

On the Effectiveness of School – Work Alternation Programmes in Italian High Schools

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Marco Bertoni, Giorgio Brunello, Clemenfina Crocè
and Lorenzo Rocco; University of Padua



ABSTRACT

In 2015, school-work alternation programmes were made compulsory in all Italian high schools, with the aim of enabling students to combine theoretical learning at school with more practical experience. A distinctive feature of this reform was that the intensity of school-work alternation varied across school tracks, being higher for professional and technical schools and lower for academic schools. In addition, the type of practical learning also varied, with students in technical and professional schools having more opportunities to learn in firms. Using a difference-in-differences approach, we show that students who participated in more hours of school-work alternation experienced a significant increase in the probability of employment during the three quarters following high school graduation.

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Skills2Capabilities, a Horizon Europe study, is about understanding how skills systems need to develop if they are to assist people to make labour market transitions – i.e. between jobs, employers or sectors – and thereby reduce the level of skill mismatch which might otherwise arise.

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Introduction

Education curricula that combine school-based training with practical experience provide students with early opportunities to interact with the world of work. This education system is likely to facilitate the school-to-work transition, improve employment prospects post-graduation and offer valuable insights into labour market dynamics, thus also influencing decisions to pursue further education.

Work-based programmes, such as the dual VET systems prevailing in Germany, Denmark, Austria, Switzerland, the Netherlands, Norway, and partially in France, are recognised for effectively addressing youth unemployment and skill mismatch and expediting the school-to-work transition. These programmes integrate classroom education with on-the-job training and work experience, often in the form of apprenticeships. Therefore, graduates gain both transferrable skills from formal education and occupation-specific skills that enhance their employability with the training company or other employers (Eichhorst et al., 2012).

Work-based systems, which are an example of demand-led education that emphasizes the skill needs of local labour markets, generally outperform school-based systems in facilitating the school-to-work transition. In school-based programmes, the focus is often on theoretical learning, and a limited or non-existent interaction with the world of work complicates the transition from school to work after graduation.

Until the early 2000s, Italy's educational structure was characterized by a school-based system. The high youth unemployment rate and slow school-to-work transition (see Quintini et al., 2007) has promoted efforts to reform the education system with interventions aimed at increasing the interactions between schools and the labour market and adding elements of practical learning as complements to theoretical learning.

Law 53/2003 and Decree 77/2005 introduced, for the first time in Italy, a model of dual education, i.e. a combination of formal education and practical training known as "*alternanza scuola lavoro*" (ASL). In 2015, ASL became compulsory for all upper secondary school students, irrespective of the school type. Following this reform, students were required to engage in practical training for a period ranging from 5 to 10 weeks during their last three years, collaborating with firms, or other public or private institutions.

At the end of the 2010s, prompted by budgetary reasons and the discontent among academic high school teachers and principals, ASL underwent first a reduction in its intensity and then a shift in its focus; the emphasis was thus redirected towards counselling and student orientation, rather than spells of experience in the world of work.

An evaluation of the effectiveness of ASL in facilitating the school-to-work transition is crucial for designing future policies aimed at reducing youth unemployment and skill mismatches. However, conducting such assessment is challenging due to the absence of an obvious control group, as the reform affected all secondary school students regardless of their curriculum. This may contribute to explaining why, to the best of our knowledge, no previous study has assessed the impact of ASL.

In this paper, we evaluate the *differential* effects of the policy on students graduating from academic and technical schools. Rather than investigating the extensive margin, i.e. whether ASL affects the school to work transition, we investigate the intensive margin, i.e. whether a treatment that is more intense and involves firms to a higher extent can improve the employability of high school graduates.

We exploit the fact that, although ASL was implemented in all secondary schools, its intensity varied significantly by school track: technical and professional schools were required to allocate a minimum of 400 hours to ASL activities, while academic schools had a lower requirement of 200 hours. Not only was the intensity of ASL different across schools, but the type of activities also differed. In particular, the involvement of firms in practical learning activities was significantly higher for students of technical and professional schools than for students at academic schools. This difference mainly arose because the former had stronger links with local employer organisations and single firms, which facilitated the organisation of the relevant activities.

Our evaluation focuses on the short-term effects of the policy and compares graduates from technical and academic schools during the first three quarters after completing high school. This focus on the short-term makes sense for two reasons: first, we are interested in the school-to-work transition, which is inherently a short-term phenomenon. Second, in the longer run additional events could play a role and therefore confound the effects we intend to evaluate. An obvious example in the current context is the COVID pandemic, which could have affected differently graduates of technical and academic high schools. Moreover, in the longer run all high school graduates have the opportunity of accumulating work experience, by means of internships or trial periods, that would compensate any effect due to the differential intensity of ASL between graduates of technical and academic schools.

Since our emphasis is on the school-to-work transition, we examine both employment status and a measure of employment intensity, captured by the number of weekly hours worked. However, we also consider college enrolment. By providing opportunities to directly sample the labour market, ASL could have been a valuable source of information about labour market outcomes with and without

a college degree, thereby potentially influencing the decision to continue education.

Our approach is difference-in-differences, which consists of comparing the selected outcomes for treated and control groups before and after the reform making ASL compulsory. We find large and statistically significant positive effects of the differential treatment on employment, especially for technical high school male graduates living in the North. For technical high school female graduates, we find instead that college enrolment is positively affected by the treatment, probably signalling that the additional information gathered by interacting with the world of work induced females to postpone labour market entry.

The paper is organized as follows. Section 1 presents the institutional setup; Section 2 discusses the data; Section 3 explains our empirical approach and Section 4 presents the results. Conclusions follow.

Institutional setup

In Italy, upper secondary education begins upon completion of lower secondary school, typically at age 14. It spans three to five years and is divided into academic and vocational tracks. The vocational track includes three- to five-year high schools with a focus on technical training, comprising professional schools (*istituti professionali*) and technical schools (*istituti tecnici e commerciali*). The academic track encompasses four to five-year high schools with a more general education, emphasizing theoretical, classical, scientific or linguistic and pedagogical studies (*licei* and *scuole magistrali*).

Vocational and academic tracks differ not only in orientation but also in learning objectives: academic schools specialise in a particular field (humanities, arts or science), while also incorporating a comprehensive range of general subjects (e.g., mathematics, chemistry, physics and biology, history, geography, Italian language and literature); conversely, vocational schools concentrate more on technical and practical subjects (e.g., technology, informatics, engineering, construction and accounting), with a focus on developing industrial and administrative skills.

As shown by Agarwal et al, 2021, students from vocational high schools are much less likely to complete college than those from academic tracks (13.1 versus 53.7 percent in 2016). Although vocational high school graduates generally achieve lower final scores than their academic counterparts (77.1/100 vs. 79.9/100), those entering college exhibit comparable scores (83.3/100 vs. 83.3/100).

Introduced in Italy in 2003, ASL allows high school students to integrate theoretical education with practical learning in real-world settings, such as firms or non-profit organisations. The incorporation of practical learning was initially optional, and schools were responsible for organizing school-work-alternation. As a

consequence, such initiatives were more prevalent in schools that had established formal connections with firms and employers. Although Decree 87/2010 made ASL compulsory for professional school 12th and 13th graders, for a total of 132 hours, only a minority of students experienced ASL. For instance, in the school year 2014/15, 10 percent of eligible high school students were involved in school-work-alternation, concentrated in the vocational track.

In 2015, Law 107 (also known “*La Buona Scuola*”) made ASL compulsory for all upper secondary students in grades 11, 12 and 13, irrespective of the track. However, the programme’s intensity varied across tracks, with students in professional and technical high schools required to complete a minimum of 400 ASL hours during their last three years while academic track students could suffice with 200 ASL hours.

The reform was phased in progressively, starting with 11th graders in the 2015/16 school year and was fully implemented by the 2017/18 school year. By the end of the 2016/17 school year, 90% of all upper secondary schools activated ASL, which involved over 1 million students by the 2017/18 school year. The distribution of involved students by grade in the school year 2016/17 is shown in Table 1.

A key challenge in organising school-work-alternation has been securing the willing involvement of employers (Gentili, 2018). Due to existing networks involving local industries, vocational schools, both professional and technical, have been better equipped to address this challenge than academic schools, which, in most cases, had no contact with the world of work beyond the school context (Giancola and Salmieri, 2021). Teselli, 2018, reports the results of a survey carried out by Fondazione Di Vittorio on a non-random sample of schools, showing that for about one student out of four ASL was not particularly useful, mainly because it did not involve any practical experience. This was true especially for students of academic tracks.

Table 2 illustrates the distribution of hosting institutions per 100 students involved in ASL, by school track. Clearly, the importance of firms as hosts is much higher for students in technical (49.9 percent) and professional schools (60.6 percent) than for students in academic schools (33.8 percent).¹ For the latter, schools, municipalities, museums, libraries, non-profit organisations, and volunteering associations play a much more important role (about 27 percent of academic school students involved in ASL, compared to about 16 percent of vocational school students in ASL).²

¹ This importance has increased compared to when alternation programs were not compulsory. During the school year 2011/12, the percentage of students doing alternation programs in firms was 44% in professional schools, 44.8 in technical schools and 7.1% in academic schools. See Indire, 2013.

² Schools could organize “virtual” firms where students play the roles of entrepreneurs.

Starting with the 2018/19 school year, ASL programme was downscaled to cut expenses: the 2019 budgetary law (Law 145/2018) reduced both the expenses and the hours to be devoted to ASL, setting a minimum of 210 hours for professional schools, 150 for technical schools and 90 for academic schools. At the same time, ASL was also re-labelled as PCTO (*Percorsi per le Competenze Trasversali e l'Orientamento*), and new guidelines have been applied since the 2019/20 school year (Decree 774/2019). These guidelines shifted the focus of school-work-alternation activities by placing more emphasis on developing *transversal* skills and providing student orientation, and less emphasis on facilitating the school-to-work transition.

The Data

We investigate the short-term effects of ASL on labour market outcomes and college enrolment by using cross-sectional quarterly data from the Italian Labour Force Survey spanning the period 2010 to 2019.³ For each year, we focus on the graduating cohort and select within this cohort individuals aged 18 to 22. Given that graduation typically occurs in July, we examine the three quarters following graduation to capture post-graduation labour market outcomes: the 3rd quarter (July-September), the 4th quarter (October-December), and the 1st quarter of the following year (January-March).

Prudentially, we do not consider the 2nd quarter of the year following graduation because our sample includes the cohort graduated in 2019 and therefore, we intend to avoid including in our sample the period affected by the COVID pandemic, which characterized mainly the quarters of 2020 following the first.

For each quarter post-graduation, we consider the following outcomes: employment status (defined as having worked at least one hour in the week before the survey), employment for at least 30 hours per week and college enrolment (within the four weeks preceding the interview). Table 3 presents the descriptive statistics of each outcome and key characteristics for the cohorts graduating before compulsory ASL was introduced. Academic school graduates are more likely than technical graduates to enrol in college (68.8 versus 32.2 percent), less likely to be employed (5 versus 18.2 percent) and to be employed for at least 30 hours per week (2.1 versus 14.9 percent). Graduates from academic tracks are more likely to be female (61.9 versus 32.8 percent) and less likely to be immigrants (2.3 versus 4.3 percent).

For each cohort, the size of our working sample ranges between 1,442 and 2,403 individuals (across three different quarters), which is notably very small compared

³ These are publicly available secondary data that can be downloaded after registration from the website www.istat.it

to the close to half a million high school graduates in Italy during the relevant period. Using Labour Force Survey weights is unlikely to address lack of representativeness, as these weights allow reproducing the national population by area, gender and age group, not by education degree.

Figure 1 compares the percentage of young high school graduates enrolled in college by high school type using our working sample and data by the Ministry of Education, which refers to the entire universe of graduates. This comparison suggests that there may be in our data a potential underestimation of the share of graduates from technical schools enrolled in college. Additionally, there is evidence that college enrolment in our working sample exhibits higher variability over time than in the official statistics.

To address the small sample size of each cohort, we pool data across two neighbouring cohorts, starting with the pair 2010 and 2011 and ending with the pair 2018 and 2019. The underlying assumption is that the effects of interest do not vary within pairs of cohorts.

The Empirical Strategy

ASL became compulsory from the school year 2015/16, starting with the 3rd grade of high schools. In the following school year (2016/17), compulsory ASL extended to 4th graders, and 5th graders were involved from 2017/18. Because of this, the first cohort *directly* affected by the reform was the one graduating in 2018, who was in grade 11 in 2015/16. The cohort graduating in 2016 was not directly affected by the reform because it was in the 5th grade when ASL became compulsory for 3rd graders. Similarly, the cohort graduating in 2017 was also not directly affected because it was in grade 4th in 2016 and in grade 5th in 2017, one grade higher than the ones directly affected. However, the cohorts graduating in 2016 and 2017 may have been *indirectly* affected by the new school activities generated by compulsory ASL and by interactions with pupils in lower grades. Because of this, we present below estimates that either include or exclude these two cohorts.

We exploit the variation in treatment intensity across school type, with professional and technical schools treated more intensively than academic schools. In addition to a higher treatment intensity, pupils in professional and technical tracks were more likely to have experienced spells of practical learning involving firms, and therefore to have developed connections which could have helped them to find a job after graduation.

Ideally, we would like to compare the labour market experiences of high school graduates who differ only in the intensity and type of exposure to ASL. One step in this direction is to consider only graduates of technical and academic tracks, excluding those who graduated from professional schools, for whom ASL has been

compulsory since 2011. Graduates from professional schools, on average, tend to come from less privileged parental backgrounds and to exhibit lower cognitive skills than graduates from technical and academic schools (see Agrawal et al, 2021).

We use a difference-in-differences approach to estimate the effect of ASL intensity and type on labour market outcomes and college enrolment in the three quarters following high school graduation. This approach consists of comparing two groups, the treatment group (students of technical schools) and the control group (students of academic schools), before and after the implementation of the policy. The identification assumption is that these groups exhibit different characteristics but that these differences are constant over time (parallel trends hypothesis). Visual inspection of aggregate data – see Figures 2 to 4 – suggest that, for the outcomes of interest – this assumption is likely to hold.

Our empirical specification is

$$Y_{ijt} = \alpha + \gamma_j + \gamma_t + \theta T_{ij} + \sum_{j=2010}^{2013} \alpha_j C_j T_{ij} + \sum_{j=Q}^{2019} \beta_j C_j T_{ij} + \delta X_{ijt} + \varepsilon_{ijt} \quad (1)$$

where the indices i, j and t refer to the individual, the cohort and time, respectively. Y is the outcome, T is the treatment ($T=1$ for graduates from technical schools and $T=0$ for graduates from academic schools), C is the cohort, γ_j represents cohort fixed effects, γ_t denotes year and quarter fixed effects; X is a vector of covariates, which includes gender, regional dummies, age and age squared, household size, a dummy for residence in large municipalities, and interactions of the treatment with age, gender and a dummy for residence in Southern Italy.

The treatment T in Eq. (1) combines two features: (i) the higher minimum number of hours of compulsory ASL taken by students in technical schools compared to students in academic schools; (ii) the higher likelihood that ASL done by technical high school students involves firms rather than schools or other organizations such as volunteering and non-profit organisations.

The subscript Q indicates the first cohort in the post-treatment period, 2016-17 in the baseline specification and 2018-19 in the specification that omits cohorts 2016 and 2017. We estimate (1) using ordinary least squares and clustering standard errors by province of residence and high school track.

The empirical specification includes the interactions of the treatment T with the cohorts graduating between 2010 and 2013, before ASL became compulsory. If

these interactions are not statistically significant, we cannot reject the parallel trends hypothesis.⁴

The results

Our baseline specification assumes that the first cohort affected by the introduction of compulsory ASL is the one graduating in 2016/17. Figure 2 plots the percent of high school graduates employed by cohort and type of high school. This percentage moves more or less in parallel across school types until 2015, before the treatment starts, and increases more rapidly for technical school graduates after the treatment starts. This pattern is particularly evident in the case of employment for at least 30 hours per week. However, regarding college enrolment, we do not detect any visual effect suggesting that the reform had a differential effect across graduates of different school types.

Table 4 presents our main results. In this and the following tables, we exclude the dummy for the cohort 2014/15, which becomes the reference pre-treatment cohort. As anticipated by Figures 2 to 4, we find that the coefficients of the interactions of the treatment with the older cohorts – which were not affected by the treatment – are generally small and not statistically significant, thus confirming that the hypothesis of parallel trends is not violated.

There is also evidence that the treatment had a positive and statistically significant differential effect on the probability of employment of the treated compared to the control groups, especially for the youngest affected cohort (2018-19). Our estimates indicate that employment for this cohort increased by 3.4 to 3.6 percentage points because of the treatment, a large effect (between 27 and 38 percent) relative to the pre-treatment mean for the group of treated graduates. No effect is found instead for college enrolment.

Do the effects of compulsory ASL vary by gender and by area? Females graduating from technical high schools are less likely to be employed after graduation than males, and more likely to be enrolled in college. On the other hand, females graduating from technical and academic schools have similar employment probabilities. These differences suggest that the facilitating role of ASL for technical high school graduates is likely to be lower for females than for males. The substantial difference in the level of industrialization between the North and the rest of the country also suggests that practical learning may be more useful in the former than in the latter area.

We estimate Eq. (1) separately by gender (see Table 5) and find that the positive and statistically significant employment effects apply only to males. On the other

⁴ The cohorts graduating in 2014 and 2015 are the reference category.

hand, there is evidence that female technical graduates are more likely to enrol in college because of the policy. Compared to academic high school graduates, their probability of enrolment increases by 10 percentage points, a sizeable amount when compared to the pre-treatment mean (0.29). One possible interpretation of this results is that the interaction with the world of work provided useful information on labour market prospects with and without a college degree. For females, the prospects as high school graduates may have been less interesting than for males, inducing the former to increasingly opt for higher education.

Empirical evidence suggests that females aged 25 to 30 who graduate from a technical high school and do not go to college earned on average in 2018 16.6 thousand euro, compared to 20.1 thousand earned by those with a college degree. This gap is larger than the one experienced by males with a technical high school degree, who earned in 2018 23.1 thousand euro on average if without college and 25.1 thousand euro if with college.⁵

When we estimate Eq. (1) separately for graduates living in the North and in the Centre-South of the country (see Table 6), we find that the positive differential effect of ASL on employment holds only in the North of the country. In particular, we estimate that, for the youngest cohort, the treatment increases the employment of technical high school graduates by 31 to 41 percent, compared to employment of academic high school graduates.

Most of our empirical findings suggest that the ASL reform has had statistically significant effects on the youngest cohort, i.e. 2018/19. It is therefore not surprising that our estimates are confirmed when we drop the cohort 2016/17, which is only indirectly affected by the reform – see Table 7.

Conclusions

Programmes that facilitate the interaction of high school students with the labour market are likely to ease the school-to-work transition. By conveying useful information on labour market prospects, these programmes could also affect the choice of continuing into tertiary education.

In 2015, school-work alternation programmes were made compulsory in all Italian high schools, with the view that students needed to combine learning at school with learning in the labour market. A distinctive feature of this reform was that the intensity and type of the treatment varied across school tracks. We have exploited this setup to evaluate whether differences in the treatment produced differences in labour market outcomes after high school graduation, in particular employment, and whether they affected the decision to continue into tertiary education.

⁵ Source: PLUS (Participation, Labour and Unemployment Survey) survey.

Using a difference-in-differences approach, we have shown that having done more hours of school-work alternation and/or more practical activities involving firms as hosts significantly increased employment in the three quarters after high school graduation for graduates of technical high schools, compared to graduates of academic high schools. The estimated differential effect is sizeable and higher than 25 percent of mean employment for the treated before the treatment.

Interestingly, this positive employment effect holds only for males living in the North of the country. For females, the differential treatment has produced a higher probability to enrol in college rather than higher employment, possibly signalling that the additional information collected by virtue of ASL induced females to postpone labour market entry by choosing tertiary education.

This paper has explored the importance of practical work experience in educational curricula by investigating the labour market effects of a reform introduced in Italy in the mid 2010s. Although it is hard to generalize these findings because of differences in institutional setups, our research has implications for other European countries, especially in the Mediterranean, where the education system provides limited opportunities for the interaction with the world of work (see Eichhorst et al, 2012). In these countries, high youth unemployment can be partially addressed by complementing school education with periods of practical work experience. In addition, our approach can be used to evaluate the impact of similar reforms that increase the importance of practical education.

We have focused on the effects of introducing practical education on the school to work transition and the labour market. These are important economic outcomes, but there are also other important outcomes that could be considered, including those related to social exclusion and individual development.

The interaction between supply-led and demand-led education is an over-arching theme of the “Skills2Capabilities” project. The tension between developing individual capabilities and providing the skills that the labour market requires (and is willing to pay for) has many facets. This paper illustrates one of these facets by showing that demand-led education, with its emphasis on the skill needs of local labour markets, generally outperforms school-based systems in facilitating the school-to-work transition and reducing youth unemployment.

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Tables and Figures

Table 1. Students involved in school-work alternation programmes (%).
School year 2016/17, by school track

High school grade	Academic schools	Technical schools	Professional schools
11	51.3	48.2	43.3
12	47.0	44.3	38.9
13	1.7	7.5	17.8
Total	100.0	100.0	100.0

Source: Italian Ministry of Education

Table 2. School - work alternation programmes in 2016/17, by type of host.
Only students in grades 11 and 12

Host	Academic Track	Technical Track	Professional Track
Firms	33.8	49.9	60.6
Professionals	2.9	5.4	2.2
Schools	10.5	8.2	10.7
Municipalities, museums, libraries	7.9	3.8	2.3
Non-profit organizations and volunteering	8.7	4.2	3.3
Other	36.2	28.5	20.9
Total	100.0	100.0	100.0

Source: Italian Ministry of Education

Table 3. Descriptive statistics, by school type and for the cohorts graduating between 2010 and 2015. Weighted means.

	Technical high school graduates	Academic high school graduates
Enrolled in college	0.271 (0.445)	0.622 (0.484)
Employed	0.113 (0.316)	0.037 (0.189)
Employed at least 30 hours per week	0.089 (0.284)	0.016 (0.126)
Female	0.350 (0.477)	0.629 (0.483)
Immigrant	0.042 (0.201)	0.016 (0.127)
Age	19.506 (0.791)	19.230 (0.662)
Household size	3.880 (0.784)	3.845 (0.792)
Lives in a large city	0.008 (0.091)	0.014 (0.119)

Table 4. Difference - in - differences estimate of the effect of ASL on employment and college enrolment. Treatment (technical high school graduates) versus control (academic high school graduates).

Variables	Employed	Employed at least 30 hours per week	Enrolled in college
T x cohort 2010/11	0.011 (0.013)	0.017 (0.011)	-0.013 (0.021)
T x cohort 2012/13	-0.005 (0.012)	-0.005 (0.010)	-0.034* (0.020)
T x cohort 2016/17	0.005 (0.014)	0.008 (0.012)	0.025 (0.025)
T x cohort 2018/19	0.034* (0.017)	0.036** (0.015)	0.017 (0.025)
Observations	20,451	20,451	20,040
R-squared	0.078	0.082	0.209
mean	0.074	0.051	0.507
mean treated pre treatment	0.125	0.094	0.278

Note: each regression includes also a constant, cohort, year, quarter and regional dummies, age, age squared, dummies for gender and residence in the South, the binary variable T and the interactions between the treatment T, age, gender and residence in the South. Standard errors clustered at the province by type of diploma. One, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence

Table 5. Difference – in – differences estimate of the effect of ASL on employment and college enrolment. Treatment (technical high school graduates) versus control (academic high school graduates). By gender.

Variables	Employed - Males	Employed at least 30 hours per week - Males	Enrolled in college -Males	Employed - Females	Employed at least 30 hours per week - Females	Enrolled in college - Females
Treat x cohort 2010/11	0.018	0.016	-0.044	-0.009	0.012	0.028
	-0.017	-0.015	-0.031	-0.019	-0.016	-0.033
Treat x cohort 2012/13	-0.025*	-0.024*	-0.033	0.022	0.02	-0.022
	-0.015	-0.013	-0.026	-0.02	-0.016	-0.03
Treat x cohort 2016/17	-0.012	-0.004	0.009	0.033*	0.025	0.047
	-0.019	-0.016	-0.031	-0.02	-0.018	-0.04
Treat x cohort 2018/19	0.039*	0.044**	-0.018	0.022	0.025	0.100**
	-0.023	-0.019	-0.037	-0.025	-0.022	-0.04
Observations	9,881	9,881	9,694	10,570	10,570	10,346
R-squared	0.089	0.091	0.225	0.058	0.06	0.187
mean	0.094	0.07	0.461	0.0551	0.0322	0.551
mean T pre treatment	0.137	0.107	0.271	0.103	0.0707	0.29

Note: each regression includes also a constant, cohort, year, quarter and regional dummies, age, age squared, dummies for gender and residence in the South, the binary variable T and the interactions between the treatment T, age, gender and residence in the South, female. Standard errors clustered at the province by type of diploma. One, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence.

Table 6. Difference – in – differences estimate of the effect of ASL on employment and college enrolment. Treatment (technical high school graduates) versus control (academic high school graduates). By area.

Variables	Employed - Nord	Employed at least 30 hours per week - Nord	Enrolled in college - Nord	Employed -Centre South	Employed at least 30 hours per week - Centre South	Enrolled in college - Centre South
Treat x cohort 2010/11	0.001 (0.023)	0.024 (0.020)	0.033 (0.028)	0.017 (0.016)	0.011 (0.013)	-0.045 (0.031)
Treat x cohort 2012/13	-0.005 (0.021)	0.009 (0.019)	-0.019 (0.027)	-0.007 (0.013)	-0.017 (0.011)	-0.042 (0.027)
Treat x cohort 2016/17	0.012 (0.023)	0.029 (0.019)	0.013 (0.037)	-0.001 (0.016)	-0.010 (0.013)	0.039 (0.031)
Treat x cohort 2018/19	0.055** (0.027)	0.059** (0.024)	0.043 (0.036)	0.012 (0.021)	0.014 (0.016)	-0.002 (0.032)
Observations	8,893	8,893	8,714	11,558	11,558	11,326
R-squared	0.090	0.094	0.198	0.042	0.044	0.218
mean	0.107	0.0782	0.531	0.0481	0.0291	0.489
mean T pre treatment	0.179	0.141	0.309	0.0820	0.0566	0.252

Note: each regression includes also a constant, cohort, year, quarter and regional dummies, age, age squared, dummies for gender and residence in the South, the binary variable T and the interactions between the treatment T, age, gender and residence in the South, female. Standard errors clustered at the province by type of diploma. One, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence.

Table 7. Difference - in - differences estimate of the effect of ASL on employment and college enrolment. Treatment (technical high school graduates) versus control (academic high school graduates). Omitting the cohort 2016/17.

Variables	Employed	Employed at least 30 hours per week	Enrolled in college
T x cohort 2010/11	0.010 (0.013)	0.018 (0.011)	-0.023 (0.022)
T x cohort 2012/13	-0.005 (0.012)	-0.003 (0.010)	-0.042** (0.020)
T x cohort 2018/19	0.034* (0.017)	0.038*** (0.014)	0.008 (0.025)
Observations	16,886	16,886	16,471
R-squared	0.079	0.082	0.211
mean	0.073	0.050	0.503
mean treated pre treatment	0.126	0.096	0.275

Note: each regression includes also a constant, cohort, year, quarter and regional dummies, age, age squared, dummies for gender and residence in the South, the binary variable T and the interactions between the treatment T, age, gender and residence in the South, female. Standard errors clustered at the province by type of diploma. One, two and three stars for statistical significance at the 10, 5 and 1 percent level of confidence.

Figure 1. Percent enrolled in first-level college by type of high school diploma.

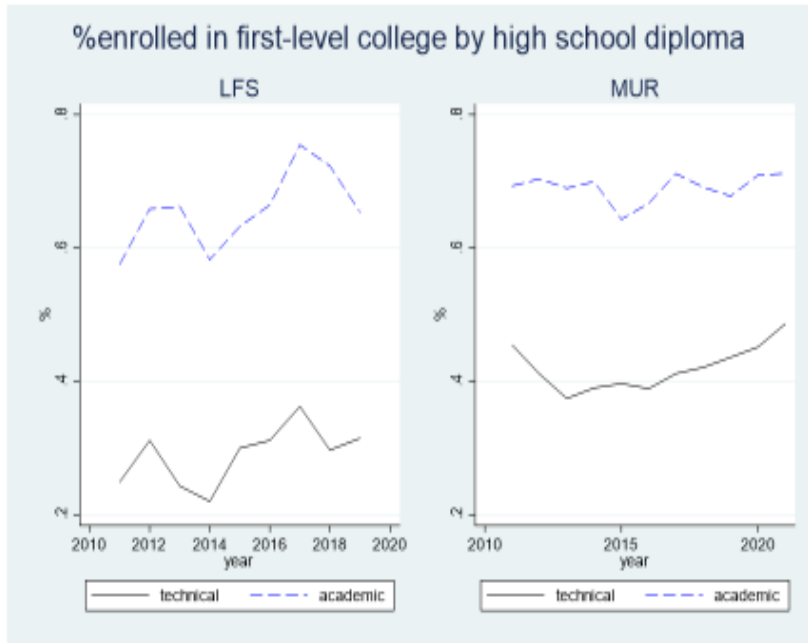


Figure 2. Percent employed after high school graduation. By type of high school.

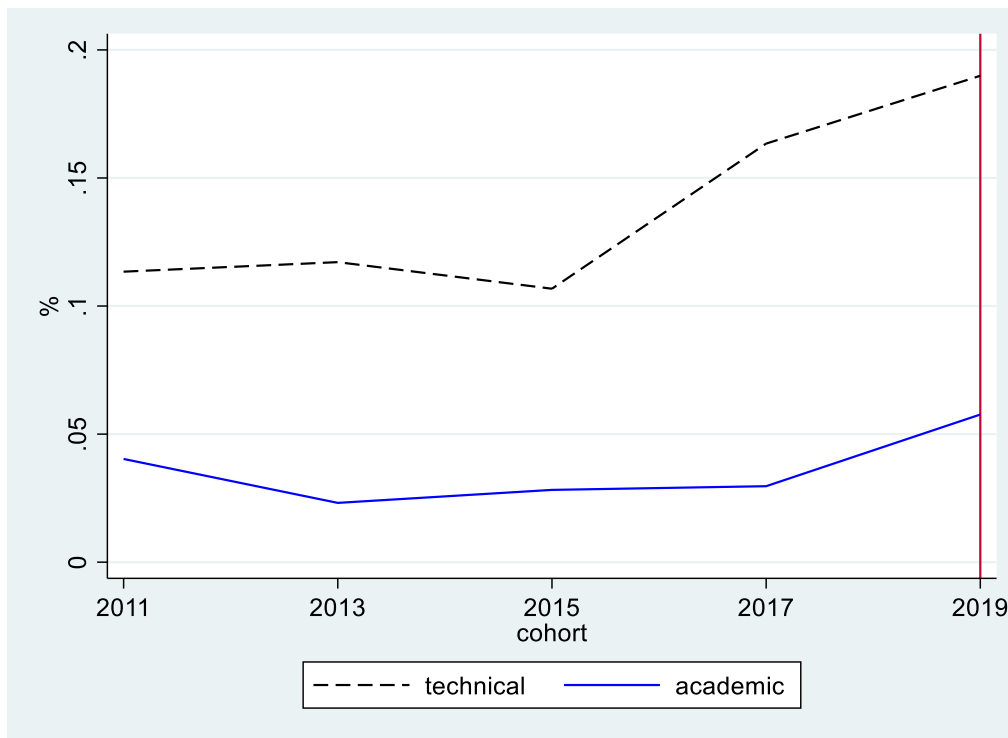


Figure 3. Percent employed for at least 30 hours a week after high school graduation. By type of high school.

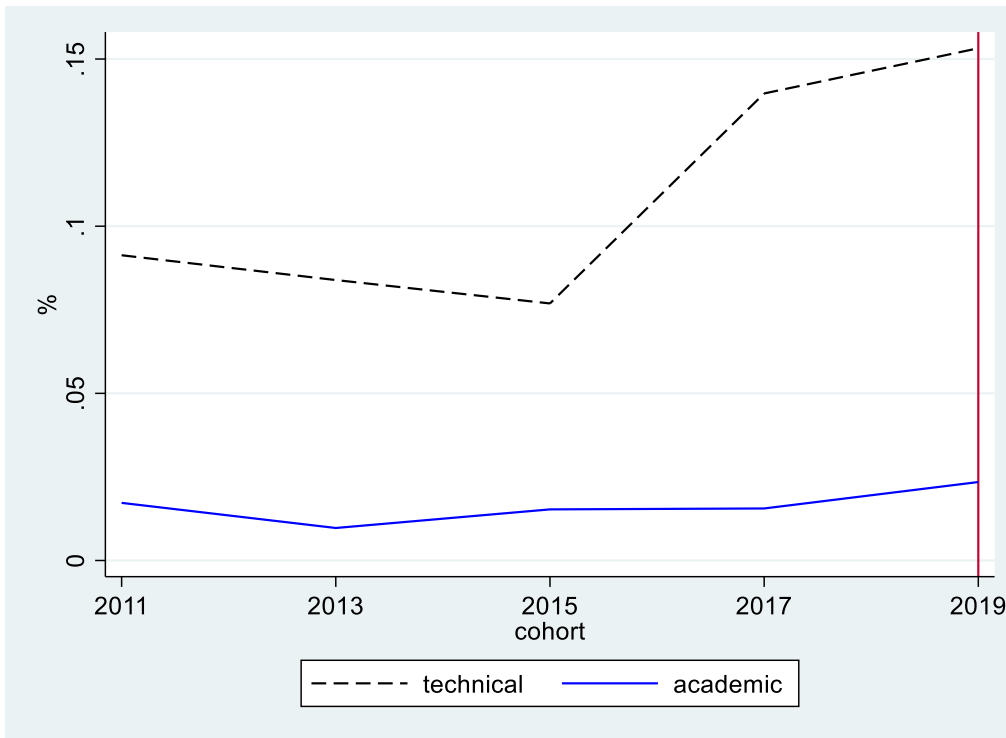
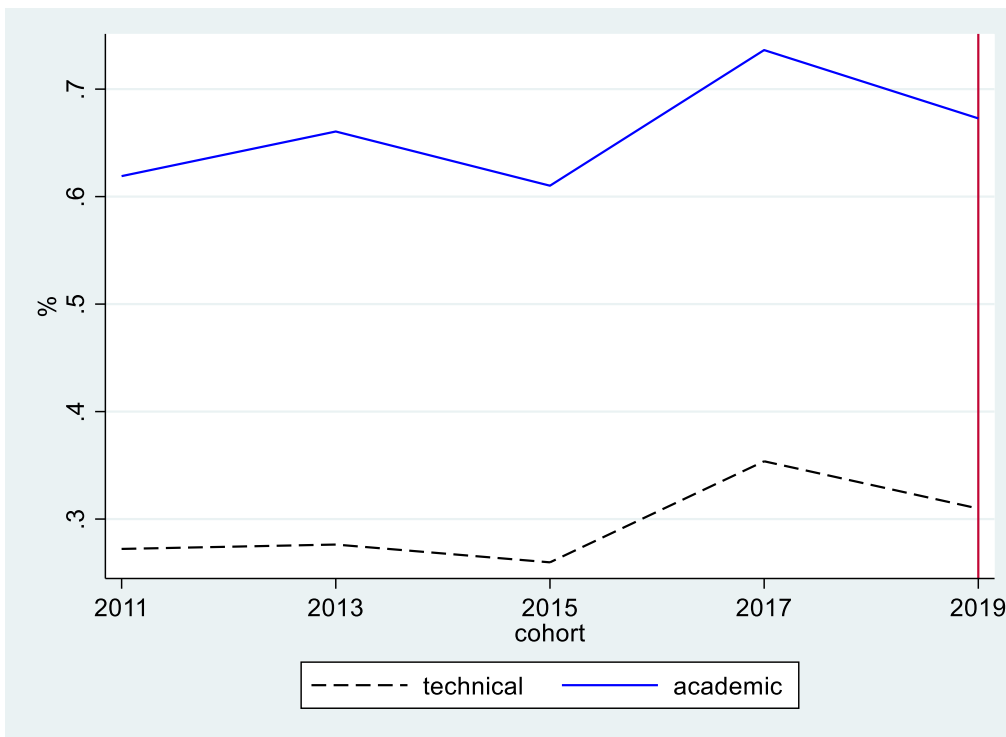


Figure 4. Percent enrolled in college after high school graduation. By type of high school.



This working paper was authored for Skills2Capabilities by Marco Bertoni (Padova), Giorgio Brunello (Padova), Clementina Crocè (Padova) and Lorenzo Rocco (Padova). This paper is a deliverable from the work package six, 'The supply of skills and lifelong learning', led by Research Centre for Education and the Labour Market (ROA) at Maastricht University.

This working paper represents the views of the authors based on the available research. It is not intended to represent the views of all Skills2Capabilities affiliates.

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