

VOCATIONAL EDUCATION AND LABOUR MARKET ENTRY IN TRANSITION COUNTRIES

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Abstract

Prior research on the consequences of the transition from socialism to capitalism has largely ignored the consequences of the transformation for the education system. Yet, closer inspection reveals substantial dynamism in the education systems of Central- and Eastern European countries after 1989. In this study, we focus on the consequences of system change on the provision of vocational education in Hungary and Eastern Germany for the period from 1993 to 2006, as well as the resulting changes in the dynamics of labour market integration of vocational graduates. Both countries experienced a dramatic decline in enterprise-based training, resulting in an increasing share of vocational graduates who have only obtained school-based vocational training. In multivariate analyses, we assess the consequences of this partial substitution of enterprise-based training with school-based training. We find that labour market entry has become more turbulent for vocational graduates in Hungary: They increasingly need to spend more time on the labour market to find employment and are more likely to initially enter unskilled employment. In Eastern Germany, we witness weak signs of changing labour market entry dynamics, while for Western Germany no changes are visible. Our findings support existing theories emphasizing the impact of institutional linkages in structuring youth labour market entry.

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INTRODUCTION

Comparative social research has made substantial progress in studying how institutions impact stratification processes. Much research has focused on consequences of national differences in the education system on educational attainment (Hanushek and Wossmann 2006; Pfeffer 2008) as well as labour market entry (Breen 2005; Kerckhoff 1995; Kerckhoff 2001; Müller and Shavit 1998; Rosenbaum et al. 1990; Ryan 2001; Shavit and Müller 2000). A recurring result of these studies is that among graduates from secondary education, those with vocational certificates experience smoother labour market (LM) entries: Lesser turnover and shorter unemployment (search) periods are required to find skill-adequate employment. At the same time, their level of literacy or numeracy is lower than of those with general training (e.g. OECD 2005), and the occupational status attained is often inferior compared to graduates with tertiary degrees (e.g. Shavit and Müller 2000). Following Shavit and Müller (2000), we can summarize the role of vocational education as both a *safety net*, because it provides a smooth entry into protected, skilled worker positions, while avoiding insecure unskilled employment. At the same time, vocational certificates are a *diversion*, because they usually provide few opportunities for upward mobility. In the following, we test for the period from the beginning of the 1990s to the mid-2000s whether these claims hold true for vocational degree holders in Hungary and Germany (East and West). In Germany, we particularly focus on graduates from either vocational school or apprenticeship training, while in Hungary we focus on graduates from vocational school. Sharing a common history, these types of vocational education in Germany and Hungary are characterized by tight integration of school-based education and enterprise-based training. Furthermore, for the period of observation, these are the modal education groups on the youth labour market.

There are several reasons to expect that particularly the safety net function of vocational education has been eroded in these countries. Post-socialist Eastern Germany and Hungary experienced massive transformation crises, which were compounded by the structural changes all advanced economies, like Western Germany, are undergoing. Several authors have criticized systems of vocational education as overly rigid and emphasized general skills as critical components of success in a rapidly changing economic environment (e.g. Krueger and Kumar 2004), although relatively few robust findings exist on the viability of vocational education systems today (Mayer and Solga 2008). Apart from structural changes, we also

observe institutional change in the post-socialist countries in the system of vocational education itself, in part a consequence of the transition crisis. In response to a substantial decline in enterprise-based training after the transition in both Eastern Germany and Hungary, the share of vocational graduates who have received specific skill training outside enterprises in school workshops rose dramatically in both countries. This erosion of the school-to-work linkage is likely to have detrimental consequences on vocational graduates in the post-socialist countries.

Our contribution to these issues is threefold: First, we seek to sketch out the consequences of the transition from socialism to capitalism for the education system. We focus on vocational education, which was or has been the central pillar of the system of skill formation in the societies we analyze. From the perspective of “transitology”, this addresses a prominent research gap. While much has been written about the impact of transition on institutions and institutional change, very few studies address consequences for the education system and in how far changes in the education system are then linked to new inequalities on the labour market. This is somewhat surprising given the enormous dynamism in the education systems of post-socialist societies (e.g. Kogan 2008; Kotasek 1996) that generates variation that is rarely observed in such a short time-period in Western countries. Beyond describing these changes, the second part of the analyses seeks to address the consequences of institutional change within the system of vocational education in Hungary and Eastern Germany for labour market entry of vocational graduates. Here, we use institutional variation within the same country (Hungary and Eastern Germany) to study the effect of institutional differences in the provision of vocational education on the labour market entry dynamics of vocational graduates using fixed-effects regression methods. This allows for an alternative, rigorous test of institutional theories previously tested mainly in the cross-section.¹ Finally, given ongoing debates about the future of vocational education, we provide a timely overview of the development of the main structural indicators and outcomes for three countries that have an extensive history of vocational education.

Our article is structured as follows: We begin by developing a theoretical micro-model of labour market entry dynamics, which we use to micro-operationalize the consequences of institutional change in the system of vocational education, most importantly the decline in on-the-job training already referred to above. Then, we describe the consequences of market

¹ Past research relies on a comparison of vocational graduates to otherwise similar graduates from general education (Iannelli and Raffe 2007; Scherer 2005), or compares vocational graduates from different countries (Shavit and Müller 2000; Wolbers 2007). We compare vocational graduates from the same countries across time.

transition for the Hungarian and Eastern German education system and the system of vocational education in particular. On this basis, we develop our research questions and hypotheses on the consequences of institutional change within vocational education for the labour market entry patterns of graduates from vocational education. We put forward a design to test our hypotheses and, following a review of trends in central labour market outcomes of vocational graduates, we present results of multivariate, fixed-effects regression analyses of vocational graduates labour market integration dynamics. We conclude by discussing alternative explanations and summarizing our findings.

INSTITUTIONAL CHANGE AND YOUTH LABOUR MARKET ENTRY

The dynamics of labour market entry

Labour market matching theory (Johnson 1978; Jovanovic 1979) provides an adequate toolkit to describe labour market entry dynamics, if actors have limited information. On the supply side, young labour market entrants are assumed to have limited information about their abilities as well as the characteristics of prospective jobs. On the demand side, employers cannot determine the productivity of young, inexperienced applicants *ex ante*. As a consequence, either side cannot assess the value of prospective matches. Matches must be formed first to “experience” their utility for employers and individuals alike. Once a match is formed, both sides gain information about the quality of the match and either side may unilaterally end the match to take advantage of better alternatives. From the perspective of matching theory, turnover is therefore necessary to solve the inefficiencies generated by imperfect information. We argue that the classical matching models provide accurate descriptions if educational degrees (a) constitute unreliable signals to employers of applicants’ true productivity and (b) provide LM entrants with little information about their preferences, abilities for as well as working conditions in different jobs. They therefore particularly apply to educational degrees obtained in general or academic tracks of the education system, characterized by no or mainly general vocational education (as opposed to

occupation-specific preparatory training).² This general nature of education provides little orientation for graduates and has a low signalling value in the eyes of employers. Due to this lack of information on both sides, LM entrants' initial matches are likely to be of low quality and both employer- and employee-induced turnover will be high at the beginning of individual labour market careers. With time spent on the labour market and trying out different jobs/applicants, employers' and LM entrants' probability to locate an optimal, therefore lasting, match increases. At the same time, better matches are associated with a higher match-specific productivity, and therefore greater labour market returns for both actors.

In contrast, enrolling in and graduating from apprenticeship programs solves actors' information problems. Because of employer involvement in the provision of training and standardization of education and training curricula, apprenticeship degrees constitute reliable signals to employers of applicants' productivity. And, because of the occupation-specific orientation of the degree, LM entrants themselves show more directed search behaviour, i.e. they mainly search for vacancies within the occupation or industry they received training, because this is where they can reap the benefits to their education. They will also dispose of better information ex ante about work conditions and other monetary and non-monetary job aspects, allowing them to better distinguish the quality of matches ex ante. Therefore, we expect that LM entrants with apprenticeship degrees will already be well matched at the beginning of their career, since they can locate good matches more easily. At the same time, employers face lower hiring risks, since their education provides a reliable signal. Compared to graduates from general programs (at a similar level), matches are already quite efficient at the beginning of the career, and even if mobility occurs as individuals try to locate the best employer within an industry, it will typically be smooth given the high signalling power of their degrees. As a consequence, initial employment rates will already be quite close to equilibrium levels and consequently, and time spent on the labour market will not make a great difference as employment rates were already high to begin with. At the same time, the opportunities for mobility are typically confined to skilled worker positions.

Past research assumes that occupation-specific, on-the-job training following nationally standardized curricula are the central factors contributing to the structuring capacity of vocational education (Breen 2005; Müller and Shavit 1998; Rosenbaum et al. 1990). If

² The American high school degree may be a prime example for this type of degree. Sociologists have for a long time pointed to the low signalling power of high school degrees/transcripts (Miller and Rosenbaum 1997; Rosenbaum and Binder 1997).

however the link between education and workplace through institutionalized on-the-job training is broken, vocational students would no longer be able to acquire specific skills by being trained within enterprises. As a consequence, the level of specific skills they obtain declines to the extent that vocational training inside schools cannot compensate for on-the-job training. If employers are risk-averse, they are more reluctant to hire individuals trained in schools, compared to individuals they have trained themselves. In the latter case, they have information about the actual productivity of applicants on the job, which they lack if individuals received training only in schools. Similarly, if individuals only train in schools, they lack information about employers, possible job opportunities and job characteristics upon entry into the labour market. Hence, the information set of both actors is reduced and the resulting matches are likely to become more inefficient. More turnover will therefore be necessary to achieve optimal assignment. As a consequence, a decline in on-the-job training within apprenticeship education should lead to more turbulent LM entry for graduates from vocational programs, similar to the LM entry patterns observed for graduates from general tracks. Their initial unemployment probability should rise and then decline with time spent on the labour market, while the reverse applies to employment probability. Furthermore, to the extent that they are unable to secure employment in the target occupation/job that they were educated for, they risk being employed in a low status job, if only temporarily.

Vocational education and the transition to capitalism

Vocational education systems combining school-based and enterprise-based training have been crucial components of the skill formation regimes of the countries studied here since the period of industrialization (König et al. 1987).³ Vocational education for a specific occupation has traditionally taken place in the beginning of the life course and life-long employment in the occupation one had been trained for has constituted the norm. In both capitalist and socialist economies, nationally standardized curricula guaranteed for the reproduction and homogeneity of skills taught within the dual system. The allocation of labour market positions strictly depended on the occupation one was trained for. Solga and

³ In Germany, students generally first complete a general secondary degree (*Hauptschule, Realschule / Polytechnische Oberschule, Gymnasium*), then seek an apprenticeship place or enrol in specific vocational schools (e.g. for nurses). Both forms of vocational training last around 3-3.5 years and combine school-based education with on-the-job training. In Hungary, after completing primary education, students directly enrol in vocational school (*szakmunkásképző or szakiskola*), which also combines school-based education with on-the-job training in a three (later four) year program. Instead of enrolling in vocational school, students can continue in either upper secondary general (*Gimnázium*) or vocational (*Teknikum or Szakközépiskola*), successful completion of which grants access to university.

Konietzka (1999) show that vocational certificates strongly structured labour market entry in capitalist and socialist Germany before 1989.⁴ However, despite these similarities in labour market allocation patterns, the functional pressures under which the dual systems were operating were of course quite different.

Following the seminal work of Becker (1964), the apprenticeship system as found in Western Germany constitutes a puzzle: Apprenticeships training generates a form of general human capital because it raises productivity with many employers. Theoretically therefore, rational employers do not pay for apprenticeship training, but instead try to poach trained apprentices from other companies. This causes the system to break down, because no employer is willing to bear the cost of training individuals that end up working for other employers. While the exact sources of the stability of the German dual system are increasingly well understood (e.g. Acemoglu and Pischke 1999; Culpepper and Thelen 2008; Estevez-Abe et al. 2001), we can assume that the functional problems of the apprenticeship system under capitalism, i.e. poaching of trained workers, does not exist under socialism. An authoritarian state owning and seeking to control most parts of the economy can simply enforce the functioning of the dual system, by obliging employers to train (not to poach) and apprentices to stay. However, with the transition to capitalism, employers could no longer be coerced by a dictatorial state to participate in training. When costs began to bite in the course of privatization and liberalization, many companies were forced to close or shed employment. As a consequence, training rates by private enterprises declined substantially in Hungary and Eastern Germany.

The transition to capitalism confronted policy makers with enormous problems. Given the extensive history of vocational education, path dependency arguments therefore point in the direction of sustaining existing educational practices and labour market allocation principles on the basis of vocational certificates after the transition to capitalism, particularly in times when other, more pressing structural reforms have to be undertaken. At the same time, the declining participation of employers in training needed to be addressed. Here, the Hungarian and German states took on a central role in responding to the training crisis, with remarkably different outcomes.

For Germany, the 1990s were marked by strains on the dual system even in Western Germany, where structural changes in the economy have led to a decline in apprenticeship

⁴ Studies on older workers in Eastern Germany suggest continuity in the role of vocational certificates obtained in the GDR for individual labour market careers in the course of transition during the early 1990s (Mayer et al. 1999; Solga and Diewald 2001).

training particularly in small- and medium-sized enterprises (Culpepper and Thelen 2008). However, problems were much more severe in Eastern Germany: In the course of decentralization, privatization and the dissolution of the large industrial conglomerates (*Kombinate*), the number of newly formed training contracts declined substantially from 135.640 in 1989 to 99.122 in 1993 (Schober 1995). In July 1994, demand for apprenticeship places exceeded supply by around 2:1 (Schober 1995). While employers were failing to provide enough training places, the state took a decisive role in stabilizing the vocational training system. First, with unification, the institutional structure supporting apprenticeship training in the West was transferred to the East. More importantly for the period analyzed, the federal government responded by subsidizing newly formed apprenticeship contracts to provide incentives for training for private employers. The financial efforts by the federal governments have not been limited to the turbulent transition years, but continue to the present day (Culpepper and Thelen 2008). For example, in 1996 around 50%, in 1999 70% and in 2003 still 34% of apprenticeship contracts in Eastern Germany received some form of state subsidy (BMBF 2003). The financial subsidies in part financed apprenticeship training in free-standing training centres (*Ausserbetriebliche Ausbildungsstätten*), i.e. an increasing share of apprentices, particularly those who had difficulty finding an apprenticeship, were trained in school workshops rather than enterprises. According to Schober (1995: 40), 21,3% of newly concluded apprenticeships were localized in such training centres in 1992. The importance of exclusively school based training rose in Eastern Germany in subsequent years: In 1999 33% and in 2003 32% percent of apprentices were trained outside enterprises, while the corresponding figures for Western Germany were around 5-6% (BMBF 2004).

In the case of Hungary, a similar decline in employer's willingness to train apprentices became evident in the early transition crisis. In response to the economic changes, the apprenticeship sector was reformed in 1993 (Lannert and Mártonfi 2003; Zachár 2002): From 1996 on the total duration of education in basic vocational schools increased from three to four years (meanwhile the compulsory education was lengthened from 10 to 12 years) and academic components of the curricula were strengthened. Instead of a combination of a 3-year-long school- and enterprise-based training, from 1998 a two year-long classroom-based general and pre-vocational education was introduced, while the second two years were reserved for concrete vocational training either in school-workshops or within enterprises. (Halász and Lannert 1998; Zachár 2002). However, given employers unwillingness to train in times of economic stringency, the relative share of basic vocational school students receiving some form of enterprise-based training rapidly declined. While in the 1990/91 school-year

only 25% of vocational school students solely received their training inside schools, this share rose to 64% in 1999/00, and declined to 50% in 2001/02 (Lannert and Mártonfi 2003). As a consequence, and similar to Eastern Germany, an increasing share of vocational school graduates lacked labour market experience and ties to employers prior to completing their apprenticeship, although this trend was more pronounced in Hungary than Eastern Germany.

Viewed in comparison, the consequences of the transition from socialism to capitalism for the skill production regimes were quite different in the two countries. It appears that – despite all structural problems caused by the transition – the West German model of skill formation, characterized by a strong dual system coupled with relatively low university enrolment, has been implemented in the German East, not least due to extensive state subsidies. Looking at Table 1, we observe that among 15-34 year-olds, the share of tertiary graduates has remained constant, while still two thirds of all graduates have obtained some form of apprenticeship or vocational training. Due to the structural problems, the share of graduates from apprenticeship/vocational programs has actually declined somewhat, while the share of individuals with only lower-, medium- or upper secondary degrees has risen. Nevertheless, the data on the distribution of educational degrees among the youth population indicate that the traditional German model prevails.

At the same time, in Hungary the difficulties in providing enterprise-based training led to a comprehensive reform of the dual system, increasingly focusing on general education and offering training within schools. At the same time, as Table 1 shows, this was coupled with a general shift in enrolment towards upper secondary (academic and vocational) and university education. Hungary experienced an enormous rise in tertiary graduates, albeit from a very low level: The relative share of tertiary graduates nearly doubled between 1993 and 2006 (see Table 1). Conversely, the share of individuals with only lower secondary education and with vocational school degrees has been declining. For vocational school graduates, this decline levelled out in recent years. With one third of each cohort obtaining a vocational school degree, they still constitute the modal degree group on the Hungarian youth labour market for the period of observation. Altogether, the substantial shifts in enrolment patterns indicates that a growing share of young people view higher education as indispensable to succeed in the new economy and that vocational schools may have fallen into disfavour among many. From our theoretical considerations above, the institutional reforms of vocational schools could only have further weakened the labour market value of vocational school degrees.

RESEARCH QUESTIONS AND HYPOTHESES

The previous section showed how the transition to capitalism has led to a partial substitution of enterprise-based training with school-based training for vocational graduates in Eastern Germany and Hungary. Based on the theoretical considerations, we expect that due to this shift in training labour market entry of vocational graduates has become increasingly problematic, particularly in Hungary, where this change was especially pronounced. More specifically, we argue that the observed institutional changes should have altered the association between outcomes and time spent on the labour market. Initially and due to the tight institutional linkage between the education system and the workplace, we expect no dependence between time spent on the labour market and either employment probability or the probability to be an unskilled worker. Labour market entry occurs smoothly, with short unemployment spells and little turnover. Vocational graduates' employment probability should already be high at the very beginning of the career, and they should be employed in skill-adequate, i.e. skilled worker, positions.

If, however, the tight link between education and the workplace is broken, as is the case, when training is moved from the firm to vocational schools, labour market entry should become more turbulent. Individuals, who were just trained in schools, lack information about suitable employers and working conditions, while employers have difficulty judging the productivity of individuals, who were only trained in schools. As a consequence, the fraction of vocational school graduates trained only in schools will have difficulty finding initial employment, i.e. their early career employment probability declines. However, by trying out different jobs and gaining labour market experience, their chances to obtain an optimal match improve, and, consequently, their employment probability should rise with time. Altogether, the disruption of the school-to-work linkages therefore causes increasingly inefficient initial matches and an increasing dependence of job market outcomes on time spent on the labour market. Additionally we expect that individuals' initial occupational placements will be further off their target occupations. Their initial difficulties to secure adequate employment may force to accept, if only temporarily, unskilled worker positions. However, with time spent searching and gaining experience, they become increasingly likely to exit unskilled for skilled worker positions.

Unfortunately, our data do not allow us to identify this institutional effect at the individual level. We do not know whether vocational certificate holders received training

inside schools only or whether they were partly trained within enterprises. However, given the scope of institutional change, particularly in Hungary, the consequences of declining on-the-job training should also become visible when looking at average outcomes. The individual level effects for those trained only within schools should then be larger than what we estimate in our models.

DATA AND STATISTICAL MODELING

We draw on the Hungarian Labour Force Survey (HULFS) and the German Mikrozensus (GMZ) to test our hypotheses. The period covered by the data is 1993 to 2005 for Germany (no data available for 1994) and 1993 to 2006 for Hungary. While the HULFS is available on a quarterly basis, data from Germany is only available from the second quarter of each year. The data are well suited to detect trends in labour market outcomes for specific subgroups, and they can be made comparable relatively easily due to similar survey design. Furthermore, we can take advantage of detailed national educational classifications and do not have to rely on standardized and aggregated comparable classifications schemes. For Germany, we distinguish the following educational degrees:

<i>Educational degree</i>	<i>Abbreviation</i>
Lower secondary or less (<i>Hauptschule</i> or less)	LS
Secondary without vocational certificates, aggregating medium secondary (<i>Realschule, polytechnische Oberschule</i>) and upper secondary (<i>~Gymnasium</i> , general or conditional university entrance qualifications)	Sec
Vocational certificate (either apprenticeship or occupation-specific school, e.g. nursing) and lower secondary general schooling degree	LSVoc
Vocational certificate and medium secondary general schooling degree	MSVoc
Vocational certificate and upper secondary general schooling degree	USVoc
Higher vocational (e.g. master craftsmen, technician)	HiVoc
University (including University of Applied Sciences / <i>Fachhochschule</i>)	Uni

For Hungary, we distinguish the following degree groups:

<i>Educational degree</i>	<i>Abbreviation</i>
Lower secondary or less (<i>általános iskola</i> or less)	LS
Vocational school (<i>szakmunkásképző</i> or <i>szakiskola</i>)	VS
Upper secondary general (<i>Gimnázium</i>)	US
Upper secondary vocational (<i>Teknikum</i> or <i>Szakközépiskola</i>)	Tech
University and colleges	Tert

To compute the time individuals spent on the labour market in years, we took the difference between the year of survey and the year of obtaining the highest degree in Hungary. For Germany, information on the year of completing the highest educational degree is only available from 1999 onwards, and suffers from high incidence of missing values. We used the available data to compute the modal age of obtaining the different degrees distinguished above. Then, we imputed this value for each individual, and subtracted it from the individuals' age at time of survey to obtain the time elapsed in years since graduating from education.

Since we observe individuals with the same education degree across years in each country, we can use a fixed effects approach to control for all unobserved cohort- and period specific factors influencing outcome levels. Following Deaton (1985), we use the micro-data to construct a pseudo-panel of cohort averages, i.e. instead of modelling associations at the individual level, we model average outcomes of cohorts. We define the year of labour market entry as the year of obtaining the highest educational degree and then define, in the case of Hungary, 19 labour market entrant cohorts whom we can observe at some point of their labour market career between 1993 and 2006. Each cohort is observed maximally six times, starting from the first year after graduating from education to the sixth year after graduating from education (see the Table 4).⁵ Hence, we define labour market entrants as individuals who have completed their highest educational degree one to six years ago from the point of observation. There are nine cohorts (shaded in gray) that we can observe completely, on which we will also focus in the multivariate analyses. With the cohorts thus defined, we calculate average outcomes in each cell, defined by cohort, year of observation and time since graduation. In both countries, we focus on cohorts that entered the labour market in 1993 or later. Thereby, we avoid the turbulent initial years, and focus instead on the more lasting impact of the transition in the stabilization period.

Our dependent variables are unemployment and employment in an unskilled position (relative to all other employment). For Germany, unemployment was defined as either (a) being not employed and searching for work or (b) being not employed and receiving

⁵ For several reasons, we decided to drop graduates who left school in the year of observation. The cells in “year zero” were much more thinly populated in both countries (less than half the number of observation compared to the other cells). This may be due to difficulties in sampling individuals fresh out of school and searching for employment, who are likely to be mobile. Furthermore, in Germany, data are only gathered in late March, early April, when many individuals, who graduate in the respective year, are likely to be still formally enrolled as pupils/apprentices. Specification checks indicate that dropping “year zero” had no consequence on our findings.

unemployment benefit. We report the results for the first definition.⁶ For Hungary, we followed the recommendation of the Statistical Office. Unskilled employment is defined as class 9 in the European Socio-economic Classification (ESeC) (Harrison and Rose 2006). This class schema bears many conceptual similarities to 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, labourer, assemblers, porters and messengers. We used three-digit ISCO codes to derive the class schema.⁷ Unfortunately, information on respondents' occupation was only available only from 1995 for Hungary and from 1996 in Germany.

For the multivariate analyses, we then regress the cohort- and year-specific outcome on cohort fixed effects (dummy variables for each cohort), period fixed effects (dummies for each year) and the variable "time since graduation" or (potential) "time on the labour market", focusing on one education group at a time. Given the small number of observations, we present the results of several models differing in the degrees of freedom used. Model 1 includes period fixed effects as well as the time on the labour market and its interaction with a linear trend. This is the most parsimonious specification modelling change in the association between time on the labour market and the respective outcome variable that controls for period effects.⁸ Model 2 controls for cohort specific fixed effects (adds dummy variables for each cohort). Model 3 estimates the effect of time on the labour market for each cohort separately, while also controlling for cohort and period fixed effects. In specification analyses, we have run all models separately for each gender. This reduces the cell sample sizes substantially, and therefore increases the imprecision of the estimates of cohort averages. We mainly focus on the pooled sample: On the one hand, this yielded cell sizes of on average 1000 observations for Hungary, which makes us confident in the precision of the estimated cell average.⁹ On the other hand, for the outcomes considered here, with one exception (see below), results did not fundamentally differ between genders.

⁶ For vocational graduates, there are minor differences in the results, which do not affect the trends observed and the conclusions drawn below. Results are available from the authors.

⁷ We are very grateful to Peter Robert for making available to us the code for converting the Hungarian occupational classification into ISCO-88.

⁸ The reported main effect of "time on the labour market" and the linear trend interaction is only defined for the cohorts that we can observe for the full six years, i.e. the cohorts shaded in grey in Table 4. For the other cohorts (unshaded), we fit cohort-specific time effects, which we control for in Models 1, 2 and 3.

⁹ For the pooled sample, cell sizes were on average 350 for Eastern Germany and 830 for Western Germany. Hence, cohort averages are estimated least precisely in Eastern Germany, which increases the estimated standard errors.

RESULTS

Descriptive analysis

Table 5 presents descriptive information for the first and the final year of observation and one year in between representing the trough, in case of Hungary, and a temporary low, in case of Germany, of the aggregate unemployment rate. LM entrants are defined as individuals aged 15 (17 in case of Hungary) to 34 years of age who are either employed or unemployed and searching for a job. It becomes immediately obvious that both countries have witnessed diverging employment and unemployment trends. In the Hungarian case, unemployment peaked in the years after the transition and then declined steadily throughout the 1990s, reaching a low in 2001-02. In Eastern Germany, unemployment was steadily rising since the transition, with a temporary recovery between 1997 and 2000, but then climbing even higher afterwards.¹⁰ Considering structural trends, we observe a substantial rise in globalization, occupational upgrading and computerization within both countries. Globalization was measured here using the KOF index of economic globalization (Dreher 2006). Occupational upgrading was defined as the number of professional, technical and managerial workers (ISCO-88 groups 11x to 33x) among employed youth (generated from microdata). Computerization was measured as the number of personal computers among 1000 individuals (World Bank). All three indicators relate to structural changes on the labour market, which may have induced a skill-biased demand shift. Unfortunately, separate data for Eastern and Western Germany was not available for the globalization and computerization index. We observe that the share of PTM worker is highest in Western Germany and lowest in Hungary, but it is also growing fastest in Hungary.

Focusing on the labour market outcomes of secondary graduates with and without vocational certificates, we observe that in Hungary the unemployment rate of vocational school graduates is higher than that of technikum graduates, while it is substantially lower compared to individuals with only lower secondary education or less. In Germany, the pattern is somewhat different. Graduates with a vocational certificate (regardless of their secondary

¹⁰ In both countries, there are typical, marked differences by levels of education. However, trends in relative unemployment rates differ. Compared to tertiary educated, we witness an equalization of unemployment rates between education groups in Hungary, while we witness polarization in Germany. In Eastern Germany, high educated (USVoc, HiVoc, Tert) experience declines in unemployment rates, while there are strong rises among low educated (LSVoc, Sec, LS) and almost no change among individuals with medium secondary degrees and a vocational degree, the by far most numerous group. In Western Germany, we observe rising unemployment among all education groups, although the rises are generally higher, the lower the level of education.

schooling degree) have lower unemployment risks than those with only lower secondary or less as well as medium- or upper-secondary. Therefore, obtaining vocational education substantially lowers the risk of unemployment in both countries when compared to lower secondary or less education. However, in Germany graduates with only general (medium- or upper-secondary) education are worse off compared to vocational certificate holders, while in Hungary *Technikum* as well as upper secondary (*Gimnázium*) graduates are better off than vocational graduates in terms of unemployment. Regarding employment in unskilled positions, unskilled employment is rising across *all* education groups in Hungary for the period of observation. For vocational school graduates, the share (among employed) working in unskilled occupations grew from 27% to 35%. This increase occurred over both periods distinguished here in spite of the recovery in LM conditions observed in the first period. In Germany, however, the share of unskilled employment among vocational degree holders remains largely constant, except for LSVoc graduates in Eastern Germany, who show an increase in unskilled employment from 34% to 38%.¹¹

In sum, vocational graduates among the labour market entrants in both countries have substantially lower unemployment risks than graduates with only lower secondary education or less. In Germany, however, the safety net function of vocational degrees appears somewhat stronger since even vocational certificate holders with only lower secondary education are better off than medium- and upper-secondary graduates without vocational qualifications. In terms of employment in unskilled positions, vocational school graduates are similarly affected as LSVoc graduates in Eastern Germany. Furthermore, unskilled employment has been rising across education groups in Hungary.

Multivariate Analysis

In the following, we want to assess whether the institutional changes have had an impact on dynamics of labour market integration of vocational graduates. Subsequently, we will assess competing explanation focusing on the role of structural or compositional changes. We run OLS regressions of cohort unemployment or unskilled employment rates on time (potentially) spent on the labour market. While the previous section documented substantial trends in average labour market outcomes, our main interest is here is to assess whether the association

¹¹ Furthermore, among those with a vocational degree in Germany, individuals with lower secondary education are much more likely to work in unskilled position compared to individuals with medium or upper secondary degrees and vocational certificates. Comparing East and West Germany, unskilled employment is clearly more prevalent in the East among the lesser educated (MSVoc, LSVoc, Sec, LS).

between time on the labour market and the labour market outcomes has been changing over time in response to institutional changes. In Table 6, we report the results of our regression analyses. We ran separate regressions for each education group that we study here. Furthermore, we run additional analyses splitting the sample further by gender. Generally, we did not find major gender differences, with one exception (see below).

The uppermost panel of Table 6 reports our results for vocational school graduates in Hungary. In Model 1 we observe a significant interaction of the linear trend variable (defined only for the cohorts fully observed) with the variable for time potentially spent on the labour market. This indicates that additional time spent on the labour market becomes increasingly important in reducing vocational school graduates unemployment risks. This effect is robust to the inclusion of cohort fixed effects (Model 2). Model 3 is similar to Model 2 but estimates an effect of time spent on the labour market for each cohort separately. Figure 1 reports the parameter estimates from gender-specific analyses as well as the pooled sample (men and women), to which the model statistics in Table 6 relate. It shows that for the cohort entering the labour market in 1993, there were no returns to time spent on the labour market in terms of lower unemployment rates. This changes for subsequent cohorts. For the cohorts entering the labour market in 2000, an additional year on the labour market reduces unemployment rates by around 5-10%. Altogether, this suggests an increasing dependence of time on the labour market on unemployment, which is consistent with our hypothesis on the effect of institutional changes in the apprenticeship system.

In the previous section, we could show that, once employed, the share of vocational school graduates entering unskilled occupations has been increasing substantially over the period of observation. Here, we assess whether unskilled employment has become increasingly a terminal destination, or whether the first six years spent on the labour market increase the likelihood of exiting unskilled employment for a higher, skill-adequate position. The results in Table 4 indicate very weak associations, which are not significant at conventional levels. This indicates that there is no significant mobility out of unskilled into higher status employment, and that this association also does not change over time. When we look at the gender-specific results (Figure 1, upper right pane), there are some signs of trends: While initially, neither men nor women are more likely to exit unskilled employment with time spent on the labour market, this changes for later cohorts in a different direction for each gender. Among men, the effect of time turns positive in some cohorts, while for women it turns increasingly negative in later cohorts. Hence, for women, there is some indication that time on the labour market facilitates exit from unskilled employment. For men, the results

suggest that time contributes little to changing their unskilled employment rate, or that it is even positively associated with their unskilled employment rate.

Our results for Hungary are consistent with our expectation. Despite overall declines in unemployment of vocational school graduates (Table 4.), the strengthening association between time on the labour market and unemployment is consistent with an interpretation of increasingly turbulent labour market entry due to institutional changes described above. Because of the broken link between education and employment that resulted from the decline in enterprise-based training, an increasing share of vocational school graduates has difficulty finding initial employment. Spending time on the labour market however becomes increasingly important to reduce unemployment in the early labour market career. At the same time vocational school graduates increasingly end up in unskilled occupations, which, at least for men, become a terminal position, at least for the first six years of the labour market career that we observe here. Altogether, this suggests that the safety net function of vocational education has been weakened in the course of transition.

Western Germany has also seen rising unemployment among vocational graduates, but as Table 6 and Figure 1 indicate, their dynamics of labour market entry has not changed. Time on the labour market has no effect on unemployment rates and, by and large, no effect on unskilled employment for the cohorts entering the labour market between 1993 and 2000. Further inspection of Models 1 and 2 reveals that the period effects explain nearly all the variation in cohort unemployment rates for Western Germany.

In Eastern Germany, we see some signs of increasing difficulties for vocational graduates (see also Konietzka 2001). Looking at the third panel, we observe that for medium secondary plus vocational graduates in Eastern Germany time potentially spent on the labour market becomes increasingly important in reducing unemployment rates (for the cohorts fully observed). The respective interaction of the linear time trend with “time spent on the labour market” is, however, only marginally significant ($p < 0.1$). If we consider the cohort specific parameter estimates in Figure 1 (middle panel), we also observe somewhat consistent trends: For the early cohorts, the association between time on the labour market is insignificant, but for the later cohorts this association becomes increasingly negative and also statistically significant ($p < 0.05$). Regarding unskilled employment, there is some evidence of a negative association between time on the labour market and unskilled employment (Figure 1), but no evidence of a trend in the association.

Alternative explanations

Before drawing conclusions, we need to assess competing explanations of a changing association between time spent on the labour market and labour market outcomes. First of all, cyclical changes in labour demand are known to have a powerful effect on labour market entry dynamics (Blanchflower and Freeman 2000; Gangl 2002; Pollmann-Schult 2005). Labour market entrants usually lack the protection against cyclical fluctuations accorded by firm-specific capital and seniority and are therefore more likely to be laid off in the event of a downturn in the cycle. The earlier individuals are in the labour market career, the more vulnerable they are to cyclical fluctuations. Here, it is interesting to compare Eastern Germany and Hungary, because they have experienced rather differing macroeconomic trends throughout the 1990s. And particularly in the Hungarian case, where we observed the strongest trend in relation to unemployment dynamics, the business cycle explanation is not plausible: For most of the period, specifically between 1993 and 2001, macroeconomic conditions were improving, which is not least reflected in declining unemployment and rising employment rates among vocational school graduates (see Table 3). This should have improved the position of individuals early in their labour market career relative to individuals later in their labour market career, exactly contrary to what we observe.

Another demand side explanation relates to changes in skill demand due to the modernization of the economy and opening up to international trade. If the tasks performed by vocational graduates are increasingly performed by machines, or off-shored to developing countries, or if the skill content of their jobs rises because of technical change, employment opportunities for vocational graduates become increasingly scarce (see, for example, Kézdi 2002). Hence, they would have increasing difficulties finding increasingly scarce (skill-adequate) employment. Since globalization and technological change have affected both the German and Hungarian economy, we would expect changes in a similar direction across countries (Katz and Autor 1999): For vocational certificate holders, unemployment as well as unskilled employment rates should rise, and a decline of employment opportunities for vocational graduates should prolong their initial job search and increase their unemployment probability. Furthermore, if search is costly, they will increasingly enter unskilled employment. Adverse demand shift explanations are therefore consistent with the increasing dependence of time spent on the labour market and unemployment, as observed for Hungary. However, if these demand shifts were the sole force altering the dynamics of labour market entry, it is indeed surprising why there was no change whatsoever in Western Germany.

Recent studies clearly indicate substantial changes in the wage and employment structure (Dustmann et al. 2007; Spitz-Oener 2006), but apparently the dynamics of labour market integration of vocational graduates has been unaffected. For Eastern Germany, the structural transformation may have been even harsher compared to Hungary, still the observed changes in labour market entry dynamics are much weaker here.

On the supply side and specific to Hungary, the extensive growth in tertiary educated may have lead to crowding out of lesser educated (Collins 1979; Dolado et al. 2000; Knight 1979). Rapid educational expansion may have generated a surplus of tertiary and/or upper secondary educated. Surplus upper secondary graduates may then have increasingly entered jobs normally taken by vocational school graduates, who would then in turn displace individuals with only lower secondary education or less. In the end, this least competitive group would be pushed into unemployment, while vocational graduates would experience declining occupational status in their initial jobs. Crowding out by higher educated therefore increases the difficulties of vocational graduates to find an initial job that matches their vocation. Their unemployed search duration increases, and if job search is costly, they are increasingly likely to accept less than skill-adequate, i.e. unskilled employment, if only temporarily while continuing to search for skill adequate. Crowding out explanations are therefore consistent with the increasing dependence of time spent on the labour market and unemployment observed in Hungary.

Finally, also related to the supply side, Kertesi and Varga (2005) have observed that the Hungarian vocational schooling sector suffers from increasing adverse selection of students: compositional changes due to the changing enrolment patterns have altered the cohort quality of vocational school graduates and therefore the labour market value of their degree. Enrolment in vocational school not only declined substantially, while it rose in academic and university programs, but it is likely from indirect empirical data that particularly students with superior academic abilities increasingly decide against vocational school. However, we rule out this explanation for two reasons. First, our analyses control for cohort-specific fixed effects, which are precisely meant to capture such unobserved composition changes. Second, auxiliary analyses indicate that there has been no change in the composition of vocational school students in terms of their parental background. We took 15-17 year-olds enrolled in secondary education each year and ran logistic regression of their track location (vocational school = 1, upper secondary = 0) on their parents' education (lower secondary or less,

vocational school [Ref.], upper secondary, tertiary) for each year.¹² The results are reported in Figure 2. Essentially, there is no trend in any of the parental education variables.

Altogether, our design cannot rule out that the observed patterns for Hungary are partly due to technological change. However, if technological change was the driving force and institutions did not matter, we should see trends in Western and Eastern Germany that are similar to Hungary. The complete absence of trends in Western Germany makes us confident that technical change cannot be the sole part of the explanation and that institutions matter. Furthermore, to the extent that crowding out or cohort quality changes are credible alternative mechanisms explaining the observed trends in Hungary, they are also in part consequences of political reform privileging more general and higher forms of education and eroding specific skill training within vocational education.

SUMMARY, DISCUSSION AND CONCLUSION

While economic and sociological research has been highly interested in the role of institutions and institutional change in the course of the transition from socialism to capitalism, existing research has been largely silent on the consequences of the transition for the education system. Here, we have focused on the impact of the transition on the provision of vocational education, which constitutes or has constituted the central pillar of the German and Hungarian systems of skill formation. In response to the system change, we can document a striking dynamism of the skill regime in Hungary, which changed at a rate hardly ever observed in advanced economies. A central consequence of the breakdown of socialism and the transition crisis was a substantial decline in enterprise-based training in Eastern Germany and Hungary. The development in both countries diverged thereafter, because states responded in very different manners to the crisis of vocational education. In Eastern Germany, the basic structure of the system could be maintained with the transfer of institutions and, more importantly, extensive subsidies from Western Germany. At the same time, the unwillingness of employers to train still persists, which has made training in school-based workshops a persistent feature of the dual system in Eastern Germany. In contrast, the Hungarian state responded to employers' unwillingness to train by formally reducing the amount of training

¹² We additionally control for age and gender of child, and age of parent. We normally took the education of the father, if this information was not available, we used mother's education.

required to obtain a vocational certificate, while increasing the relative share of general education. Furthermore, in-school training became much more prevalent compared to Eastern Germany. This erosion of vocational education was accompanied by a more general shift in education policy as well as individual education choices towards more general and especially university education, which seemed to hold greater promise for successful labour market careers in the new economy. In contrast, the share of university graduates among youth stagnated in Eastern Germany. Altogether, while there were substantial commonalities in system of vocational education in Eastern Germany and Hungary before the transition, we see a marked divergence thereafter largely due to different state policies. While vocational school has been by far the modal degree group for cohorts entering the labour market before the transition, the skill profile has moved towards more general and higher forms of education (see Bukodi and Róbert 2008). In Eastern Germany, the Western German model has been implemented, albeit with some strains.

Furthermore, by studying the consequences of pervasive institutional change in the system of vocational education in Hungary, we have tested existing institutional theories about the role of institutional linkages in facilitating labour market entry. Past research has sought to identify the effect of vocational education either by comparing vocational graduates to “similar” graduates from general education or by comparison across countries. For post-socialist countries, we are able to observe substantial institutional variation over a short period of time within one country, i.e. we do not have to compare across countries to have institutional variation or across education groups with different degrees. The multivariate analyses indicated that for Hungary labour market entry of vocational graduates has become more turbulent, which is consistent with the institutional changes just described. On the one hand, the decline of enterprise-based training disrupted existing linkages between education system and the labour market. On the other hand, the overall policy shift towards general/higher education potentially caused a decline in the quality of vocational school graduates or may have lead to their being crowded out by higher educated. In Eastern Germany, we have witnessed some signs of changing labour market entry dynamics for vocational graduates (see also Konietzka 2001), although on a much smaller scale compared to Hungary. While our design does not allow us to fully rule out competing explanations, our results are consistent with and make us more confident about the validity of existing institutional theories about the role of institutional linkages between the education system and the labour market in facilitating youth labour market integration.

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APPENDIX

Table 1. Changes in the distribution of educational degrees, 15-34 year-olds.

	Hungary				Germany - East			Germany - West		
	1993	2006	Δ		1993	2005	Δ	1993	2005	Δ
LS	0.27	0.22	-0.05	LS	0.02	0.07	0.05	0.14	0.16	0.02
VS	0.38	0.32	-0.06	Sec	0.05	0.10	0.05	0.07	0.11	0.04
Tech	0.18	0.22	0.05	LSVoc	0.05	0.09	0.04	0.30	0.19	-0.11
US	0.09	0.09	0.00	MSVoc	0.65	0.50	-0.14	0.27	0.27	-0.01
Tert	0.08	0.15	0.07	USVoc	0.02	0.07	0.05	0.07	0.10	0.03
				HiVoc	0.13	0.09	-0.04	0.06	0.06	0.00
				Uni	0.08	0.08	0.00	0.09	0.12	0.03

Source: HULFS, GMZ; authors' calculations.

Table 2. Structure of pseudo-panel dataset for Hungary.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1993	6	5	4	3	2	1													
1994		6	5	4	3	2	1												
1995			6	5	4	3	2	1											
1996				6	5	4	3	2	1										
1997					6	5	4	3	2	1									
1998						6	5	4	3	2	1								
1999							6	5	4	3	2	1							
2000								6	5	4	3	2	1						
2001									6	5	4	3	2	1					
2002										6	5	4	3	2	1				
2003											6	5	4	3	2	1			
2004												6	5	4	3	2	1		
2005													6	5	4	3	2	1	
2006														6	5	4	3	2	1

Note: Each column corresponds to one cohort, each row corresponds to one year of observation. The values in the individual cells are the years passed since obtaining the highest educational degree.

Table 3. Changes in labour market outcomes and structural changes

	Hungary				Germany - East				Germany - West				
	1993	2001	2006	Δ	1993	2000	2005	Δ	1993	2000	2005	Δ	
<i>Aggregate unemployment rates</i>													
Adults	0.10	0.05	0.07	-0.03	0.18	0.17	0.19	0.01	0.05	0.06	0.09	0.04	
Youth	0.17	0.08	0.12	-0.05	0.20	0.17	0.25	0.05	0.07	0.07	0.15	0.08	
<i>Structural indicators</i>													
PTM	0.21	0.26	0.29	0.08	0.31	0.32	0.34	0.03	0.35	0.38	0.39	0.04	
PCs	27.0	93.3	146.0	119.0	125.7	336.2	545.3	419.7	125.7	336.2	545.3	419.7	
Glob	67.1	84.0	88.8	21.7	59.4	79.3	74.2	14.9	59.4	79.3	74.2	14.9	
<i>Youth unemployment rates - by education group</i>													
LS	0.28	0.17	0.25	-0.03	LS	0.47	0.42	0.58	0.11	0.18	0.19	0.38	0.20
VS	0.17	0.08	0.12	-0.06	Sec	0.26	0.29	0.40	0.14	0.09	0.11	0.22	0.13
Tech	0.12	0.06	0.08	-0.03	LSVoc	0.33	0.34	0.44	0.11	0.06	0.06	0.15	0.09
US	0.13	0.07	0.11	-0.02	MSVoc	0.21	0.17	0.22	0.01	0.04	0.04	0.10	0.05
Tert	0.03	0.03	0.05	0.02	USVoc	0.18	0.07	0.13	-0.05	0.05	0.03	0.07	0.03
					HiVoc	0.10	0.07	0.08	-0.02	0.04	0.02	0.05	0.01
					Uni	0.10	0.04	0.09	-0.01	0.05	0.03	0.05	0.00
<i>Share of employed youth in unskilled employment - by education group</i>													
LS	0.48	0.56	0.61	0.12	LS	0.54	0.59	0.62	0.09	0.52	0.53	0.53	0.00
VS	0.27	0.31	0.35	0.08	Sec	0.28	0.28	0.28	0.00	0.20	0.21	0.24	0.05
Tech	0.14	0.15	0.18	0.04	LSVoc	0.34	0.35	0.38	0.04	0.24	0.25	0.25	0.01
US	0.13	0.15	0.20	0.07	MSVoc	0.21	0.20	0.21	0.00	0.10	0.11	0.12	0.02
Tert	0.01	0.01	0.03	0.02	USVoc	0.10	0.07	0.09	-0.01	0.05	0.05	0.05	0.00
					HiVoc	0.03	0.04	0.05	0.01	0.06	0.04	0.05	-0.01
					Uni	0.02	0.01	0.02	0.00	0.02	0.01	0.02	0.00

Notes: For definitions, see text. Youth are 15-34 year-olds, adults are 35-54 year-olds; PTM = share of professional/technical/managerial worker among employed 15-34 year olds, first value from 1995 (Hungary) or 1996 (Germany); PCs = number of personal computers per capita (Worldbank, 2007), last value from 2004; Glob = KOF Index of Economic Globalization (Dreher 2006), last value from 2005. Except stated otherwise, all values calculated from microdata.

Table 4. "Time on the labour market" and group-specific labour market outcomes, OLS regression estimates with robust standard error estimation.

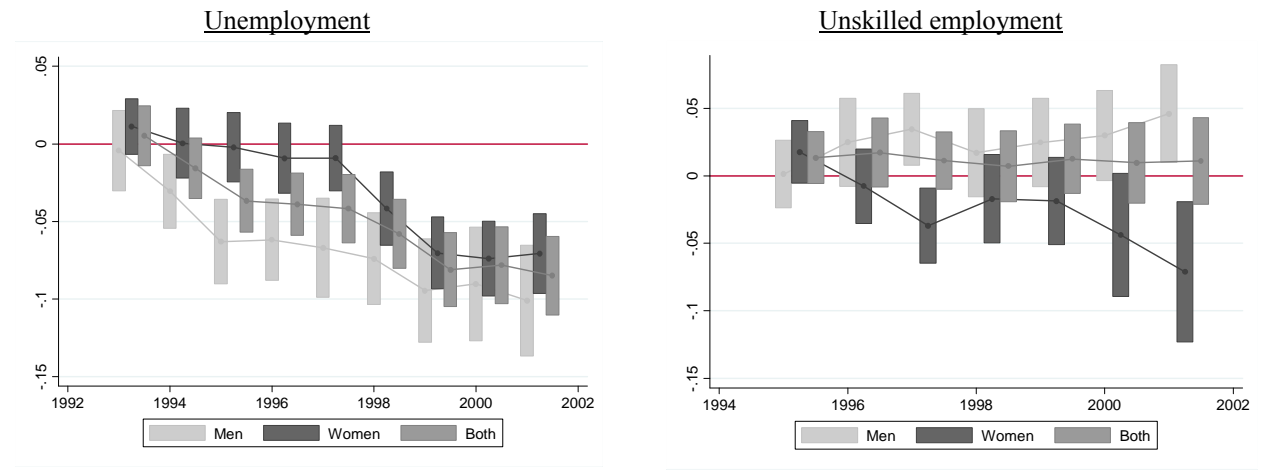
		Unemployment rate			Unskilled employment rate		
		M1	M2	M3	M1	M2	M3
Hungary <i>Vocational school</i>	Time on LM	-0.018 ***	0.002	-	0.004	0.014	-
	x Lin. Trend	-0.003 ***	-0.011 ***	-	-0.002	-0.001	-
	N	84	84	84	72	72	72
	df	23	34	41	21	30	35
	R2	0.83	0.91	0.93	0.77	0.87	0.88
Germany East <i>Vocational certificate, lower secondary schooling (Hauptschule)</i>	Time on LM	-0.002	0.007	-	-0.026	0.245 **	-
	x Lin. Trend	-0.003	-0.001	-	-0.004	-0.054	-
	N	72	72	72	60	60	60
	df	21	30	35	19	26	29
	R2	0.57	0.72	0.82	0.17	0.63	0.78
Germany East <i>Vocational certificate, med. secondary schooling (Mittlere Reife)</i>	Time on LM	-0.009 **	-0.010	-	0.011 ***	-0.038 **	-
	x Lin. Trend	-0.001	-0.006 *	-	0.006 ***	0.006	-
	N	72	72	72	60	60	60
	df	21	30	35	19	26	29
	R2	0.73	0.85	0.9	0.68	0.76	0.83
Germany West <i>Vocational certificate, lower secondary schooling (Hauptschule)</i>	Time on LM	-0.004 **	-0.011	-	-0.012 ***	0.000	-
	x Lin. Trend	0.002 ***	0.003	-	-0.001	0.002	-
	N	72	72	72	60	60	60
	df	21	30	35	19	26	29
	R2	0.91	0.92	0.95	0.82	0.89	0.9
Germany West <i>Vocational certificate, med. secondary schooling (Mittlere Reife)</i>	Time on LM	-0.001	0.000	-	-0.004	-0.009	-
	x Lin. Trend	0.000	0.000	-	0.002	0.004	-
	N	72	72	72	60	60	60
	df	21	30	35	19	26	29
	R2	0.94	0.96	0.97	0.59	0.70	0.77

Notes: * p<0.05, ** p<0.01, *** p<0.001 (two-tailed tests). M1 includes "time on the labour market" and its interaction with a linear trend variable, as well as period fixed effects. M2: M1 plus cohort fixed effects. M3: cohort-specific "Time on the labour market" parameters, period and cohort fixed effects. For the respective parameter estimates, see Figure 1. For further details, see text.

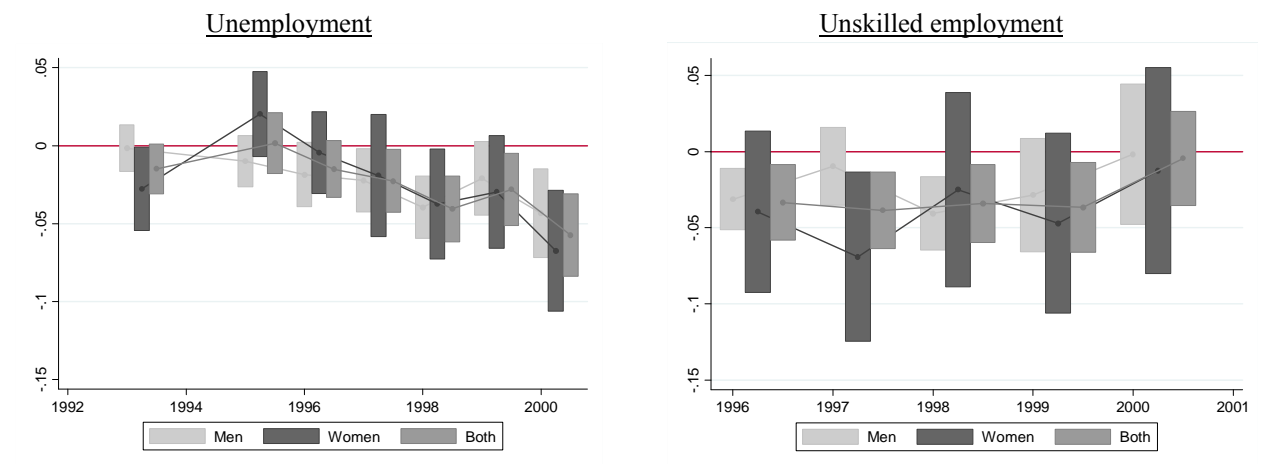
Sources: Hungarian Labour Force Survey, German Mikrozensus; authors' calculations.

Figure 1. "Time on the labour market" and group-specific labour market outcomes, OLS regression estimates with 95 percent confidence intervals.

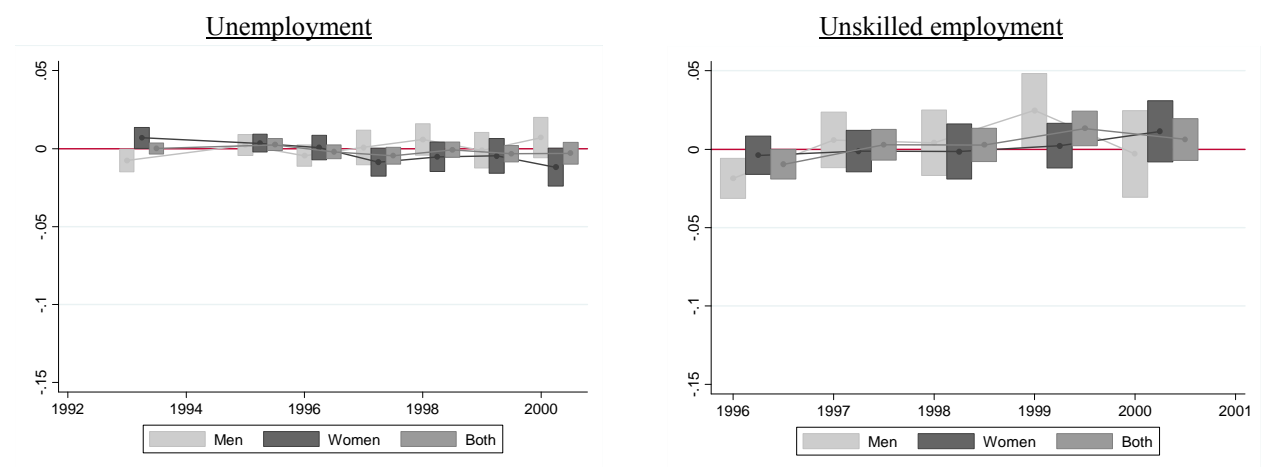
Hungary, Vocational school graduates



Germany – East, Graduates with a vocational certificate and medium secondary schooling

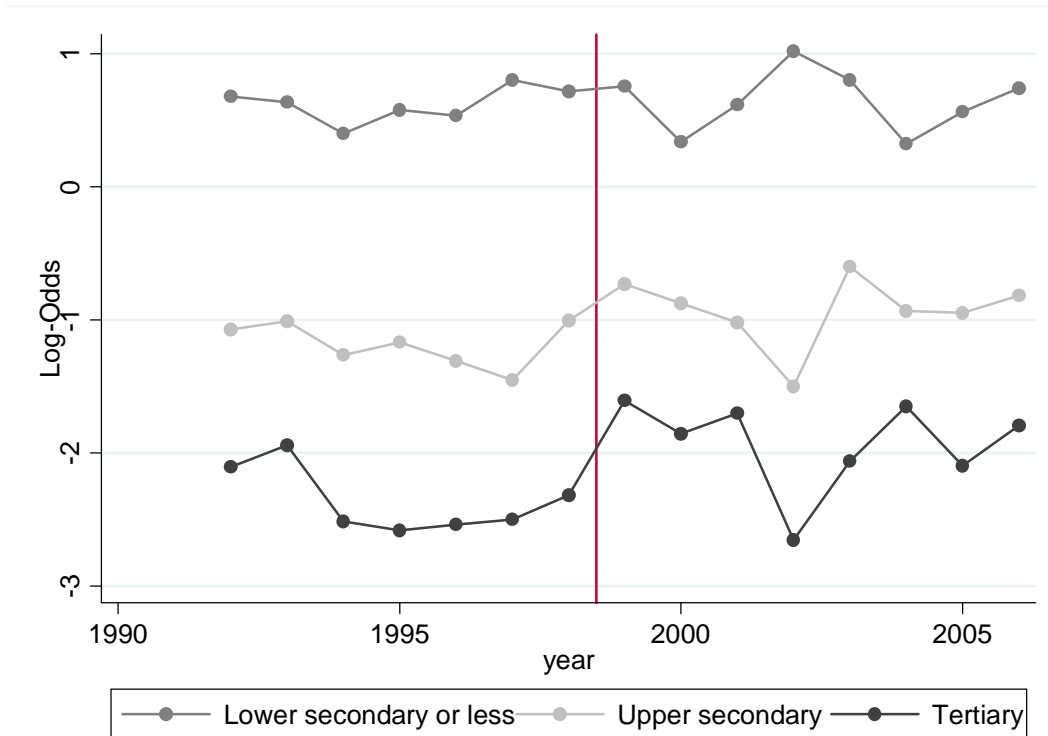


Germany – West, Graduates with a vocational certificate and medium secondary schooling



Notes: Unit effects and 95% confidence intervals. Each bar measures the effect of an additional year (potentially spent) on the labour market on the respective outcome for a specific labour market entrant cohort defined by year of labour market entry.

Figure 2. Effect of parental education on students track location (Vocational school=1, Other secondary=0) at age 15-17. Logistic regression estimates (log-odds), robust standard errors, reference group for parental education: vocational school.



Source: HULFS, authors' calculations.