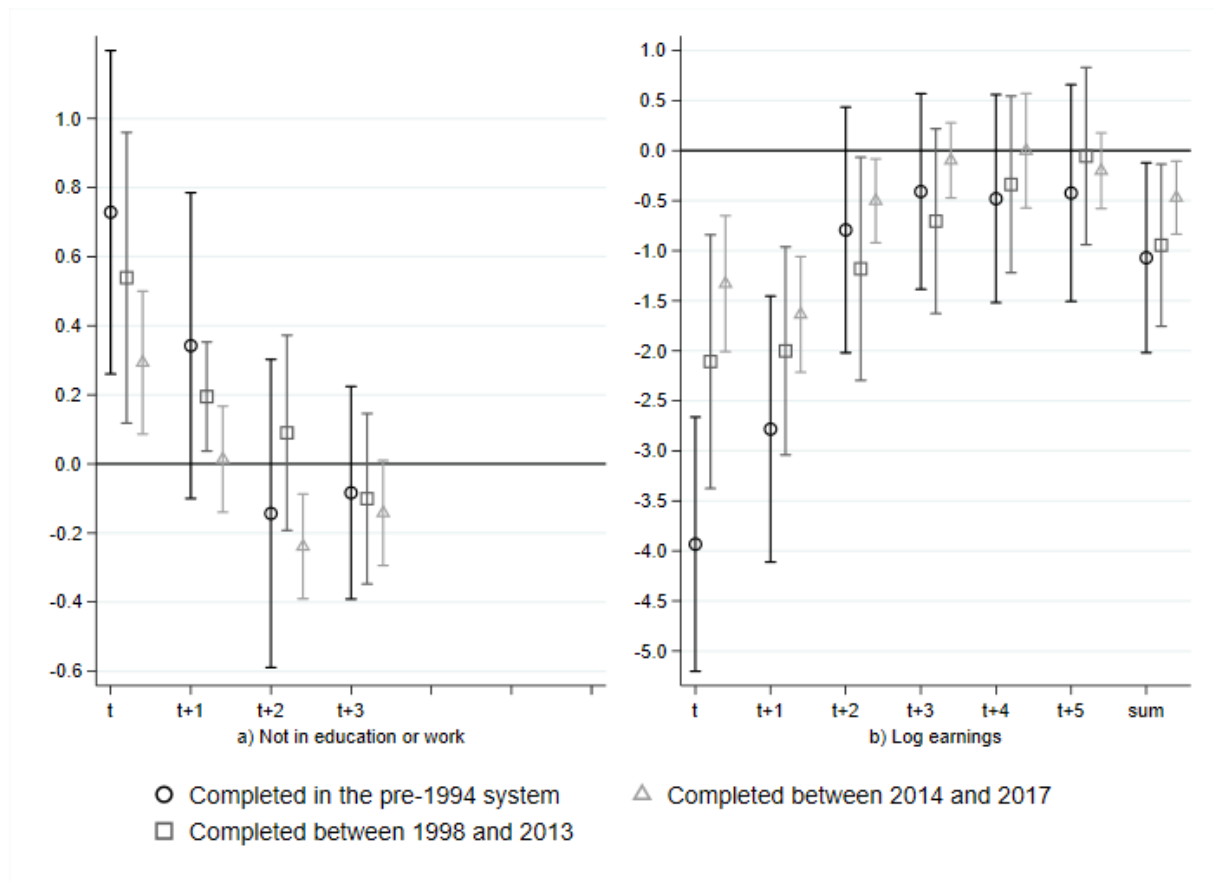


Figure 9 Scaled average effects on a) not in education and work, and b) log earnings by completion period for individuals completing the Electrical Engineering track

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1), for individuals completing the Electrical Engineering track. These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for.

Tables

Table 1 Average effect on employment, by track

	(1) Employed, year t	(2) Employed, year t+1	(3) Employed, year t+2	(4) Employed, year t+3	(5) Employed, year t+4	(6) Employed, year t+5	(7) Employed, year t+6
<u>Panel A: Building and Construction</u>							
u. rate	-0.046*** (0.007)	-0.034*** (0.006)	-0.016*** (0.005)	-0.012** (0.006)	-0.010** (0.005)	-0.001 (0.005)	0.002 (0.004)
N	47447	47447	47447	47447	47447	47447	47447
<u>Panel B: Design and Crafts</u>							
u. rate	-0.024*** (0.009)	-0.004 (0.008)	-0.016*** (0.005)	0.004 (0.010)	-0.003 (0.009)	-0.002 (0.009)	-0.010 (0.009)
N	13611	13611	47447	13611	13611	13611	13611
<u>Panel C: Electrical Engineering</u>							
u. rate	-0.062*** (0.009)	-0.044*** (0.008)	-0.022*** (0.006)	-0.010** (0.006)	-0.006 (0.005)	-0.001 (0.004)	-0.002 (0.004)
N	51776	51776	51776	51776	51776	51776	51776
<u>Panel D: Agriculture and Fishery</u>							
u. rate	-0.034*** (0.012)	-0.049*** (0.011)	-0.040*** (0.011)	-0.024** (0.011)	-0.026*** (0.010)	-0.024*** (0.010)	-0.022* (0.012)
N	8929	8929	8929	8929	8929	8929	8929
<u>Panel E: Restaurant and Food-industries</u>							
u. rate	-0.024** (0.010)	-0.013* (0.007)	-0.008 (0.006)	0.004 (0.007)	0.005 (0.007)	-0.014* (0.007)	0.003 (0.007)
N	20950	20950	20950	20950	20950	20950	20950
<u>Panel F: Service & Logistics</u>							
u. rate	-0.028*** (0.006)	-0.018** (0.007)	-0.017** (0.006)	-0.010* (0.006)	-0.005 (0.005)	-0.006 (0.007)	-0.005 (0.005)
N	39673	39673	39673	39673	39673	39673	39673
<u>Panel G: Technology and Manufacturing</u>							
u. rate	-0.059*** (0.010)	-0.043*** (0.008)	-0.015** (0.008)	-0.003 (0.007)	-0.002 (0.006)	0.001 (0.004)	0.002 (0.004)
N	69539	69539	69539	69539	69539	69539	69539

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression where employment in each year since completion (year t) is the dependent variable. The unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects, with additional controls for unemployment at enrolment. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 2: Balance test for predetermined characteristics

	(1) Parents, lower secondary education or less	(2) Parents, upper secondary education	(3) Parents, Higher ed.	(4) Parents, missing ed.	(5) Mothers' earnings tercile, missing	(6) Mother, 1st earnings tercile	(7) Mother, 2nd earnings tercile	(8) Mother, 3rd earnings tercile	(9) Fathers' earnings tercile, missing	(10) Father, 1st earnings tercile	(11) Father, 2nd earnings tercile	(12) Father, 3rd earnings tercile	(13) Boy	(14) Minority
<u>Panel A: Completed in the pre-1994 system</u>														
u. rate	0.002 (0.006)	-0.003 (0.004)	0.001 (0.004)	-0.001 (0.000)	0.000 (0.001)	0.004 (0.005)	0.004 (0.005)	-0.008* (0.004)	-0.002 (0.002)	0.008 (0.005)	-0.009 (0.006)	0.003 (0.005)	-0.004 (0.006)	0.001 (0.001)
N	66328	66328	66328	66328	66328	66328	66328	66328	66328	66328	66328	66328	66328	66328
<u>Panel B: Completed upper secondary education between 1998 and 2013</u>														
u.rate	0.011 (0.009)	-0.002 (0.008)	-0.009 (0.006)	-0.000 (0.001)	-0.000 (0.001)	-0.004 (0.004)	0.008 (0.005)	-0.003 (0.004)	0.000 (0.002)	0.006 (0.006)	0.003 (0.005)	-0.009* (0.006)	-0.003 (0.004)	0.004** (0.002)
N	115612	115612	115612	115612	115612	115612	115612	115612	115612	115612	115612	115612	115612	115612
<u>Panel C: Completed upper secondary education between 2014 and 2017</u>														
u.rate	-0.002 (0.005)	-0.002 (0.005)	0.002 (0.006)	0.002* (0.001)	0.000 (0.001)	0.001 (0.006)	-0.009 (0.005)	0.008 (0.005)	-0.002 (0.002)	-0.001 (0.005)	-0.004 (0.006)	0.007 (0.005)	0.000 (0.003)	-0.002 (0.003)
N	35424	35424	35424	35424	35424	35424	35424	35424	35424	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression where we use the different pre-determined characteristics as dependent variable. The unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects, with additional controls for unemployment at enrolment. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.%.

Table 3 Average effect on employment, by completion period

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Employed, year t	Employed, year t+1	Employed, year t+2	Employed, year t+3	Employed, year t+4	Employed, year t+5	Employed, year t+6
<u>Panel A: Completed in the pre-1994 system</u>							
u. rate	-0.040*** (0.005)	-0.028*** (0.006)	0.004 (0.007)	0.009* (0.005)	0.005 (0.005)	0.005 (0.005)	0.001 (0.005)
N	66328	66328	66328	66328	66328	66328	66328
<u>Panel B: Completed upper secondary education between 1998 and 2013</u>							
u. rate	-0.049*** (0.008)	-0.037*** (0.007)	-0.018** (0.008)	-0.009 (0.006)	0.004 (0.005)	0.005 (0.005)	0.007 (0.005)
N	115612	115612	115612	115612	115612	115612	115612
<u>Panel C: Completed upper secondary education between 2014 and 2017</u>							
u. rate	-0.059*** (0.007)	-0.010 (0.006)	0.011* (0.006)	0.012* (0.005)	0.001 (0.004)	0.002 (0.005)	-0.002 (0.004)
N	35424	35424	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression where employment in each year since completion (year t) is the dependent variable. The unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for.

Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 4 Effect on employment, by mother's earnings tercile

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t	t+1	t+2	t+3	t+4	t+5	t+6
<u>Panel A: Completed in the pre-1994 system</u>							
1st earnings tercile	-0.041*** (0.007)	-0.024** (0.010)	0.012 (0.009)	0.009 (0.007)	-0.000 (0.007)	0.001 (0.007)	-0.002 (0.006)
N	23874	23874	23874	23874	23874	23874	23874
2nd earnings tercile	-0.030*** (0.008)	-0.030*** (0.008)	-0.001 (0.009)	0.012 (0.008)	0.010 (0.008)	0.007 (0.007)	0.003 (0.007)
N	26563	26563	26563	26563	26563	26563	26563
3rd earnings tercile	-0.053*** (0.010)	-0.032*** (0.010)	-0.001 (0.010)	0.006 (0.010)	0.001 (0.010)	0.006 (0.009)	0.003 (0.009)
N	15891	15891	15891	15891	15891	15891	15891
<u>Panel B: Completed upper secondary education between 1998 and 2013</u>							
1st earnings tercile	-0.059*** (0.011)	-0.039*** (0.008)	-0.014 (0.009)	-0.010 (0.008)	0.002 (0.007)	0.003 (0.008)	0.009 (0.007)
N	42475	42475	42475	42475	42475	42475	42475
2nd earnings tercile	-0.036*** (0.008)	-0.034*** (0.007)	-0.024*** (0.009)	-0.004 (0.007)	0.004 (0.007)	0.003 (0.007)	0.005 (0.005)
N	45743	45743	45743	45743	45743	45743	45743
3rd earnings tercile	-0.058*** (0.011)	-0.037*** (0.013)	-0.016 (0.011)	-0.016 (0.011)	0.003 (0.008)	0.012 (0.009)	0.005 (0.008)
N	27394	27394	27394	27394	27394	27394	27394
<u>Panel C: Completed upper secondary education between 2014 and 2017</u>							
1st earnings tercile	-0.054*** (0.010)	-0.018** (0.007)	0.010 (0.008)	0.010 (0.008)	-0.001 (0.007)	-0.009 (0.010)	-0.010 (0.008)
N	12486	12486	12486	12486	12486	12486	12486
2nd earnings tercile	-0.068*** (0.010)	0.001 (0.014)	0.010 (0.010)	-0.04 (0.008)	-0.008 (0.007)	-0.002 (0.005)	-0.009 (0.008)
N	14053	14053	14053	14053	14053	14053	14053
3rd earnings tercile	-0.058*** (0.012)	-0.014 (0.013)	0.018* (0.010)	0.037* (0.009)	0.013 (0.009)	0.021* (0.011)	0.019* (0.015)
N	8885	8885	8885	8885	8885	8885	8885

Note: Mothers' earnings tercile is determined by their earnings in the year the individual turned 16. Mothers' earnings tercile is based on all individuals in the same cohort and gender. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression where employment in each year since completion (year t) is the dependent variable. The unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 5 Effect on employment, Electrical engineering track

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Employed, year t	Employed, year t+1	Employed, year t+2	Employed, year t+3	Employed, year t+4	Employed, year t+5	Employed, year t+6
<u>Panel A: Completed in the pre-1994 system</u>							
Electrical engineering	-0.053*** (0.014)	-0.040*** (0.013)	0.006 (0.015)	-0.003 (0.011)	0.003 (0.013)	0.005 (0.009)	-0.007 (0.011)
N	11154	11154	11154	11154	11154	11154	11154
<u>Panel B: Completed upper secondary education between 1998 and 2013</u>							
Electrical engineering	-0.060*** (0.017)	-0.037*** (0.012)	-0.021* (0.013)	0.002 (0.011)	0.008 (0.010)	0.013 (0.010)	0.012 (0.010)
N	30868	30868	30868	30868	30868	30868	30868
<u>Panel C: Completed upper secondary education between 2014 and 2017</u>							
Electrical engineering	-0.099*** (0.012)	-0.030** (0.012)	0.005 (0.009)	0.015 (0.011)	-0.004 (0.012)	-0.018* (0.008)	-0.017* (0.008)
N	9754	9754	9754	9754	9754	9754	9754

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression where employment in each year since completion (year t) is the dependent variable. The unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Online Appendix

Appendix A: Identifying academic supplementary year over time

In the Norwegian Educational Database, specific education programmes are classified using six-digit codes from the Norwegian Standard Classification of Education (NUS2000). This classification provides information on both the level and the type/field of education.

Since the 1994 reform, access to higher education (HE) requires obtaining a General Higher Education Entrance Qualification. Vocational track students can achieve this by completing an academic supplementary year, which qualifies them for HE on the same terms as students in the academic track.

The academic supplementary programme is assigned a specific six-digit educational code, making individuals enrolling in this programme easily identifiable in the post-1994 reform period. The NUS2000 code identifying this programme is 401110, “Supplementary Programme for General University Admissions Certification (all vocational education programs), Upper Secondary Level 3 (Vg3)”. In addition, access to HE can also be obtained through specific courses within certain tracks.²⁸²⁹

Prior to the 1994 reform, there was no unified way of obtaining access to HE for individuals completing the vocational track. Although some students, depending on their track, could gain entry to specialised HE programmes. Others, wanting to pursue HE, could enrol in different types of academic supplementary programmes offered at various education levels. The six digit educational codes identifying these courses, and which we also include in our definition of academic supplementary programmes are: 401115 (preparatory course for engineering); 501101 (preparatory course for university or college education); 501102 (preparatory course for college of engineering). The last two were categorized at level 5, “higher non-tertiary education”. To maintain comparability over time, we therefore include all codes starting with 401 (which indicates all upper secondary, general subjects, final year education) that give access to higher education, as well as the specific codes at level 5, as listed above. The specific codes and their corresponding titles are shown in Table A1. In addition, the table presents the distribution of individuals across these codes by completion period.

²⁸ Media and Communication also provided access to higher education; however, this track is excluded from our sample, see appendix B for details.

²⁹ <https://www.samordnaopptak.no/universitet-og-hogskole/opptakskrav/3-arig-vidaregaande-skole.html>

Table A.1: Codes identifying academic supplementary programmes

NUS code	Name of education	Pre-1994 system	Compl.: 1998 and 2013	Compl.: 2014-2017
401101	General subjects, Advanced Course II	0.09	0.03	0.00
401102	General studies branch at a foreign upper secondary school	0.00	0.00	0.00
401103	General secondary school education, upper stage	0.00	0.00	0.00
401104				
	International Baccalaureate, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3)	0.00	0.00	0.00
401105	Specialization in general studies, individual subjects/sub-courses providing entrance qualifications for higher education, upper secondary level 3 (Vg3)	0.04	0.03	0.04
401106	Sami course providing entrance qualifications for higher education course	0.00	0.00	0.00
401107	Upper secondary school for adults, general and business studies, with state support	0.04	0.00	0.00
401108	Upper secondary school for adults, general and business studies, without state support	0.00	0.01	0.00
401109	Rudolf Steiner School, three-year general studies branch	0.00	0.00	0.00
401110	Supplementary programme for general university admissions certification (all vocational education programmes), upper secondary level 3 (Vg3)	0.11	0.79	0.85
401111	Natural science and mathematics, upper secondary level 3 (Vg3)	0.00	0.00	0.00
401112	Languages, social sciences and economics, upper secondary level 3 (Vg3)	0.00	0.00	0.00
401113	Arts, crafts and design, upper secondary level 3 (Vg3)	0.00	0.00	0.00
401114	Specialization in general studies, upper secondary level 3 (Vg3)	0.00	0.00	0.00
401115	Preparatory course for engineering education, one-year	0.00	0.00	0.09
401120	Specialization in general studies, individual subjects/sub-courses providing entrance qualifications for higher education, upper secondary level 3 (Vg3), first	0.00	0.00	0.00
401199	General programmes, unspecified, upper secondary, final year	0.00	0.00	0.00
401999	General subjects, other, unspecified, upper secondary, final year	0.00	0.00	0.00
416904	Drawing, form and colour, Advanced Course II	0.00	0.00	0.00
441106	Business and administration, Advanced Course II	0.14	0.00	0.00
479903	Agriculture, fishing and forestry (general studies)	0.03	0.04	0.02
501101	Preparatory course for university or college education	0.04	0.07	0.00
501102	Preparatory course for college of engineering	0.51	0.02	0.00
N		1483	18158	5936

Appendix B: Cross walk of Vocational Tracks Across Curriculum

The structure of the various vocational programs underwent changes during our empirical period. To maintain consistency over time, we apply a crosswalk, which we detail below.

Our starting point is the nine vocational tracks that existed in the final year of our empirical period and was introduced under “Kunnskapsløftet 2006” (LK06). LK06 built on the institutional framework established by the 1994 reform, maintaining the 2+2 model (two years in school followed by two years in apprenticeship). The reform primarily introduced structural changes, including a reduction in the number of programmes. Empirical evidence suggests only modest effects on completion rates, and LK06 has been characterised as largely consolidating existing structures rather than introducing substantive changes (Vibe et al., 2012).

The nine vocational tracks that exists as of 2006 is: 1) Electrical Engineering, 2) Design and Crafts, 3) Healthcare, Child and Youth Development, 4) Building and Construction, 5) Agriculture, Fishing and Forestry, 6) Restaurant and Food Processing, 7) Service and Logistics, 8) Technological and Industrial Production, and 9) Media and Communication. Each of these tracks include vocational educations with distinct six-digit codes based on the Norwegian Standard Classification of Education (NUS2000) system. These codes represent different specializations within each track.

Across time periods in our analysis, individuals are assigned to one of the nine tracks listed above, based on the six-digit code of the vocational education they completed. The correspondence between track and six-digits NUS2000 codes comes from the official database of upper secondary education, see <https://kodeverk.vigo.no/program-areas>.

Although Media and Communication is formally classified as a vocational track, in practice, few students in this track end up with vocational qualifications (Frøseth & Vibe, 2014). E.g., following the 1994 reform, only a small proportion of students pursued an apprenticeship after completing the school-based component of vocational education. Instead, most students enrolled directly in the academic supplementary year after completing the school-based portion of the program, subsequently transitioning to HE. We therefore exclude individuals who completed this programme from our sample.

After assigning individuals to tracks based on the correspondence between NUS2000 codes and tracks in the LK06 system, we observed that some NUS2000 codes remained unassigned to any track. Specifically, approximately 17% of the NUS2000 vocational code—representing about 35% of the vocational student sample—were unassigned.

To address this, we first utilised a crosswalk that maps tracks from the 1994 reform (R94) structure to the LK06 structure (see Table A1). This mapping is based on the track codes (denoted as *studretn* in the National Education Database) and is based on assessments conducted during the evaluation of LK06 (Frøseth et al., 2008).

Following this step, the number of unassigned NUS2000 codes was reduced to 25%, corresponding to only 6% of the student sample.

These remaining unassigned codes are primarily due to two factors: (i) some codes were obsolete and no longer in use after R94; and (ii) certain codes were missing from the database owner's codebook. To assign these remaining NUS2000 codes to specific tracks, we conducted a qualitative assessment by reviewing course descriptions and assigning codes to the appropriate tracks. Table A2 provides an overview of the different NUS2000 codes associated with the various tracks, as well as the source of classification i) LK06, ii) R94–LK06 crosswalk (based on Table A1), and iii) qualitative assessment.

Table A1. Crosswalk of vocational track based on the track code (*studretn* in the National Education Database) between: LK06 and Reform 94

Track under LK06 (<i>studretn</i> code)	<i>Studretn</i> code(s) R94	Name under R94 (authors' translation)
Building and Construction (70)	36/35/40	Technical Construction Trades / Construction / Woodworking Trades
Design and Crafts (71)	33/3	Crafts / Crafts and Aesthetic Subjects
Electrical Engineering (72)	37	—
Health and Social Services (73)	31/11	—
Agriculture and Fishery (75)	32/10	— / Fisheries and Maritime Subjects
Restaurant and Food Industries (76)	34	Hotel and Food Processing
Service and Logistics (77)	42	Sales and Services
Technology and Manufacturing (78)	38/39	Mechanical Trades / Chemistry and Processing Trades

Note: Studretn codes below 20 are from before Reform 94; codes 20–60 is from R94; codes above 60 are LK06 codes. — denotes that the track name is the same as under LK06.

Table A2: Crosswalk, vocational tracks across time periods¹

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Building and construction	473106	Landscaping, upper secondary level 3 (Vg3)	LK06
Building and construction	457901	Construction vehicle/machinery operator, upper secondary level 3 (Vg3)	LK06
Building and construction	457141	Industrial plumbing level 3 (Vg3)	LK06
Building and construction	457299	Architecture, unspecified, upper secondary, final year	Qualitative assesment
Building and construction	457101	Reinforcing, Advanced Course II	R94 crosswalk LK06
Building and construction	457102	Asphalt work, upper secondary level 3 (Vg3)	LK06
Building and construction	457103	Railway track work, upper secondary level 3 (Vg3)	LK06
Building and construction	458401	Mining, Advanced Course II	R94 crosswalk LK06
Building and construction	457104	Concrete site work, Advanced Course II	Qualitative assesment
Building and construction	457133	Concrete work, upper secondary level 3 (Vg3)	LK06
Building and construction	457105	Industrial concrete work, Advanced Course II	R94 crosswalk LK06
Building and construction	459902	Tinsmithing and other sheet metal work, upper secondary, final year	Qualitative assesment
Building and construction	482501	Fire prevention, level 2 (Vg2) and level 3 (Vg3), special pathway	LK06
Building and construction	482599	Fire service, unspecified, upper secondary, final year	Qualitative assesment
Building and construction	458413	Well and drilling, upper secondary level 3 (Vg3)	LK06
Building and construction	457199	Building and construction, unspecified, upper secondary, final year	Qualitative assesment
Building and construction	457999	Building and construction, other, unspecified, upper secondary, final year	Qualitative assesment
Building and construction	457135	Building and construction with specialization in general studies, upper secondary level 3 (Vg3)	LK06
Building and construction	457136	Building operations, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Building and construction	457143	Building assembly, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	Qualitative assesment
Building and construction	457106	Paperhanging, Advanced Course II	R94 crosswalk LK06
Building and construction	457107	Chimney sweeping, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Building and construction	458409	Rock blasting and mining, upper secondary level 3 (Vg3)	LK06
Building and construction	457108	Formwork, Advanced Course II	R94 crosswalk LK06
Building and construction	457109	Galvanizing, Advanced Course II	R94 crosswalk LK06
Building and construction	458303	Glazier work, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Building and construction	457111	Wooden housing prefabrication, Advanced Course II	Qualitative assesment
Building and construction	457112	Industrial painting, upper secondary level 3 (Vg3)	LK06

¹ This table provides the crosswalk between NUS2000 level 4 codes and track. A similar procedure was used to create the crosswalk between NUS2000 level 3 codes and track.

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Building and construction	457115	Insulation, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Building and construction	457137	Insulation level 3 (Vg3)	LK06
Building and construction	457116	Mapping and surveying, Advanced Course II	R94 crosswalk LK06
Building and construction	458306	Laminated timber production, upper secondary level 3 (Vg3)	LK06
Building and construction	457139	Painter and surface treatment, Vg3	LK06
Building and construction	457118	Painting, upper secondary level 3 (Vg3)	LK06
Building and construction	457138	Bricklaying and tiling level 3 (Vg3)	LK06
Building and construction	457119	Bricklaying, upper secondary level 3 (Vg3)	LK06
Building and construction	457120	Surveying and land reallocation training, upper secondary, final year	Qualitative assesment
Building and construction	458313	Parquet production, Advanced Course II	R94 crosswalk LK06
Building and construction	469913	Institutional cleaning, level 2 (Vg2) and level 3 (Vg3), special pathway	LK06
Building and construction	469907	Institutional cleaning, upper secondary level 3 (Vg3) (old structure)	LK06
Building and construction	457121	Plumbing, upper secondary level 3 (Vg3)	LK06
Building and construction	457122	Retailing of building materials, Advanced Course II	R94 crosswalk LK06
Building and construction	457142	Carpentry level 3 (Vg3)	LK06
Building and construction	458408	Masonry, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Building and construction	457144	Scaffolding, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	Qualitative assesment
Building and construction	457123	Scaffolding, upper secondary level 3 (Vg3)	LK06
Building and construction	457124	Roofing and membrane installation, upper secondary level 3 (Vg3)	LK06
Building and construction	457127	Technical drawing, Advanced Course II	R94 crosswalk LK06
Building and construction	457125	Technical drawing, upper secondary, final year	Qualitative assesment
Building and construction	457132	Technical building trades, Advanced Course II	R94 crosswalk LK06
Building and construction	457126	Thermal spraying, Advanced Course II	R94 crosswalk LK06
Building and construction	458322	Woodworking trades, Advanced Course II	R94 crosswalk LK06
Building and construction	458344	Woodworking and laminated timber production level 3 (Vg3)	LK06
Building and construction	457128	Timber processing, two-year course	Qualitative assesment
Building and construction	458318	Timber processing, upper secondary level 3 (Vg3)	LK06
Building and construction	458324	Wood products and building furnishings, upper secondary level 3 (Vg3)	LK06
Building and construction	458321	Joinery and cabinetmaking, Advanced Course II	R94 crosswalk LK06
Building and construction	457129	Carpentry, upper secondary level 3 (Vg3)	LK06
Building and construction	457130	Hot-dip galvanizing, Advanced Course II	R94 crosswalk LK06
Building and construction	457131	Road and construction work, upper secondary level 3 (Vg3)	LK06
Building and construction	457140	Road construction and maintenance worker level 3 (Vg3)	LK06
Building and construction	457117	Ventilation and tinsmith work, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Design and crafts	465901	Occupational therapy, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	483999	Other services, other, unspecified educational group, upper secondary, final year	Qualitative assesment
Design and crafts	483399	Other services, other, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416999	Visual art and crafts, other, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416403	Imagery, two-year	Qualitative assesment
Design and crafts	458215	Automotive upholstery level 3 (Vg3)	LK06
Design and crafts	416908	Floral design, upper secondary level 3 (Vg3)	LK06
Design and crafts	416901	Floral design, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458332	Lead glass handicrafts, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	458302	Lead glass handicrafts, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	416613	Folk costume making, upper secondary level 3 (Vg3)	LK06
Design and crafts	416601	Folk costume making, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416906	Furriery, upper secondary level 3 (Vg3)	LK06
Design and crafts	416902	Furriery, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458331	Cooperage, upper secondary level 3 (Vg3)	LK06
Design and crafts	458301	Cooperage, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	455301	Gunsmithing, Advanced Course II	Qualitative assesment
Design and crafts	455309	Gunsmithing, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	483101	Ladies' hairdressing, Advanced Course II	Qualitative assesment
Design and crafts	416102	Duodji/Sami domestic crafts, upper secondary, final year	Qualitative assesment
Design and crafts	416101	Duodji (traditional Sami handicrafts), upper secondary level 3 (Vg3)	LK06
Design and crafts	416504	Exhibition design level 3 (Vg3)	LK06
Design and crafts	416209	Filigree silversmithing level 3 (Vg3)	LK06
Design and crafts	416201	Filigree silversmithing, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	455399	Precision mechanics, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416208	Gilding, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	416207	Gilding, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	416105	Arts, crafts and design studies, rigid and plastic materials, Advanced Course II	R94 crosswalk LK06
Design and crafts	416399	Photography, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416302	Photography, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Design and crafts	483107	Hairdressing, upper secondary level 3 (Vg3)	LK06
Design and crafts	483106	Hairdressing, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	483102	Training for hairdressers, upper secondary, final year	Qualitative assesment
Design and crafts	416401	Pre-press work, Advanced Course II	Qualitative assesment
Design and crafts	416412	Plastering level 2 (Vg2) and level 3 (Vg3), special pathway	LK06
Design and crafts	457110	Plastering, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	458902	Brazing, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	458901	Brazing, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	458333	Glassblowing level 2 (Vg2) and level 3 (Vg3), special pathway	LK06
Design and crafts	416202	Glass handicrafts, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	458304	Glass grinding, Advanced Course I and II, special pathway	Qualitative assesment
Design and crafts	416602	Pattern grading (cutting/design), Advanced Course II	R94 crosswalk LK06
Design and crafts	416404	Graphic arts, upper secondary, final year	Qualitative assesment
Design and crafts	416210	Engraving, level 2 (Vg2) and level 3 (Vg3), special pathway	LK06
Design and crafts	416203	Engraving, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	416211	Goldsmithing, upper secondary level 3 (Vg3)	LK06
Design and crafts	416204	Goldsmithing, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	483103	Men's hairdressing, Advanced Course II	R94 crosswalk LK06
Design and crafts	416614	Men's tailoring, upper secondary level 3 (Vg3)	LK06
Design and crafts	416603	Men's tailoring, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416111	Horn, bone and metal duodji, upper secondary level 3 (Vg3)	LK06
Design and crafts	416106	Horn, bone and metal duodji, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416199	Domestic crafts, applied art and industrial design, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	458334	Handbinding, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	458323	Handbinding, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	416606	National College of Art and Design, fashion and costume design branch	Qualitative assesment

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Design and crafts	416605	National College of Art and Design, textile branch	Qualitative assesment
Design and crafts	416615	Handweaving, upper secondary level 3 (Vg3)	LK06
Design and crafts	416604	Handweaving, upper secondary level 3 (Vg3)	LK06
Design and crafts	483199	Hair and beauty care, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416506	Interior design, upper secondary level 3 (Vg3)	LK06
Design and crafts	416502	Interior design, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416599	Interior design and display, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416112	Ceramics making, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	416104	Ceramics making, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	416103	Ceramics, upper secondary, final year	Qualitative assesment
Design and crafts	416616	Dressmaking, upper secondary level 3 (Vg3)	LK06
Design and crafts	416607	Dressmaking, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458335	Composite boat building, upper secondary level 3 (Vg3)	LK06
Design and crafts	458326	Composite boat building, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416699	Clothing and textile design, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416617	Costume making, upper secondary level 3 (Vg3)	LK06
Design and crafts	416608	Costume making, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416206	Applied art, metal work, upper secondary, final year	Qualitative assesment
Design and crafts	458336	Basketmaking, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	458305	Basketmaking, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	416405	Training for painters, upper secondary, final year	Qualitative assesment
Design and crafts	483108	Wig-making and stage make-up, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	483105	Wig-making and stage make-up, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	416410	Media design, upper secondary level 3 (Vg3)	LK06
Design and crafts	416411	Media graphics, upper secondary level 3 (Vg3)	LK06
Design and crafts	416618	Millinery, upper secondary level 3 (Vg3)	LK06
Design and crafts	416609	Millinery, upper secondary level 3 (Vg3) (old structure)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Design and crafts	458308	Musical instrument maker, three-year	Qualitative assesment
Design and crafts	458338	Cabinet making, upper secondary level 3 (Vg3)	LK06
Design and crafts	458325	Cabinet making, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458309	Cabinetmaking, upper secondary, final year	Qualitative assesment
Design and crafts	458310	Furniture upholsterer, upper secondary, final year	Qualitative assesment
Design and crafts	458337	Upholstering level 2 (Vg2) and level 3 (Vg3), special pathway	LK06
Design and crafts	458311	Upholstering, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	455303	Nautical instrument maker, upper secondary level 3 (Vg3)	LK06
Design and crafts	455304	Optical and geodetic instrument making, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458339	Organ building, upper secondary level 3 (Vg3)	LK06
Design and crafts	458312	Organ building, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458314	Piano tuning and repair, upper secondary level 3 (Vg3)	LK06
Design and crafts	458399		Qualitative assesment
		Production of wood, paper, plastic and glass, unspecified, upper secondary, final year	
Design and crafts	416413		LK06
		Profile design, upper secondary level 3 (Vg3)	
Design and crafts	416409	Profile design, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416406	Advertising, three-year	Qualitative assesment
Design and crafts	458216	Ropemaking, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	458214	Ropemaking, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	458217	Saddlery, upper secondary level 3 (Vg3)	LK06
Design and crafts	458201	Saddlery, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458218	Sailmaking, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	458209	Sailmaking, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old pathway)	LK06
Design and crafts	483299	Waiter/Waitress, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	483203	Training for waiters/waitresses, upper secondary, final year	Qualitative assesment
Design and crafts	416113	Leather and fur duodji, upper secondary level 3 (Vg3)	LK06
Design and crafts	416107	Leather and fur duodji, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458219	Shoemaking, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Design and crafts	458210	Shoemaking, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	455252		LK06
Design and crafts	455238	Blacksmithing, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	455305	Large clock repairs, upper secondary level 3 (Vg3)	LK06
Design and crafts	416619	Knitting, upper secondary level 3 (Vg3)	LK06
Design and crafts	416610	Knitting, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416612	Knitting/weaving, Advanced Course II	R94 crosswalk LK06
Design and crafts	483202	Training for stewards, upper secondary, final year	Qualitative assesment
Design and crafts	416212	Silversmithing, upper secondary level 3 (Vg3)	LK06
Design and crafts	416205	Silversmithing, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416907	Taxidermy, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Design and crafts	416903	Taxidermy, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Design and crafts	416407	Drawing and painting, upper secondary, final year	Qualitative assesment
Design and crafts	416499		Qualitative assesment
Design and crafts	458299	Drawing, graphic arts, painting and sculpture, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416114	Textile and leather production, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	416108	Textile duodji, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416611	Textile duodji, upper secondary level 3 (Vg3)	LK06
Design and crafts	416611	Textile printing and embroidery, Advanced Course II	Qualitative assesment
Design and crafts	416299	Wood, metal and glass crafts, unspecified, upper secondary, final year	Qualitative assesment
Design and crafts	458341	Wooden boat building, upper secondary level 3 (Vg3)	LK06
Design and crafts	458317	Wooden boat building, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458340	Wood turning, upper secondary level 3 (Vg3)	LK06
Design and crafts	458320	Wood turning, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	416115	Wood duodji, upper secondary level 3 (Vg3)	LK06
Design and crafts	416109	Wood duodji, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	458342	Woodcarving, upper secondary level 3 (Vg3)	LK06
Design and crafts	458319	Woodcarving, upper secondary level 3 (Vg3) (old structure)	LK06
Design and crafts	455311	Watch and clock repairs, upper secondary level 3 (Vg3)	LK06
Design and crafts	455306	Watch and clock repairs, upper secondary level 3 (Vg3) (old structure)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Design and crafts	455307	Watchmaking, upper secondary, final year	Qualitative assesment
Design and crafts	416501	Exhibition design, upper secondary level 3 (Vg3)	LK06
Design and crafts	416116	Weaving and hand-knitting duodji, upper secondary level 3 (Vg3)	LK06
Design and crafts	416110	Weaving and hand-knitting duodji, upper secondary level 3 (Vg3) (old structure)	LK06
Electrical engineering	455102	Automation, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455139	Automation, upper secondary level 4 (Vg4)	LK06
Electrical engineering	455101	Avionics, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455141	Avionics, upper secondary level 4 (Vg4)	LK06
Electrical engineering	455128	Computer electronics, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455138	Computer electronics, upper secondary level 4 (Vg4)	LK06
Electrical engineering	455146	Drone technician level 3 (Vg3)	Qualitative assesment
Electrical engineering	455103	Electrical engineering, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455199	Electrical and electronic subjects, unspecified, upper secondary, final year	Qualitative assesment
Electrical engineering	455104	Repair of electric motors and transformers, Advanced Course II	R94 crosswalk LK06
Electrical engineering	455105	Electrical repair, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455106	Power-supply fitter, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455107	Power-supply operation, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455140	Remote operated vehicle operations, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455110	Aircraft interior and equipment, Advanced Course III	R94 crosswalk LK06
Electrical engineering	455111	Avionics components repair and maintenance, Advanced Course III	R94 crosswalk LK06
Electrical engineering	455112	Aircraft components repair and maintenance, Advanced Course III	R94 crosswalk LK06
Electrical engineering	455108	Aircraft mechanic, upper secondary, final year	Qualitative assesment
Electrical engineering	455113	Aircraft engine mechanic, upper secondary level 4 (Vg4)	LK06
Electrical engineering	455114	Airframe mechanic, upper secondary level 4 (Vg4)	LK06
Electrical engineering	455115	Avionics systems repair and maintenance, Advanced Course III	R94 crosswalk LK06
Electrical engineering	455116	Flight systems mechanic, upper secondary level 4 (Vg4)	LK06
Electrical engineering	455109	Technical aeronautics, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455117	Lift fitter, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455118	Refrigeration and heat pumps, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455119	Sound technician, upper secondary, final year	Qualitative assesment
Electrical engineering	455256	Locksmith, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Electrical engineering	455143	Maritime electrical engineering, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455144	Maritime electrical engineering, upper secondary level 4 (Vg4)	LK06
Electrical engineering	455312	Optical and geodetic instrument making, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455123	Production electronics, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455126	Radio and television technology, upper secondary, final year	Qualitative assesment
Electrical engineering	455127	Space technology, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455147	Space technology, upper secondary level 3 (Vg3)	Qualitative assesment
Electrical engineering	455136	Service electronics, computer and office systems, Advanced Course II	R94 crosswalk LK06
Electrical engineering	455137	Service electronics, electronic systems in motor vehicles, Advanced Course II	R94 crosswalk LK06
Electrical engineering	455120	Service electronics, audio and video systems, Advanced Course II	R94 crosswalk LK06
Electrical engineering	455121	Service electronics, maritime electronic systems, Advanced Course II	R94 crosswalk LK06
Electrical engineering	455122	Service electronics, medical electronic systems, Advanced Course II	Qualitative assesment
Electrical engineering	455124	Service electronics, radar system, Advanced Course II	R94 crosswalk LK06
Electrical engineering	455125	Service electronics, radio communications systems, Advanced Course II	Qualitative assesment
Electrical engineering	455131	Service electronics, telecommunications, control and alarm systems, Advanced Course II	R94 crosswalk LK06
Electrical engineering	455129	Signal fitter, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455130	Control panel fitter trade, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455132	Telecommunications installation, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455133	Telecommunications technology, upper secondary, final year	Qualitative assesment
Electrical engineering	455134	Train electrician, upper secondary level 3 (Vg3)	LK06
Electrical engineering	455145	Electrical engineering and computer technology level 3 (Vg3)	LK06
Electrical engineering	455135	Coil trade, upper secondary level 3 (Vg3)	LK06
Health and social services	465903	Occupational therapy, upper secondary level 3 (Vg3)	LK06
Health and social services	469901	Ambulance service, upper secondary level 3 (Vg3)	LK06
Health and social services	466999	Pharmacy, other, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	466302	Training for pharmacy technicians, upper secondary, final year	Qualitative assesment
Health and social services	466301	Pharmacy skills, upper secondary level 3 (Vg3)	LK06
Health and social services	466399	Pharmacy technology, unspecified, upper secondary, final year	Qualitative assesment

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Health and social services	465201	Occupational therapy training, upper secondary, final year	Qualitative assesment
Health and social services	469902	Audiology programme	Qualitative assesment
Health and social services	462101	Child care and youth work, upper secondary level 3 (Vg3)	LK06
Health and social services	469903	Diploma course, holistic practitioner, natural medicine	Qualitative assesment
Health and social services	467299	Veterinary nursing, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	465199	Occupational therapy, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	466199	Pharmacy, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	465902	Pedicure, upper secondary level 3 (Vg3)	LK06
Health and social services	465299	Physiotherapy, unspecified, upper secondary, final year	R94 crosswalk LK06
Health and social services	469910	Health and social care studies, Advanced Course II	R94 crosswalk LK06
Health and social services	469999	Health, welfare and sport, other, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	461903	Health work, upper secondary level 3 (Vg3)	LK06
Health and social services	469908	Medical secretary, upper secondary level 3 (Vg3)	LK06
Health and social services	469909	Medical office skills, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	461299	Auxiliary nursing, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	461201	Nursing auxiliary skills, Advanced Course II	R94 crosswalk LK06
Health and social services	483104	Cosmetologist, upper secondary level 3 (Vg3)	LK06
Health and social services	461901	Housewife's substitute, upper secondary, final year	Qualitative assesment
Health and social services	465399	Chiropractic, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	463999	Medicine, other, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	463199	Medicine, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	464199	Odontology, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	461902	Care work, Advanced Course II	R94 crosswalk LK06
Health and social services	469905	Orthopaedic technician, upper secondary level 3 (Vg3)	LK06
Health and social services	461999	Nursing and caring, other, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	469911	Medical orderly, upper secondary level 3 (Vg3)	LK06
Health and social services	469906	Training for radiographers	Qualitative assesment
Health and social services	466299	Dispensing pharmacy, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	462999	Social services, other, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	462199	Social services, unspecified, upper secondary, final year	Qualitative assesment

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Health and social services	461199	Nursing, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	464999	Dental health, other, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	464201	Dental assistant, upper secondary level 3 (Vg3)	LK06
Health and social services	464299	Dental care, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	464302	Dental technology, Advanced Course II	R94 crosswalk LK06
Health and social services	464301	Dental technology, upper secondary, final year	Qualitative assesment
Health and social services	464399	Dental technology, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	465999	Therapy, other, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	461399	Social education, unspecified, upper secondary, final year	R94 crosswalk LK06
Health and social services	467199	Veterinary science, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	467999	Veterinary medicine, other, unspecified, upper secondary, final year	Qualitative assesment
Health and social services	461202	Supplementary education for auxiliary nurses	R94 crosswalk LK06
Agriculture and fishery	479905	Agronomy course, two-year	Qualitative assesment
Agriculture and fishery	471901	Aquaculture, upper secondary level 3 (Vg3)	LK06
Agriculture and fishery	474101	General forestry, Advanced Course II	R94 crosswalk LK06
Agriculture and fishery	473101	Landscaping, upper secondary level 3 (Vg3) (old structure)	LK06
Agriculture and fishery	479912	Animal husbandry, level 3 (Vg3)	LK06
Agriculture and fishery	471101	Fishing and general seamanship, upper secondary level 3 (Vg3)	LK06
Agriculture and fishery	471999	Fisheries and aquaculture, other, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	471199	Fisheries and aquaculture, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	471902	Training for masters of fishing vessels	Qualitative assesment
Agriculture and fishery	479902	Stewardship course I and II, agricultural college	Qualitative assesment
Agriculture and fishery	473999	Horticulture, other, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	473199	Horticulture, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	473102	Gardening, upper secondary level 3 (Vg3)	LK06
Agriculture and fishery	473105	Gardening, upper secondary level 3 (Vg3) (experiment)	LK06
Agriculture and fishery	473103	Horticultural technology, one-year	Qualitative assesment
Agriculture and fishery	471102	Aquaculture management level 3 (Vg3)	LK06
Agriculture and fishery	479906	Equestrian trades, upper secondary level 3 (Vg3)	LK06
Agriculture and fishery	455253	Farrier trades, level 2 (Vg2) and level 3 (Vg3)	LK06
Agriculture and fishery	455215	Farrier trades, upper secondary level 3 (Vg3) (old structure)	LK06
Agriculture and fishery	473104	Sports facilities management, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Agriculture and fishery	472999	Agriculture, other, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	472199	Agriculture, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	479901	Agriculture, upper secondary level 3 (Vg3)	LK06
Agriculture and fishery	479909	Agriculture studies, upper secondary level 3 (Vg3) (experiment)	LK06
Agriculture and fishery	479999	Primary industries, other, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	479907	Reindeer husbandry, Advanced Course II	R94 crosswalk LK06
Agriculture and fishery	479908	Reindeer husbandry, upper secondary level 3 (Vg3)	LK06
Agriculture and fishery	474999	Forestry, other, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	474199	Forestry, unspecified, upper secondary, final year	Qualitative assesment
Agriculture and fishery	474102	Forestry, upper secondary level 3 (Vg3)	LK06
Agriculture and fishery	474104	Forestry school, two-year	Qualitative assesment
Agriculture and fishery	474103	Forestry machinery operation, Advanced Course II	R94 crosswalk LK06
Agriculture and fishery	474901	Wilderness management	Qualitative assesment
Agriculture and fishery	479904	Ecological agriculture, Advanced Course II	R94 crosswalk LK06
Restaurant and food-industries	458101	Baking, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	458102	Retail butchering, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	458116	Nutritional cookery level 3 (Vg3)	LK06
Restaurant and food-industries	458117	Perishable goods dealer level 3 (Vg3)	LK06
Restaurant and food-industries	458115	Hotel and food processing trades, Advanced Course II	R94 crosswalk LK06
Restaurant and food-industries	444999	Hotel, travel and tourism, other, unspecified, upper secondary, final year	Qualitative assesment
Restaurant and food-industries	444299	Hotel and restaurant, unspecified, upper secondary, final year	Qualitative assesment
Restaurant and food-industries	444201	Hotel management school	Qualitative assesment
Restaurant and food-industries	458105	Industrial food production, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	458106	Institutional cookery, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	458107	Meat cutting, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	458108	Cookery, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	458109	Training for cooks, upper secondary, final year	Qualitative assesment
Restaurant and food-industries	458110	Confectionery, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	444202	Institutional catering management, two-year	Qualitative assesment
Restaurant and food-industries	458112	Dairy processing, Advanced Course II	R94 crosswalk LK06
Restaurant and food-industries	458111	Training for dairy product processors, upper secondary, final year	Qualitative assesment
Restaurant and food-industries	458199	Food processing, unspecified, upper secondary, final year	Qualitative assesment
Restaurant and food-industries	458113	Sausage making, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	444199	Travel and tourism, unspecified, upper secondary, final year	Qualitative assesment
Restaurant and food-industries	483201	Waiting, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Restaurant and food-industries	458103	Seafood retailing and wholesaling, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	458104	Seafood production, upper secondary level 3 (Vg3)	LK06
Restaurant and food-industries	458114	Butchering, upper secondary level 3 (Vg3)	LK06
Service and logistics	442101	Retailing, Advanced Course II	R94 crosswalk LK06
Service and logistics	442999	Wholesale and retail sales and marketing, other, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	442199	Wholesale and retail sales, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	454104	ICT operation technician, upper secondary level 3 (Vg3) (old structure)	LK06
Service and logistics	454101	ICT service operations, upper secondary level 3 (Vg3)	LK06
Service and logistics	454103	ICT service developer, upper secondary level 3 (Vg3) (old structure)	LK06
Service and logistics	454999	Information and computer technology, other, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	454199	Information and computer technology, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	454299	Information modelling, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	443201	Office and administrative skills, upper secondary level 3 (Vg3)	LK06
Service and logistics	443999	Secretarial and office skills, other, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	443299	Office skills, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	481905	Logistics, upper secondary level 3 (Vg3) (old structure)	LK06
Service and logistics	442201	Marketing, specialized course	Qualitative assesment
Service and logistics	442299	Marketing, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	481901	Postal services, upper secondary, final year	Qualitative assesment
Service and logistics	444102	The travel industry, upper secondary level 3 (Vg3)	LK06
Service and logistics	444101	The travel industry, upper secondary level 3 (Vg3) (old structure)	LK06
Service and logistics	444901	Reception desk services, upper secondary level 3 (Vg3)	LK06
Service and logistics	442103	Sales, upper secondary level 3 (Vg3)	LK06
Service and logistics	442102	Sales, upper secondary level 3 (Vg3) (old structure)	LK06
Service and logistics	481999	Transport and communications, other, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	443199	Secretarial training, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	449902	Service and administration level 3 (Vg3)	LK06
Service and logistics	482999	Safety and security, other, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	482902	Safety and security services, upper secondary level 3 (Vg3)	LK06
Service and logistics	482901	Safety and security services, upper secondary level 3 (Vg3) (old structure)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Service and logistics	449901	Language and administrative procedures branch, Advanced Course II	Qualitative assesment
Service and logistics	481902	Training for telegraph operators	Qualitative assesment
Service and logistics	481903	Telecommunications, upper secondary, final year	Qualitative assesment
Service and logistics	481904	Telematics, IT, diploma course	Qualitative assesment
Service and logistics	442901	Training in the co-operative system	Qualitative assesment
Service and logistics	481499	Road traffic, unspecified, upper secondary, final year	Qualitative assesment
Service and logistics	481401	Transport driver, upper secondary level 3 (Vg3) (old structure)	LK06
Technology and manufacturing	455201	Aluminium constructions, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455202	Construction and production machinery mechanics, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455243	Construction and production machinery mechanics, upper secondary level 4 (Vg4)	LK06
Technology and manufacturing	455203	Automation engineering, Advanced Course II	Qualitative assesment
Technology and manufacturing	455244	Automation engineering, Advanced Course III	R94 crosswalk LK06
Technology and manufacturing	455204	Motor vehicle, light vehicles, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455205	Motor vehicle, heavy vehicles, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455206	Vehicle spraying, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455207	Auto mechanic, upper secondary, final year	Qualitative assesment
Technology and manufacturing	455254	Vehicle valeting level 3 (Vg3)	LK06
Technology and manufacturing	455208	Motor vehicle body repair, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455209	Bookbinding, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458402	Drilling operations, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458411	Well drilling and rigging, electrical cable operations, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458410	Well drilling and rigging, sea-floor installations, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458404	Well technology, wireline operation, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	458405	Well drilling and rigging, completions, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458403	Well drilling and rigging, coiled tubing, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458412	Well drilling and rigging, mechanical cable operations, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458406	Well drilling and rigging, cementation, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455308	Gunsmithing, Advanced Course III	R94 crosswalk LK06
Technology and manufacturing	455313	Gunsmithing, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455247	CNC machines, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455217	Chassis building, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455210	Dimensions inspector, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Technology and manufacturing	455901	Training for operations technicians, upper secondary, final year	Qualitative assesment
Technology and manufacturing	458999	Manufacturing and extraction, other, unspecified, upper secondary, final year	Qualitative assesment
Technology and manufacturing	455211	Skilled operator, chemical/technical industry, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	455302	Instrument and toolmaker, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	452199	Physics, unspecified, upper secondary, final year	Qualitative assesment
Technology and manufacturing	452999	Physics and chemistry, other, unspecified, upper secondary, final year	Qualitative assesment
Technology and manufacturing	455212	Tanning, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Technology and manufacturing	483302	Waste recovery, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Technology and manufacturing	483306	Waste recovery, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455245	Graphic packaging, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455251	Graphic production, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458499	Mining and extraction, unspecified, upper secondary, final year	Qualitative assesment
Technology and manufacturing	455214	Wheels, chassis, and suspensions, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	457134	Industrial surface treatment, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458203	Industrial footwear, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Technology and manufacturing	455216	Industrial machinery mechanics, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455249	Industrial fitting, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455310	Industrial measurement, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	457113	Industrial plumbing, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458327	Industrial carpentry, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458202	Industrial sewing, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	457114	Industrial furniture upholstery, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458220	Industrial textiles upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458207	Industrial textiles, dyeing, printing and finishing, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458208	Industrial textiles, fishing gear, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458211	Industrial textiles, yarn production, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Technology and manufacturing	458204	Industrial textiles, yarn production/spinning, Advanced Course I and Advanced Course II, special pathway	R94 crosswalk LK06
Technology and manufacturing	458206	Industrial textiles, knitwear, Advanced Course I and Advanced Course II, special pathway	R94 crosswalk LK06
Technology and manufacturing	458213	Industrial textiles, knitwear, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458205	Industrial textiles, weaving, Advanced Course I and Advanced Course II, special pathway	R94 crosswalk LK06
Technology and manufacturing	458212	Industrial textiles, weaving, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455218	Cable manufacture, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	455219	Packaging material production, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	455220	Ceramic decoration, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	455221	Ceramic moulding, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	452201	Chemical processing, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	452299	Chemistry, unspecified, upper secondary, final year	Qualitative assesment
Technology and manufacturing	455246	Cranes and lifting equipment, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	481301	Course for coastal skippers, 1st class	Qualitative assesment
Technology and manufacturing	452202	Laboratory work, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455222	Agricultural machinery mechanics, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	481906	Logistics, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455223	Locksmith, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway (old structure)	LK06
Technology and manufacturing	458330	Maritime internal work, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455224	Maritime engineering, upper secondary, final year	Qualitative assesment
Technology and manufacturing	481399	Maritime navigation, unspecified, upper secondary, final year	Qualitative assesment
Technology and manufacturing	455225	Machine operation, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	455226	Materials management, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	481302	Seaman, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455299	Engineering and mechanical trades, unspecified, upper secondary, finishing course	Qualitative assesment
Technology and manufacturing	455227	Metal moulding, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	452203	Metallurgical processes, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	455228	Metal component production, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	458307	Model building, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455229	Engine mechanic, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455230	Motorcycle repair, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Technology and manufacturing	455232	NDT inspection, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458407	Oil production engineering, upper secondary, final year	Qualitative assesment
Technology and manufacturing	469904	Orthopaedic footwear, Advanced Course I and Advanced Course II, special pathway	R94 crosswalk LK06
Technology and manufacturing	458343	Plastics worker, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458315	Plastics mechanic, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455234	Sheet metal, welding and steel construction trades, upper secondary, final year	Qualitative assesment
Technology and manufacturing	455233	Sheet metal work, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458328	Composite polymers, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455235	Pressure moulding, Advanced Course II	Qualitative assesment
Technology and manufacturing	455248	Production, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455236	Parts supply, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455237	Screenprinting, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	481303	Training for ship's masters	Qualitative assesment
Technology and manufacturing	455231	Ship engine mechanic, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	458316	Wallboard and particle board production, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	481304	Training for ship's mates	Qualitative assesment
Technology and manufacturing	455242	Forging, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455239	Welding, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455240	Cycle repairs, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	455902	Technological and industrial production with specialization in general studies, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	483301	Dry cleaning, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Technology and manufacturing	483305	Dry cleaning skills, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	454102	Transport terminal operations, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	458329	Thermoplastics, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	452204	Pulp and paper processing, Advanced Course II	R94 crosswalk LK06
Technology and manufacturing	455255	Technological and industrial production level 3 (Vg3)	LK06
Technology and manufacturing	455213	Printing, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	455999	Electrical, electronic, mechanical and machine subjects, other, unspecified, upper secondary, final year	Qualitative assesment
Technology and manufacturing	483303	Laundry, upper secondary level 2 (Vg2) and upper secondary level 3 (Vg3), special pathway	LK06
Technology and manufacturing	483304	Laundry skills, upper secondary level 3 (Vg3)	LK06

Track, according to 2006-classification	Nus2000	English title of completed education, NUS2000	Source of classification
Technology and manufacturing	455241	Toolmaker, upper secondary level 3 (Vg3)	LK06
Technology and manufacturing	481402	Transport driver, upper secondary level 3 (Vg3)	LK06

Reference

Frøseth, M. W., Hovdhaugen, E., Høst, H. & Vibe, N. (2008). *Tilbudsstruktur og gjennomføring i videregående opplæring. Delrapport 1. Evaluering av Kunnskapsløftet* (Rapport 40/2008). NIFU STEP. <http://hdl.handle.net/11250/284580>

Vibe, N., Frøseth, M. W., Hovdhaugen, E. & Markussen, E. (2012). *Strukturer og konjunkturer. Evaluering av Kunnskapsløftet. Sluttrapport fra prosjektet «Tilbudsstruktur, gjennomføring og kompetanseoppnåelse i videregående opplæring»* (NIFU-rapport 26/2012). NIFU. <http://hdl.handle.net/11250/280897>

Appendix C: Descriptive statistics

Table C1 presents an overview of the outcome variable levels in our sample, broken down by year since completion and by group. There are some notable differences in terms of post-completion educational activity by time period. Enrollment in any form of education immediately after completing a vocational degree is most prevalent in the first period (30%) and least common in the mid-period (23%). The type of educational activities also varies, with approximately 18% of completers transitioning horizontally within the education system during the post-Reform 1994 period, compared to only about 9% in the two subsequent post-Reform 1994 periods. While only about 2% of completers enrolled directly in an academic supplementary program during the first period, this figure increased to 6% for those completing between 1998–2013 and 7.5% for those completing between 2014–2017, the period when this programme became universally accessible to all. Perhaps surprisingly, it was more common to pursue HE after completing a vocational degree in the first period, with about 11% of completers having obtained an HE degree within 6 years. In the last period (column 3), where access to HE became universally accessible, about 8.4% of individuals had completed a HE degree within 6 years of completing vocational education. Prior to universal access to HE (column 2) only about 6.8% of individuals had completed a HE degree within 6 years.

Comparing employment rates and the proportion of individuals not engaged in education or work across time periods reveals clear trends. Post-completion employment is highest for individuals in the most recent period and lowest for those in the pre-1994 reform period. Similarly, the proportion of individuals not in education or work is highest in the first period and lowest in the most recent one.

Table C2 presents the observable characteristics for our sample, broken down by group. Several differences in background characteristics over time reflect demographic changes, such as rising education levels and an increasing immigrant population. For example, in the first period only about 16% of students had parents with HE compared to about 31% in the last period. At the population level, the proportion of individuals aged 16 and above with higher education increased from approximately 14% in 1988 to around 33% in 2017.² This also suggests that using parental education level as a measure of socio-economic background poses challenges when comparing individuals with parents of differing education levels across time periods. For example,

² Based on Statistics Norway Table 08921: 08921: Persons 16 years and above, by region, contents, year and level of education.

the group of individuals with less-educated parents in the earlier period will be qualitatively different from those with less-educated parents in the later period. To address this issue, we conduct subgroup analyses based on parental earning terciles. Parental earnings terciles are determined based on the parental earnings rank in the year the individual turned 16. The ranking and division into terciles are calculated within the same birth cohort and gender as the parent.

In Table C2, we report both the mother's and father's earnings terciles, which are noticeably more similar over time than parental education level. Missing information on earnings terciles indicates that no earnings data were reported for the year the individual turned 16. The higher proportion of missing information for fathers' terciles may be due to missing information on father's id in the data.

A final thing to notice is that gender is overrepresented in all time periods—ranging from 75% males in the first period (column 1) to 90-91% in the two last periods (columns 2 and 3). The increase in the proportion of males completing vocational education between the pre-reform period in 1994 (column 1) and the post-reform periods (columns 2 and 3) aligns with results showing that the 1994-reform led to a rise in the share of men completing vocational education (Bertrand, Mogstad, & Mountjoy, 2021).

Table C1 Outcome variables, by completion period

	(1) Completed: Pre 1994 system	(2) Completed: 1998-2013	(3) Completed: 2014-2017
In education, year t	0.299	0.230	0.266
In education, year t+1	0.323	0.242	0.274
In education, year t+2	0.280	0.184	0.212
In education, year t+3	0.247	0.170	0.192
In education, year t+4	0.208	0.153	0.167
In education, year t+5	0.170	0.134	0.147
In academic supplementary prog., year t	0.019	0.060	0.075
In academic supplementary prog., year t+1	0.015	0.029	0.032
In academic supplementary prog., year t+2	0.012	0.021	0.022
In academic supplementary prog., year t+3	0.009	0.015	0.013
In academic supplementary prog., year t+4	0.007	0.009	0.007
In upper sec.ed, year	0.177	0.094	0.093
In upper sec.ed, year t+1	0.159	0.094	0.088
In upper sec.ed, year t+2	0.108	0.042	0.044
In upper sec.ed, year t+3	0.075	0.028	0.031
In upper sec.ed, year t+4	0.051	0.021	0.023
HVET, year t	0.050	0.074	0.071
HVET, year t+1	0.061	0.083	0.087
HVET, year t+2	0.042	0.055	0.059
HVET, year t+3	0.029	0.044	0.054
HVET, year t+4	0.021	0.035	0.048
Enrolled in HE, year t	0.064	0.017	0.028
Enrolled in HE, year t+1	0.096	0.047	0.068
Enrolled in HE, year t+2	0.124	0.075	0.088
Enrolled in HE, year t+3	0.138	0.089	0.096
Enrolled in HE, year t+4	0.133	0.092	0.090
Completed some HE, within t+5	0.109	0.068	0.084
Employed, year t	0.472	0.682	0.752
Employed, year t+1	0.562	0.725	0.797
Employed, year t+2	0.642	0.763	0.819
Employed, year t+3	0.702	0.784	0.837
Employed, year t+4	0.739	0.802	0.856
Not in education or work, t	0.355	0.212	0.128
Not in education or work, t+1	0.275	0.171	0.091
Not in education or work, t+2	0.215	0.149	0.086
Not in education or work, t+3	0.171	0.134	0.083
Not in education or work, t+4	0.155	0.124	0.080
	66328	115612	35424

Table C2 Observable characteristics

	(1) Completed: Pre 1994 system	(2) Completed: 1998-2013	(3) Completed: 2014-2017
Parents, missing ed.	0.002	0.003	0.006
Parents, lower secondary education or less	0.613	0.337	0.160
Parents, upper secondary education	0.223	0.416	0.520
Parents, Higher ed.	0.162	0.244	0.314
Mothers' earnings tercile, missing	0.009	0.009	0.011
Mother, 1st earnings tercile	0.351	0.358	0.342
Mother, 2nd earnings tercile	0.400	0.396	0.397
Mother, 3rd earnings tercile	0.240	0.237	0.251
Fathers' earnings tercile, missing	0.036	0.032	0.036
Father, 1st earnings tercile	0.303	0.289	0.250
Father, 2nd earnings tercile	0.375	0.385	0.390
Father, 3rd earnings tercile	0.286	0.294	0.323
Boy	0.745	0.912	0.904
Minority	0.008	0.026	0.047
N	66328	115612	35424

Notes: Information on gender, minority background and parental education is measured the year the individual turns 16, which corresponds to the year they typically enter upper secondary education. Parental education, based on parents' highest completed education level, is divided into compulsory education or less, upper secondary education, and higher education. Minority background is defined as born in Norway to two foreign-born parents (descendants) or born abroad (immigrants).

Reference

Bertrand, M., Mogstad, M., & Mountjoy, J. (2021). Improving educational pathways to social mobility: evidence from Norway's reform 94. *Journal of Labor Economics*, 39(4), 965-1010.

- Appendix D: Unscaled results on outcomes, average effects

Table D1: Average effect on enrolment in academic supplementary programme

	(1) In academic supplementary prog., year t	(2) In academic supplementary prog., year t+1	(3) In academic supplementary prog., year t+2	(4) In academic supplementary prog., year t+3
Panel A: Completed in the pre-1994 system				
u. rate	-0.001 (0.001)	0.002* (0.001)	-0.001 (0.001)	-0.001 (0.001)
N	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.004 (0.004)	0.002 (0.002)	-0.002 (0.001)	-0.002 (0.001)
N	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.024*** (0.006)	0.008** (0.003)	-0.002 (0.002)	0.000 (0.001)
N	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in an academic supplementary year, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table D2: Average effect on enrolment in education

	(1)	(2)	(3)	(4)	(5)	(6)
	In education, year t	In education, year t+1	In education, year t+2	In education, year t+3	In education, year t+4	In education, year t+5
u. rate	0.006 (0.006)	0.020*** (0.006)	0.009* (0.005)	0.010** (0.005)	0.004 (0.006)	0.003 (0.005)
N	66323	66328	66325	66325	66326	66325
Panel B: Completed upper secondary education between 1998 and 2013						
u. rate	0.001 (0.006)	0.004 (0.006)	0.008 (0.005)	0.006 (0.005)	0.005 (0.005)	0.003 (0.004)
N	115611	115611	115611	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017						
u. rate	0.036*** (0.012)	0.031*** (0.010)	0.023*** (0.008)	0.011 (0.007)	0.010** (0.004)	0.015** (0.006)
N	35424	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in any form of education, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table D3: Average effect on enrolment in upper secondary education (excl. academic supplementary year)

	(1)	(2)	(3)	(4)	(5)	(6)
	In upper sec.ed, year	In upper sec.ed, year t+1	In upper sec.ed, year t+2	In upper sec.ed, year t+3	In upper sec.ed, year t+4	In upper sec.ed, year t+5
Panel A: Completed in the pre-1994 system						
u. rate	0.003 (0.005)	0.011** (0.005)	0.008** (0.004)	0.007** (0.003)	0.003 (0.003)	-0.002 (0.002)
N	66328	66328	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013						
u. rate	-0.002 (0.005)	-0.001 (0.005)	0.000 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.000 (0.001)
N	115612	115612	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017						
u. rate	-0.004 (0.005)	-0.002 (0.006)	0.007** (0.003)	-0.000 (0.004)	-0.003* (0.002)	0.002 (0.002)
M	35424	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in upper secondary education (excl. academic supplementary programme), evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10

Table D4: Average effect on enrolment in HVET

	(1) HVET, year t	(2) HVET, year t+1	(3) HVET, year t+2	(4) HVET, year t+3	(5) HVET, year t+4
All	0.001 (0.002)	0.002 (0.003)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)
N	66328	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013					
All	-0.003 (0.004)	-0.003 (0.005)	-0.003 (0.003)	0.001 (0.002)	0.003 (0.002)
N	115612	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017					
u. rate	0.010*** (0.004)	0.009** (0.004)	-0.000 (0.003)	-0.002 (0.003)	0.003 (0.005)
N	35424	35424	35424	35424	35424

Note: Each estimate is derived from a separate regression using the baseline model specified in Equation (1). The unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** 1%, ** 5%, * 10%.

Table D5: Average effect on enrolment in higher education

	(1) Enrolled in HE, year t	(2) Enrolled in HE, year t+1	(3) Enrolled in HE, year t+2	(4) Enrolled in HE, year t+3	(5) Completed some HE, within t+5
Panel A: Completed in the pre-1994 system					
u. rate	0.001 (0.004)	0.006* (0.003)	0.002 (0.003)	0.006 (0.004)	0.003 (0.004)
N	66328	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013					
u. rate	0.001 (0.002)	0.006*** (0.002)	0.011*** (0.003)	0.008** (0.004)	0.005 (0.003)
N	115612	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017					
u. rate	0.005* (0.003)	0.018*** (0.005)	0.021** (0.008)	0.016*** (0.005)	0.018*** (0.006)
N	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in HE, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table D6: Average effect on the proportion of individuals not in education or work

	(1) Not in education or work, t	(2) Not in education or work, t+1	(3) Not in education or work, t+2	(4) Not in education or work, t+3
Panel A: Completed in the pre-1994 system				
u. rate	0.031*** (0.006)	0.015*** (0.005)	-0.004 (0.005)	-0.006 (0.004)
N	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.033*** (0.007)	0.022*** (0.004)	0.008 (0.006)	0.000 (0.005)
N	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.025*** (0.005)	-0.009** (0.004)	-0.023*** (0.005)	-0.013** (0.006)
N	35424	35424	35424	35424

Note: Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual not in education or work, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table D7: Average effect on log earnings

	(1) year t	(2) year t+1	(3) year t+2	(4) year t+3	(5) year t+4	(6) year t+5	(7) sum, year t to t+5
Panel A: Completed in the pre-1994 system							
u. rate	-0.151*** (0.020)	-0.112*** (0.019)	-0.026* (0.015)	-0.010 (0.012)	-0.003 (0.011)	-0.012 (0.010)	-0.037*** (0.012)
N	61240	62805	64125	64623	64572	64578	66208
Panel B: Completed upper secondary education between 1998 and 2013							
u. rate	-0.082*** (0.015)	-0.113*** (0.020)	-0.076*** (0.017)	-0.053*** (0.016)	-0.028** (0.014)	-0.015 (0.012)	-0.053*** (0.013)
N	113835	113737	114027	113944	113821	113766	115535
Panel C: Completed upper secondary education between 2014 and 2017							
u. rate	-0.086*** (0.017)	-0.112*** (0.015)	-0.027* (0.014)	0.008 (0.013)	0.007 (0.011)	0.008 (0.008)	-0.025** (0.011)
N	34727	34446	34610	34580	34659	34755	35374

Note: Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is log earnings, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table D8: Average effect on normalised earnings

	(1) year t	(2) year t+1	(3) year t+2	(4) year t+3	(5) year t+4	(6) year t+5	(7) sum, year t to t+5
Panel A: Completed in the pre-1994 system							
u. rate	-0.134*** (0.023)	-0.095*** (0.016)	-0.028*** (0.011)	-0.011 (0.008)	-0.009 (0.008)	-0.015** (0.007)	-0.033*** (0.009)
N	66328	66328	66328	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013							
u. rate	-0.077*** (0.012)	-0.091*** (0.017)	-0.071*** (0.014)	-0.053*** (0.012)	-0.033*** (0.011)	-0.025*** (0.010)	-0.054*** (0.011)
N	115612	115612	115612	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017							
u. rate	-0.084*** (0.015)	-0.091*** (0.014)	-0.021** (0.010)	0.011 (0.011)	0.009 (0.010)	0.006 (0.007)	-0.021** (0.010)
N	35424	35424	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is normalised earnings—yearly earnings relative to average earnings. This approach allows the inclusion of individuals with zero earnings. The estimates are evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Appendix E: Scaled results on outcomes, average effects

Given that the employment effects of one 1 pp increase in unemployment varies somewhat across reform periods, comparing the “raw” coefficients on educational participation and log earnings is hard to interpret at face value as they can reflect both differences in educational contexts, but also differences in the initial impact on employment across time periods. To make the comparison more easily interpretable we scale the coefficients on the various educational outcomes, not in education or work, and log earnings by the initial effect on employment (employment in year t), where all coefficients come from estimating Equation 1 with the various outcomes as dependent variables. The scaled coefficients are multiplied by 100, so that dichotomous dependent variables are expressed in percentage-point units. These coefficients can therefore be interpreted as the percentage-point change in the share of individuals pursuing a given activity following a one-percentage-point decrease in employment. If e.g. we observe a 0.8 pp increase in the share of individuals enrolling in the academic supplementary year, this implies that 80% of the reduction in employment translates into a higher proportion of individuals in the academic supplementary year.

This appendix reports the table corresponding to the scaled effects corresponding to the results shown in Figures 2 and 3 in the paper.

Table E1: Scaled average effect on enrolment in academic qualification programme

	(1)	(2)	(3)	(4)	<i>Note:</i> The estimates represent the coefficients on
	T	t+1	t+2	t+3	
Panel A: Completed in the pre-1994 system					
u. rate	-0.0 (0.0)	0.1* (0.0)	-0.0 (0.0)	-0.0 (0.0)	
N	66328	66328	66328	66328	
Panel B: Completed upper secondary education between 1998 and 2013					
u. rate	0.1 (0.1)	0.0 (0.0)	-0.0 (0.0)	-0.0 (0.0)	
N	115612	115612	115612	115612	
Panel C: Completed upper secondary education between 2014 and 2017					
u. rate	0.4*** (0.1)	0.1** (0.1)	-0.0 (0.0)	0.0 (0.0)	
N	35424	35424	35424	35424	

unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in an academic supplementary year. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table E2: Average effect on enrolment in education

	(1) t	(2) t+1	(3) t+2	(4) t+3	(5) t+4	(6) t+5
Panel A: Completed in the pre-1994 system						
u. rate	0.1 (0.2)	0.5*** (0.1)	0.2* (0.1)	0.3** (0.1)	0.1 (0.1)	0.1 (0.1)
N	66323	66328	66325	66325	66326	66325
Panel B: Completed upper secondary education between 1998 and 2013						
u. rate	0.0 (0.1)	0.1 (0.1)	0.2 (0.1)	0.1 (0.1)	0.1 (0.1)	0.1 (0.1)
N	115611	115611	115611	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017						
u. rate	0.6*** (0.2)	0.5*** (0.2)	0.4*** (0.1)	0.2 (0.1)	0.2** (0.1)	0.2** (0.1)
N	35424	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in any form of education. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table E3: Average effect on enrolment in upper secondary education (excl. academic supplementary year)

	(1) t	(2) t+1	(3) t+2	(4) t+3	(5) t+4	(6) t+5
Panel A: Completed in the pre-1994 system						
u. rate	0.1 (0.1)	0.3** (0.1)	0.2** (0.1)	0.2** (0.1)	0.1 (0.1)	-0.0 (0.1)
N	66328	66328	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013						
u. rate	-0.0 (0.1)	-0.0 (0.1)	0.0 (0.0)	-0.0 (0.0)	-0.0 (0.0)	-0.0 (0.0)
N	115612	115612	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017						
u. rate	-0.1 (0.1)	-0.0 (0.1)	0.1** (0.0)	-0.0 (0.1)	-0.1* (0.0)	0.0 (0.0)
N	35424	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in upper secondary education (excl. academic supplementary programme). Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table E4: Average effect on enrolment in HVET

	(1) t	(2) t+1	(3) t+2	(4) t+3	(5) t+4
Panel A: Completed in the pre-1994 system					
u. rate	0.0 (0.1)	0.0 (0.1)	-0.0 (0.1)	-0.1 (0.0)	-0.0 (0.0)
N	66328	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013					
u. rate	-0.1 (0.1)	-0.1 (0.1)	-0.1 (0.1)	0.0 (0.1)	0.1 (0.0)
N	115612	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017					
u. rate	0.2*** (0.1)	0.2** (0.1)	-0.0 (0.1)	-0.0 (0.1)	0.1 (0.1)
N	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in HVET. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table E5: Average effect on enrolment in higher education

	(1) Enrolled in HE, year t	(2) Enrolled in HE, year t+1	(3) Enrolled in HE, year t+2	(4) Enrolled in HE, year t+3	(5) Completed some HE, within t+5
Panel A: Completed in the pre-1994 system					
u. rate	0.0 (0.1)	0.1* (0.1)	0.1 (0.1)	0.2 (0.1)	0.1 (0.1)
N	66328	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013					
u. rate	0.0 (0.0)	0.1*** (0.0)	0.2*** (0.1)	0.2** (0.1)	0.1 (0.1)
N	115612	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017					
u. rate	0.1* (0.0)	0.3*** (0.1)	0.4** (0.1)	0.3*** (0.1)	0.3*** (0.1)
N	35424	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in HE. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table E6: Average effect on the proportion of individuals not in education or work

	(1) t	(2) t+1	(3) t+2	(4) t+3
Panel A: Completed in the pre-1994 system				
u. rate	0.8*** (0.1)	0.4*** (0.1)	-0.1 (0.1)	-0.2 (0.1)
N	66328	66328	66328	66328
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.7*** (0.1)	0.5*** (0.1)	0.2 (0.1)	0.0 (0.1)
N	115612	115612	115612	115612
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.4*** (0.1)	-0.2** (0.1)	-0.4*** (0.1)	-0.2** (0.1)
N	35424	35424	35424	35424

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is not in education or work. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table E7: Average effect on log earnings

	(1) t	(2) t+1	(3) t+2	(4) t+3	(5) t+4	(6) t+5	(7) sum t to t+5
Panel A: Completed in the pre-1994 system							
All	-3.8*** (0.5)	-2.8*** (0.5)	-0.7* (0.4)	-0.3 (0.3)	-0.1 (0.3)	-0.3 (0.3)	-0.9*** (0.3)
N	61240	62805	64125	64623	64572	64578	66208
Panel B: Completed upper secondary education between 1998 and 2013							
All	-1.7*** (0.3)	-2.3*** (0.4)	-1.5*** (0.3)	-1.1*** (0.3)	-0.6** (0.3)	-0.3 (0.2)	-1.1*** (0.3)
N	113835	113737	114027	113944	113821	113766	115535
Panel C: Completed upper secondary education between 2014 and 2017							
All	-1.5*** (0.3)	-1.9*** (0.3)	-0.5* (0.2)	0.1 (0.2)	0.1 (0.2)	0.1 (0.1)	-0.4** (0.2)
N	34727	34446	34610	34580	34659	34755	35374

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is log earnings. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Appendix F: Unscaled results on outcomes—all vocational tracks combined

Here we present the results from the same specification and outcomes as in Appendix D, but we include all eight tracks in our sample: 1) Electrical engineering, 2) Design and crafts, 3) Healthcare, Child and youth development, 4) Building and construction, 5) Agriculture, fishing and forestry, 6) Restaurant and food processing, 7) Service and logistics, 8) Technological and industrial production.

Table F1: Average effect on employment, all tracks combined

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Employed, year t	Employed, year t+1	Employed, year t+2	Employed, year t+3	Employed, year t+4	Employed, year t+5	Employed, year t+6
Panel A: Completed in the pre-1994 system							
u. rate	-0.035*** (0.005)	-0.026*** (0.005)	0.002 (0.006)	0.010** (0.005)	0.006 (0.006)	0.006 (0.004)	0.002 (0.005)
N	79070	79070	79070	79070	79070	79070	79070
Panel B: Completed upper secondary education between 1998 and 2013							
u. rate	-0.045*** (0.008)	-0.032*** (0.007)	-0.016** (0.007)	-0.010 (0.006)	-0.003 (0.005)	-0.002 (0.004)	0.001 (0.004)
N	172550	172550	172550	172550	172550	172550	172550
Panel C: Completed upper secondary education between 2014 and 2017							
u. rate	-0.052*** (0.007)	-0.009* (0.005)	0.003 (0.006)	-0.000 (0.008)	-0.008 (0.006)	-0.008 (0.006)	-0.008 (0.006)
N	47990	47990	47990	47990	47990	47990	47990

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression where employment in each year since completion (year t) is the dependent variable. The unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for.

Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table F2: Average effect on enrolment in academic supplementary programme, all tracks combined

	(1) In academic supplementary prog., year t	(2) In academic supplementary prog., year t+1	(3) In academic supplementary prog., year t+2	(4) In academic supplementary prog., year t+3
Panel A: Completed in the pre-1994 system				
u. rate	-0.001 (0.001)	0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)
N	79070	79070	79070	79070
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.005 (0.006)	0.001 (0.002)	-0.001 (0.001)	-0.000 (0.001)
N	172550	172550	172550	172550
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.014*** (0.004)	0.008*** (0.003)	-0.001 (0.002)	-0.000 (0.002)
N	47990	47990	47990	47990

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in an academic supplementary year, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table F3: Average effect on enrolment in education, all tracks combined

	(1)	(2)	(3)	(4)	(5)	(6)
	In education, year t	In education, year t+1	In education, year t+2	In education, year t+3	In education, year t+4	In education, year t+5
u. rate	0.008 (0.006)	0.020*** (0.006)	0.009* (0.005)	0.008 (0.005)	0.003 (0.005)	0.003 (0.004)
N	79065	79069	79064	79067	79068	79066
Panel B: Completed upper secondary education between 1998 and 2013						
u. rate	0.002 (0.006)	0.005 (0.005)	0.010* (0.006)	0.008 (0.006)	0.006 (0.005)	0.004 (0.003)
N	172549	172548	172549	172549	172550	172546
Panel C: Completed upper secondary education between 2014 and 2017						
u. rate	0.022** (0.009)	0.026*** (0.007)	0.016*** (0.005)	0.008 (0.005)	0.006 (0.004)	0.014*** (0.005)
N	47990	47990	47990	47990	47990	47990

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in any form of education, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table F4: Average effect on enrolment in upper secondary education (excl. academic supplementary year), all tracks combined

	(1)	(2)	(3)	(4)	(5)	(6)
	In upper sec.ed, year t	In upper sec.ed, year t+1	In upper sec.ed, year t+2	In upper sec.ed, year t+3	In upper sec.ed, year t+4	In upper sec.ed, year t+5
Panel A: Completed in the pre-1994 system						
u. rate	0.005 (0.004)	0.012*** (0.004)	0.009** (0.003)	0.006** (0.003)	0.003 (0.003)	-0.001 (0.002)
N	79070	79070	79070	79070	79070	79070
Panel B: Completed upper secondary education between 1998 and 2013						
u. rate	-0.002 (0.003)	-0.001 (0.003)	0.000 (0.002)	-0.002 (0.001)	-0.002* (0.001)	-0.001 (0.001)
N	172550	172550	172550	172550	172550	172550
Panel C: Completed upper secondary education between 2014 and 2017						
u. rate	-0.005 (0.004)	-0.001 (0.004)	0.006*** (0.002)	0.002 (0.002)	-0.002 (0.001)	0.001 (0.002)
N	47990	47990	47990	47990	47990	47990

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in upper secondary education (excl. academic supplementary programme), evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10

Table F5: Average effect on enrolment in HVET, all tracks combined

	(1) HVET, year t	(2) HVET, year t+1	(3) HVET, year t+2	(4) HVET, year t+3	(5) HVET, year t+4
Panel A: Completed in the pre-1994 system					
u. rate	0.001 (0.002)	0.001 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.001 (0.002)
N	79070	79070	79070	79070	79070
Panel B: Completed upper secondary education between 1998 and 2013					
u. rate	-0.002 (0.003)	-0.002 (0.003)	-0.001 (0.002)	0.001 (0.002)	0.002 (0.002)
N	172550	172550	172550	172550	172550
Panel C: Completed upper secondary education between 2014 and 2017					
u. rate	0.009*** (0.003)	0.010*** (0.004)	-0.001 (0.003)	-0.002 (0.003)	0.004 (0.004)
N	47990	47990	47990	47990	47990

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in HVET, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table F6: Average effect on enrolment in higher education, all tracks combined

	(1) Enrolled in HE, year t	(2) Enrolled in HE, year t+1	(3) Enrolled in HE, year t+2	(4) Enrolled in HE, year t+3	(5) Completed some HE, within t+5
Panel A: Completed in the pre-1994 system					
u. rate	0.002 (0.003)	0.006 (0.004)	0.002 (0.004)	0.004 (0.004)	0.002 (0.005)
N	79070	79070	79070	79070	79070
Panel B: Completed upper secondary education between 1998 and 2013					
All	0.001 (0.001)	0.005** (0.003)	0.010** (0.004)	0.008 (0.005)	0.005 (0.004)
N	172550	172550	172550	172550	172550
Panel C: Completed upper secondary education between 2014 and 2017					
All	0.004* (0.002)	0.011** (0.004)	0.013** (0.005)	0.010*** (0.004)	0.010*** (0.004)
N	47990	47990	47990	47990	47990

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in HE, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table F7: Average effect on the proportion of individuals not in education or work, all tracks combined

	(1)	(2)	(3)	(4)
	Not in education or work, t	Not in education or work, t+1	Not in education or work, t+2	Not in education or work, t+3
Panel A: Completed in the pre-1994 system				
u. rate	0.025*** (0.005)	0.013*** (0.004)	-0.001 (0.005)	-0.005 (0.004)
N	79070	79070	79070	79070
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.030*** (0.006)	0.020*** (0.004)	0.008* (0.005)	0.002 (0.004)
N	172550	172550	172550	172550
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.027*** (0.005)	-0.007* (0.004)	-0.014** (0.005)	-0.009* (0.005)
N	47990	47990	47990	47990

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual not in education or work, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table F8: Average effect on log earnings, all tracks combined

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t	t+1	t+2	t+3	t+4	t+5	sum t to t+5
Panel A: Completed in the pre-1994 system							
u. rate	-0.138*** (0.019)	-0.097*** (0.018)	-0.018 (0.015)	-0.005 (0.011)	0.003 (0.010)	-0.003 (0.010)	-0.028** (0.012)
N	73547	75263	76546	77004	76878	76820	78930
Panel B: Completed upper secondary education between 1998 and 2013							
u. rate	-0.085*** (0.019)	-0.104*** (0.022)	-0.071*** (0.018)	-0.056*** (0.018)	-0.037** (0.015)	-0.027** (0.013)	-0.056*** (0.015)
N	169809	169962	170209	169978	169719	169568	172416
Panel C: Completed upper secondary education between 2014 and 2017							
u. rate	-0.064*** (0.015)	-0.088*** (0.014)	-0.026** (0.013)	0.011 (0.010)	0.011 (0.010)	0.010 (0.008)	-0.018* (0.010)
N	46875	46716	46896	46850	46932	47026	47920

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is log earnings, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Appendix G: Scaled results on outcomes – all vocational tracks combined

Here we present the results from the same specification and outcomes as in Appendix D, but we include all eight tracks in our sample: 1) Electrical engineering, 2) Design and crafts, 3) Healthcare, Child and youth development, 4) Building and construction, 5) Agriculture, fishing and forestry, 6) Restaurant and food processing, 7) Service and logistics, 8) Technological and industrial production. Note that here we present the scaled results, where the “raw” coefficients, shown in Appendix F, are scaled by the initial effect on employment (employment in year t), and multiplied by a 100. For more details on the scaling, refer to Appendix E.

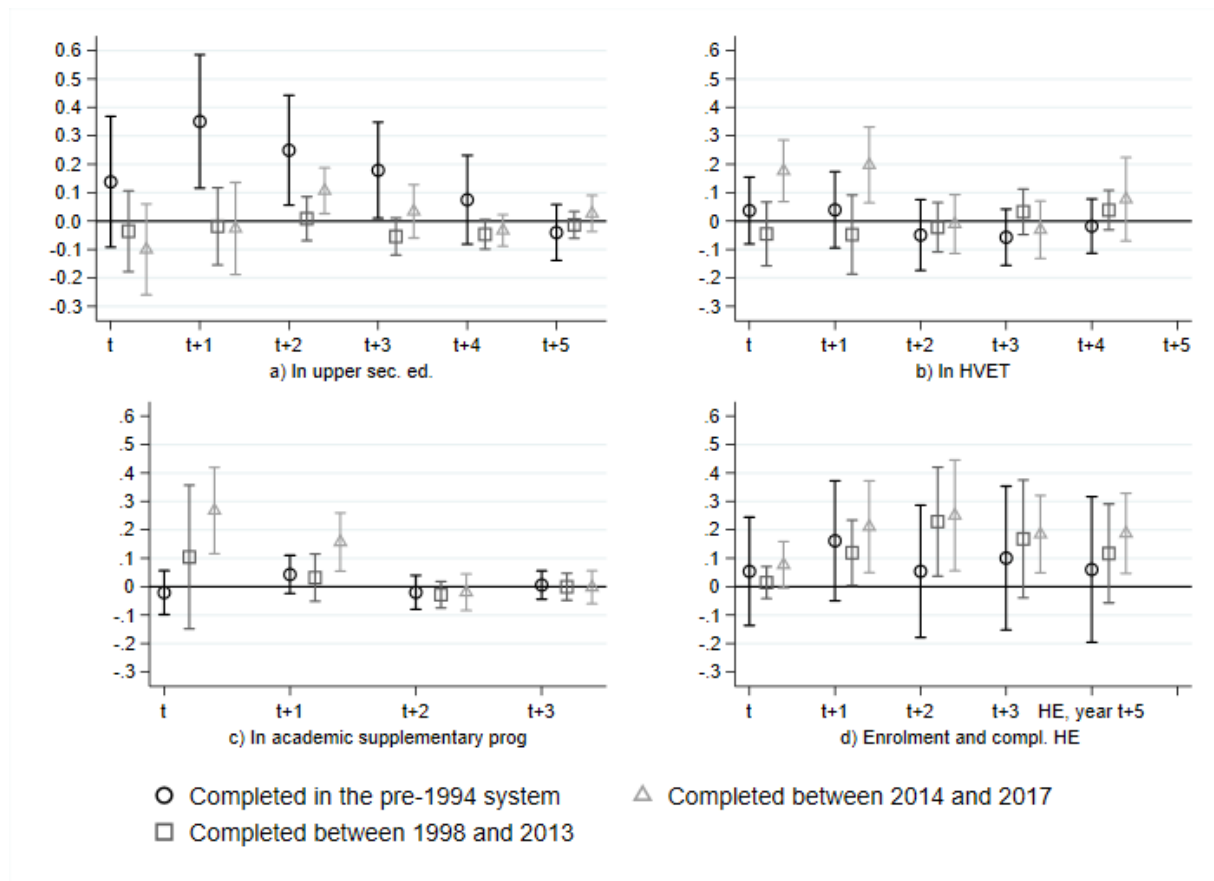


Figure G1 Scaled average effects on a) enrolment in upper secondary education (exl. academic supplementary year), b) enrolment in HVET, c) academic supplementary year, and e) enrolment and completion of HE by completion period

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for.

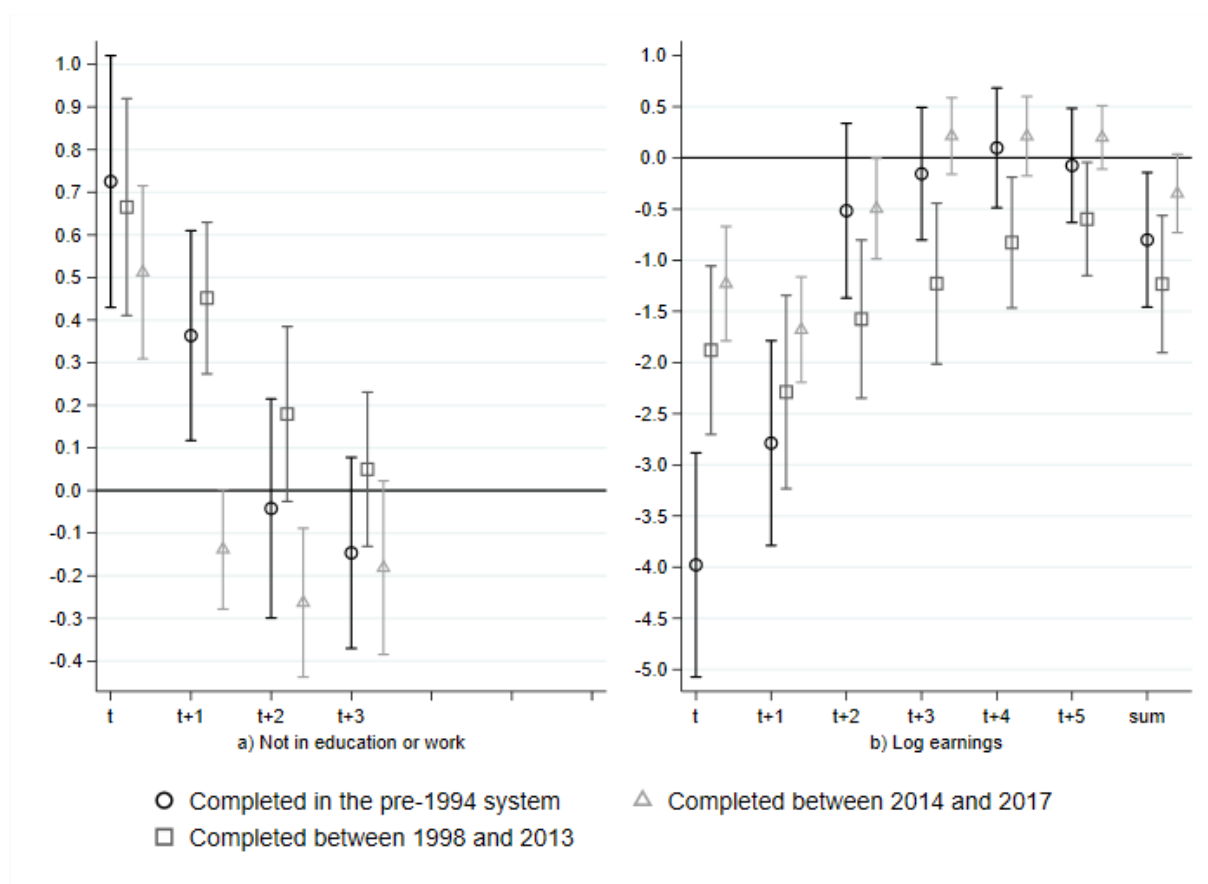


Figure G2: Scaled average effects on a) not in education and work, and b) log earnings by completion period

Note: The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for.

Appendix H: Unscaled results on outcomes, by Socio-economic background

Table H1: Effect on enrolment in academic qualification programme, by mothers' earnings tercile

	(1) t	(2) t+1	(3) t+2	(4) t+3
Panel A: Completed in the pre-1994 system				
1st earnings tercile	0.000 (0.002)	0.002 (0.002)	0.001 (0.002)	-0.001 (0.002)
N	23874	23874	23874	23874
2nd earnings tercile	0.001 (0.002)	0.000 (0.002)	-0.000 (0.002)	-0.001 (0.001)
N	26563	26563	26563	26563
3rd earnings tercile	-0.005** (0.003)	0.006** (0.002)	-0.004* (0.002)	-0.001 (0.002)
N	15891	15891	15891	15891
Panel B: Completed upper secondary education between 1998 and 2013				
1st earnings tercile	0.003 (0.005)	0.002 (0.003)	-0.002 (0.002)	-0.004** (0.002)
N	42475	42475	42475	42475
2nd earnings tercile	-0.000 (0.004)	0.002 (0.003)	-0.001 (0.002)	-0.002 (0.002)
N	45743	45743	45743	45743
3rd earnings tercile	0.011* (0.006)	0.000 (0.004)	-0.004 (0.003)	0.000 (0.003)
N	27394	27394	27394	27394
Panel C: Completed upper secondary education between 2014 and 2017				
1st earnings tercile	0.019** (0.008)	0.012 (0.008)	0.003 (0.003)	0.001 (0.003)
N	12486	12486	12486	12486
2nd earnings tercile	0.020*** (0.006)	0.001 (0.004)	-0.001 (0.003)	0.007*** (0.002)
N	14053	14053	14053	14053
3rd earnings tercile	0.038*** (0.008)	0.011* (0.006)	-0.009** (0.004)	-0.009*** (0.003)
N	8885	8885	8885	8885

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in an academic supplementary year. Each coefficient comes from a separate regression, where the impact on the dependent variable is analysed year by year since completion (year t) and by mothers' earning tercile. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table H2: Effect on enrolment in higher education, by mothers' earnings tercile

	(1) t	(2) t+1	(3) t+2	(4) t+3	(5) Completed HE, t+5
Panel A: Completed in the pre-1994 system					
1st earnings tercile	0.003 (0.004)	0.009* (0.005)	0.012** (0.005)	0.014*** (0.005)	0.004 (0.005)
N	23874	23874	23874	23874	23874
2nd earnings tercile	-0.004 (0.005)	0.000 (0.005)	-0.007 (0.006)	-0.001 (0.006)	-0.000 (0.006)
N	26563	26563	26563	26563	26563
3rd earnings tercile	0.011* (0.006)	0.009 (0.007)	0.003 (0.007)	0.008 (0.008)	0.008 (0.007)
N	15891	15891	15891	15891	15891
Panel B: Completed upper secondary education between 1998 and 2013					
1st earnings tercile	0.001 (0.002)	0.008*** (0.003)	0.010** (0.004)	0.007 (0.004)	0.003 (0.003)
N	42475	42475	42475	42475	42475
2nd earnings tercile	-0.001 (0.003)	0.001 (0.003)	0.005 (0.004)	0.004 (0.004)	-0.000 (0.004)
N	45743	45743	45743	45743	45743
3rd earnings tercile	0.003 (0.003)	0.012** (0.006)	0.022*** (0.007)	0.016* (0.009)	0.015** (0.006)
N	27394	27394	27394	27394	27394
Panel C: Completed upper secondary education between 2014 and 2017					
1st earnings tercile	0.009*** (0.003)	0.018*** (0.006)	0.025*** (0.010)	0.018*** (0.005)	0.022*** (0.005)
N	12486	12486	12486	12486	12486
2nd earnings tercile	0.003 (0.007)	0.021** (0.011)	0.014 (0.010)	0.010 (0.007)	0.011 (0.010)
N	14053	14053	14053	14053	14053
3rd earnings tercile	0.000 (0.005)	0.012** (0.006)	0.023** (0.009)	0.021** (0.009)	0.021*** (0.007)
N	8885	8885	8885	8885	8885

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled HE. Each coefficient comes from a separate regression, where the impact on the dependent variable is analysed year by year since completion (year t) and by mothers' earning tercile. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table H3: Effect on the proportion of individuals not in education or work, by mothers' earnings tercile

	(1) t	(2) t+1	(3) t+2	(4) t+3
Panel A: Completed in the pre-1994 system				
1st earnings tercile	0.037*** (0.009)	0.010 (0.008)	-0.010 (0.008)	-0.008 (0.006)
N	23874	23874	23874	23874
2nd earnings tercile	0.025*** (0.007)	0.023*** (0.007)	-0.002 (0.008)	-0.012* (0.007)
N	26563	26563	26563	26563
3rd earnings tercile	0.033*** (0.009)	0.011 (0.009)	0.003 (0.008)	0.005 (0.008)
N	15891	15891	15891	15891
Panel B: Completed upper secondary education between 1998 and 2013				
1st earnings tercile	0.036*** (0.010)	0.024*** (0.006)	0.005 (0.007)	0.000 (0.006)
Observations	42475	42475	42475	42475
2nd earnings tercile	0.029*** (0.006)	0.022*** (0.005)	0.016** (0.007)	0.001 (0.006)
N	45743	45743	45743	45743
3rd earnings tercile	0.034*** (0.010)	0.021*** (0.007)	-0.000 (0.009)	-0.003 (0.008)
N	27394	27394	27394	27394
Panel C: Completed upper secondary education between 2014 and 2017				
1st earnings tercile	0.024*** (0.008)	-0.008 (0.007)	-0.024** (0.007)	-0.009 (0.008)
N	12486	12486	12486	12486
2nd earnings tercile	0.025*** (0.006)	-0.015** (0.006)	-0.023*** (0.008)	0.010 (0.009)
N	14053	14053	14053	14053
3rd earnings tercile	0.028*** (0.009)	-0.001 (0.009)	-0.020*** (0.007)	-0.023* (0.014)
N	8885	8885	8885	8885

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is not in education or work. Each coefficient comes from a separate regression, where the impact on the dependent variable is analysed year by year since completion (year t) and by mothers' earning tercile. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table H4: Effect on log earnings, by mothers' earnings tercile

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t	t+1	t+2	t+3	t+4	t+5	Sum t to t+5
Panel A: Completed in the pre-1994 system							
1st earnings tercile	-0.162*** (0.026)	-0.123*** (0.021)	-0.045*** (0.017)	-0.007 (0.015)	-0.009 (0.013)	-0.021 (0.013)	-0.037*** (0.013)
N	21619	22400	22945	23178	23191	23180	23811
2nd earnings tercile	-0.174*** (0.027)	-0.115*** (0.023)	-0.012 (0.022)	-0.008 (0.016)	0.005 (0.017)	-0.011 (0.016)	-0.036** (0.014)
N	24811	25286	25792	25950	25918	25940	26524
3rd earnings tercile	-0.103*** (0.025)	-0.098*** (0.033)	-0.017 (0.025)	-0.020 (0.026)	-0.011 (0.020)	-0.002 (0.015)	-0.036* (0.019)
N	14810	15119	15388	15495	15463	15458	15873
Panel B: Completed upper secondary education between 1998 and 2013							
1st earnings tercile	-0.099*** (0.019)	-0.123*** (0.027)	-0.089*** (0.018)	-0.063*** (0.018)	-0.025 (0.017)	-0.013 (0.013)	-0.054*** (0.014)
N	41726	41728	41841	41824	41768	41752	42432
2nd earnings tercile	-0.075*** (0.015)	-0.104*** (0.018)	-0.053*** (0.018)	-0.031* (0.017)	-0.012 (0.014)	-0.005 (0.013)	-0.044*** (0.013)
N	45110	45071	45194	45154	45115	45102	45720
3rd earnings tercile	-0.071*** (0.022)	-0.114*** (0.027)	-0.094*** (0.028)	-0.076*** (0.022)	-0.062*** (0.023)	-0.038* (0.020)	-0.072*** (0.020)
N	26999	26938	26992	26966	26938	26912	27383
Panel C: Completed upper secondary education between 2014 and 2017							
1st earnings tercile	-0.055** (0.023)	-0.088*** (0.021)	-0.014 (0.018)	0.002 (0.022)	-0.016 (0.015)	-0.004 (0.014)	-0.031* (0.017)
N	12187	12118	12169	12167	12214	12239	12475
2nd earnings tercile	-0.113*** (0.020)	-0.148*** (0.023)	-0.043* (0.025)	0.006 (0.016)	0.023 (0.016)	0.002 (0.011)	-0.028* (0.016)
N	13808	13690	13764	13748	13783	13815	14023
3rd earnings tercile	-0.088*** (0.022)	-0.093*** (0.023)	-0.020 (0.020)	0.020 (0.021)	0.015 (0.023)	0.030 (0.019)	-0.012 (0.014)
N	8732	8638	8677	8665	8662	8701	8876

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is log earnings. Each coefficient comes from a separate regression, where the impact on the dependent variable is analysed year by year since completion (year t) and by mothers' earning tercile. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Appendix I: Scaled results on outcomes, by Socio-economic background

This appendix shows the table equivalents to the scaled coefficients reported in Figures 4–7 in the paper. The “raw” coefficients (shown in Appendix H) are scaled by the initial effect on employment (employment in year t), and multiplied by a 100. For more details on the scaling, refer to Appendix E.

Table I1: Scaled effect on enrolment in academic qualification programme, by mothers' earnings tercile

	(1) t	(2) t+1	(3) t+2	(4) t+3
Panel A: Completed in the pre-1994 system				
1st earnings tercile	0.0 (0.1)	0.0 (0.0)	0.0 (0.0)	-0.0 (0.0)
N	23874	23874	23874	23874
2nd earnings tercile	0.0 (0.1)	0.0 (0.1)	-0.0 (0.1)	-0.0 (0.0)
N	26563	26563	26563	26563
3rd earnings tercile	-0.1** (0.0)	0.1** (0.0)	-0.1* (0.0)	-0.0 (0.0)
N	15891	15891	15891	15891
Panel B: Completed upper secondary education between 1998 and 2013				
1st earnings tercile	0.1 (0.1)	0.0 (0.1)	-0.0 (0.0)	-0.1** (0.0)
N	42475	42475	42475	42475
2nd earnings tercile	-0.0 (0.1)	0.1 (0.1)	-0.0 (0.1)	-0.0 (0.0)
N	45743	45743	45743	45743
3rd earnings tercile	0.2* (0.1)	0.0 (0.1)	-0.1 (0.0)	0.0 (0.1)
N	27394	27394	27394	27394
Panel C: Completed upper secondary education between 2014 and 2017				
1st earnings tercile	0.4** (0.2)	0.2 (0.2)	0.1 (0.1)	0.0 (0.1)
N	12486	12486	12486	12486
2nd earnings tercile	0.3*** (0.1)	0.0 (0.1)	-0.0 (0.0)	0.1*** (0.0)
N	14053	14053	14053	14053
3rd earnings tercile	0.7*** (0.1)	0.2* (0.1)	-0.2** (0.1)	-0.2*** (0.1)
N	8885	8885	8885	8885

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in an academic supplementary year. Each coefficient comes from a separate regression, where the impact on the dependent variable is analysed year by year since completion (year t) and by mothers' earning tercile. The coefficients are scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table I2: Scaled effects on enrolment and completion of higher education, by mothers' earnings tercile

	(1)	(2)	(3)	(4)	(5)
	t	t+1	t+2	t+3	Completed HU, t+5
Panel A: Completed in the pre-1994 system					
1st earnings tercile	0.1 (0.1)	0.2* (0.1)	0.3** (0.1)	0.3*** (0.1)	0.1 (0.1)
N	23874	23874	23874	23874	23874
2nd earnings tercile	-0.1 (0.2)	0.0 (0.2)	-0.2 (0.2)	-0.0 (0.2)	-0.0 (0.2)
N	26563	26563	26563	26563	26563
3rd earnings tercile	0.2* (0.1)	0.2 (0.1)	0.0 (0.1)	0.1 (0.1)	0.1 (0.1)
N	15891	15891	15891	15891	15891
Panel B: Completed upper secondary education between 1998 and 2013					
1st earnings tercile	0.0 (0.0)	0.1*** (0.0)	0.2** (0.1)	0.1 (0.1)	0.1 (0.1)
N	42475	42475	42475	42475	42475
2nd earnings tercile	-0.0 (0.1)	0.0 (0.1)	0.1 (0.1)	0.1 (0.1)	-0.0 (0.1)
N	45743	45743	45743	45743	45743
3rd earnings tercile	0.1 (0.1)	0.2** (0.1)	0.4*** (0.1)	0.3* (0.1)	0.3** (0.1)
N	27394	27394	27394	27394	27394
Panel C: Completed upper secondary education between 2014 and 2017					
1st earnings tercile	0.2*** (0.1)	0.3*** (0.1)	0.5*** (0.2)	0.3*** (0.1)	0.4*** (0.1)
N	12486	12486	12486	12486	12486
2nd earnings tercile	0.0 (0.1)	0.3** (0.2)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)
N	14053	14053	14053	14053	14053
3rd earnings tercile	0.0 (0.1)	0.2** (0.1)	0.4** (0.2)	0.4** (0.2)	0.4*** (0.1)
N	8885	8885	8885	8885	8885

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled HE. Each coefficient comes from a separate regression, where the impact on the dependent variable is analysed year by year since completion (year t) and by mothers' earning tercile. The coefficients are scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table I3: Scaled effects on the proportion of individuals not in education or work, by mothers' earnings tercile

	(1) t	(2) t+1	(3) t+2	(4) t+3
Panel A: Completed in the pre-1994 system				
1st earnings tercile	0.9*** (0.2)	0.2 (0.2)	-0.2 (0.2)	-0.2 (0.1)
N	23874	23874	23874	23874
2nd earnings tercile	0.8*** (0.2)	0.8*** (0.2)	-0.1 (0.3)	-0.4* (0.2)
N	26563	26563	26563	26563
3rd earnings tercile	0.6*** (0.2)	0.2 (0.2)	0.1 (0.2)	0.1 (0.1)
N	15891	15891	15891	15891
Panel B: Completed upper secondary education between 1998 and 2013				
1st earnings tercile	0.6*** (0.2)	0.4*** (0.1)	0.1 (0.1)	0.0 (0.1)
N	42475	42475	42475	42475
2nd earnings tercile	0.8*** (0.2)	0.6*** (0.1)	0.4** (0.2)	0.0 (0.2)
N	45743	45743	45743	45743
3rd earnings tercile	0.6*** (0.2)	0.4*** (0.1)	-0.0 (0.2)	-0.1 (0.1)
N	27394	27394	27394	27394
Panel C: Completed upper secondary education between 2014 and 2017				
1st earnings tercile	0.4*** (0.2)	-0.1 (0.1)	-0.4** (0.1)	-0.2 (0.2)
N	12486	12486	12486	12486
2nd earnings tercile	0.4*** (0.1)	-0.2** (0.1)	-0.3*** (0.1)	-0.1 (0.1)
N	14053	14053	14053	14053
3rd earnings tercile	0.5*** (0.2)	-0.0 (0.2)	-0.4*** (0.2)	-0.4** (0.2)
N	8885	8885	8885	8885

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is not in education or work. Each coefficient comes from a separate regression, where the impact on the dependent variable is analysed year by year since completion (year t) and by mothers' earning tercile. The coefficients are scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table I4: Scaled effect on log earnings, by mothers' earnings tercile

	(1) T	(2) t+1	(3) t+2	(4) t+3	(5) t+4	(6) t+5	(7) Sum t to t+5
Panel A: Completed in the pre-1994 system							
1st earnings							
tercile	-3.9*** (0.6)	-3.0*** (0.5)	-1.1*** (0.4)	-0.2 (0.4)	-0.2 (0.3)	-0.5 (0.3)	-0.9*** (0.3)
N	21619	22400	22945	23178	23191	23180	23811
2nd earnings							
tercile	-5.7*** (0.9)	-3.8*** (0.8)	-0.4 (0.7)	-0.3 (0.5)	0.2 (0.6)	-0.4 (0.5)	-1.2** (0.5)
N	24811	25286	25792	25950	25918	25940	26524
3rd earnings							
tercile	-1.9*** (0.5)	-1.9*** (0.6)	-0.3 (0.5)	-0.4 (0.5)	-0.2 (0.4)	-0.0 (0.3)	-0.7* (0.4)
N	14810	15119	15388	15495	15463	15458	15873
Panel B: Completed upper secondary education between 1998 and 2013							
1st earnings							
tercile	-1.7*** (0.3)	-2.1*** (0.5)	-1.5*** (0.3)	-1.1*** (0.3)	-0.4 (0.3)	-0.2 (0.2)	-0.9*** (0.2)
N	41726	41728	41841	41824	41768	41752	42432
2nd earnings							
tercile	-2.1*** (0.4)	-2.9*** (0.5)	-1.5*** (0.5)	-0.9* (0.5)	-0.3 (0.4)	-0.1 (0.4)	-1.2*** (0.3)
N	45110	45071	45194	45154	45115	45102	45720
3rd earnings							
tercile	-1.2*** (0.4)	-2.0*** (0.5)	-1.6*** (0.5)	-1.3*** (0.4)	-1.1*** (0.4)	-0.7* (0.4)	-1.2*** (0.3)
N	26999	26938	26992	26966	26938	26912	27383
Panel C: Completed upper secondary education between 2014 and 2017							
1st earnings							
tercile	-1.0** (0.4)	-1.6*** (0.4)	-0.3 (0.3)	0.0 (0.4)	-0.3 (0.3)	-0.1 (0.3)	-0.6* (0.3)
N	12187	12118	12169	12167	12214	12239	12475
2nd earnings							
tercile	-1.6*** (0.3)	-2.2*** (0.3)	-0.6* (0.4)	0.1 (0.2)	0.3 (0.2)	0.0 (0.2)	-0.4* (0.2)
N	13808	13690	13764	13748	13783	13815	14023
3rd earnings							
tercile	-1.5*** (0.4)	-1.6*** (0.4)	-0.4 (0.3)	0.4 (0.4)	0.3 (0.4)	0.5 (0.3)	-0.2 (0.2)
N	8732	8638	8677	8665	8662	8701	8876

Note: The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is log earnings. Each coefficient comes from a separate regression, where the impact on the dependent variable is analysed year by year since completion (year t) and by mothers' earning tercile. The coefficients are scaled by the initial effect on employment (employment in year t), and multiplied by a 100. Mothers' earnings tercile is determined by their earnings in the year the individual turned 16 and is based on all individuals in the same cohort and gender. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Appendix J: Unscaled results on outcomes, Electrical engineering track

Table J1: Average effect on enrolment in academic qualification programme, Electrical engineering track

	(1) In academic supplementary prog., year t	(2) In academic supplementary prog., year t+1	(3) In academic supplementary prog., year t+2	(4) In academic supplementary prog., year t+3
Panel A: Completed in the pre-1994 system				
u. rate	0.004 (0.006)	-0.002 (0.006)	-0.004 (0.005)	0.006 (0.004)
N	11154	11154	11154	11154
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.003 (0.006)	0.006 (0.005)	0.000 (0.003)	-0.002 (0.003)
N	30868	30868	30868	30868
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.036*** (0.007)	0.014*** (0.005)	-0.000 (0.006)	0.001 (0.005)
N	9754	9754	9754	9754

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in an academic supplementary year, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table J2: Average effect on enrolment in higher education, Electrical engineering track

	(1) Enrolled in HE, year t	(2) Enrolled in HE, year t+1	(3) Enrolled in HE, year t+2	(4) Enrolled in HE, year t+3	(5) Completed some HE, within t+5
Panel A: Completed in the pre-1994 system					
u. rate	-0.002 (0.006)	0.006 (0.008)	0.006 (0.009)	0.010 (0.011)	0.004 (0.008)
N	11154	11154	11154	11154	11154
Panel B: Completed upper secondary education between 1998 and 2013					
u. rate	0.006* (0.003)	0.007 (0.005)	0.016* (0.008)	0.004 (0.009)	0.006 (0.007)
N	30868	30868	30868	30868	30868
Panel C: Completed upper secondary education between 2014 and 2017					
u. rate	0.005 (0.009)	0.022** (0.010)	0.022 (0.014)	0.019** (0.009)	0.020** (0.008)
N	9754	9754	9754	9754	9754

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual is enrolled in HE, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table J3: Average effect on the proportion of individuals not in education or work, Electrical engineering track

	(1) Not in education or work, t	(2) Not in education or work, t+1	(3) Not in education or work, t+2	(4) Not in education or work, t+3
Panel A: Completed in the pre-1994 system				
u. rate	0.039*** (0.013)	0.018 (0.012)	-0.008 (0.012)	-0.004 (0.008)
N	11154	11154	11154	11154
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.033** (0.013)	0.012** (0.005)	0.005 (0.009)	-0.006 (0.008)
N	30868	30868	30868	30868
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.029*** (0.010)	0.001 (0.008)	-0.024** (0.008)	-0.014* (0.008)
N	9754	9754	9754	9754

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is a binary indicator equal to 1 if the individual not in education or work, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10

Table J4: Average effect on log earnings, Electrical engineering track

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	t	t+1	t+2	t+3	t+4	t+5	sum t to t+5
Panel A: Completed in the pre-1994 system							
u. rate	-0.210*** (0.034)	-0.148*** (0.036)	-0.042 (0.033)	-0.022 (0.026)	-0.026 (0.028)	-0.023 (0.029)	-0.057** (0.026)
N	10222	10514	10717	10886	10882	10924	11136
Panel B: Completed upper secondary education between 1998 and 2013							
u. rate	-0.128*** (0.039)	-0.121*** (0.032)	-0.071** (0.034)	-0.043 (0.028)	-0.020 (0.027)	-0.003 (0.027)	-0.057** (0.025)
N	29749	30134	30278	30252	30211	30200	30820
Panel C: Completed upper secondary education between 2014 and 2017							
u. rate	-0.132*** (0.034)	-0.162*** (0.029)	-0.050** (0.021)	-0.010 (0.019)	-0.000 (0.029)	-0.020 (0.019)	-0.047** (0.018)
N	9316	9388	9421	9385	9409	9473	9714

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression, where the dependent variable is log earnings, evaluated year by year since completion (year t). In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Appendix K: Scaled results on outcomes, Electrical engineering track

This appendix shows the table equivalents to the scaled coefficients reported in Figures 8–9 in the paper. The “raw” coefficients (shown in Appendix J) are scaled by the initial effect on employment (employment in year t), and multiplied with a 100. For more details on the scaling, refer to Appendix E.

Table K1: Scaled effect on enrolment in academic qualification programme, Electrical engineering track

	(1) T	(2) t+1	(3) t+2	(4) t+3
Panel A: Completed in the pre-1994 system				
u. rate	0.1 (0.1)	-0.0 (0.1)	-0.1 (0.1)	0.1 (0.1)
N	11154	11154	11154	11154
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.0 (0.1)	0.1 (0.1)	0.0 (0.0)	-0.0 (0.0)
N	30868	30868	30868	30868
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.4*** (0.1)	0.1*** (0.0)	-0.0 (0.1)	0.0 (0.0)
N	9754	9754	9754	9754

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in an academic supplementary year. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table K2: Scaled effect on enrolment in higher education, Electrical engineering track

	(1) t	(2) t+1	(3) t+2	(4) t+3	(5) Completed HE, t+5
Panel A: Completed in the pre-1994 system					
u. rate	-0.0 (0.1)	0.1 (0.1)	0.1 (0.2)	0.2 (0.2)	0.1 (0.2)
N	11154	11154	11154	11154	11154
Panel B: Completed upper secondary education between 1998 and 2013					
u. rate	0.1* (0.1)	0.1 (0.1)	0.3* (0.1)	0.1 (0.2)	0.1 (0.1)
N	30868	30868	30868	30868	30868
Panel C: Completed upper secondary education between 2014 and 2017					
u. rate	0.1 (0.1)	0.2** (0.1)	0.2 (0.1)	0.2** (0.1)	0.2** (0.1)
N	9754	9754	9754	9754	9754

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is enrolled in HE. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table K3: Scaled effect on the proportion of individuals not in education or work

	(1) T	(2) t+1	(3) t+2	(4) t+3
Panel A: Completed in the pre-1994 system				
u. rate	0.7*** (0.2)	0.3 (0.2)	-0.1 (0.2)	-0.1 (0.2)
N	11154	11154	11154	11154
Panel B: Completed upper secondary education between 1998 and 2013				
u. rate	0.5** (0.2)	0.2** (0.1)	0.1 (0.1)	-0.1 (0.1)
N	30868	30868	30868	30868
Panel C: Completed upper secondary education between 2014 and 2017				
u. rate	0.3*** (0.1)	0.0 (0.1)	-0.2** (0.1)	-0.1* (0.1)
N	9754	9754	9754	9754

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is a binary indicator equal to 1 if the individual is not in education or work. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table K4: Scaled effects on log earnings

	(1) t	(2) t+1	(3) t+2	(4) t+3	(5) t+4	(6) t+5	(7) sum t to t+5
Panel A: Completed in the pre-1994 system							
u. rate	-3.9*** (0.6)	-2.8*** (0.7)	-0.8 (0.6)	-0.4 (0.5)	-0.5 (0.5)	-0.4 (0.5)	-1.1** (0.5)
N	10222	10514	10717	10886	10882	10924	11136
Panel B: Completed upper secondary education between 1998 and 2013							
u. rate	-2.1*** (0.6)	-2.0*** (0.5)	-1.2** (0.6)	-0.7 (0.5)	-0.3 (0.4)	-0.1 (0.4)	-0.9** (0.4)
N	29749	30134	30278	30252	30211	30200	30820
Panel C: Completed upper secondary education between 2014 and 2017							
u. rate	-1.3*** (0.3)	-1.6*** (0.3)	-0.5** (0.2)	-0.1 (0.2)	-0.0 (0.3)	-0.2 (0.2)	-0.5** (0.2)
N	9316	9388	9421	9385	9409	9473	9714

Note: The sample is restricted to individuals completing the Electrical engineering track. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). The dependent variable is log earnings. Each coefficient is obtained from a separate regression, where the outcome is evaluated year by year since completion (year t) and scaled by the initial effect on employment (employment in year t), and multiplied by a 100. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Appendix L: Heterogeneity in response based on regional variation in access to the academic supplementary track

Although individuals who completed vocational education before 2014 did not have a legal right to access the academic supplementary programme, some were still able to enroll depending on regional availability. This may suggest that regional variation over time could be exploited as an additional robustness check. To this end, we leverage county-level variation in access to this programme for individuals who completed their education between 1998 and 2013.

Since counties are the administrative units responsible for upper secondary schools, we begin by calculating the average share of individuals enrolled in the academic supplementary track (NUS code 401110) immediately after completing vocational education, for those who completed between 1998 and 2013. We then split the sample based on county-level enrollment rates, comparing individuals residing in counties below the median (2.4% enrolled) to those above the median (4.8% enrolled).

Table L1 presents the average (unscaled) impact on employment, measured year-by-year since completion. The scarring effects are nearly twice as large and more persistent for individuals residing in counties above the median, suggesting potential endogeneity issues related to access to the academic supplementary programme. Specifically, counties that more extensively offered this programme may have done so in response to observing or expecting poorer labour market outcomes for their vocational students. These differences are also reflected in the scarring effects on earnings, as shown in Figure L4, where the scarring effects are larger for individuals residing in counties that more extensively offer the supplementary programme to their students (“above median”) compared to those that to a lesser extent offer this. Overall, this suggests that exploiting this regional variation is not a valid robustness check as the counties do not appear to be comparable in terms of the labour market prospects for their vocational students.

The scaled results on educational outcomes and the proportion of students not in education and work, scaled by the employment rate in year t , are shown in Figures L1–L3.

Table L1: Average unscaled effects on employment

	(1) t	(2) t+1	(3) t+2	(4) t+4	(5) t+5	(6) t+6	(7) t+7
Below the median	-0.038*** (0.008)	-0.019** (0.008)	-0.009 (0.008)	-0.006 (0.007)	0.002 (0.006)	0.001 (0.007)	0.004 (0.006)
N	60159	60159	60159	60159	60159	60159	60159
Above the median	-0.062*** (0.011)	-0.048*** (0.006)	-0.023*** (0.008)	-0.013** (0.006)	0.004 (0.007)	0.008 (0.006)	0.007 (0.006)
N	55453	55453	55453	55453	55453	55453	55453

Note: The sample is limited to individuals who completed their education between 1998 and 2013. “Above” vs. “below the median” refers to whether individuals resided in counties where the share of academic supplementary year enrollments was above or below the county-level median during this period. The estimates represent the coefficients on unemployment at completion, derived from the baseline model specified in Equation (1). Each coefficient is obtained from a separate regression where employment in each year since completion (year t) is the dependent variable. The unemployment rate corresponds to the annual average in the LLM during the year individuals first completed vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for. Robust standard errors, clustered at the LLM level, are reported in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

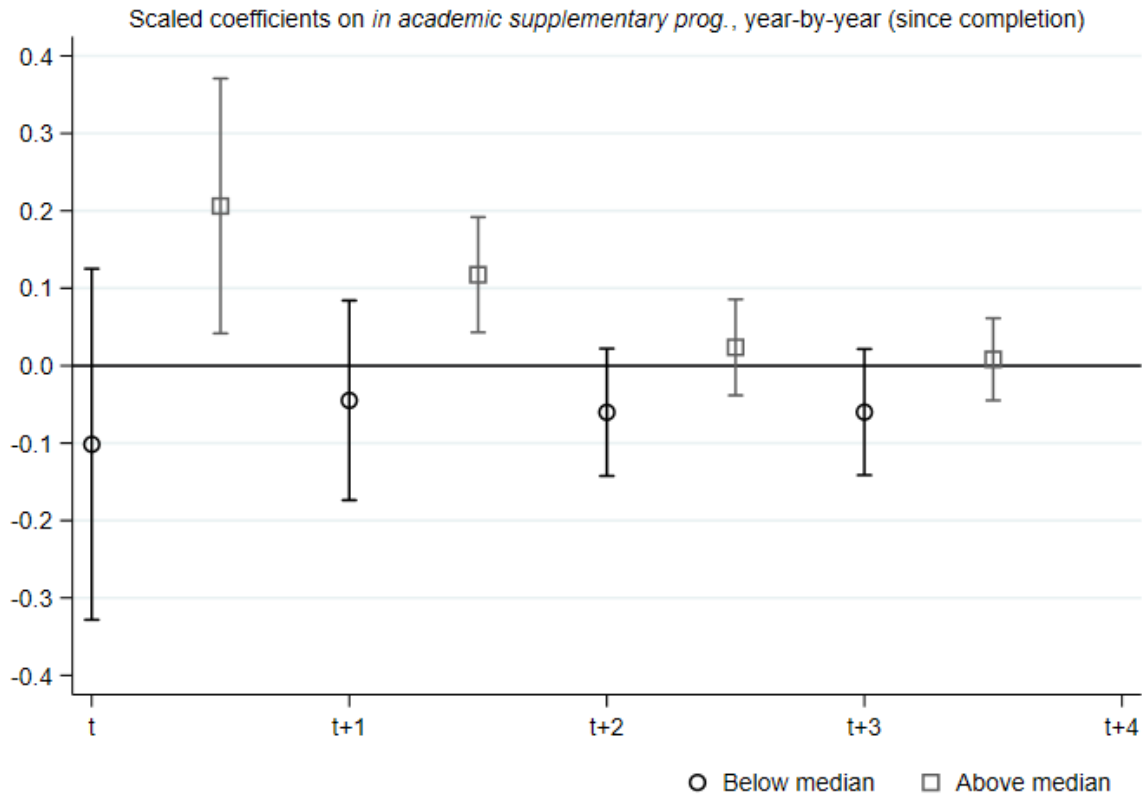


Figure L1: Scaled effects on enrolment in academic supplementary programme by county-level variation in access to the academic supplementary year

Note: The sample is limited to individuals who completed their education between 1998 and 2013. “Above median” vs. “below median” refers to whether individuals resided in counties where the share of academic supplementary year enrollments was above or below the county-level median during this period. The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for.

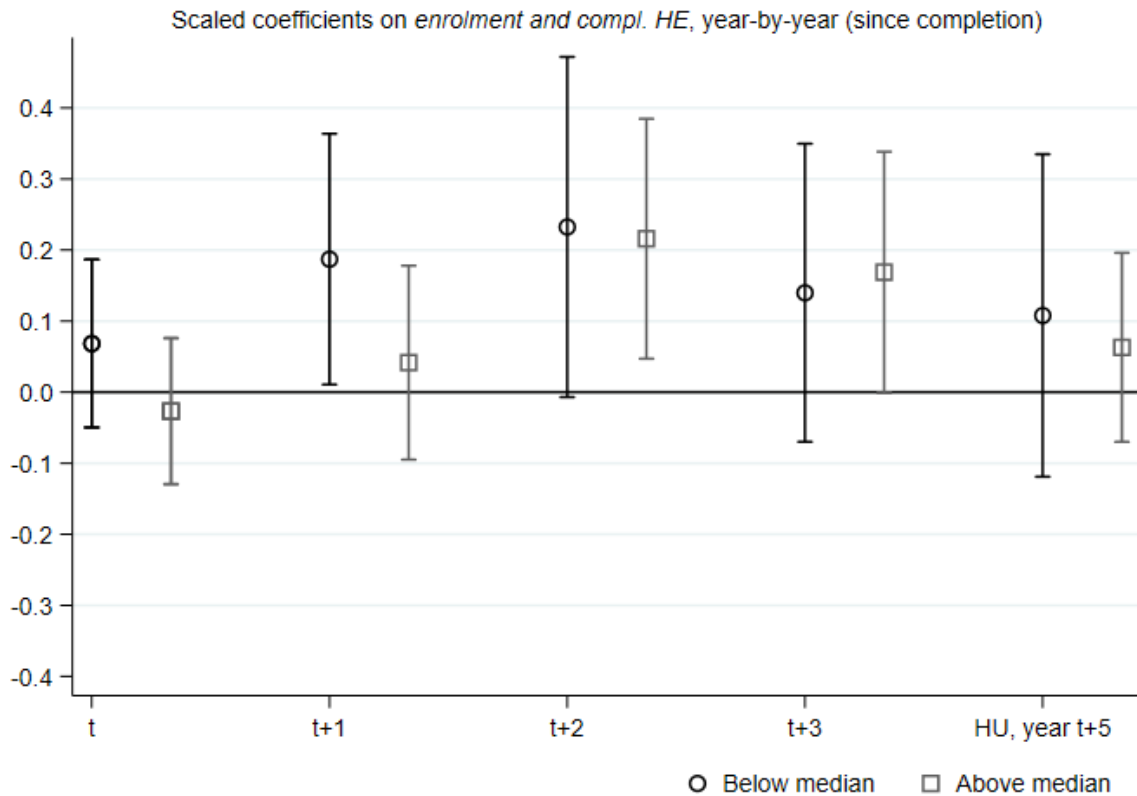


Figure L2: Scaled effects on enrolment in HE by county-level variation in access to the academic supplementary year

Note: The sample is limited to individuals who completed their education between 1998 and 2013. “Above median” vs. “below median” refers to whether individuals resided in counties where the share of academic supplementary year enrollments was above or below the county-level median during this period. The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for.

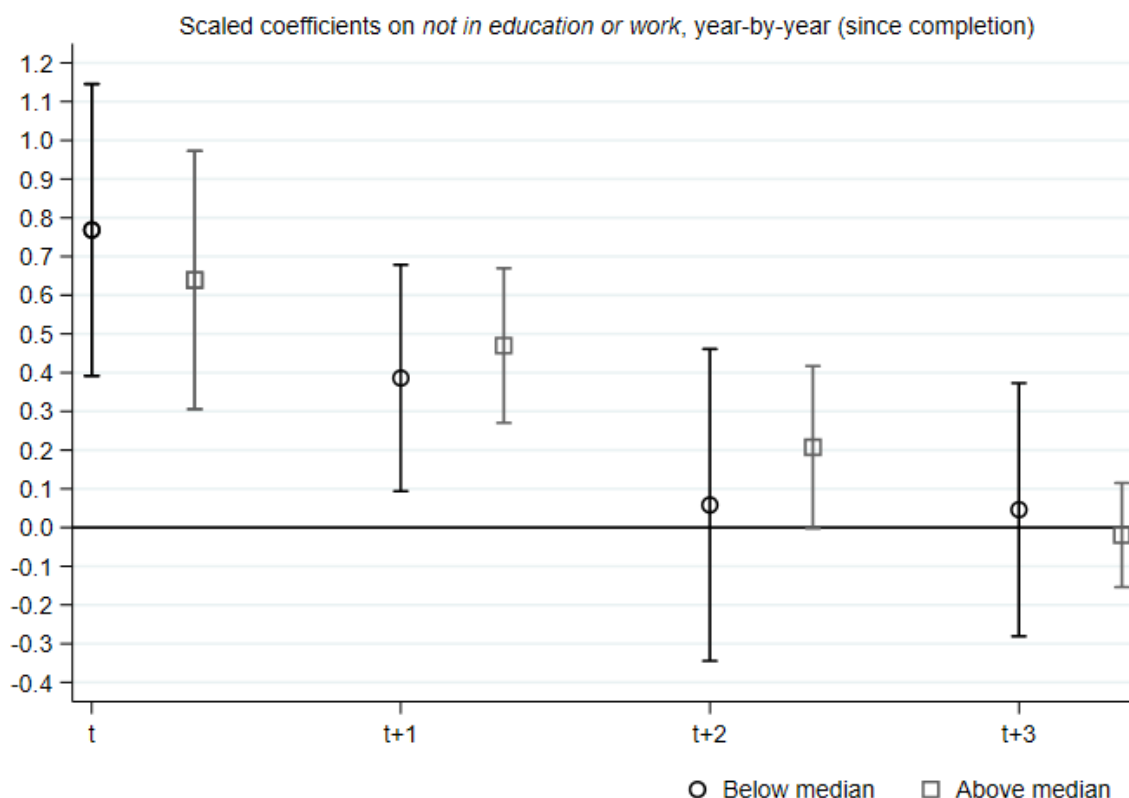


Figure L3: Scaled effects on not in education and work by county-level variation in access to the academic supplementary year

Note: The sample is limited to individuals who completed their education between 1998 and 2013. “Above median” vs. “below median” refers to whether individuals resided in counties where the share of academic supplementary year enrollments was above or below the county-level median during this period. The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels— and the LLM unemployment at enrolment are controlled for.

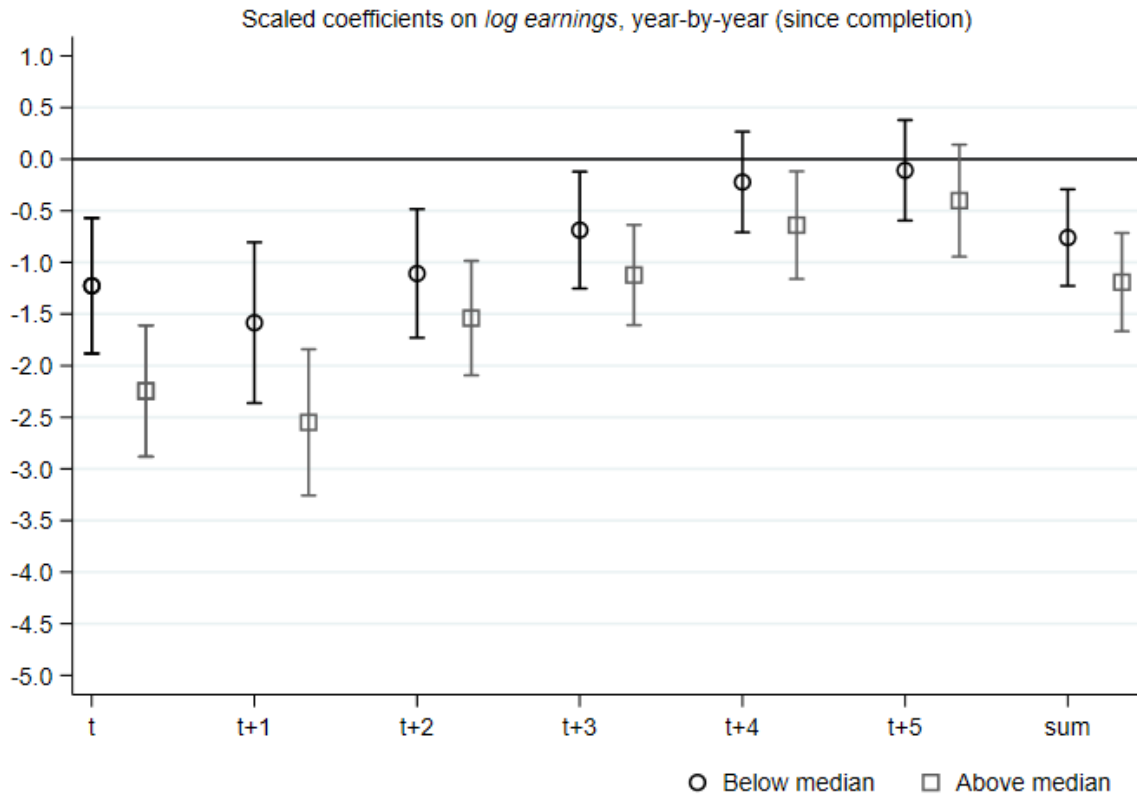


Figure L5: Scaled effects on log earnings by county-level variation in access to the academic supplementary year

Note: The sample is limited to individuals who completed their education between 1998 and 2013. “Above median” vs. “below median” refers to whether individuals resided in counties where the share of academic supplementary year enrollments was above or below the county-level median during this period. The figures show the scaled coefficients on unemployment at completion, based on the baseline model specified in Equation (1). These coefficients are presented alongside their corresponding 95% confidence intervals, calculated using robust standard errors clustered at the LLM levels. Each coefficient is derived from a separate regression for each outcome and year since completion (year t) and scaled by the initial effect on employment (employment in year t), and expressed in percentage-point units. In the regressions, the unemployment rate corresponds to the annual average in the LLM during the year individuals first complete vocational education. All regressions include cohort and LLM fixed effects. Additionally, baseline characteristics—gender, minority background, and parental education levels—and the LLM unemployment at enrolment are controlled for.

Appendix M: Employment trajectories year-by-years since completion: Differences between completers experiencing high vs. low unemployment levels

One might question whether the observed fadeout in employment effects, as shown in Table 3 of the paper, is due to the comparison group—those graduating during a period of low unemployment—experiencing deteriorating labor market conditions and worse employment outcomes e.g. three years later, rather than those graduating during high unemployment successfully catching up over time. Thus, that the observed fadeout is the result of some form of path dependency in the unemployment rate.

To investigate this further, we first define the following two groups: those experiencing "high unemployment at completion" and those experiencing "low unemployment at completion". We approach this by regressing unemployment at the time of completion on unemployment at the time of enrollment, while also controlling for year and region fixed effects. Based on the residuals from this regression, we divide the sample into two groups: a "high unemployment at completion" group, where the residual is above the median, and a "low unemployment at completion" group, where the residual is below the median. Finally, we plot the employment rate (y-axis) against years since completion (x-axis) to compare the employment trajectories of the two groups following the completion of vocational education. The result is shown in Figure M1.

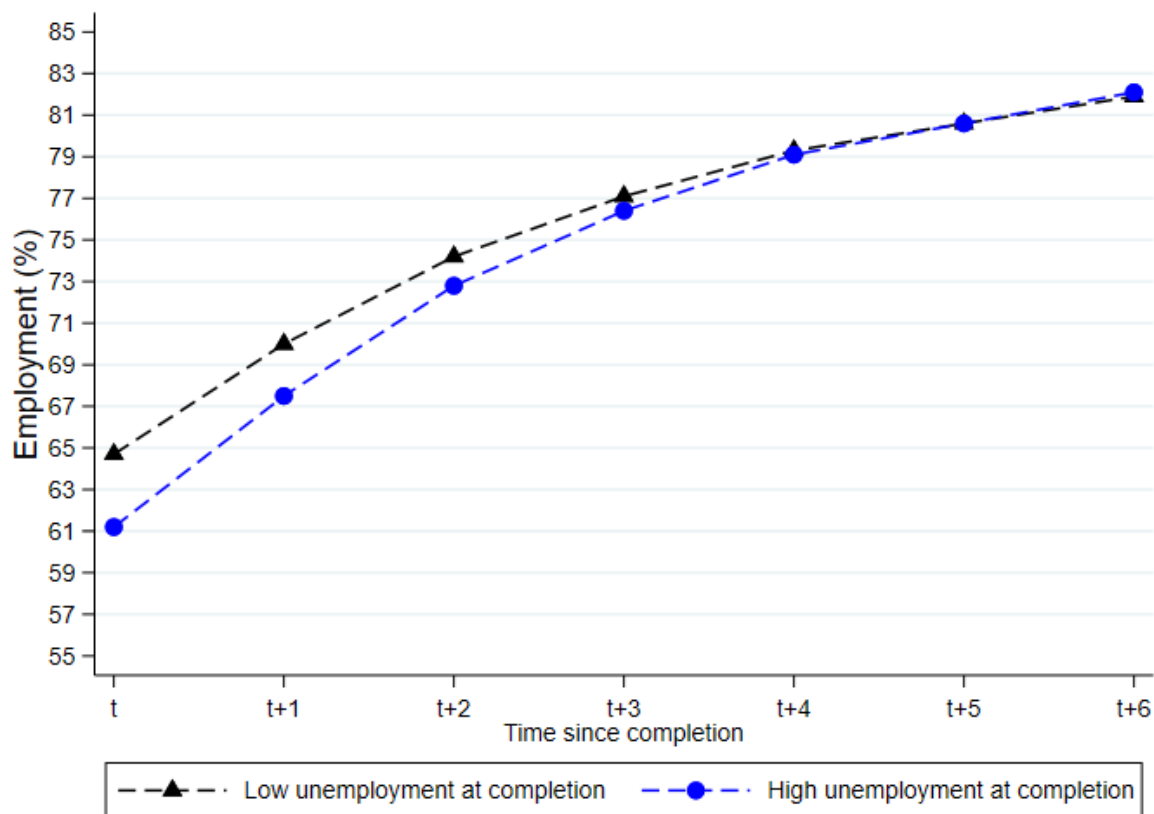


Figure M1: Employment trajectories

As illustrated in Figure M1, the observed scarring effects on employment appear to diminish over time, as the "High unemployment at completion" group gradually converges to the employment level of the "Low unemployment at completion" group. This convergence does not appear to be due to the "Low unemployment group" experiencing worse outcomes over time.