Social Transformation and the Transition from Vocational Education to Work

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Abstract

Social research has long pointed to the apparent effectiveness of vocational education and training (VET) at the secondary level combining school-based vocational education with employer-provided training (so called "dual systems") in preparing non-college bound youth for the labor market. This study uses the Hungarian transformation process to better understand what makes dual system VET sustainable and effective. The two key questions we address are: Can employer involvement in dual system VET be sustained in the context of liberal labor market reforms? Is employer involvement required for the effectiveness of VET? Hungary had inherited an extensive dual system VET sector, but the liberal reform approach in the course of transformation has created a hostile environment for voluntary employer provision of training places for VET students. The decline in employer-provided training places has, however, been compensated by increasing training provision inside vocational schools. Results from differences-in-differences and triple-differences analyses show that the substitution of employer- with school-provided training did not affect the quality of VET graduates' jobs. However, the shift in training provision between 1994 and 2000 alone has raised young male VET graduates unemployment rate by 10 percentage points in the first year after graduation.

Társadalmi átalakulás és átmenet
a szakképzésből a munka világába

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Összefoglaló

A szakképzést vállalati képzéssel egybekötött (duális) szakképző rendszereket a szakirodalom eredményesebbnek tekinti a nem duális rendszereknél, amennyiben a felsőoktatásból már eleve kimaradó rétegeket a duális rendszerek jobban felkészítik a munkaerőpiacra. A tanulmányban a duális szakképző rendszerek eredményességét és fenntarthatóságát vizsgáljuk a Magyar eset segítségével. Két kérdésre keressük a választ: Vajon a munkaadói részvétel a szakképzésben egy liberális rendszer esetében is fenntartható-e? Fontos-e a munkaadói részvétel a szakképzés eredményességének fenntartásához? A rendszerváltás során az eredetileg duális Magyar szakképzési rendszer jelentősen átalakult. A liberális reform folyamatok hatására, a munkaadók már nem vettek részt olyan mértékben a szakképzésben, mint előtte. A csökkenő vállalati képzési helyek számát ugyanakkor ellensúlyozta a jelentősen növekvő iskolai képzési helyek száma. Diff-in-diff modellek segítségével bemutatjuk, hogy a vállalati képzési helyek helyettesítése iskolai képzési helyekkel nem befolyásolta a szakiskolások végzés utáni munkahelyének minőségét. Azonban azt is megmutatjuk, hogy 1994 és 2000 között a képzési helyek ilyen „cseréje" mintegy 10%-al megnövelte a fiatal szakiskolát végzett diákok munkanélküliségi esélyét 1 évvel a végzés után.

Tárgyszavak: átmenet az iskolából a munkaerőpiacra, szakképzés, vállalati és iskolai képzési helyek

JEL kódok: I21, J24, J64

INTRODUCTION

Social research has long pointed to the apparent effectiveness of certain types of vocational education and training (VET) in preparing non-college bound youth for the labor market. In particular, VET systems at the secondary level combining school-based vocational education with employer-provided, workplace-based training (so called "dual systems") have sustained a positive track record (Rosenbaum et al. 1990; Müller and Shavit 1998; Shavit and Müller 2000; Ryan 2001; Breen 2005; Wolbers 2007). However, extant empirical research also provides little information about the causal mechanisms that make dual system VET effective and the conditions under which such a system can be sustained, particularly on liberal labor markets.

The Hungarian case allows us to analyze two key questions related to the effectiveness and sustainability of dual system VET. First, can employer involvement in dual system VET be sustained in the context of liberal labor market reforms? Second, is employer involvement required for the effectiveness of VET? Like other Central and Eastern European socialist countries, Hungary had been operating an extensive dual system at the secondary level under socialism. With transformation, however, dual system VET came under pressure. As the following sections show, market reform created a hostile environment for voluntary employer provision of training places for vocational school students. However, the decline in employer-provided training places has been compensated by increasing training provision inside schools.

The empirical analysis then tests whether the substitution of employer-provided with school-provided training places has had an impact on early labor market outcomes of vocational school graduates. So far, there is a dearth of studies that try to identify the causal effect of system-level changes in VET provision. From an individual-level perspective, identifying the causal effect of attending one educational program relative to another is complicated by selection bias, which goes unaddressed in most sociological studies on this topic. And even if the individual-level causal effects were identified, the existence of general equilibrium effects is likely sabotage attempts to generalize from micro-level to substantively interesting system-level effects. Thus, from an empirical perspective still little is known about the causal effects of dual system VET that would convince skeptics (Heckman 1993) that dual system VET is indeed more efficient than job shopping on deregulated labor markets.

This study exploits the dramatic change that occurred in Hungary to study the effect of a system level change in training provision (from employer- to school-provision) on the outcomes of vocational school graduates. In the empirical analysis, we estimate the causal

effect of substituting employer with school provided training for early labor market returns of vocational graduates using a pseudo panel of labor market entrant cohorts constructed from the Hungarian Labor Force Survey. Using school survey data, we measure the type and intensity of training received by different (annual) vocational school leaver cohorts at the level of the 20 Hungarian counties. We use Differences-in-Differences (DD) and Differences-in-Differences-in-Differences (DDD) estimation strategies to effectively rule out unobserved cohort and period effects, as well as unobserved, time-varying local labor market shocks.

BACKGROUND

Hungary had been among the most developed socialist Central European countries and an early starter in the process of transforming from a socialist to a capitalist society, having experimented with forms of private property already in the 1980s, before the onset of full scale social transformation in 1989. Compared to other transformation countries in the region, the economic crisis that followed full-scale liberal reforms was less severe. However, while economic growth soon returned, employment rates remained at low levels and the Hungarian state remained heavily indebted. Youth labor force participation dropped substantially in the course of the 1990s, partly due to increasing tertiary enrolments. Youth unemployment rose rapidly in the early years of transformation, and after a brief recovery returned to high levels in the mid-2000s pointing to structural problems on the Hungarian youth labor market (see Figure 1.). In the course of the 2008-9 economic and financial crisis, youth unemployment soared, surpassing levels found in Greece or Ireland, to reach the fourth highest value across OECD countries in 2009.

Hungarian secondary education is highly stratified resulting in highly unequal learning environments and subsequent long-term career prospects across school types (Bukodi and Robert 2008). After completing primary education (grades 1-8), students can chose between three upper secondary school types. Upper secondary general school (gymnasium) represents the traditional route to university, while upper secondary vocational school (technikum) also grants access to university but combines both general and school-based vocational education in the curriculum. While technikum schools also provide some vocational training, they are similar to gymnasiums in their student intake as well as in their outcomes (Horn et al. 2006). Given that they both provide access to university while vocational schools do not, they represent the "natural" school choice for children from advantaged social backgrounds, while children of less educated and working class parents tend to enrol in vocational schools.

Figure 1.

**Youth (Ages 15-24) unemployment rates (in %) in Hungary
in comparative perspective**
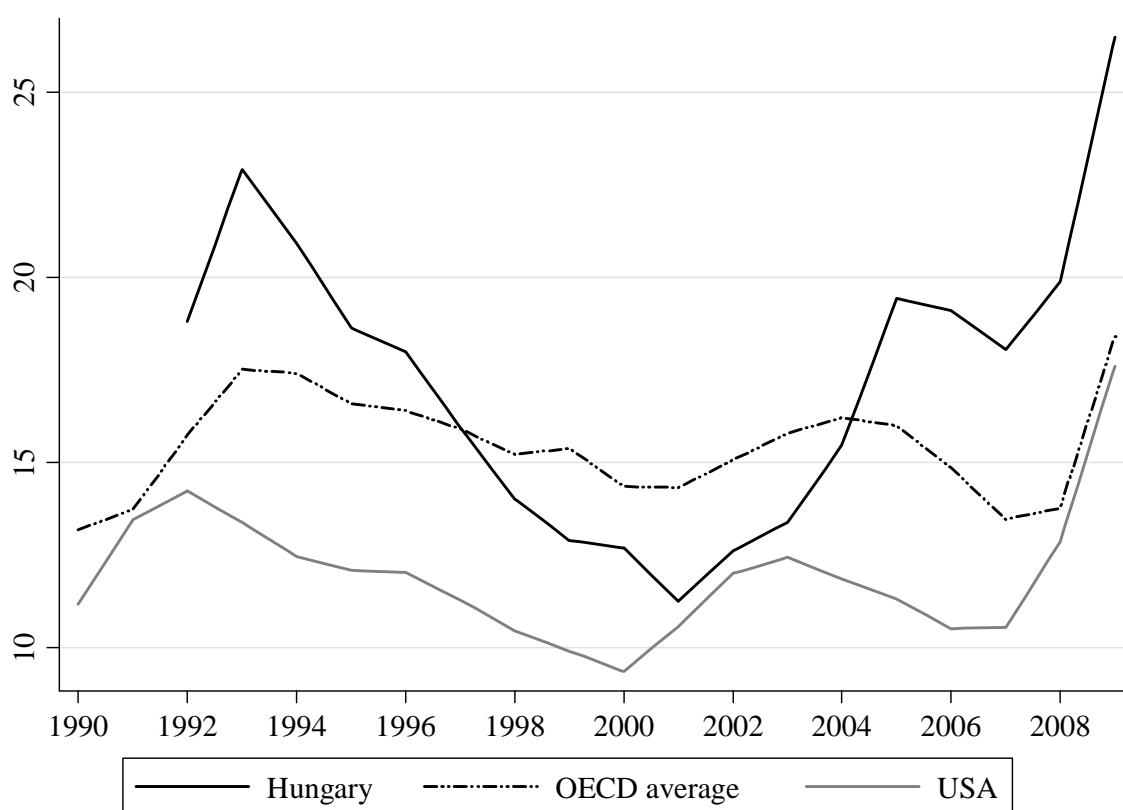
Source: OECD Labour Force Statistics.

Vocational schools then represent a third option that practically is an educational dead-end, leading to direct labor market entry. While gymnasium and technikum last for four years, vocational schools could also be a year shorter depending on the program studied. Vocational schools prepare for specific occupations and lead to the corresponding occupational credentials, typically semi-skilled and skilled jobs in agriculture and industry, but also some lower level service sector jobs. Under socialism, vocational schools were tightly linked to enterprises, where vocational students were trained in enterprise-based workshops or at workplaces.

In the course of transformation, young people increasingly chose upper secondary tracks granting access to higher education instead of vocational schools. Figure 2 shows that the number of vocational school graduates, in absolute terms and as a percentage of all upper secondary graduates, dropped considerably. However, since 2001 the relative share of vocational school graduates has remained stable. In this period of rapid enrolment changes, negative selection of vocational school students in terms of social background increased (Bukodi and Robert forthcoming).

Figure 2.

Changes in secondary education enrollment across school types
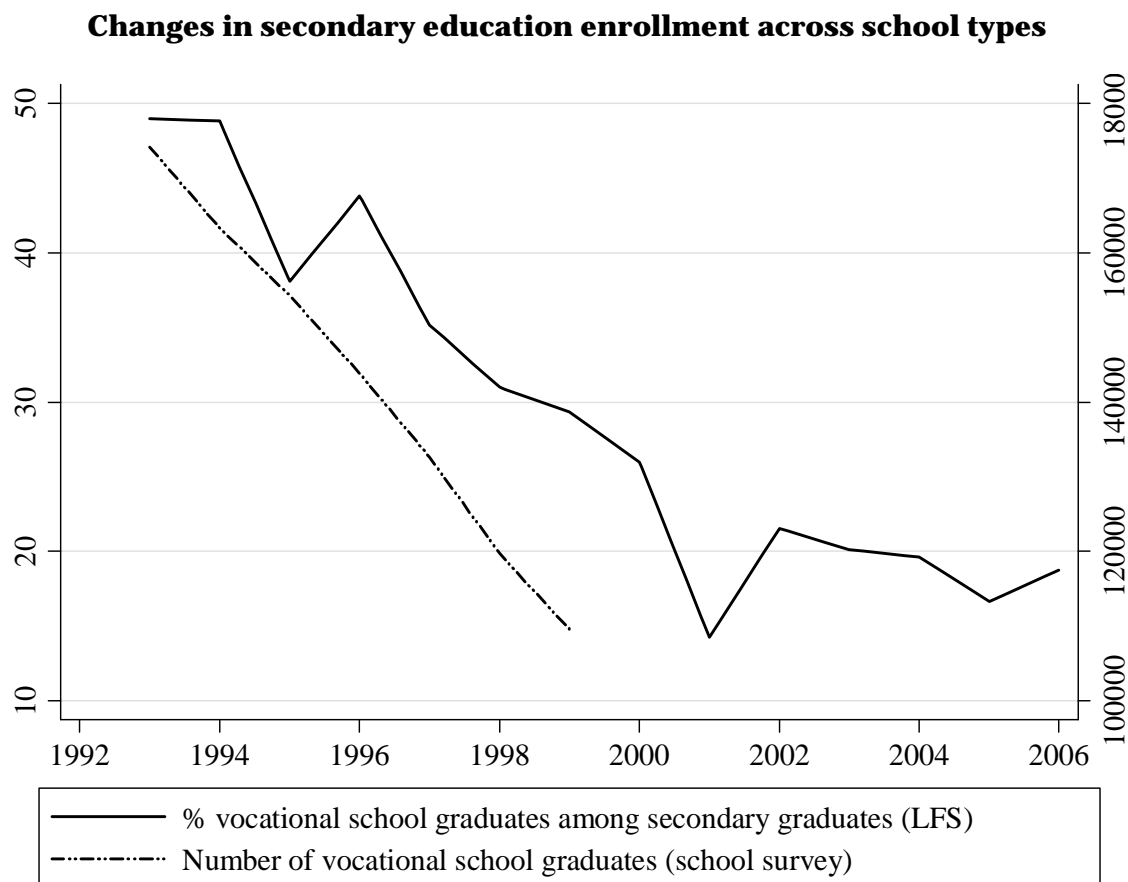
Source: Hungarian Labor Force Survey and KIR-Stat database, own calculations.

In the following section, we distinguish three regimes (socialist, coordinated, liberal) structuring vocational training provision and the transition from secondary (vocational) education to work. We conceptualize the transformation of the organization of VET in Hungary as a transformation from the socialist to the liberal regime, while retaining elements of state regulation. We then discuss the impact of change in training provision on the early labor market careers of vocational school graduates.

THE IMPACT OF SOCIAL TRANSFORMATION ON THE HUNGARIAN VET SYSTEM

VET systems in socialist economies were modeled after dual system apprenticeship programs found in Western European countries. Rather than voluntary employer cooperation, training provision by employers was ultimately guaranteed by political coercion. VET played a crucial role in socialist states, providing a steady supply of skilled and semi-skilled workers for agriculture and industry. Students received theoretical instruction in vocational schools and on-the-job training at workplaces or enterprise-based training

workshops. They were forced to specialize very early into specific occupations with few opportunities for "course corrections" later on. The transition from vocational school to work was highly structured, often involving administrative assignment of vocational graduates to jobs (Gerber 2003; Noelke and Müller forthcoming).

Among capitalist countries, coordinated market economies have achieved voluntary employer cooperation in the provision of on-the-job training (Soskice 1994; Franz and Soskice 1995). The key source of efficiency is the provision of general as well as specific human capital on a mass scale, in particular benefiting non-college bound youth. On-the-job learning of industry-, occupation- and firm-specific skills may be particularly attractive for young people from disadvantaged backgrounds unlikely to pursue an academic education, and increase their employability relative to those with general education only across a broad spectrum of skilled white and blue collar jobs (Wolter and Ryan 2011). Importantly, vocational degrees prepare for concrete occupations, and employers value the occupational credentials highly (Shavit and Müller 2000). Alongside dual system VET programs exist extensive vocational programs that are mainly school-based and may conclude with an internship period on the job. Upon completing a vocational degree, a certain fraction of young people stays with the training firm, while others switch employers (Witte and Kalleberg 1995; Franz and Zimmermann 2002). Compared to academic secondary education, the system is said to facilitate rapid entry to skilled blue and white collar work. By lowering unemployment risks in particular, it performs a safety net function, while potentially diverting some young people from more ambitious career paths (Winkelmann 1996; Müller and Shavit 1998; Shavit and Müller 2000; Scherer 2005).

In liberal market economies, large scale VET systems do not exist. Vocational education tends to be fully school-based and usually takes the form of pre-vocational preparation courses in tracked comprehensive secondary schools. The transition from secondary education into the labor market follows market principles. The central source of efficiency is frequent job changing which causes young people to acquire labor force experience and to move to jobs that provide an increasingly better fit between their preferences and abilities and those of employers (Johnson 1978; Jovanovic 1979; Topel and Ward 1992; Heckman 1993). While this system is very flexible, incentives for on-the-job training appear much lower than in coordinated market economies.[1] Given the lack of training, young people entering the labor market with a secondary degree (or less) are initially in a very precarious

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[1] Turnover in entry level positions tends to be very high and lack of employer coordination implies a high risk of poaching of trained young workers by non-training firms(Topel and Ward 1992; Winkelmann 1997; Acemoglu and Pischke 1998). Both factors shorten the period newly trained young workers spend with the training firm, over which the investments in specific skills, partly financed by employers, can pay off (Becker 1994).

position, which prompted experimentation with or efforts to bolster dual system type training arrangements, for example in the United Kingdom and the United States.

The post-1989 development in Hungary can be understood as a gradual transformation from the socialist to the liberal regime, while retaining a small-scale dual system based on market principles and state financing. Even though Hungary has inherited an extensive dual system VET sector from socialism and has a long-standing history of apprenticeship education, the route to a large scale, modern dual system as found in coordinated market economies like Austria or Germany was effectively blocked. The socialist state had crowded out institutional mechanisms that could solicit voluntary employer training provision under capitalism, especially effective bodies of collective worker and employer representation (Ost 2000), and the federal government was unable or unwilling to create sufficient financial incentives for training provision.[2]

Since 1989, economic and political reforms have reflected a strong liberal ideology that privileged decentralized, market-based solutions in many policy areas, including education in general (Horn 2010), VET and labor market regulations (Bukodi and Robert 2008). Vocational schools were reformed to increase the total duration from three to four years and to substitute academic for vocational components in the curriculum (implemented in 1996), while the last two years were reserved for concrete vocational training either in school workshops or within enterprises. Vocational schools organization was also reshaped as responsibility for administration and financing has been increasingly decentralized to the municipal level. Federal bodies, however, continue to be involved in maintaining training standards, administering a training fund, and setting teacher wages.

Most importantly for our purposes, with the demise of socialism and the onset of privatization, on-the-job training provision diminished considerably starting in the early 1990s. Employers in privatized enterprises rapidly withdrew from training vocational school students. Many training places were destroyed as companies were downsized and restructured. As Figure 3 shows, employer-provided training declined at a similar pace to vocational school enrolment such that the number of employer-provided training places per vocational student dropped only slightly. The growth of school-based training places more than compensated for the decline in employer-provided training. As a consequence, the total number of training places per vocational student even increased from 0.40 in 1993 to 0.47 in 1999 (not shown). However, the type of training students received changed drastically: The ratio of school-provided to employer-provided training places nearly doubled from 0.92 in 1994 to 1.76 in 2000 (not shown).

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[2] In contrast, the German government responded by massively subsidizing apprenticeship training in the struggling post-reunification East German labor market (Thelen 2007).

Figure 3.

The changing provision of vocational training, total number of places and places per vocational school student
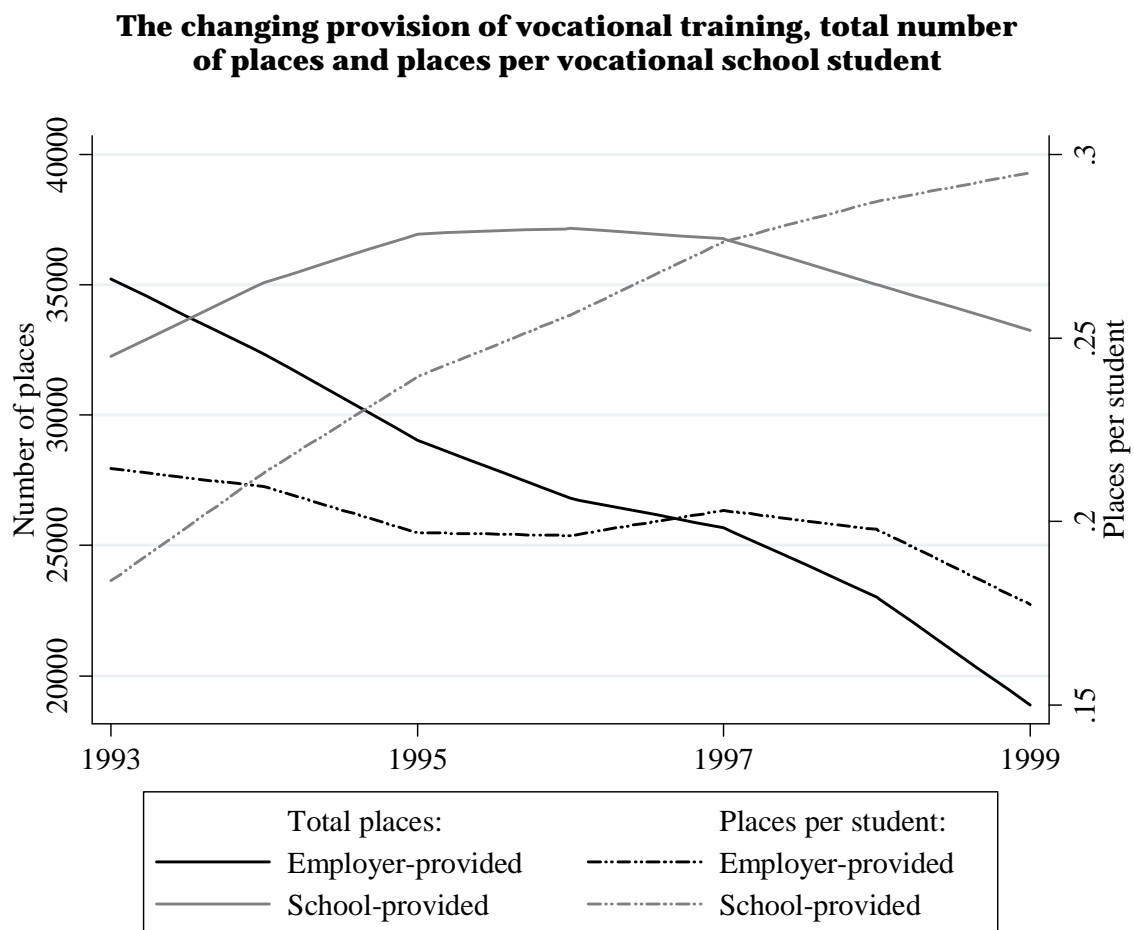
Source: KIR-Stat database (own calculations).

THE CONSEQUENCES OF SUBSTITUTING EMPLOYER-PROVIDED WITH SCHOOL-PROVIDED TRAINING

By moving the training sites out of enterprises and into schools, the key threat to efficiency is obsolescence of specific skills. Industry-, occupation- and firm-specific skills derive their economic value from being up-to-date. On-the-job training is a particular useful source of up-to-date skills, as young people learn what is currently required to perform job tasks at potential future employers. Apart from skill provision, it is sometimes argued that apprenticeships also serve a screening function, by providing employers with a low cost employment contract to screen potential future employees while circumventing the typically high dismissal costs imposed on regular employment contracts (Acemoglu and Pischke 1998). This explanation appears less plausible in the context of the deregulated Hungarian labor market, where nominal job security provisions are weakly enforced and where temporary contracts allow for low-cost employment contracts for screening purposes. The main risk involved in shifting training provision inside schools should then be skill

obsolescence and skill mismatch, as school-based training provision may become decoupled from current labor demand, in particular during times of rapid structural change as observed in Hungary during transformation. The provision of up-to-date skills therefore requires either on-the-job training or coordination of employers and VET providers to align school curricula with current labor demand.

If essentially voluntary provision of training places by employers can no longer be maintained, the critical question becomes whether coordination between VET providers and employers is feasible. While coordination is facilitated by the long history of cooperation between industrial partners and public authorities in coordinated market economies, the question for Hungary and other liberal market economies is whether coordination is possible without such an industrial relations framework. In the context of liberal market economies, two scenarios may be possible: market-based, decentralized coordination or breakdown.

Regarding the first scenario, employers and vocational schools may benefit from local coordination. To the extent that schools need to compete for students to obtain financing, they themselves have an incentive to assure that what is taught in school classrooms and workshops matches what employers require. Rosenbaum and Deil-Amen (2004) discuss "charter-building" as a form of local coordination, where schools (private occupational colleges, in their case study) actively engage with employers to help pave the way into employment for their graduates. Employers in turn have an incentive to coordinate with schools, because they effectively outsource training costs. Employer involvement also lowers their uncertainty about the skills that vocational students acquire.

Decentralization and raising school incentives to improve labor market chances of their students are essential for market-based, local coordination to work. A centralized education system may destroy incentives and flexibility for individual schools to engage in coordination. At the same time, coordination is costly for both parties. For employers, it may require sharing information about production processes. Moreover, the classical collective action problem identified by Becker (1964) remains: Non-training employers may simply poach trained workers from training firms. Were such local, market-based coordination to emerge, the benefits of VET might have been maintained. As we see a shift of coordination from state to local, early labor market outcomes of vocational school graduates should not be affected. Vocational skills should continue to pave the way into skill-adequate employment, leading to low unemployment risks upon leaving school, as found for dual system VET graduates in other coordinated market economies, for example Germany.

Alternatively, the benefits of VET may simply evaporate as employer-provided training is substituted by school-provided training and the system runs the risk of teaching graduates obsolete specific skills. Local coordination may simply fail to emerge due to lack of employer

demand for it, and lack of school flexibility or incentives to engage in cooperation. As training shifts into schools, the vocational skills students acquire become outdated, in particular in the rapidly restructuring Hungarian economy. Early labor market returns of vocational graduates should deteriorate.

More specifically, if vocational skills become increasingly obsolete young people should suffer from increased unemployment risks particularly when leaving school. Similar to secondary school graduates in liberal market economies, vocational school graduates increasingly have to acquire labor market relevant skills after, not before labor market entry, which increases turnover and unemployment risks and weakens labor force attachment early in the career. With growing labor force experience and through a process of job shopping, however, their unemployment risks should decline. Thus, we expect a steepening of experience-unemployment profiles, such that unemployment risks increase particularly very early in vocational graduates' labor market career, upon leaving vocational school, but then decline as they obtain more labor market experience. In other words, unemployment risks should become increasingly dependent on time since graduation.

Regarding job quality, we expect that the breakdown of dual system VET leads to an increase in employment in unskilled, routine occupations upon leaving vocational school. The probability to obtain a higher quality job should become more strongly dependent on time since graduation, as young vocational graduates increasingly obtain the skills required to access higher quality employment.

DATA SOURCES AND MODEL SPECIFICATION

DATA

Training data are obtained from official school reports (KIR-Stat database [Közoktatási Információs Iroda]), collected by the Ministry of Education in October around the beginning of the school year. From this data, we calculate at the level of the 20 Hungarian counties for each year the number of vocational students who received training inside schools and who received training in enterprises, respectively for the period from 1993 to 1999. We use this information to calculate three indicators: the ratio of school- to employer-provided training places, the ratio of school-provided training places, and the ratio of employer-provided training places to vocational students.

Data on vocational graduates early labor market outcomes are obtained from the Hungarian Labor Force Survey (LFS), provided by the Hungarian Statistical Office and available since 1992. We define labor market entrant cohorts according to the year of obtaining the respective educational degree. From the individual information on graduation years, we can track members of different cohorts across different cross-sectional surveys

thereby generating pseudo panel (Deaton 1985) of labor market entrant cohorts. Using the information on graduation years and counties in the LFS data, we merge the LFS with school-reported training data (aggregated to the county level). Thereby, we assign to each respondent a county-by-cohort average training value. Given that the training data pertain to the situation at the start of the current schooling year, we use the one-year lead of the training indicator variables: Those who enter the labor market in year t are matched with training data from year t-1.

For the multivariate analysis, we restrict the sample to respondents who obtained their degree between 1994 and 2000. Given 20 Hungarian counties, individual respondents are nested within 20 counties * 7 cohorts = 140 county-by-cohort macro-level units. To capture graduates early in their labor market career, we first restrict the analytical sample to those graduates who obtained a degree within 1 to 24 months before the month of survey and report not to be enrolled in school at the time of survey.[3] We then also restrict the sample to students of ages between 17 and 22 (dropping 3.7% of the sample) to focus only on those young people who make the typical transition to the labor market after completing a secondary degree in regular time. Table 1 contains descriptive information for the observations used in the unemployment analyses.

Unfortunately, we lack information on the county, in which vocational graduates obtained their degree and training and the exact month in which a degree was obtained. Regarding, the first issue, we only have information on respondent's location at the time of observation, which we assume to be identical to the county, in which vocational education and training was obtained. This we believe to be a minor problem knowing that spatial mobility, especially among the less wealthy and lower educated, tend to be very small in Hungary (Cseres-Gergely 2004). Also this assumption is most likely to hold if we restrict the sample in the manner just described. In the restricted sample, 95% of secondary graduates are aged 17-20. Moreover, on the household roster of the labor force survey, more than 91% of respondents in our sample are identified as children (cohabiting with their parents), which can be taken as evidence that we are dealing with young people who still have not moved from their parental home.

Furthermore, we lack information on the precise month in which individuals obtained a degree. Inspection of the data indicates that less than 2% of secondary graduates (and less than 1% of vocational school graduates) report having obtained a secondary degree before the month of June. Respondents who are sampled in the months from July to December and who report having obtained a secondary degree in the year of observation are distributed almost equally across months. Since June also marks the official ending date of the official

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[3] We omit graduate with 0 months since graduation, since we will use the natural log of this variable in the empirical analysis.

school year, we can therefore also assume that this is when students obtained the respective

Descriptive information, means and standard deviations (S.D.)

	Mean	S.D.	Mean	S.D.
Individual data	Vocational grads only		All secondary graduates	
Unemployed (1=yes, 0=no)	0.24	0.42	0.22	0.41
Vocational school graduate (1=yes, 0=no)	1.00	0.00	0.44	0.50
Female (1=yes, 0=no)	0.40	0.49	0.51	0.50
Time since graduation in months	13.85	6.51	14.07	6.46
Age in years	18.66	1.06	19.23	1.24
Father employed (1=yes, 0=no)	0.56	0.50	0.56	0.50
Father unemployed (1=yes, 0=no)	0.06	0.24	0.05	0.22
Father inactive (1=yes, 0=no)	0.18	0.38	0.17	0.37
Mother employed (1=yes, 0=no)	0.58	0.49	0.61	0.49
Mother unemployed (1=yes, 0=no)	0.05	0.22	0.04	0.21
Mother inactive (1=yes, 0=no)	0.28	0.45	0.23	0.42
Father absent (1=yes, 0=no)	0.14	0.34	0.14	0.35
Father's education – lower secondary (1=yes, 0=no)	0.27	0.45	0.22	0.42
Father's education – vocational school (1=yes, 0=no)	0.42	0.49	0.39	0.49
Father's education – upper sec. general (1=yes, 0=no)	0.09	0.29	0.13	0.34
Father's education – postsec. / tertiary (1=yes, 0=no)	0.01	0.11	0.03	0.18
Mother absent (1=yes, 0=no)	0.03	0.16	0.03	0.16
Mother's education – lower secondary (1=yes, 0=no)	0.51	0.50	0.42	0.49
Mother's education – vocational school (1=yes, 0=no)	0.22	0.41	0.20	0.40
Mother's education – upper sec. general (1=yes, 0=no)	0.16	0.37	0.23	0.42
Mother's education – postsec. / tertiary (1=yes, 0=no)	0.02	0.13	0.04	0.19
1 child cohabiting with parents (1=yes, 0=no)	0.32	0.47	0.31	0.46
2 children in household (1=yes, 0=no)	0.45	0.50	0.46	0.50
3 children in household (1=yes, 0=no)	0.13	0.33	0.12	0.32
4 or more children in household (1=yes, 0=no)	0.04	0.19	0.03	0.17
Respondent self identifies as parent (1=yes, 0=no)	0.02	0.13	0.02	0.15
Respondent self identifies as cohabiting (1=yes, 0=no)	0.02	0.13	0.02	0.15
Respondent self identifies as other (1=yes, 0=no)	0.03	0.17	0.03	0.18
Number of individuals	9272		16619	
Macro data				
Ratio of school- to employer-provided training places	1.46	0.85		
School provided training places per vocational student	0.25	0.08		
Employer-provided training places per vocational student	0.20	0.06		
Number of macro-level contexts	140			

Source: Hungarian Labor Force Survey and KIR-Stat database, own calculations.
The sample is restricted to those observations used in the unemployment analyses.

degree. The resulting variable time since graduation (potential labor force experience), measured in months, therefore starts counting in July in the year the respective secondary degree was obtained.

Our dependent variables are a dummy variable for unemployment (1=unemployed, 0=employed) and a dummy variable for employment in a routine occupation (1=employed in routine occupation, 0=employed in other occupation). Routine occupations are those belonging to class 9 in the European Socio-economic Classification (ESeC) (Harrison and Rose 2006). This class schema is derived from the well known Erikson-Goldthorpe-Portocarero scheme. Class 9 comprises of routine occupations that do not require extensive skills and can be monitored rather easily. Typical occupations include cleaners, laborers, assemblers, porters and messengers. We used three-digit ISCO codes to derive the class schema. Unfortunately, information on respondents' occupation was available only from 1995 for Hungary, which is why we drop the 1994 cohort in the analyses using respondents occupation.

MODEL SPECIFICATION

Most empirical evidence on the effectiveness of vocational education results from comparing vocational graduates to "comparable" graduates from general tracks (Arum and Shavit 1995; Scherer 2005) within the same country, sometimes trying to correct statistically for the endogeneity of educational choices at the individual level (Bonnal, Mendes, and Sofer 2002; Meer 2007; Neumark and Rothstein 2006; Plug and Groot 1998) or using on variation in the quality or organization of vocational schooling across U.S. states (Arum 1998) or advanced countries (Shavit and Müller 2000; Müller and Shavit 1998). Nevertheless, still little is known about the causal effects of different modes of organizing VET. Selection bias, resulting from unobserved compositional differences between treatment (vocational graduates) and control groups (academic secondary graduates), represents a threat to causal inference in analyses using micro data. Studies relying on institutional variation across geographic units (counties, states, countries), unobserved differences between institutional contexts may confound attempts to infer causality. To overcome these problems, Parey (2009) uses variation in the supply of apprenticeship places in local labor markets as an exogenous predictor for individuals' choice between dual system VET and fully school-based vocational program to identify the returns to dual system VET programs. Our identification strategy similar to Parey's in that we take the variation in employer-provided training places as an exogenous source of variation to estimate the returns to vocational training.

In our setting, transformation generates considerable temporal variation in the organization of training provision, which is rarely observed in Western countries. This makes

Hungary attractive as a case study, because we obtain substantial institutional without having to compare two fundamentally different countries. However, the preceding section alluded to the fundamental and sweeping changes Hungary underwent in the course of transformation, which complicate efforts to establish a causal relationship between changes in the organization of training provision and changes in labor market outcomes. Unobserved, time-varying confounders, both due to the changing composition of vocational school graduates and changing institutions and labor market conditions, are a key threat to causal inference.

To address these problems, we use two designs to infer the causal effect of the organization of vocational training. First, we take a sample of vocational graduates only. The panel character of our dataset allows us to specify cohort and period (year) fixed effects to eliminate unobserved, time-varying factors that change in the same manner across counties. Moreover, county fixed effects can eliminate whatever time-constant factors cause counties to differ from each other. Additional control variables are then used to rule out time-varying confounders. Second, we take a sample of all secondary graduates (vocational school and technikum/gymnasium graduates) and specify an exhaustive set of county-by-year fixed effects to non-parametrically control for unobserved county-specific, time-varying shocks that equally affect labor market entrants with a secondary degree.

Using the first design and the sample of vocational graduates, our basic econometric model is as follows:

(1) $Y_{icjt} = \beta_0 + \beta_1 \text{TRAIN}_{cj} + \beta_2 \text{TSG}_i + \varepsilon_{icjt}$

for i individuals, nested in j counties, c cohorts and t years. TRAIN_{cj} is the training indicator varying at cohort and county level (for example, the ratio of school- to employer-provided training places for each cohort and county) and TSG_i is "time since graduation", an individual level variable. We then include fixed effects, where γ_t are year fixed effects (year-specific dummy variables), δ_c are cohort-specific fixed effects and μ_j are county-specific fixed effects. β_0 is a constant and ε_{icjt} is an idiosyncratic individual error term:

(2) $Y_{icjt} = \beta_0 + \beta_1 \text{TRAIN}_{cj} + \beta_2 \text{TSG}_i + \gamma_t + \delta_c + \mu_j + \varepsilon_{icjt}.$

This essentially resembles a Differences-in-Differences model, where the treatment variable, TRAINcj, is not a binary indicator, but continuous variable measuring treatment intensity (Angrist and Pischke 2008:234). Unlike in "classical" DD designs with a binary treatment indicator, we therefore have to assume that changes in our continuous treatment variable are linearly related to changes in the dependent variable. However, we can test for different types of non-linear effects: Of central importance theoretically is whether the effect of training provision causes the outcome variable to be more strongly dependent on time

since graduation (potential labor force experience). We assess this hypothesis with a cross-level interaction between $TRAIN_{cj}$ and TSG_i:

$$(3) \quad Y_{icjt} = \beta_0 + \beta_1 TRAIN_{cj} + \beta_2 TSG_i + \beta_3 (TRAIN_{cj} \cdot TSG_i) + \gamma_t + \delta_c + \mu_j + \varepsilon_{icjt}.$$

Specifications 1 and 2 are enriched in the following ways to eliminate time-varying confounders at the county level. First, we add the following control variables: % of secondary graduates with vocational degree among secondary graduates aged 17-22 (measured at the county and cohort level) to capture compositional changes, adult (ages 37-42) vocational graduates unemployment rate to capture shocks impacting vocational degree holders (measured at the county and year level), and the unemployment rate of young people aged 17-22, who do not hold a vocational degree, to capture shocks to the youth labor market (measured at the county and year level). The effect of the latter variable is allowed to vary across counties (one coefficient estimated per county). Second, we control for county-specific, linear trends, at the risk of potentially controlling away the treatment effect we try to estimate.

To implement a triple-differences (Differences-in-Differences-in-Differences) design, we now add upper secondary graduates to the sample (which is defined according to identical criteria as above) in order to difference out unobserved, time varying labor market shocks at the local (county) level. We now fit education-group specific parameters for constant, $TRAIN_{cj}$, TSG_i, as well as education-group specific cohort effects. Instead of year and county dummies, we specify an exhaustive set of 140 year-by-county dummies, i.e. one dummy variable per year and county. This leads to the following specification:

$$(4) \quad Y_{icjt} = \alpha_1 (VOC_i \cdot TRAIN_{cj}) + \alpha_2 (VOC_i \cdot TSG_i) + \beta_1 (GEN_i \cdot TRAIN_{cj}) + \beta_2 (GEN_i \cdot TSG_i) + \delta_{c,GEN} + \delta_{c,VOC} + (\gamma_t \cdot \mu_j) + \varepsilon_{icjt},$$

where VOC_i and GEN_i are the individual level dummy variable for having a vocational school or a gymnasium/technikum degree, respectively, and $(VOC_i \cdot TRAIN_{cj})$ and $(GEN_i \cdot TRAIN_{cj})$ are their interactions with the training variable $TRAIN_{cj}$. $\delta_{c,VOC}$ and $\delta_{c,GEN}$ are education education-group specific cohort effects (including constants), $(\gamma_t \cdot \mu_j)$ are 140 year-by-county dummy variables. Now, also adding education group specific interaction terms between $TRAIN_{cj}$ and TSG_i.

$$(5) \quad Y_{icjt} = \alpha_1 (VOC_i \cdot TRAIN_{cj}) + \alpha_2 (VOC_i \cdot TSG_i) + \alpha_3 (VOC_i \cdot TRAIN_{cj} \cdot TSG_i) + \beta_1 (GEN_i \cdot TRAIN_{cj}) + \beta_2 (GEN_i \cdot TSG_i) + \beta_3 (GEN_i \cdot TRAIN_{cj} \cdot TSG_i) + \delta_{c,GEN} + \delta_{c,VOC} + (\gamma_t \cdot \mu_j) + \varepsilon_{icjt}.$$

Since the effects of time since graduation is non-linear, we use the natural log transformation in all models. We report estimates from OLS regression linear probability models and graphically display simulated probabilities from logistic regression analyses.

Reflecting the clustered nature of our sample, we use Huber-White standard errors that are robust to clustering of observations within the 140 county-by-cohort cells. As specification checks for the standard error calculations, we also chose higher level cluster units (7 cohorts, 20 counties). All analyses are performed separately for young men and women.

CONTROL VARIABLES

All models control for the natural log of respondents' age. Furthermore, we take advantage of the fact that in our analytical sample 91% of respondents are identified on the survey household roster as "children" within family units, within which we can identify "fathers" or "mothers". For those who are identified as children, we can control flexibly for social background using dummy variables for: father present/absent, father's education (lower secondary or less, gymnasium/technikum, postsecondary/tertiary; reference: vocational school) and employment status (unemployed, inactive; reference: employed), mother's presence/absence, education, and employment status (coded as for fathers'), and dummies for the number children living in the household (one, three, four or more; reference: two). For the 9% of respondents not identified as children on the household roster, we control for their respective household role (cohabiting, parent, other). Table 1 contains more details on variable means and standard deviations.

RESULTS

DESCRIPTIVE ANALYSIS

Figure 4 shows that during our period of observation, which includes the years 1994 to 2001, we witness recovery on the Hungarian youth labor market. Unemployment rates decline until approximately 2001. Unemployment rates of vocational school and gymnasium/technikum graduates evolved very similarly, which makes us more confident to use gymnasium/technikum graduates to control for time-varying, unobserved macroeconomic shocks in the triple-differences design. Throughout the period of observation, vocational school graduates have higher unemployment rates than gymnasium/technikum graduates. Unemployment is higher in our analytical sample due to compositional factors.[4]

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[4] In the analytical sample, average time since graduation is 13 months and the average age is 18.7. 95% of respondents are aged 20 or less; 70% are either 17 or 18 years old. In the age-based sample, average time since graduation is 50 months and the average age is 21.3.

Figure 4.

Youth unemployment by education group over years
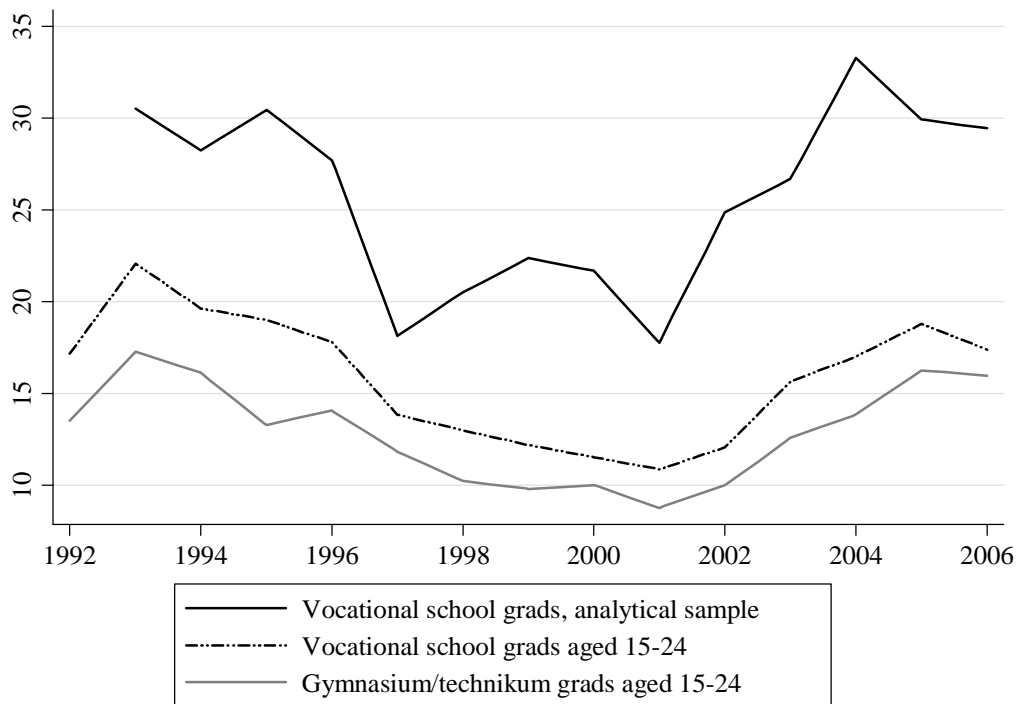
Note: The "analytical sample" is defined in the same way as the one used in the multivariate analysis, i.e. vocational school graduates observed 1-24 months after graduation, aged 17-22. The multivariate analysis only uses the 1994-2000 cohorts.
Source: Hungarian Labor Force Survey (own calculations).

Figure 5 traces the dynamics of school to work transition for our analytical samples of vocational graduates. It charts the average outcomes for each month since the month of graduation, as well as the predicted probabilities calculated from a logistic regression of the outcome variable on the natural log of time since graduation. We see that youth unemployment is very high immediately following graduation and then declines rapidly. The predicted probabilities follow the pattern in the raw data closely and capture the non-linearity well. Furthermore, the slope of the relationship becomes steeper across cohorts such that the difference between unemployment risks between those just out of school and those with some labor force experience increases (available on request). Regarding quality of employment, we observe that with increasing time, the probability to be employed in a routine occupation (among those who are employed) increases. However, the raw data are relatively noisy and we do not observe a pattern as clear as in the case of unemployment.

Figure 5.

Labor market entry dynamics of vocational school graduates
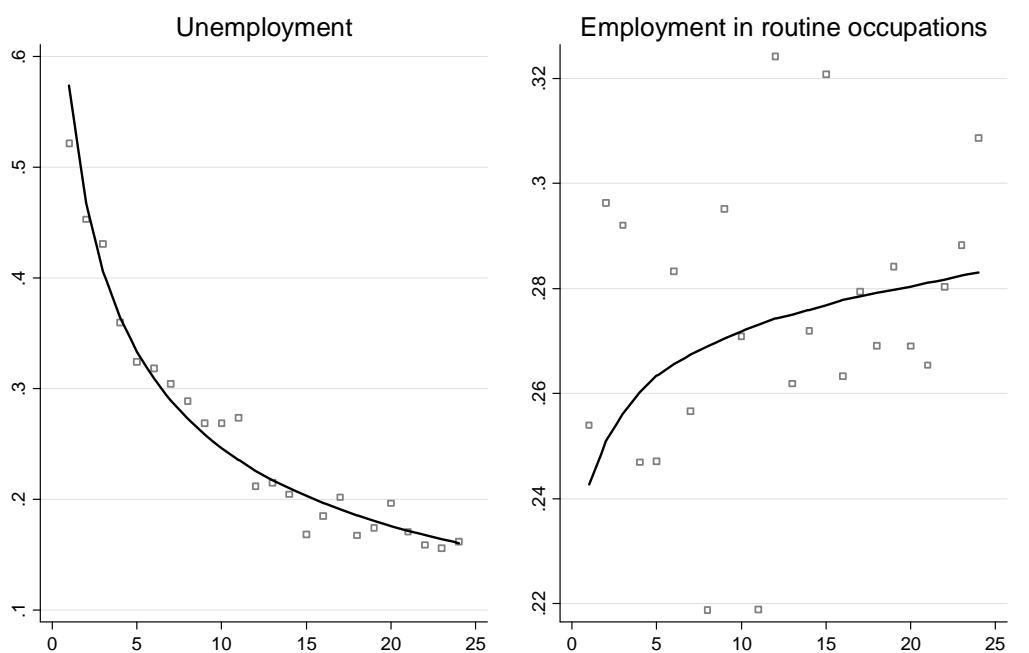
Note: Vocational school graduates observed 1-24 months after graduation, aged 17-22, 1994-2000 graduation cohorts. Average outcomes by month since graduation and predicted probabilities obtained from logistic regression analysis.
Source: Hungarian Labor Force Survey (own calculations).

The patterns documented in Figures 4 and 5 provide little indication of a VET system delivering similar results to those found in some Western European countries, for example Germany or Austria. Young people have to struggle to find a job, and have to increasingly settle into routine occupations requiring the least amount of skills. Moreover, vocational school graduates are if anything more exposed to unemployment risks than gymnasium/technikum graduates. Unlike dual system VET programs in some Western European countries, which effectively diminish unemployment risks of VET graduates relative to graduates from general/academic secondary programs at the transition from school to work (Shavit and Müller 2000; Scherer 2005), Figures 4 and 5 provide no evidence of such a "safety net" function of VET in Hungary.

MULTIVARIATE ANALYSIS

Does the site of training impact vocational school graduates unemployment risks?

In the period of observation, unemployment of vocational school graduates declined, while training places shifted from enterprises into school workshops. The following analyses try to account for compositional, institutional and macro-economic changes which impact both trends in order to identify the causal effect of the changes in the organization of vocational training on vocational graduates unemployment risks and job quality. The models reported in Table 2 report results from linear probability models (OLS regression) where the dependent variable is a dummy variable for employment status (1=unemployed, 0=employed). The upper panel (A) reports the results for young men, the lower panel (B) reports the results for young women. We focus here on the ratio of school- to employer-provided training places as an indicator for the organization of VET. Results using the number of school-provided training places per vocational student and the number of employer-provided training places per vocational student are reported in the Appendix.

We begin with the results for young men. Specification M1 is estimated without fixed effects, i.e. it uses both cross-sectional and longitudinal variation in the training indicator, but controls for individual social background. It indicates a strong negative effect of time since graduation on individual unemployment risks, while the training indicator effect is weak and statistically insignificant. M2 adds cohort, period and county fixed effects. The coefficient of the ratio of inside-to-outside school training places is now statistically significant and in the expected direction, i.e. it increases unemployment probability. The effect drops in strength and significance once we control for macro-level variables measuring compositional and macro-economic changes (M3, macro-level controls: percentage of secondary graduates with vocational degree, unemployment rate among vocational graduates aged 37-42, unemployment rate among 17-22 year-old youth not holding a vocational school degree [effect varies across counties]) or country specific linear trends (M4). However, the interaction between time since graduation and the training indicator variable (specification M2i) turns out statistically significant, and even strengthens upon inclusion of linear trends (M4i). If the ratio of students trained in schools rather than by employers increases, experience matters more for reducing individual unemployment probability.

Table 2.

OLS estimates ("cluster robust" standard errors) of the effect of the ratio of school-provided to employer-provided training places and time since graduation on vocational school graduates unemployment risks 1-24 months after graduation

	M1	M2	M3	M4	M2i	M4i	M5	M5i
A. Men								
ln(time since graduation)	-0.12***	-0.11***	-0.11***	-0.11***	-0.05*	-0.04	-0.11***	-0.05
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)
School- / employer-provided places	-0.01	0.05*	0.03	0.04	0.15***	0.13**	0.07*	0.14**
	(0.01)	(0.02)	(0.02)	(0.04)	(0.04)	(0.05)	(0.03)	(0.04)
· ln(time since graduation)					-0.04**	-0.04***		-0.04**
					(0.01)	(0.01)		(0.01)
N	5594	5594	5594	5594	5594	5594	8186	8186
R2	0.06	0.12	0.13	0.14	0.12	0.14	0.15	0.15
B. Women								
ln(time since grad)	-0.10***	-0.11***	-0.11***	-0.11***	-0.06*	-0.05	-0.12***	-0.07*
	(0.01)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)
School- / employer-provided places	-0.00	-0.01	-0.02	-0.00	0.08	0.08	0.04	0.13***
	(0.01)	(0.02)	(0.02)	(0.04)	(0.05)	(0.05)	(0.03)	(0.04)
· ln(time since graduation)					-0.03*	-0.04**		-0.04*
					(0.01)	(0.01)		(0.01)
N	3678	3678	3678	3678	3678	3678	8433	8433
R2	0.06	0.09	0.11	0.12	0.10	0.12	0.13	0.13
Social background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	Yes	Yes	Yes	Yes	Yes	No	No
Cohort FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes	No	No
Macro control vars.	No	No	Yes	No	No	No	No	No
County-spec. trends	No	No	No	Yes	No	Yes	No	No
County · year FE	No	No	No	No	No	No	Yes	Yes

Note: *** p<0.001, ** p<0.01, * p<0.05. Social background = mother's and father's education and employment status, number of children living in household. County FE = county-specific dummy variables; Cohort FE = cohort-specific dummy variables; Year FE = year-specific dummy variables; Macro control variables are: the percentage of secondary graduates with vocational degree, the unemployment rate among vocational graduates aged 37-42, the youth unemployment rate (one coefficient per county); County-spec. trends = country-specific linear trends; County · year FE = exhaustive set of county-by-year dummy variables. All models control for the age of respondents (ln). Models M5 and M5i contain education-group specific cohort, time since graduation, and age effects, as well as education-group specific training indicators and (training indicator · time since graduation) interactions. Full results available on request. For further details, see text.
Source: Hungarian Labor Force Suvey and Hungarian School Survey (own calculations).

The last two columns report results from the full sample (adding gymnasium/technikum graduates) to provide the degrees of freedom to non-parametrically control for time-varying unobserved confounders (measured at the county and year level) that affect all secondary graduates equally. Both the main effect of the training indicator variable (M5) and its interaction with time since graduation (M5i) are statistically significant and point in the expected direction. Considering the results for gymnasium/technikum graduates (available upon request), we observe that the organization of training provision neither has a statistically significant main effect nor significantly modifies the time since graduation effect. Hence, we are confident that the training indicator captures the effect of organizational changes in the VET system that specifically impact vocational school students, rather than merely capturing unaccounted changes in local labor demand that would also have a significant impact on other secondary graduates.

Thus, for young men, the substitution of employer-provided with school-provided training appears to increase unemployment risks, even though this effect is not fully robust across specifications. The highly robust interaction between training organization and time since graduation indicates an increasing dependence of unemployment risks on potential labor force experience. The interaction effect is not affected by dropping whichever year, cohort and county, varying between -0.03 and -0.05 at staying significant at least at the 1% level. It is also unaffected by retaining only respondents for which we have full social background information. If we move the cluster level, over which standard errors are calculated, from the county-by-cohort up to the county level (effectively assuming only 20 independent observations for the purposes of calculating standard errors), standard errors increase but the interaction effects retain significance at the 5% level (and also remains robust to dropping whichever year, cohort and county from the sample). Finally, re-estimating the models using logistic regression and calculating average marginal effects yields estimates of very similar magnitude and statistical significance.

Figure 6 allows for a proper interpretation of the interaction effect between training indicator and time since graduation. To this end, we re-estimate the specification M2i in Table 2 using logistic regression and simulate predicted unemployment probabilities for different levels of the training variable using CLARIFY (King, Tomz, and Wittenberg 2000; Tomz, Wittenberg, and King 2003). Substituting employer- with school-provided training places particularly affects young people very early in their labor market career. With time, the disadvantages of cohorts receiving school- rather than employer-provided training slowly dissipate.

Using the same program, we calculate the mean effect of decreasing the training indicator variable from its average value in 1994 to its average value in 2000 at different values of time since graduation. At month 1, the substitution increased unemployment

probability by 0.17 (90% confidence interval: 0.08, 0.29).[5] At month 6, the effect is down to 0.09, but retains statistical significance. After 18 months, the effect is still 0.04 (90% c.i.: 0.01, 0.07). Only after 24 months does the effect lose statistical significance at the 10% level. Averaging over these monthly estimates, the unemployment rate of young male vocational school graduates in the first 12 months after leaving school jumped by a total of 10 percentage points (90% c.i.: 0.05, 0.15) because of the substitution of employer-provided with school provided training places between 1994 and 2000.

Figure 6.

**Simulated unemployment probabilities from logistic regression analysis
Model specification as in Table 2, Model M2i**
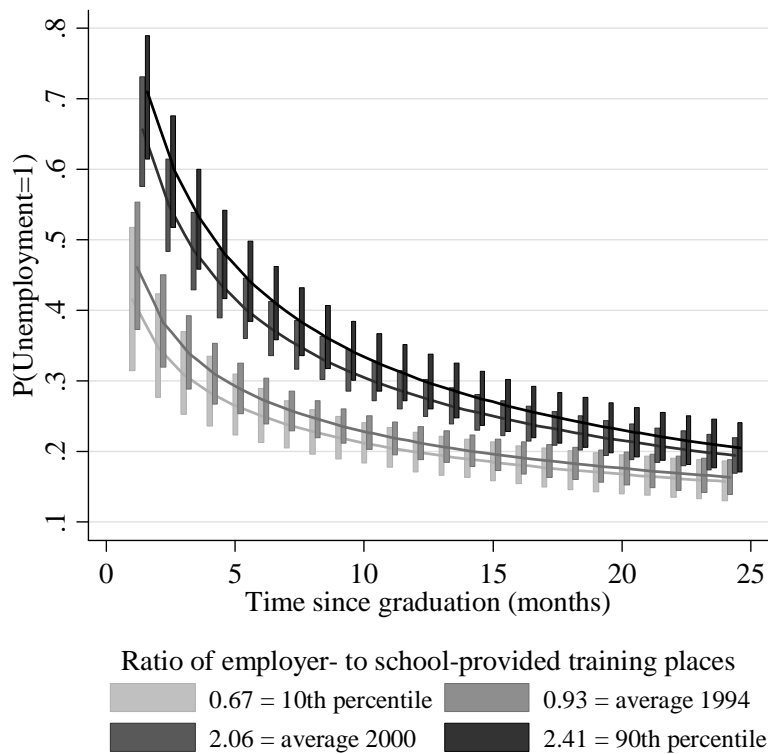
Note: Simulated probabilities obtained using the clarify ado in Stata (King et al. 2000; Tomz et al. 2003). Vertical bars represent 90% confidence intervals.
Source: Hungarian Labor Force Survey (own calculations).

In contrast to young men, young female vocational school graduates seem less affected by the substitution of employer- with school-provided training. The coefficient estimate for the main effect of the training variable shows the wrong sign and is far from statistically significant (specifications M2, M3 and M4), while the interaction effect has the expected

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[5] Because of the clear directionality of the hypothesis, we perform 1-tailed significance tests here.

sign, is statistically significant and nearly identical to the effect estimated for young men. Performing the same simulations as for young men to graphically evaluate the interaction effect for young women, we obtain qualitatively similar patterns, but effect sizes are smaller and uncertainty is larger.

To further validate the results for young men, Tables A1 and A2 in the Appendix present results using different indicators of training provision, i.e. the number of school-provided training places per vocational students (Table A1) and the number of employer-provided training place per vocational student (Table A2). We would expect that school-based training provision would be associated with higher youth unemployment and steeper experience profiles. For young men, these expectation are largely confirmed, even though the main effect of school-based training provision does not retain statistical significance in all specifications (Table A1). Also as expected, employer-provided training provision lowers unemployment risks (not significant) and flatten experience profiles (interaction effect significant at 5% level, Table A2).

At last, using NEET (1=not in education, employment or training, 0=employed) as the dependent variable essentially reproduces the patterns observed for unemployment. Repeating all analyses using employment probability (1=employed, 0=unemployed or inactive) as the dependent variable also produces the expected patterns, mirroring the results for unemployment and NEET. However, unemployment duration and being in a temporary rather than permanent contract (only available from 1996 onwards) are unaffected by the substitution of employer- with school-provided training. The latter results indicates that, in the Hungarian context, employer-provided training affects young people's employment chances by providing specific skills rather than providing a screening opportunity for employers. If apprenticeships served a screening function (Acemoglu and Pischke 1998), we would expect that as they reduce formal training provision, employers increasingly resort to temporary employment as a screening device. This, however, appears not to be the case.

Does the site of training impact the quality of employment among young vocational graduates?

In the following, we restrict the sample to employed individuals only and analyze the quality of young vocational school-leavers jobs. While 27% of 1994 vocational graduates (who were employed) were working in routine occupations (ESeC Class 9), this number has grown to 32% for the 2000 cohort. It appears that part of the decline in unemployment observed across these cohorts is accounted for by an expansion of low quality jobs. However, this patterns appears to be unrelated to the provision of training to VET students, as the following analyses show. In Table 3, we report results from regression analyses using

identical model specifications and estimation as for the results presented in Table 2. The dependent variable is employment in routine occupations.

Table 3.

OLS estimates ("cluster robust" standard errors) of the effect of the ratio of school-provided to employer-provided training places and time since graduation on vocational school graduates employment probability in routine (vs. other) occupations 1-24 months after graduation

	M1	M2	M3	M4	M2i	M4i	M5	M5i
A. Men								
ln(time since graduation)	0.01	0.01	0.01	0.01	0.03	0.02	0.01	0.04
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.04)
School- / employer- provided places	-0.01	-0.01	-0.01	0.02	0.03	0.03	-0.04	-0.02
	(0.02)	(0.03)	(0.03)	(0.04)	(0.06)	(0.06)	(0.06)	(0.07)
· ln(time since graduation)					-0.01	-0.01		-0.02
					(0.02)	(0.02)		(0.02)
N	3472	3472	3472	3472	3472	3472	5221	5221
R2	0.02	0.05	0.08	0.08	0.05	0.08	0.11	0.11
B. Women								
ln(time since graduation)	0.04	0.03	0.03	0.03	0.06	0.07	0.03	0.06
	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.05)	(0.02)	(0.04)
School- / employer- provided places	-0.02	0.03	0.02	0.02	0.09	0.07	-0.05	-0.02
	(0.02)	(0.03)	(0.03)	(0.07)	(0.09)	(0.09)	(0.04)	(0.07)
· ln(time since graduation)					-0.02	-0.02		-0.02
					(0.03)	(0.03)		(0.02)
N	2403	2403	2403	2403	2403	2403	5813	5813
R2	0.03	0.11	0.12	0.12	0.11	0.12	0.15	0.15
Social background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	Yes	Yes	Yes	Yes	Yes	No	No
Cohort FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes	No	No
Macro control vars.	No	No	Yes	No	No	No	No	No
County-spec. trends	No	No	No	Yes	No	Yes	No	No
County · year FE	No	No	No	No	No	No	Yes	Yes

Note: *** p<0.001, ** p<0.01, * p<0.05. See notes to Table 2.

We observe no statistically significant effects whatsoever. While Figure 5 suggested that with time on the labor market the relative incidence of employment in routine occupation is

increasing, this effect is not statistically significant. However, the risk to be employed in a routine occupation is also not decreasing neither with time passed since graduation nor with age (full results available on request). An increasing share of vocational school graduates appears to be stuck in routine occupations requiring the least amount of skills. Repeating these analyses with different measures of job quality, like socio-economic status (measured by the International Socioeconomic Index, ISEI) and job prestige (measured by the Standard International Occupational Prestige Scale, SIOPS) did not yield different conclusions.

DISCUSSION

Has market reform in Hungary improved labor market outcomes of vocational school graduates? The preceding analyses suggest that the destruction of employer-provided training opportunities that was entailed by market reform has lowered labor force attachment and increased unemployment risks in particular for young male vocational school graduates. Liberal market reform appears to have pushed Hungary from a socialist towards a liberal mode of organizing the transition from secondary education to work. From a Varieties of Capitalism perspective (Hall and Soskice 2001), this development is not surprising as the institutional preconditions to secure voluntary employer cooperation appear not to be met. In consequence, the transition from vocational education to work increasingly resembles the "bad equilibrium" of liberal market economies, exacerbating social inequalities and further weakening the labor market position of those anyhow at risk.

Nevertheless, dual system VET has not been fully abandoned, neither by employers nor young people. Given the still relatively large share of young people leaving school without an upper secondary degree, vocational schools still seem to be a viable option to upgrade the labor market chances of the most disadvantaged. Further research is required to cast light on the recent developments in Hungarian VET, which should prove valuable for understanding what type of VET is feasible for budget constrained, liberal market economies.

Finally, a proper evaluation of the substitution of training provision requires a long-term perspective (and genuine longitudinal data). Here, we only studied the immediate impact up to 24 months after leaving school. Nevertheless, we doubt that a long-term perspective would contradict our conclusion that the substitution of training provision has made vocational school students worse off. If anything, early career experiences of unemployment should weaken labor force attachment and accumulation of human capital over the life course, therefore leaving temporary, and possibly permanent scars in young people's labor market careers. The full individual and social costs of the partial destruction of dual system VET should only become apparent if we take a longer term perspective.

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APPENDIX

OLS estimates ("cluster robust" standard errors) of the effect of the ratio of school-provided training places per vocational students and time since graduation on vocational school graduates unemployment risks 1-24 months after graduation

	M1	M2	M3	M4	M2i	M4i	M5	M5i
A. Men								
ln(time since graduation)	-0.12***	-0.11***	-0.11***	-0.11***	0.01	0.03	-0.12***	0.01
	(0.01)	(0.02)	(0.02)	(0.02)	(0.04)	(0.04)	(0.02)	(0.04)
School training places per student	-0.11	0.92**	0.78*	0.78	2.11***	1.84**	0.57	1.44*
	(0.14)	(0.31)	(0.36)	(0.55)	(0.41)	(0.55)	(0.58)	(0.57)
· ln(time since graduation)					-0.48***	-0.54***		-0.50***
					(0.12)	(0.13)		(0.14)
N	5594	5594	5594	5594	5594	5594	8186	8186
R2	0.06	0.12	0.14	0.14	0.12	0.14	0.15	0.15
B. Women								
ln(time since graduation)	-0.10***	-0.11***	-0.11***	-0.11***	-0.04	-0.03	-0.12***	-0.05
	(0.01)	(0.02)	(0.02)	(0.02)	(0.04)	(0.05)	(0.02)	(0.05)
School training places per student	0.09	-0.26	-0.56	0.11	0.42	0.64	0.23	0.90
	(0.16)	(0.40)	(0.47)	(0.58)	(0.53)	(0.64)	(0.44)	(0.50)
· ln(time since graduation)					-0.29	-0.30		-0.29
					(0.16)	(0.17)		(0.17)
N	3678	3678	3678	3678	3678	3678	8433	8433
R2	0.06	0.09	0.11	0.12	0.10	0.12	0.13	0.13
Social background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	Yes	Yes	Yes	Yes	Yes	No	No
Cohort FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes	No	No
Macro control vars.	No	No	Yes	No	No	No	No	No
County-spec. trends	No	No	No	Yes	No	Yes	No	No
County · year FE	No	No	No	No	No	No	Yes	Yes

Note: *** p<0.001, ** p<0.01, * p<0.05. See notes to Table 2.

**OLS estimates ("cluster robust" standard errors) of the effect of the ratio
of employer-provided training places per vocational students and time since
graduation on vocational school graduates unemployment risks
1-24 months after graduation**

	M1	M2	M3	M4	M2i	M4i	M5	M5i
A. Men								
ln(time since graduation)	-0.12***	-0.11***	-0.11***	-0.11***	-0.20***	-0.20***	-0.11***	-0.21***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.04)	(0.04)	(0.02)	(0.04)
Employer training places per student	-0.03	-0.64	-0.28	-0.77	-1.70**	-1.82*	-0.92	-1.90**
	(0.22)	(0.39)	(0.32)	(0.65)	(0.62)	(0.75)	(0.58)	(0.71)
· ln(time since grad)					0.42*	0.46*		0.45*
					(0.18)	(0.18)		(0.18)
N	5594	5594	5594	5594	5594	5594	8186	8186
R2	0.06	0.12	0.13	0.14	0.12	0.14	0.15	0.15
B. Women								
ln(time since graduation)	-0.10***	-0.11***	-0.11***	-0.11***	-0.15**	-0.16**	-0.12***	-0.18***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.05)	(0.05)	(0.02)	(0.05)
Employer training places per student	0.05	0.28	0.19	0.01	-0.24	-0.60	-0.70	-1.42*
	(0.20)	(0.34)	(0.40)	(0.51)	(0.66)	(0.74)	(0.39)	(0.69)
· ln(time since graduation)					0.21	0.27		0.29
					(0.22)	(0.23)		(0.24)
N	3678	3678	3678	3678	3678	3678	8433	8433
R2	0.06	0.09	0.11	0.12	0.10	0.12	0.13	0.13
Social background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FE	No	Yes	Yes	Yes	Yes	Yes	No	No
Cohort FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes	No	No
Macro control vars.	No	No	Yes	No	No	No	No	No
County-spec. trends	No	No	No	Yes	No	Yes	No	No
County · year FE	No	No	No	No	No	No	Yes	Yes

Note: *** p<0.001, ** p<0.01, * p<0.05. See notes to Table 2.

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