

Sometimes it works: the effect of a reform of the short vocational track on school-to-work transition

Reform of the
short
vocational
track

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Abstract

Purpose – The purpose of this paper is to use the two-way fixed effect (TWFE) methodology to estimate the impact of the reform, exploiting its staggered implementation across regions. The analysis is restricted to graduates from the short vocational track before and after the reform.

Design/methodology/approach – This paper studies the impact on the length of school-to-work transition of a reform that extended from two to three years the short vocational track in Italy in the early 2000s.

Findings – The study finds that the reform had a positive impact and reduced school-to-work transition by around five months (a 24% reduction). Moreover, the new short vocational track proved to be extremely effective for migrants and females, whose school-to-work transition was reduced by 1.4 years and 0.9 years, respectively. In implementing the new short vocational track, some regions adopted a quasi-market organization in which private training institutions competed with public schools. This model proved to be more effective in shortening school-to-work transitions, in particular for migrants.

Originality/value – This study makes an important contribution to the literature on the labor-market effect of vocational education by showing that lengthening the short vocational track, and changing the overall content of curricula, can speed up school-to-work transition.

Keywords Vocational training, Disadvantaged groups, Economic reform, Further education

Paper type Research paper

1. Introduction

A number of OECD countries display a large and persistent proportion of early school leavers and high youth unemployment rates. Among them, Italy stands out as one of the countries with the highest youth unemployment and NEET (not in employment, education and training) rates: in 2020 the latter was 23.3% among those aged between 15 and 29, almost ten points higher than the EU-27 average (13.7%). Recent research on 14 EU Member States before the Covid pandemic points to Italy as the country with the longest school-to-work transition, reaching almost three years, much longer than in France and Germany (slightly more than one year) and the UK (around nine months; [Pastore et al., 2021a](#)). Poor economic growth, skill mismatches and the lack of effective policies or institutions favoring investments in work-related skills, are among the main causes of a “youth problem” in the Italian labor market ([Pastore, 2015, 2019; Pastore et al., 2021b](#)). In this regard, vocational education and training (VET) has often been advocated as an effective policy to increase youth employability and to favor school-to-work transitions, since it provides young people



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with skills and knowledge directly related to a wide range of occupational fields, production, services, livelihoods or vocations (UNESCO, 2016). In the Europe 2020 strategy, VET systems have contributed to the reduction of the rate of early school leavers to below 10%. Furthermore, the new EU Skills Agenda highlights the role of VET as a strategic asset with which to overcome the Covid crisis, to support social inclusion and equal opportunities, and to provide a reference point for skills development (EC, 2020).

In this paper we evaluate the impact on school-to-work transition of a reform of VET courses in upper-secondary education enacted in Italy in the early 2000s. The reform was very comprehensive: it lengthened the short vocational track from two to three years; it introduced mandatory general subjects (such as language, math and history), providing students with more general and soft skills; and it regulated also which educational institutions could offer such programs (schools or accredited training centers). Furthermore, for the first time the reform officially recognized VET qualifications in the formal education system (corresponding to International Standard Classification of Education -ISCED353).

The aim of this reform was to increase education attainment and general human capital of students graduating from VET programs, reducing drop-out rates and enhancing their adaptability to structural changes in skills demand. Studying the effectiveness of this type of reforms [1] is particularly relevant, given that cross-country difference-in-differences (DID) estimates based on both the International Adult Literacy Survey (IALS) and the OECD Programme for the International Assessment of Adult Competencies (PIAAC) show that, compared to individuals with general education, those with vocational education initially have better employment outcomes, but they experience lower employment probability later in their working lives (Hanushek *et al.*, 2017; Hampf and Woessmann, 2017). The focus of VET courses on technical rather than on general and soft skills has often been advocated as the main cause of this trade-off.

Extensive research has been devoted to studying the effects of vocational education and training on labor-market outcomes, such as school-to-work transitions, employment status, and earnings. Most studies have compared the labor-market performance of students in the vocational training track with that of those in the academic track, trying to control for confounding factors that can influence both self-selection into a track and subsequent labor-market performance (the so-called “selection bias”, Ryan, 2001; Eichhorst *et al.*, 2015). Since in most countries students negatively self-select (for example, in terms of ability, achievement and socio-economic background) into the vocational track, ordinary least squares (OLS) estimates are probably downward biased and hence underestimate the true labor market effects of vocational education in high schools (Brunello and Rocco, 2017; Meer, 2007; Torun and Tumen, 2019; Silliman and Virtanen, 2021). With few exceptions, once selection bias is taken into account, these studies find that vocational education has positive or no effects on subsequent labor-market performance, especially in terms of employment and in the short run. Furthermore, cross-country comparison shows that more positive results are recorded where a dual vocational system [2] is in place, while labor-market effects are more mixed in school-based systems (Brunetti and Corsini, 2019).

Our paper contributes to an additional strand of literature that investigates the impact of exogenous reforms of the VET track in upper secondary education (Oosterbeek and Webbink, 2007; Hall, 2012, 2016; Zilic, 2018; Bertrand *et al.*, 2021). As in our case, most of the existing studies considered reforms that increased the length and the general content of vocational training in secondary education, finding that they actually contributed to increase education attainment, but without significant effects on either university enrollment or labor-market performance, both in the short and the long run (Oosterbeek and Webbink, 2007). On the contrary, such reforms may hamper the labor-market prospects of low-achieving students (Hall, 2012, 2016) [3].

Zilic (2018) considered a more overarching reform of secondary education in Croatia in the mid-1970s, which resulted in reduced tracking and more mixed curricula. The discontinuity in the cohorts actually affected by this reform was exploited in a Regression Discontinuity Design. Estimates revealed heterogeneous effects by gender in terms of educational outcomes, but with no significant effects on future employment or earnings for either gender.

Bertrand *et al.* (2021) estimated the effects of a reform implemented in Norway in 1994 that both integrated more general education into the vocational track and fostered apprenticeship in the same track. Estimates based on administrative data for the entire Norwegian population showed that the reform increased enrollment in the vocational track for both genders, but it positively affected earnings (and reduced propensity to offend) only in the case of men, especially among the most disadvantaged ones [4].

We share with these studies our identification strategy, which relies on a DID approach. However, we depart from most of the existing literature for the control group considered, since we compare cohorts who graduated from the short vocational track before the reform with those who completed this track after the reform, exploiting the staggered implementation of the reform on a regional basis.

Overall, we find that the reform has reduced school-to-work transition by around five months, corresponding to 24% of the average length of time between the exit from vocational education to the first entry into employment. Moreover, the short vocational track has proved to be more effective for migrants and females. The adoption of a quasi-market as an organizational model has been more effective than the traditional model based mainly on public schools in shortening the school-to-work transition, in particular for migrants.

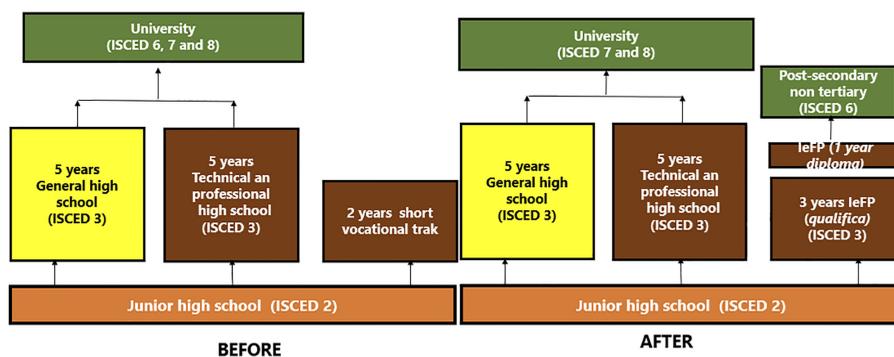
The rest of the paper is structured as follows. In Section 2 we discuss the main features of the VET system in Italy, paying especial attention to the 2003 reform that we exploit in our empirical analysis. Section 3 presents the data and basic descriptive statistics, while Section 4 is devoted to the empirical strategy. In Section 5 we discuss our baseline estimates, together with further estimates aimed at capturing heterogeneous effects by socio-demographic characteristics and organizational model. A number of sensitivity tests and robustness check are then reported in Section 6. The main results and policy implications are summarized in the last section.

2. Institutional setting

The Italian school system has been characterized by several reforms since the beginning of the 2000s. In 2003 a new law (L. 53/03, known as Riforma Moratti) extended the age limit for compulsory education from 16 to 18 in order to guarantee all citizens the duty-right to receive education and training. The Italian school system was divided into two cycles: the first comprised primary school (five years) and lower-secondary school (three years), and the second one comprised general high school (*liceo*), technical and professional high schools (*istituti tecnici e istituti professionali*), with direct access to post-secondary non-tertiary and tertiary education [5]. Figure 1 illustrates the Italian school system before and after the reform [6].

Until 2003, vocational education and training in Italy was outside the state school system and was provided only by regions through vocational training agencies. Moreover, the sole purpose of this vocational system was to impart vocational skills. The Moratti Law replaced the “old” system with a completely new short vocational track (Istruzione e Formazione Professionale, IeFP) that was included in the second cycle of education under the aegis of regions but with the same value as other schools in the state system and leading to a professional certificate recognized at national and European level (Qualifica Professionale). The reform introduced also a fourth year leading to a diploma, but in 2010/2011 this additional year was offered only by four regions, and the number of students enrolled in the

Figure 1.
The Italian education system before and after the reform



fourth year was only 2.5% of the total number of students in the IeFP programs [7]. Importantly, the new short vocational track had a larger content of general education. It maintained a strong provision of vocational and technical skills but did not neglect the basic hard (i.e. literacy and numeracy) and soft skills (such as problem solving or critical thinking).

In this way, the reform overcame the usual distinction between education and training, and the new short vocational track may be considered completely different from that previously implemented in Italy.

The short vocational track introduced by the reform was preceded by a long transitory phase which differed among regions in terms of timing as well as management.

Regarding the timing of the reform's implementation, Lazio, Lombardia, Veneto, Piemonte and Puglia introduced the third year in 2002/2003. Liguria, Molise, Friuli Venezia Giulia, Emilia Romagna, Toscana, Umbria, Abruzzo, Campania, Basilicata, Sicilia and Sardegna did so in 2003/2004, and the other regions (Valle d'Aosta, Marche and Calabria) in 2004/2005. Conversely, the autonomous provinces of Bolzano and Trento, which together form the Trentino–Alto Adige region, introduced the third year in vocational education and training systems several years before the reform (Zagardo, 2013).

From a management and funding point of view, the organization of this track was mainly under the aegis of the regions. However, the opportunity to offer a short vocational track was extended also to state-run professional public high schools by regional laws. In other words, the IeFP programs may be also activated by professional five years high schools (*istituti professionali*) in subsidiarity regime. This allows the coexistence of two systems: the first one managed by training centers accredited by regions, and a second one managed by professional high schools under the remit of the Ministry of Education. In the former case, the government defines the general rules on vocational education and training and allocates the resources for implementation of the programs to the regions. The regions are in charge of planning and providing the short vocational track. Furthermore, according to the provisions of the reform, the training institutions must be formally authorized by the regions according to a list of criteria established at the national level. The regions that have mainly adopted this organization system are: Piemonte, Lombardia, Liguria, Veneto, Lazio, Abruzzo, Molise, Puglia, Basilicata, Sicilia and Sardegna. By contrast, Friuli Venezia Giulia, Emilia Romagna, Toscana, Umbria and Campania have mainly implemented state-run programs. Even after the reform's full implementation in 2011/2012, both organizational models continued to coexist in some regions.

The growth in the number of students enrolled in three-year IeFP programs since 2003/2004 confirms the great importance of the reform. Notably, from 2003/2004 to 2004/2005 the number of students tripled, followed by another upsurge after full implementation of the reform in 2013/

2014, when students enrolled in IeFP numbered more than 300 thousand, amounting to 11.4% of all students enrolled at secondary school (CNOS-FAP, 2014). The young people enrolled in the vocational track at the end of the last century were generally 15–16 years old; 13% were migrants; 50% of them came from single-income households; and their parents' highest level of education was mainly compulsory schooling. Around 70% of boys and 80% of girls finished lower-secondary school on time (without experiencing grade retention) and 41% of the students were repeaters, coming from grade repetitions in state-run public schools.

3. Data and descriptive statistics

The data used for the empirical analysis are taken from the Italian Labour Force Survey (LFS) for the 2014–2019 period. It contains data on the current and past labor-market experiences of individuals, their sociodemographic characteristics, and educational attainment, with detailed information on tracks attained. Given the aim of the empirical analysis, LFS data are suitable for two main reasons. First, sample size is large enough to allow the selection of a sufficiently representative sample also in the case of a rare event, like earning a three-year qualification in the short vocational track in Italy. This could be attained also by exploiting the availability of different waves and using pooled cross-section data. Second, LFS data contain useful information with which to investigate school-to-work transitions. Indeed, respondents with a job in any of the years of the survey are asked when they started their first job [8]. Furthermore, in 2014 Istituto Nazionale di Statistica (ISTAT) added a new question asking when the respondent had attained his/her highest level of education. Combining these two questions, we could retrospectively observe the length of the school-to-work transition and compute the time spent looking for the first job (in years), which we call *School to work transition*. This variable would be the main outcome in our analysis. The major drawback of this dataset is that it does not include information about parental background [9] and the final grade. Furthermore, since the question about the graduation year was introduced in 2014, well after the reform, we were not able to use information collected in the same year as the reform; rather, we were forced to use retrospective information.

The short vocational track, as explained in the previous section, used to attract a minority of young Italians in each birth cohort. Hence, addressing how young people self-select into different types of schools and fields of study is crucial when studying the impact of specific educational choices. In this regard, the literature clearly shows that young people self-selecting into a short vocational track are significantly different from those who pursue a five-year high school diploma, especially in an academic track. In order to take selectivity issues into account, and to avoid comparing individuals too different from each other (and choose different education tracks), we decided to restrict our sample only to those students who graduated from the short-vocational track just before or just after the reform.

To select the operative sample, we exploited the implementation of the reform, which was adopted by Italian regions at different dates, as summed up in Table 1. Italian regions can be clustered into three groups: a first group implemented the reform in 2002, a second (larger) group implemented it in 2003; and a few regions did so in 2004. Given this scattered timing of adoption, we retained only those individuals who had graduated from a short-vocational track in the years from 1997 to 2013. Hence, we considered an interval of eight years around the first graduation year affected by the reform (i.e. 2005).

It should be noted that, in the transitory phase of the reform, the “old” vocational courses and the new short vocational ones could both be offered within the same region. Unfortunately, we could neither observe which type of short vocational track the individual attended, nor the actual length of the short vocational track, which was two years before the reform and three years after. Therefore, to be conservative, for each region we considered as treated those individuals who graduated after the pivotal year, which was 2005 in the regions of the first group, 2006 in the second group and 2007 in the third (Table 1). All the graduates in

Trentino-Alto Adige belonged to the treated group, since the reform was implemented in that region well before our period of analysis.

The dummy *Reform* was then defined according to this assignation rule and took value 1 for those individuals who graduated, in each region, after the corresponding pivotal graduation year. Finally, we retained in the sample individuals who had attained the short vocational degree by the age of 21, that is, with a four-year lag with respect the normal age at which this track should be finished after the reform, thus excluding those individuals with longer and possibly very convoluted courses of study.

Our final sample consisted of 8,858 graduates from the short vocational track. [Table 2](#) reports their sociodemographic characteristics. About 31% were females, one out of four was born abroad, 43% attained a short track diploma in manufacturing (mechanics, chemistry and ICT), 24% in services, especially personal services, and the remaining individuals in other fields.

On average, school-to-work transition lasts 1.8 years, as shown in [Table 2](#). Before the reform it took more than 2 years on average for young graduates to find their first job. This period significantly declined after the reform to around 10 months. While the share of females remained stable after the introduction of the reform, the share of migrants decreased significantly. Interestingly, graduation age did not change with the reform, even though it extended the duration of the short track by one year: it appears that the reform was then able to increase the share of students able to finish on time. The reform, by regulating nationally the types of programs offered, renewed the supply of programs, which changed the

Table 1.
Implementation of the
reform and
assignment rules

Regions	(I) Year of the reform	(II) Pivotal graduation year: (I) + 3	(III) Year of birth of the pivotal cohort: (I)-14
<i>Group 0</i>			
Trentino-Alto Adige	In the '90s	–	–
<i>Group 1</i>			
Lazio, Lombardia, Veneto, Piemonte and Puglia	2002	2005	1988
<i>Group 2</i>			
Liguria, Molise, Friuli Venezia Giulia, Emilia Romagna, Toscana, Umbria, Abruzzo, Campania, Basilicata, Sicilia and Sardegna	2003	2006	1989
<i>Group 3</i>			
Valle d'Aosta, Marche and Calabria	2004	2007	1990

Table 2.
Descriptive statistics

	Mean (Std. dev.)	Before the reform (Std. dev.)	After the reform (Std. dev.)	Difference: after- before (SE)
School-to-work transition (in years)	1.8019 (2.675)	2.2861 (3.47)	1.422 (2.07)	–0.863 (0.059)
Female	0.3128 (0.4636)	0.3169 (0.4653)	0.309 (4623)	–0.007 (0.009)
Migrants	0.2594 (0.4383)	0.3301 (0.4703)	0.2030 (0.4023)	–0.127 (0.009)
Age at graduation	17.335 (1.18)	17.16 (1.123)	17.4701 (1.212)	0.304 (0.025)
Field of study:	0.4336 (0.4983)	0.468 (0.499)	0.4056 (0.4910)	–0.063 (0.010)
Manufacturing				
Field of study:	0.2448 (0.4300)	0.2064 (0.4048)	0.2754 (0.4467)	0.068 (0.009)
Services				
Field of study: Others	0.3006 (0.4608)	0.3042 (0.4601)	0.3075 (0.4615)	0.003 (0.009)
Observations	8,858	3,928	4,930	–

composition of our sample in terms of field of study. Finally, four regions (Piemonte, Trentino-Alto Adige, Lombardia and Veneto) account for more than 60% of the total sample.

4. Empirical strategy

The aim of the empirical analysis was to estimate the effect of the reform on the duration of school-to-work transition in Italy in the early 2000s. We used a Two Way Fixed-Effects approach (TWFE), exploiting the staggered adoption of the reform among Italian regions. We estimated the following equation:

$$Y_{irt} = \alpha + \beta \text{Reform}_{rt} + \lambda X_i + \gamma_r + \tau_t + \varepsilon_{it} \quad (1)$$

where the suffix “ irt ” denotes the i th individual who graduated in year t and in region r . Y_{irt} is the number of years elapsed between graduation and the first job. We denote this outcome as *School to work transition* $_{irt}$. Reform_{irt} is a dummy variable, which takes value 1 for those individuals who graduated three years after the adoption of the reform in their region. X is a vector of individual control variables (gender, year of birth, migrant status and field of study), γ_r are region fixed effects and τ_t are time fixed effects controlling for the graduation year. Region fixed effects capture youth labor market conditions at a regional level, while graduation year fixed effects control for macroeconomic common shocks happening in the graduation year.

As explained in the previous section, we could not directly observe the length of the short vocational track in our data and we assumed a cautious approach in defining the reform dummy as potential exposure to the reform. Hence, the estimated coefficient β measures the intention to treat (ITT) rather than the average treatment effect on the treated (ATT). The ITT is the policy relevant parameter when compliance is not perfect, as it may be in our context. The main assumption that we made to identify β was that if the reform had never been introduced, the school-to-work transition of the post-reform cohorts would have been largely identical to that of the pre-reform cohorts (after controlling for observable differences between the groups, including region and time fixed effects). To this end, the most important control we needed to add to our specification was the year of birth of the individuals, because it would control for any discontinuity that might happen between cohorts. More importantly, since year of birth, together with graduation year, controlled for school duration, we were indirectly controlling for any irregularity in the school career, such as changes of track, missed years or repeated grades. Irregular careers were very frequent in this track, and in order to give robustness to our identification strategy, and to be sure that we were not picking up some unobserved heterogeneity due to this feature, we also estimated [equation \(1\)](#) adopting an even more conservative approach and using birth cohorts rather than graduation cohorts for the assignment rule (see the following robustness checks).

Another important concern is that the reform could have changed the selection of students into the vocational track. If this is the case, the estimated effect of the reform could be biased, since it may be related to unobservable characteristics of the individuals, first of all motivation. Indeed, the share on migrants graduating from the short vocational track changed dramatically. Even if we control for the migrant status, we need to investigate whether the reform changed the selection process of (migrant) students, inducing better equipped students to enroll in the short vocational-track. We addressed this issue empirically in the robustness section.

A last concern is related to the two-way fixed effects (TWFEs) estimator. A very recent stream of literature pointed out that, when the effect of a treatment changes over time and the timing of adoption varies among subjects (regions in our case), the TWFE estimator computes a weighted average of all possible 2×2 DID estimates in the data ([de Chaisemartin and D'Haultfoeulle, 2020](#); [Callaway and Sant'Anna, 2021](#); [Sun and Abraham, 2021](#)).

Hence, the estimated coefficients may be biased whenever early treated are used as controls for the late treated, and the treatment has a strong dynamic effect. We will address this issue empirically in the robustness section following Sun and Abraham (2021) and adopting an event-study specification to look for the presence of any sort of dynamic effect. Furthermore, we will re-estimate our model applying a suitable set of weights to correct for the relative importance of each 2 × 2 DID, as proposed by Callaway and Sant’Anna (2021).

5. Main results

5.1 Baseline estimates and heterogeneous effects

Table 3 reports our main estimates of the effect of the introduction of a short vocational track on the length of school-to-work transition. Given our identification strategy, all model specifications include region and graduation year fixed effects. To control for age as a potential confounding factor, starting from column 2 we control also for student’s year of birth [10]. In order to check for the presence of selection on observables, in the remaining columns, we progressively add further controls for personal characteristics (gender and migrant status, column 3) and the field of study (column 4). It turns out that our coefficient is not affected and remains stable after the inclusion of each set of controls. Overall, our estimates show that the new vocational track seems to have eased school-to-work transition by significantly reducing the time spell between the end of school and entry to the first job. More specifically, the estimated effect is around five months (0.43 years) less in the school-to-work transition. This effect is rather large, given that the mean length of time between the exit from vocational education to the first entry into employment is 1.8 years. Hence, the reform has reduced school-to-work transition by around 24%.

As mentioned in the introduction, one of the aims of this reform was to reduce drop-out rates and grade repetition and smoothen the educational career of the graduates. To check if indeed the reform might have made studies more regular, we investigated whether the reduced school-to-work transition was due to an older graduation age or to a lower age when starting the first job. Estimates in Table 4 show that the reform did not change significantly age at graduation, even though the duration of the track was increased by one year, while it

Variables	(1) School to work transition	(2) School to work transition	(3) School to work transition	(4) School to work transition
Reform	-0.396*** (0.133)	-0.430*** (0.133)	-0.419*** (0.129)	-0.422*** (0.129)
Female			0.712*** (0.0607)	0.672*** (0.0657)
Migrants			1.344*** (0.0662)	1.284*** (0.0674)
Field of study: Manufacturing				-0.322*** (0.0693)
Field of study: Services				-0.299*** (0.0785)
Constant	2.045*** (0.123)	2.242*** (0.295)	1.608*** (0.287)	1.842*** (0.291)
Observations	8,858	8,858	8,858	8,858
R-squared	0.071	0.083	0.137	0.140
Graduation year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Year of birth FE	No	Yes	Yes	Yes

Table 3.
The effect of the reform
on school-to-work
transition – TWFE
estimates

Note(s): The dependent variable is school to work transition, defined as the difference between the year the first job started and graduation year. The reform is a dummy equal to 1 for those individuals that graduated after the introduction of the reform (see Table 1). Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Variables	(1) Age at graduation	(2) Age at first job
Reform	-0.0615 (0.0561)	-0.435*** (0.136)
Constant	16.86*** (0.0577)	18.62*** (0.140)
Observations	8,858	8,858
R-squared	0.065	0.121
Year of Birth	No	No
Graduation Year FE	Yes	Yes
Regional FE	Yes	Yes
Individual characteristics	Yes	Yes

Note(s): The dependent variables are respectively age at graduation (1) and age at first job (2). The reform is a dummy equal to 1 for those individuals that graduated after the introduction of the reform (see Table 1). Each regression includes a female dummy, a migrant dummy, and field of study dummies. Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 4. The effect of the reform on age at graduation and age at first job – TWFE estimates

reduced age at first job. This implies that the reform was effective in reducing grade repetitions and in increasing the number of regular students.

Since the main aim of the new short vocational track was to allow potential early school leavers to obtain a formal qualification once they reached the compulsory schooling age, it is interesting to investigate whether the reform was actually more effective for potentially more disadvantaged students, such as migrants or people with a low socio-economic background. Furthermore, given the nature of vocational education and the features of the Italian production system, where many small and medium-sized manufacturing firms require specialized manual workers, the impact of graduating from a short vocational track on school-to-work transition may differ also according to the field/sector of specialization (i.e. manufacturing vs services).

Using the richest model specification, Table 5 reports the estimated heterogeneous effects by gender (column 1) and migrant status (column 2). Furthermore, in column 3 we also interact the reform with both gender and migrant status simultaneously, in order to capture more complex non-linearities in the effect of the reform along these dimensions. Finally, in the last column we explore heterogeneity by field of study (column 4).

Our estimates show that the effect of the reform is larger and statistically significant for females and especially migrants, whose school-to-work transition declines by 0.9 and 1.4 years respectively after the reform [11]. Interestingly, girls seem to benefit more than boys, and the estimated difference between the two groups is statistically significant. The interaction of the reform with both gender and migrant status highlights that the reform did not speed up school-to-work transition only in the case of Italian boys, whose estimated coefficient is actually positive, although not statistically significant. By contrast, the introduction of a short vocational track seems effective for all migrants, regardless of their gender.

As regards the field of study, it appears that the reform did not benefit more students graduating from manufacturing-oriented courses. Indeed, those courses not elsewhere classified and coded as “other” benefited more from this reform. In this regard, the reform has also introduced new qualifications, so that the training and education provided are better suited to matching skills provision to the needs of enterprises and local economies.

5.2 The role of the organizational model

Since the local regional governments are in charge of planning and providing the short vocational track, when implementing the reform each region has adopted an organization model centered either on state-run professional public high schools (Friuli Venezia Giulia,

Table 5.
Heterogeneous effect of
the reform on school-to-
work transition –
TWFE estimates

Variables	(1) School to work transition	(2) School to work transition	(3) School to work transition	(4) School to work transition
Reform * Male	-0.209 (0.135)			
Reform * Female	-0.863*** (0.152)			
Reform * Italian		0.000542 (0.134)		
Reform * Migrants		-1.362*** (0.157)		
Reform * Female * Migrants			-1.538*** (0.215)	
Reform * Male * Migrants			-1.232*** (0.167)	
Reform * Female * Natives			-0.469*** (0.159)	
Reform * Male * Natives			0.236 (0.144)	
Reform * Manufacturing				-0.253* (0.142)
Reform * Service				-0.224 (0.161)
Reform * Other field of study				-0.531*** (0.144)
Constant	1.750*** (0.291)	1.638*** (0.290)	1.930*** (0.294)	1.558*** (0.290)
Observations	8,858	8,858	8,858	8,858
R-squared	0.142	0.150	0.140	0.153
Individual characteristics	Yes	Yes	Yes	Yes
Graduation year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Year of birth FE	Yes	Yes	Yes	Yes
p value Test reform*Male = Reform*Fem	0.000			
p value Test reform*immigrant = Reform*Native		0.000		
p value Test reform*imm.*female = reform*imm.*male			0.141	
p value Test reform*imm.*female = reform*native*female			0.000	
p value Test reform*imm.*female = reform*natives*male			0.000	
p value Test reform*imm.*male = reform*native*male			0.000	
p value Test reform*imm.*male = reform*native*female			0.000	
p value Test reform*native*female = reform*native*male			0.000	
p value Test reform*manufacturing = reform*services				0.843
p value Test reform*manufacturing = reform*others				0.0359
p value Test reform*services = reform*others				0.0480

Note(s): The dependent variable is school to work transition, defined as the difference between the year the first job started and graduation year. The reform is a dummy equal to 1 for those individuals that graduated after the introduction of the reform (see Table 1). Each regression includes a female dummy, a migrant dummy, and field of study dummies. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Emilia Romagna, Toscana, Umbria, Campania and Sicilia) or on a quasi-market in which private non-profit accredited institutions compete with public schools to offer short vocational programs (all the other regions [12]). The introduction of a quasi-market should enhance competition among accredited institutions and public schools, improving training and educational services and easing the school-to-work transition. Furthermore, private training centers may be better able to develop strong connections with the entrepreneurial system of their local economies. Through these connections, they may be more effective in integrating young graduates into the labor market. Since the public sector is often considered less efficient than the private training institutions, the choice of the organizational model made by the local regional government may yield different results in terms of labor-market outcomes, and school-to-work transition in particular.

We explore the effect of the two different organizational models adopted by the regions by (fully) having our reform dummy interact with the two organizational models: public schools vs. quasi-market. Table 6 shows that quasi-markets perform better than the model based on public schools, although in some cases the difference is not statistically significant. Interestingly, when we look at which subgroups benefit more from the quasi-market

Variables	(1) School to work transition	(2) School to work transition	(3) School to work transition
Reform*Public schools	-0.368*** (0.134)		
Reform*Quasi-markets	-0.572*** (0.166)		
Reform*Public schools*Male		-0.145 (0.141)	
Reform*Public schools*Female		-0.816*** (0.159)	
Reform*Quasi-markets*Male		-0.402** (0.179)	
Reform*Quasi-markets*Female		-0.888*** (0.231)	
Reform*Public schools*Natives			-0.0154 (0.139)
Reform*Public schools*Migrants			-1.210*** (0.166)
Reform*Quasi-markets*Natives			0.100 (0.180)
Reform*Quasi-markets*Migrants			-1.882*** (0.228)
Constant	1.811*** (0.292)	1.723*** (0.292)	1.623*** (0.290)
Observations	8,858	8,858	8,858
R-squared	0.140	0.142	0.151
Graduation Year FE	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes
Year of Birth FE	Yes	Yes	Yes
Individual characteristics	Yes	Yes	Yes
p-value Test reform*public school = reform*quasi-market	0.15		
p-value Test reform*public school*female = reform*quasi-market*female		0.73	
p-value Test reform*public school*male = reform*quasi-market*male		0.10	
p-value Test Reform*public school*imm. = reform*quasi-market*imm			0.00

Note(s): The dependent variable is school to work transition, defined as the difference between the year the first job started and graduation year. The reform is a dummy equal to 1 for those individuals that graduated after the introduction of the reform (see Table 1). Each regression includes a female dummy, a migrant dummy, and field of study dummies. Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 6.
The role of the organizational model adopted – TWFE estimates

organization, we find that migrants are those that do so, but the quasi-market model has been able to ease school-to-work transition also for males.

One possible explanation may be due to the fact that public high schools seem more oriented to tasks of supervising and evaluating students' achievement, while their relationships with enterprises are usually quite few. By contrast, accredited institutions are more inclined to offer services to firms, such as counseling and personnel recruiting and selection, and they are likely to have more networks with private firms. Consequently, disadvantaged groups, such as migrants, may be more likely to find a job in the presence of more market-oriented educational institutions. Moreover, this stronger effect on migrants may be considered a signal that a quasi-market works efficiently, since accredited institutions prove able to place even individuals often discriminated against in the labor market.

6. Robustness checks

In this section, we propose a number of further estimates to check the robustness of our main results.

[Table 7](#) reports a set of checks aimed at testing the sensitivity of our baseline results to model specification. In column 1 we controlled for provinces (NUTS3 regions) fixed effects, to control more precisely for heterogeneous local labor market conditions. In addition, to account for omitted variable bias due to region-specific shocks that can explain the adoption of the reform or the choice of an organizational model and have a direct effect on school-to-work transition, in columns 2 and 3 we included the lagged regional gender-specific youth unemployment rate. These estimates show that the effect of the reform is almost unchanged compared to our baseline estimates.

As mentioned in [Section 4](#), another aspect that deserves attention is related to the shortcomings of TWFE estimates, especially in presence of dynamic effects. In light of these issues, we adopted an event study approach and checked whether the effect of the reform varied over time. Then, to control for potential bias due to the presence of dynamic treatment effects, we used the estimator proposed by [Callaway and Sant'Anna \(2021\)](#). Results of the event study are reported in [Figure 2](#). As it can be seen, the reform significantly reduced school-to-work transition, but such effect seems rather stable over time. Furthermore, when we estimated the average treatment effect using the alternative estimator proposed by [Callaway and Sant'Anna \(2021\)](#), results are almost unchanged, confirming that issues related to dynamic treatment effects or other econometric issues of staggered DID models do not affect our estimates substantially.

We carried out a third set of estimates to test the sensitivity of our main results to a narrower definition of either the control or the treatment group. More specifically, given our assignment rule based on graduation year, it may be the case that, after the implementation of the reform, some individuals who have already completed the first two years under the old vocational system could opt to stay in education for a third year thanks to the new vocational track. These individuals are partially treated, but they are assigned to the control group if they graduated within two years since the implementation of the reform in their region. On the contrary, due to grade retention, individuals who enrolled in the old vocational system just before the reform are classified as treated if they completed their program in three years or more [\[13\]](#). Estimates reported in columns (1) and (2) of [Table 8](#) address these two concerns. More specifically, in column 1 we excluded individuals who are partially treated by limiting our control group to those who graduated three years before the pivotal graduation year. Estimates in column 1 of [Table 8](#) suggest that the effect of the reform is slightly higher than our baseline estimate, suggesting that the inclusion of partially treated individuals in the control group, if any, attenuates the true impact of the reform. In column 2, we used a slightly different assignment rule and used year of birth rather than graduation year to assign individuals to the treated group. We re-defined the dummy reform, which now takes value 1 for individuals born in each region after the pivotal years (see column 3 of [Table 1](#)) and

Variables	(1) School to work transition With province FE	(2) School to work transition Controlling for regional macro-economic conditions	(3) School to work transition Controlling for regional macro-economic conditions	(4) School to work transition With an assignment rule based on birth cohorts	(5) School to work transition Callaway and Sant'Anna (2021) estimator
Reform*Public schools	-0.474*** (0.127)	-0.470*** (0.130)	-0.419*** (0.135)	-0.292** (0.124)	-0.490** (0.197)
Reform*Quasi-markets	-	0.0269*** (0.00885)	-0.629*** (0.167)		
(1 Lag) Youth unemployment rate	-		0.0275*** (0.00884)		
Constant	1.770*** (0.330)	1.086*** (0.335)	1.279*** (0.338)	2.390*** (0.195)	8,985
Observations	8,858	8,858	8,858	8,985	-
R-squared	0.180	0.138	0.141	0.143	
Graduation year FE	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	Yes	Yes	Yes
Year of birth FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	No	No	No	No
Individuals characteristics	Yes	Yes	Yes	Yes	Yes

Note(s): The dependent variable is school to work transition, defined as the difference between the year the first job started and graduation year. The reform is a dummy equal to 1 for those individuals that graduated after the introduction of the reform (see Table 1). Each regression includes a female dummy, a migrant dummy, and field of study dummies. Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 7. Robustness checks: sensitivity of the results to alternative specifications and estimators

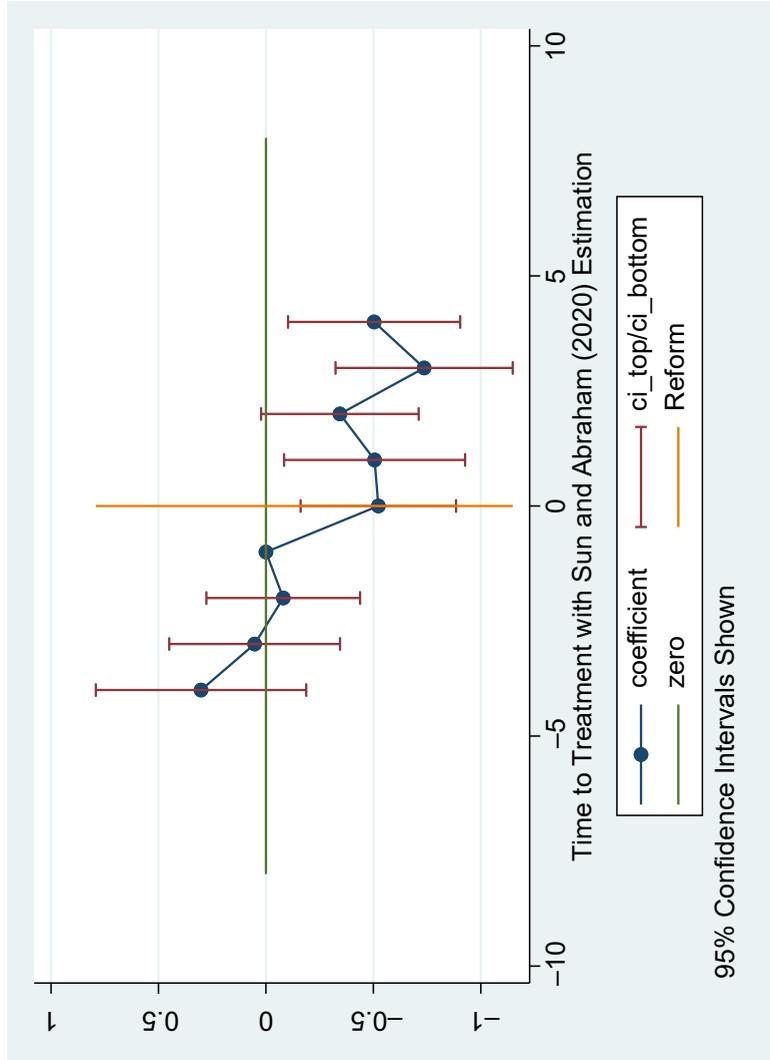


Figure 2.
Event-study analysis

Variables	(1)	(2)	(3)	(4)	(5)	Reform of the short vocational track
	School to work transition	School to work transition	School to work transition Piemonte, Lombardia, Veneto and Trentino-Alto Adige	School to work transition	School to work transition	
	Narrower control group	Assignment rule based on birth cohorts		Including people who never worked	Shorter (+/-5 years) bandwidth	
Reform	-0.585*** (0.154)	-0.292** (0.124)	-0.465*** (0.137)	-0.594*** (0.165)	-0.324** (0.147)	
Constant	4.169*** (0.558)	2.390*** (0.195)	2.585*** (0.348)	2.484*** (0.376)	1.089 (0.730)	
Observations	6,999	8,985	5,524	10,365	5,508	
R-squared	0.143	0.143	0.142	0.209	0.136	
Graduation year FE	Yes	Yes	Yes	Yes	Yes	
Region FE	Yes	Yes	Yes	Yes	Yes	
Year of birth FE	Yes	Yes	Yes	Yes	Yes	
Individuals characteristics	Yes	Yes	Yes	Yes	Yes	

Note(s): The dependent variable is defined as the difference between the year the first job started and graduation year. The reform is a dummy equal to 1 for those individuals that graduated after the introduction of the reform (see Table 1). In column (2) we used an alternative definition of reform, defined as a dummy equal to 1 for those individuals who turned 14 after the introduction of the reform -see Table 1. Each regression includes a female dummy, a migrant dummy, and field of study's dummies. Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 8.
Robustness checks: changing sample selection and the assignment rule

retained in the sample individuals born between 1980 and 1996 (an interval of eight years around the year of birth of the first cohort affected, that is individuals born in 1988). Estimates are quite similar to our baseline estimates (column 4 of Table 3), confirming that our results are not sensitive to how we deal with the presence of repeaters in the treatment group.

As a further robustness check, we acknowledged that half of our sample were residents in four regions (Piemonte, Lombardia, Trentino-Alto Adige and Veneto), which are all in the north of Italy, with more developed local labor markets and with low levels of youth unemployment compared to the Italian average. We re-estimated equation (1) using only these four regions. This exercise is closer to a pure DID estimate, since Trentino-Alto Adige is the perfect control region because its treatment did not change in the period under analysis. Furthermore, Piemonte, Lombardia and Veneto belong to the group of regions that introduced the reform in 2003. Results in column 3 of Table 8 show that the effect of the reform is larger than our baseline estimates.

Another concern is that the NEETs and other people who never found a job after graduation are excluded from our analysis. Since we used retrospective information to compute school-to-work transition, the latter can be computed also for people who never worked. More specifically, we included these individuals in the sample, assigning to them a school to work transition equal to their non-employment spell since their year of graduation. Results in column 4 of Table 8 show a slightly larger effect of the reform, implying that the exclusion of this group does not significantly influence our estimates.

A further concern may be related to the existence of confounding effects due to other reforms, such as the pilot experiment conducted in some regions with the introduction of the fourth year in the new short vocational track [5]. In order to test the sensitivity of our estimates to such potential confounders, we shortened the bandwidth around the first

graduation year affected by the reform, i.e. 2005, to a five-year interval. Estimates in column 5 of Table 8 show that the effect of the reform remains unchanged.

A last concern is related to selection into treatment, as discussed in section 4. Indeed, the reform may have affected the (unobserved) selection of students into the vocational track. We addressed this issue in three ways. First, to check the sensitivity of our coefficient to selection on observables, we estimated our model excluding migrant status. As it can be seen in the first column of Table 9, the effect of the reform is unchanged. Second, we control for a differential trend in the school-to-work transition by migrant status including a set of interaction terms between graduation years and the migrant dummy. Again, even though the coefficient is slightly lower, the effect of the reform is negative and statistically significant. Lastly, we directly checked if the reform caused a substitution effect between the new vocational track and five-year high schools or early school leaving. To do so, we estimated equation (1) on a sample of students graduating from professional and technical high schools (lasting 5 years) and on a sample of potential drop-out students. Should better students have switched from high school to the new vocational track or decided to enroll in the vocational track rather than quitting completely school, we should find that the reform increased the duration of the school-to-work transition for these two groups. Results reported in column 3 and 4 of Table 9 show that the coefficients of the dummy reform are not statistically significant, and we can thus exclude that our main results are driven by high ability or motivated students self-selecting into the new vocational track.

7. Conclusions

This paper has investigated the impact on school-to-work transition of a reform that extended the length (from two to three years) and scope (introducing more general contents) of the short vocational track in upper-secondary education in Italy in 2002–2003. To this end, it has exploited the staggered adoption of this reform across Italian regions in a DID framework. Differently from most studies that used individuals graduating from the general education track as the counterfactual situation, we selected as control group individuals who graduated

Variables	(1) School to work transition Without controlling for migrant status	(2) School to work transition With interaction between migrant and years dummies	(3) School to work transition Technical and professional high school track sample	(4) School to work transition Drop-out from high school sample (higher level of education = junior high school)
Reform	−0.462*** (0.131)	−0.216* (0.128)	−0.108 (0.0708)	−0.765 (0.480)
Constant	2.368*** (0.295)	1.404*** (0.292)	1.640*** (0.0701)	0.691 (0.690)
Observations	8,858	8,858	44,710	1,738
R-squared	0.104	0.163	0.113	0.200
Graduation year FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Year of birth FE	Yes	Yes	Yes	Yes
Individuals characteristics	Yes	Yes	Yes	Yes

Note(s): The dependent variable is defined as the difference between the year the first job started and graduation year. The reform is a dummy equal to 1 for those individuals that graduated after the introduction of the reform (see Table 1). Regressions in column (1) and (2) include a female dummy, a migrant dummy, and field of study's dummies, while regression in column (3) and (4) include only a female dummy and a migrant dummy. Robust standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 9.
Robustness checks: the
role of selection into
short VET

from the short vocational track before the reform. Our identification strategy thus relied on differences between individuals with a short vocational qualification before and after the reform and across groups of regions. Overall, our estimates evidenced that this reform was effective in easing school-to-work transition by around five months, corresponding to 24% of the average length of time between the exit from vocational education and the first entry into employment. This result was robust to a number of robustness checks, including alternative model specifications or more conservative definitions of the treated group.

Our estimates reveal that the reform of the short vocational track proved to be more effective for girls compared to boys and migrants compared to natives. The relatively small size of the subsamples of migrants by gender requires additional research to draw solid policy implications, but our results seem to point to the potential effectiveness of the reform introduced in Italy in the early-2000 in improving education attainment and labor market performance, at least in the short run, of the young migrants who, in OECD countries, register completion rates lower than those of natives in high school VET programs, even in the case of second-generation migrants.

The reform that we considered simultaneously changed both the length of the VET courses and program curricula, increasing the hours of general subjects. Although in a policy perspective it is relevant to estimate the relative impact of each specific component, our setting does not allow to disentangle the two effects. This is a limitation that we share with previous studies which evaluated reforms increasing the program's length, whose measure necessarily also entails an increase in teaching hours, and hence a change in the program's curriculum.

We leave to future researchers the study of the effect of this reform on other outcomes such as wages, the stability of the career of VET and the probability of unemployment as adults. Furthermore, more in-depth analysis will help in understanding the effect of the other reforms that shaped VET in Italy in the following years, such as the introduction of a dual system in 2016.

Notes

1. Similar reforms were implemented in the Netherlands in 1975, in Sweden in 1991.
2. A dual vocational system combines in-class general education with on the job training and actual work experience in a so called "training company". A dual system is adopted in most Continental European countries, such as Austria, Germany and Switzerland, and in Denmark.
3. Note that [Hall \(2012\)](#) investigated the effects of a six-year pilot study in Sweden, which gave rise to the 1991 reform exploited in [Hall \(2016\)](#). In the pilot study, the new vocational tracks were implemented and evaluated in selected municipalities.
4. A quasi-experimental approach has been used also to evaluate the labor market effects of different State-level programs of Career and Technical Education (CTE) in the USA (among the others, see [Dougherty \(2018\)](#) on Massachusetts, [Hemelt et al. \(2019\)](#) on North Carolina, [Bonilla \(2020\)](#) on California, [Brunner et al. \(2021\)](#) on Connecticut). Most of these studies employed a Regression Discontinuity Design and found that CTE contributed to reduce drop-out rates and to increase graduation rates. Furthermore, [Brunner et al. \(2021\)](#) showed that higher education attainment reflected into higher earnings that were persistent over time. These earnings gains were not fully explained by selection into high paying industries, but they partly arose from higher accumulation of general skills. However, these positive effects were found mainly for males, while CTE did not seem to significantly influence females' labor market performance.
5. In the following years, regulations issued by the State-Regions conference introduced further systemic elements and the reform was fully implemented in 2011/2012. However, they did not change the aim and the essence of the Moratti reform.

6. Above secondary level, the Italy system consists of Higher Technical Education and Training (IFTS), Higher Technical Training (ITS) and University.
7. We address this further extension of the reform in our robustness checks in [section 6](#).
8. In the Labour Force Survey, retrospective information about the first jobs is asked only to those who currently have a job. Since we observe individuals between 2014 and 2019, on average questions about the first job are asked 12 years after they graduated. We have retrospective information for most graduates (70.6%). Around 10% of the sample reported that they never had a job. For these individuals we can compute the length of the school to work transition as the distance from the graduation year to the time of the interview. We will use this information to carry out a specific robustness check in [section 6](#). For the remaining 19% we are unfortunately unable to reconstruct school-to-work transition.
9. This information is available only for young people cohabiting with their parents, who represent 35% of the total sample.
10. Since the reform increased the length of the program, students enrolled after the reform graduate at later age compared to those enrolled before it. If older age implies greater maturity and the latter is a determinant of the length of the school-to-work transition, the lack of a control for age can lead to biased estimates of the impact of the reform.
11. These effects correspond to a 37.4% reduction for females (average length of school-to-work transition: 2.28 years) and 47.8% reduction for migrants (average length of school-to-work transition: 2.85 years)
12. The regions are Piemonte, Lombardia, Liguria, Veneto, Lazio, Abruzzo, Molise, Puglia, Basilicata, Sicilia and Sardegna.
13. We already addressed this issue in our empirical strategy by controlling also for year of birth in our preferred specification (see our discussion in [section 4](#)), but we further test the relevance of this issue.

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