Saving some inequality for young adulthood? Social origin differences in ‘re’-enrollment in postsecondary education in the United States, Sweden, and Germany

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Abstract

In this article, three country contexts are compared with regard to inequality by social origin in late enrollment in post-secondary education. Countries differ in the frequency at which young adults leave the labor market and (re)-enroll. This article discusses how inequality in late entry into education by social origin can be linked to characteristics of the education system and the labor market. Two cases with education systems that welcome adult learners and offer many second chances – Sweden and the US – are contrasted with the German system before its recent reforms. Systems with a welcoming environment for adult learners in higher education are shown to have higher educational inequalities in later transitions, while inequality in earlier transitions is lower.

Keywords: Lifelong learning; inequality in higher education; social origins; non-traditional students; education system; labor market;

Introduction

The increasing role played by formal adult learning also increases the relevance of inequality in later entry into education for the intergenerational transmission of social positions. For long, research into education beyond the traditional age of school attendance marked a gap in the public and sociological debate on intergenerational inequality (Elman 1998). This recently changed and adult education attracted more attention from sociologists (Blossfeld et al. 2014). This research revealed social origin differences in participation in formal adult education in several societies (e.g. Elman and O'Rand 2004, Hällsten 2010, Kilpi-Jakonen et al. 2014), but also illustrated how adult education can improve labor market conditions and thus potentially reduce social inequality (Kilpi-Jakonen et al. 2012).

At the same time, educational- and labor market policies relating to formal adult education differ greatly across societies. Specifically, higher education systems address the needs of adult learners in very different ways. Recently, policy makers paid much attention to an increasing openness towards adult learners. To exemplify, the recent Europe-wide reforms of the higher education system, initiated by the so-called Bologna Process, explicitly aimed at more openness of education systems to non-traditional students, along with hopes to reduce social inequalities in the education system by offering second chance education (Eurydice 2012). For sociologists concerned with social inequality, one of the first questions to be asked is whether the expanded 'late' or 'second chance' transition into education are similarly unequal as earlier educational transitions, or even promote equality by providing new opportunities for those who were deterred from attaining more education earlier in their life course. Hence, in addition to the studies that are now available on single countries, there is a need for comparative analyses of social inequality in late entry into education with specific regard to systematic discussion of the relevant institutional conditions.

In this article, I investigate how parental social class affects participation in postsecondary education in early adulthood. Empirical analyses focus on the decision to leave the labor market and enter the education system. The comparison of the US, Sweden, and former West Germany follows a tradition of life course research that focuses on structural conditions set by the state that act as a framework for individual life courses (Mayer and Müller 1986). Rather than having recourse to broad categories of welfare states and complex system types, I suggest that individual policy areas, in this case the education system, are the institutions that condition individuals' life

courses. In order to separate the education system from other institutional forces, I draw on two cases which are both comparatively welcoming for adult learners, but are otherwise quite different in many respects, namely, Sweden and the US. I contrast these two cases with Germany, which differs from them in central features of the education system. This comparison facilitates the identification of the educational transitions – that is, the points in time during young adulthood – where inequality manifests itself in the different system configurations.

My findings show that, regardless of the otherwise large differences between the two cases, inequality by social origin manifests itself later in Sweden and the US, which have a long-established welcoming environment for adult learning in the formal education sector, compared to the rigid and inflexible German system before the Bologna reforms. However, when measures for performance in the earlier school career are kept constant, these inequalities are reduced to a great extent. This suggests that the manifestation of educational inequality shifts toward adulthood when education is (partly) shifted into later phases of the life course. Upon a closer look, much of this shift can be explained by individual-level attributes, which are formed at earlier stages of the educational career.

Social origin differences in educational biographies – Institutionalized life courses in Sweden, Germany, and the US

Two micro-level perspectives on inequality in late education

Previous studies asked one of the following two empirical questions: (a) Who re-enrolls? or (b) Who delays? The first perspective is an ‘*ad hoc* decision’ to revise earlier educational decisions and return to school, which is assumed to be behind the transition to re-enrollment. This implies ‘myopia’ on the part of respondents, which provoked a critical response in the literature (Cameron and Heckman 1998, 263) and prompted the question: Are we modeling re-enrollments or are we confusing them with intended delays?

Empirically, inequalities by social origins exist in delaying college entry and in the extent of taking non-traditional pathways through college in the US (Roksa et al. 2007, Carneiro and Heckman 2003, Bozick and DeLuca 2005, Rowan-Kenyon 2007, Maralani 2011). Late enrollments differ by social origins, too (e.g. Elman and O’Rand 2004, Jacob and Weiss 2011, Milesi 2010) – with the exception of women re-enrolling after more than at least two years of full-time labor market experience (Weiss and

Scholten 2014). In Germany, the most frequent delayers are young adults who first complete vocational education and later enroll in higher education. Among those who completed VET, the enrollment rates of young people from low socioeconomic backgrounds is below average (Becker and Hecken 2009). Results for Sweden point in the same direction: the most disadvantaged groups in initial education lose further ground through lower re-enrollment rates after the age of 30, while the moderately disadvantaged catch up somewhat (Hällsten 2010).

When arguing theoretically about re-entry behavior, these assumptions on individual behavior have consequences: if delays are more common among young adults of lower class origin, this group will re-enroll more often. Then, we would find less re-enrollments for the privileged classes in systems with many delays. Other hypotheses start from a perspective of re-enrollments as just another educational transition and expect lower classes to remain absent from education once they left.

Thus, in the later empirical analyses, I take the first perspective of transitions instead of studying the frequency of delays vs. ‘on-time’ educational careers. This means, I implicitly interpret late enrollment as *ad hoc* revisions of educational decisions. However, for the comparative argument, I also reflect how the frequency of delay in certain systems affects inequality in re-entry into education. Essentially, only empirical evidence could decide what decision pattern applies more frequently, which hardly exists on this question.

Education systems and inequalities in re-enrollment

Two characteristics of the education system are most directly related to adult participation in formal adult education: *openness* and *flexibility*. The openness¹ (as opposed to selectivity) of an education system defines the extent to which access to higher education is irreversibly pre-defined. ‘Open’ systems are characterized by few and permeable barriers with regard to nominal eligibility for higher education.

Flexibility refers to the institutional set of rules defining the extent to which students may choose their curricula, class schedules, and educational trajectories. Policies to increase flexibility include rules for credit transfer between colleges;

¹¹ Note that this definition of openness does not refer to a general openness toward adult learners, which is the case, for example, in Kilpi-Jakonen et al. (2014), whose definition comprises both flexibility and openness, but only to the absence of institutional rules for permanent exclusion from post-secondary or higher education.

allowing students to study on a part-time basis, distance learning, or ‘stopouts’ (DesJardins and McCall 2010) for a longer period of time.

Educational inequality in re-entry rates can depend on the composition of the group that qualifies for higher education. Education systems differ in the institutionally introduced *exclusion* or *openness* of young adults from entry into post-secondary education, and especially into higher education. While *selection* is frequently discussed as a methodological problem, the effects of this selectivity are consequences of the institutional set-up of the education system (e.g. Holm and Jæger 2009). In less open systems, the group that qualifies for higher education is more homogeneous in their aspirations and aptitude. Selection into higher education takes place at earlier stages of the educational career and hence, fewer students with weak motivation to enter higher education are among those eligible. Moreover, in open systems those young adults whose interests change and who develop aspirations for higher education later are not hindered in the realization of their plans. Therefore, I expect larger inequality in re-enrollment transitions in less selective, open systems such as Sweden and the United States. Selective systems are represented by Germany.

High *costs of higher education* may influence the timing of entry by forcing poorer students to delay their enrollment or ‘stopout’ (DesJardins and McCall 2010). One possibility for students who cannot afford to enroll in higher education is to save up first. Once tuition fees and living expenses can be covered, they (re-)enroll. If delay is a strategy more often used by able and motivated lower-class students, they would be overrepresented among late entrants and inequality would be reversed due to higher re-enrollment rates of young adults from lower-class families. The precondition for the effects of costs to unfold is that the labor market must offer jobs for workers with general secondary education. Otherwise, delayers would not be able to find jobs or would have to acquire vocational qualifications first. This situation applies to Germany and makes delaying almost impossible there, regardless of costs. The US stands out with high costs for higher education, while studying is comparatively inexpensive in Sweden and Germany. Hence, if the delay mechanism was at work, the strongest inequality would be expected in the US, with young people from lower-class origins catching up through later re-entry. Furthermore, high costs may continue to deter those from a lower-class origins from enrolling in higher education and may therefore also increase inequality (cf. Valentine and Darkenwald 2008).

Labor markets

In a labor market that offers good opportunities to those without higher education, more young adults may decide against studying after completing general education, which leads to a larger group of potential re-entrants. This is the case in labor markets with a low degree of *occupational closure* (Bol and Van de Werfhorst 2011).

The other important characteristic of the labor market for secondary school graduates is the job security ensured by strict *employment protection legislation* (EPL). In many cases, re-entering higher education means giving up a job. Giving up a secure job with long-term prospects implies higher opportunity costs than the loss related to giving up a less secure short-term job. I hypothesize that under strict EPL young adults from lower-class origins are ‘locked into’ jobs and hesitate to give up a safe position in the labor market for two reasons. First, because the risk of failing in higher education or failing to get a job after graduation is harder to buffer with private resources of the parents, a secure job is a more valuable asset for them than for their upper-class peers. Second, the relative-demotion argument hypothesizes that the first priority in status attainment is to achieve at least parental status (Boudon 1974). When entering the labor market after secondary education, young people from lower-class origins are more likely to have achieved parental status than those from upper- or middle-class families. Thus, employment protection legislation should increase the ‘locking in’ of young adults from lower-class origins, thereby reducing their willingness to re-enroll.

The institutional contexts

Germany

The formal requirement for entering tertiary education in Germany is the general higher education entrance qualification (*Abitur*), which entitles the holder to study any subject at a higher education institution, the vocationally oriented *Fachabitur*, which entitles the holder to study particular subjects at tertiary level, and the *Fachhochschulreife*, a qualification that entitles the holder to study at a university of applied sciences. These qualifications are obtained on successful completion of upper secondary education, which is achieved only by a minority. Hence, selectivity of higher education is high.

With regard to flexibility, credit transfer between higher education institutions or from previous programs is sometimes possible, but it is not the rule. The German higher education system is commonly classified as a ‘binary stratified’ system (Goedegebuure et al. 1996) as it is (for the most part) a two-tier system with universities

on the upper tier and universities of applied sciences (*Fachhochschulen*) on the lower tier. In both institutions, at least four to five years have to be spent studying before obtaining a degree. Most importantly, prior to the recent reforms, the higher education system in Germany was not very open to non-traditional students. Studying on a part-time basis and shorter programs were uncommon, and flexibility in curricula and class-schedules was low. Alternative postsecondary programs to the higher education sector are school-based and apprenticeship-based vocational education and training (VET), which is popular even among young people who qualify for admission to the tertiary sector (Heine and Quast 2009).

The recent Bologna reforms fundamentally changed the organization of HE programs in Germany. Most importantly for the present research question, one major was to foster the role of higher education in lifelong learning. In a European Union report on the implementation of the reforms, German representatives explicitly state the aim of moving toward more flexibility (Eurydice 2012, 136, Bundesministerium für Bildung und Forschung 2012, 31).

United States

In the US, access to higher education is achieved by graduating from high school or by passing the General Educational Development (GED) test. Qualifying for higher education beyond traditional college age is not uncommon and is often achieved through the GED, which is usually linked to being less well prepared for college (Maralani 2011). As Maralani further shows, late completion and GED instead of high school diploma completion is more frequent among young adults from lower social origins. As the majority of students take this hurdle, the US is a case with low selectivity of higher education entry.

The higher education system is often classified as ‘diversified’ (Goedegebuure et al. 1996), with one major distinction being that between four-year colleges and community colleges (two-year colleges). The former offer classes in liberal arts and scientific education, and Bachelor, Master, and doctoral degrees (Lucas 2006). Within this system, studies are structured into undergraduate and graduate phases. The community- or two-year colleges offer transfer classes and ‘Associates in Arts’ degrees (A.A.) for continuation in higher education, and also terminal vocational education. By offering credit transfer and class-time flexibility in their programs – and therefore the

possibility of stopping out temporarily – community colleges often cater for part-time students and older students returning to education (Roksa et al. 2007).

Sweden

Defining the group who qualifies for higher education in Sweden is difficult (cf. Jonsson and Erikson 2007). As a general requirement, students need to complete at least two years in upper secondary school, including at least two years of studies in Swedish and English. While the grade point average achieved in upper secondary education is taken into account for admission to higher education, there are also other criteria such as scores in national university tests, age, and work experience (Halldén 2008).

Higher education in Sweden is organized in three tiers (Jonsson and Erikson 2007). The lower tertiary track (*Högskola*) is vocationally oriented and usually lasts less than three years. The higher tertiary track (*Universitet*) provides academic education in a broad range of fields of study, and offers B.A. and M.A. degrees. Finally, there are occupationally oriented professional university programs ‘with longer study times of 4-7 years, such as law, medicine, business administration, and civil engineering’ (Jonsson and Erikson 2007, 123). Most programs are sequentially stratified into B.A. and M.A. The main line in parallel stratification divides the institutions into two tiers: the *Universitet* (upper tier) and the *Högskola* (lower tier). Almost all secondary school students in Sweden transfer to upper secondary school. However, especially prior to the 1990s, the majority of programs at upper secondary level were vocationally oriented. A large majority of vocational programs are school based; apprenticeship training plays a minor role.

Following several reforms during the second half of the 20th century, the Swedish higher education system is now a comparatively welcoming environment for adult learners. Anyone with at least four years’ work experience (previously: five years) or who has turned 25 is eligible (the so-called 25/4-rule). However, high hurdles may apply in practice, and admissions via this track are limited by a quota. In addition to measures in favor of adult learners, the geographical diversification of the university colleges, in particular, and the availability of distance learning reduces costs and removes difficulties for less mobile adult students. In 1993, the proportion of distance students among all students was 8.4 percent. This percentage increased rapidly thereafter (European Commission 2013). A grant system offers support to the majority of higher education students (European Commission 2011). The strong focus on adult

learning is also reflected in the fact that secondary education is widely available to adults. Municipalities provide adult education according to the curricular standards of municipal adult education (*Kommunal Vuxenutbildning* or *Komvux*).

Educational inequality in re-enrollment in Germany, Sweden and the US

Among the three systems, the German case stands out because of its combination of low returns on incomplete education, attractive options to smoothly enter the labor market via vocational education and training, and secure labor market positions thanks to a comparatively strict EPL (cf. Table 1). Hypotheses that are derived from the setup of the labor markets in the three comparison cases contradict the hypotheses derived from the education system of the three societies. With regard to the labor market institutions one would expect the German and the Swedish cases to show similar inequality in adult enrollment. With regard to the education system, the US and Sweden are more similar, both in terms of the level of selectivity of the higher education system and the level of flexibility for individualistic educational career patterns. On the other hand, the German and the Swedish education systems should have similarly low levels of inequality if costs are decisive for re-enrollment.

Table 1: Summary of institutional characteristics.

	Germany	Sweden	United States
Education system			
Flexibility (vs. inflexibility) for non-traditional students: <i>how common and how easy are stop-outs and re-enrollments?</i>	low	high	high
Selectivity (vs. openness): <i>what proportion of a cohort qualifies for higher education?</i>	high	very low	low
direct costs of higher education	low	very low	high
Labor market			
chances of labor market entry without a vocational qualification	low	medium	good
strictness of EPL	high	high	low

In the following, I compare the three societies empirically. The analysis is twofold: To begin with, I compare inequality in transition rates across the three country cases. I then present multivariate analyses for each country separately in order to correct for possible compositional differences between social origins. A second series of models includes the best available indicators for educational stratification in the earlier school career, in particular with regard to scholastic performance. Due to the different measurement and availability of covariates for the countries, full ‘construct comparability’ cannot be assured. However, in most cases, these inconsistencies are not inconsistencies in measurement but rather substantial differences between countries. For example, migration background is relevant in Sweden, whereas in the US race is more important.

Figure 1 illustrates how differences in flexibility affect the patterns of life courses. Two ‘key events’ capture the variability in the timing of education and work: the ‘first transition from education to the labor market,’ and the completion of the transition from school to work, i.e. the ‘first job after the last time enrolled in education’. The second event is always as late as the first; it is later if there is an intervening period involving any activity other than education. Survivor curves for the occurrence of these events are plotted, starting at the time of leaving general upper-secondary education (cf. Coleman 1984). They show the probability of remaining in the group that has not (yet) experienced an event. In the more flexible countries more very early exits occur, but there are also more very late transitions and there is no typical age for leaving the education system.

Figure 1: Survivor curves: first and last transition from school to work.

Note: for each country, the left curve depicts the first and the right curve the final transition from school to work.
Data sources: GLHS 64/71, NLSY79 and LNU; own calculations.

Methods

The analyses focus on three consecutive transitions. Re-entry can only occur if qualification for higher education is achieved and if the labor market is entered without completion of postsecondary education. Only re-entries into postsecondary education² are included.

Qualifying for higher education is defined according to the national regulation in each country, with the exception of Sweden. In Sweden, I show the overall – theoretical – eligibility in the descriptive analysis in figure 2 in order to show who is indeed eligible and at what time. This is an important feature of the Swedish system, even though theoretical eligibility according to the 25/4-rule is not frequently used. Therefore, I restrict the sample for the later analyses to the group being identified as

² Re-entries into secondary education, which are e.g. frequent in the US, usually take place before qualifying for higher education and are thus not regarded here.

eligible by Erikson and Jonsson (2007)³. Transition into the first employment is defined as the first spell of employment with at least 4 consecutive months of employment with at least 25 working hours per week. Both criteria, the number of months and the number of weekly working hours, were tested for sensitivity using different boundaries, which did not change the results. Further, only spells after completion of a higher education entrance qualification and without education as a parallel activity are considered⁴. The last transition, re-enrollment into postsecondary education, is defined as being enrolled for at least six consecutive months in a postsecondary institution (at least ISCED-level 4).

In a first step, I comparatively illustrate bivariate differences by survivor curves, which visualize many aspects of the transition processes. Their limitation is that differences in the slope of the curve are hard to see, which would be interesting to see how inequality changes over the process time. Hazard rates, that are included in the online Appendix at www.XX.xx, represent the slopes of survivor curves.

In a second step, using multivariate models, I estimate social background differences in each of the transitions net of compositional differences. I report fully parametric survival models in accelerated failure time (AFT) form. In such a model covariates are modeled as accelerating (or decelerating) the transition process. Positive coefficients indicate a delay and negative coefficients an acceleration of event occurrence. These models have several advantages. For example, the parametric model does not ignore the absolute ‘risk’ of transitions as the popular proportional hazards model does (Royston and Lambert 2011, 2ff.), which can be informative for comparative research. On the downside, one must specify a functional form underlying the hazard rate, in this case a log-logistic distribution. In evaluating the choice of this distribution, I checked each model by comparing it with varying specifications of semi-

³ This restriction serves two purposes: firstly, it makes the models more comparable to previously published work on Sweden. Secondly, only very few young adults who are not eligible according to this definition actually enroll. Hence, if the full is analyzed, results for Sweden show even much stronger inequality. The comparison with the other countries, however, focuses on the group which could easily enter higher education. Even after this restriction, inequality found for Sweden is comparatively high. By comparison, in the US I also restrict the sample to those who took the comparatively low hurdle of having at least a High School diploma or GED. Thus, the restricted Swedish sample is a conservative approach to evaluating the hypotheses that inequality in re-entry is comparatively high in Sweden.

⁴ Compulsory military or civil service is not regarded as work, but effects age of later events especially in Germany, where almost all men were drafted in the respective period.

parametric models⁵. Though the semi-parametric Royston-Parmar models show better model fit, they would lead to the same conclusions. As they require the estimation of a large set of parameters and are much more complex for reporting I only document them in the Appendix to this article. There, I also discuss the selection of independent variables in more detail.

Data Sources

Capturing the time dimension of educational careers requires data on the trajectories of life courses, including the timing of all entries to and exits from education. Information about parents is needed in order to operationalize social origins. Three databases, which I have made as comparable as possible, can meet these requirements.

The German Life History Study (GLHS) is a retrospective study on life courses (Max Planck Institut für Bildungsforschung 2004). I analyze the birth cohorts 1964 and 1971 for former West Germany, which were both interviewed in 1998. The 1971 cohort was re-interviewed in 2004. I included only individuals who answered in both waves. The response rate of 66 percent (Mayer 2006, 31) stands out positively among German studies. As a drawback, no measures for scholastic performance except grades in school-leaving certificates are available.

For the US, I analyze a sub-sample of the NLSY79 (U.S. Department of Labor 2008), a yearly cohort panel study representative of the US population, which started in 1979. At that time, respondents were aged between 14 and 18 years. The response rate for the initial interview in the sub-samples I am using 90 percent of all persons designated for interviewing. Annual response rates continued to be high. In 1994, 89 percent of all respondents who completed an interview in 1979 were still in the panel. I dropped subsamples targeting specific populations (racial-, military- and poor-white sub-samples). Furthermore, I restricted samples to the younger cohorts born between 1961 and 1964 in order to capture the entire educational career and to ensure that IQ-testing was conducted before completing high school. For scholastic performance, a direct cognitive test (IQ test) is available in addition to other variables such as tracking in high school or expulsion from school. On the downside, information on school

⁵ These models allow estimating smooth baseline hazard rates with flexible shape by using cubic splines (Lambert and Royston 2009, Royston and Parmar 2002).

grades in the transcript surveys could not be used because the proportion of missing values is large.

For Sweden, I analyze the Swedish Level of Living Survey (LNU). The LNU applies a hybrid approach, combining panel- and retrospective life history designs. Respondents were re-interviewed in decennial waves. The dataset was collected by the Swedish Institute for Social Research (Bygren, Gähler, and Nermo 2004). In the 1990 and 2000 waves that I used, 79 and 77 percent of the targeted sample respectively took part in the study. The selected subsample analyzed for this article is limited to the birth cohorts born between 1955 and 1970. The main drawbacks are the somewhat small sample size of higher education students and the scarce information on scholastic performance.

In the Swedish sample, the number of missing values is very small. In order to tackle the missing value problem for the other two country contexts, the datasets were multiply imputed using chained equations (Rubin 1996). For Germany, this yielded an analysis sample of 2227 cases (761 qualified for higher education; 459 entered the labor market before completing postsecondary education), of which 237 had at least one imputed value. For the US, out of the sample of 3107 cases (2522 qualified for higher education; 2233 entered the labor market before higher education), 777 had at least one missing value.

I define social origins as the social class of parents according to a three-class version of the EGP (Erikson- Goldthorpe-Portocarero) class scheme: the service classes, the intermediate classes, and the working classes (see Tables 2 and 3). In the case of respondents whose parents both had an occupation, out of the two I assign the higher class position. This class scheme served many previous comparative studies of inequality (e.g. Erikson and Goldthorpe 1992, Bihagen, Nermo, and Erikson 2010) for defining social positions in both the parental and the filial generation. As a major advantage over other measures, the differentiation of occupations into classes is theoretically informed, based on the differentiation of employment relations (Goldthorpe 2000). While this approach may not capture all possible sources of parental influence on educational careers in young adulthood, the scheme comprehensibly defines social class positions.

The reason for collapsing the categories is to simplify the class scheme but still capture the ordinal element of the EGP-scheme. Also, the reduction to three classes ensures sufficiently large case numbers in each category. The underlying parental

occupations are measured as occupations of each parent when the respondent was 14 (NLSY79) and 15 (GLHS) respectively. In the LNU, parental occupation refers to the main occupation up to age 16, which is the reason for the absence of inactive parents.

Table 2: EGP Class Scheme.

EGP Class Scheme Categories		Simplified Version
I	Professionals and managers, higher grade	Service (1)
II	Professionals and managers, lower grade; technicians, higher grade	Service (1)
IIIa	Routine non-manual employees, higher grade	Intermediate (2)
IIIb	Routine non-manual employees, lower grade	Skilled Working (3)
IVabc	Small employers and self-employed workers	<i>Assigned to other classes according to occupation</i>
V	Technicians, lower-grade supervisors of manual Workers	Intermediate (2)
VI	Skilled manual workers	Skilled Working (3)
VIIa/b	Non-skilled manual workers	Unskilled Working (3)

Table 3: EGP Class Scheme: distribution of social origins.

EGP Class Scheme Categories	Sweden	Germany	United States
Service (1)	0.32%	24%	26%
Intermediate (2)	0.29%	58%	35%
Skilled Working (3)	0.39%	14%	32%
Inactive (4)	-	4% (missing value)	6%
N	1823	2227	3107

In accordance with the EGP scheme I use the term ‘service class’ rather than ‘upper class.’ However, in some cases I also use the terms interchangeably. I use the term ‘lower classes’ to refer to non-service classes.

Results

In Figure 2, the first column shows the process of qualifying for higher education. Survivor curves by social origins range from age 18 to 30. Without doubt, inequality is

strongest in Germany, as indicated by the large gaps between the lines. Descendants of service class parents qualify for higher education much more frequently. The age norm for this transition is around 18 to 19 years, while there are few entrants up to age 25. In the US, a much higher proportion of a cohort earns a high school diploma or GED, although a class-gap exists there, too. When examining the lines closely, it can be seen that this gap gets slightly smaller during adolescence, which is large attributable on GEDs. Although the US literature sometimes stresses that lower class youth more often qualify for higher education late and by way of a GED (Maralani 2011), in a comparative perspective inequality in this transition is rather small both with respect to the overall rate as well as with respect to timing.

For Sweden, I define eligibility for higher education according to all existing institutional rules. My rationale in doing so is to illustrate the full scope of possible exceptions at this point of transition, which include those who may only enroll via the aforementioned 25/4 rule. If I were to use the definition employed by Jonsson and Erikson (2007), which is closer to the ‘de facto’ qualification for higher education, it would lead to a higher degree of inequality. However, I will use their definition in the multivariate models below as it is a more realistic measure with regard to comparing the samples between the different country contexts. Figure 2 illustrates one consequence of this rule: the total rate of eligibility is the same, but young adults with service-class family background qualify faster.

Country differences in inequality of eligibility for higher education exist and they lead to differences between the populations at risk of later transition. Both Sweden and the US have lower selectivity and lower inequality levels at the point of qualification for higher education than Germany. The graphs also indicate that young people from working-class families do not catch up substantially, but neither does inequality increase much beyond the typical age of upper secondary school completion.

Figure 2: Survivor curves of school-to-work transition sequences.

Data sources: GLHS; Swedish LNU; NLSY79; own calculation

Among those who hold a higher education entrance qualification, many start working full time instead of continuing their education. Some start working immediately after secondary school, others do so after dropping out, or stopping out, of higher education. Figure 2 shows that in each of the three societies, lower-class students enter the labor market faster rather than enrolling in post-secondary education.

By comparison to the US, class inequality is more pronounced in Germany and Sweden⁶. In the US, the proportion of both service and intermediate-class students staying in education is smaller. Here, young people from a service class background are even more likely to enter the labor market before 25, which is probably due to the comparatively short study programs. As a consequence, the population of re-entrants has a more homogeneous composition of social origins in the US (relative to the overall distribution of social origins in the country) than in Sweden and Germany.

The third column shows (re)-enrollment into postsecondary education by social origin. Time starts at labor market entry (for at least four months and without parallel enrollment). The graphs reveal a clear country pattern: inequality in Sweden and the US is higher than in Germany, where there is a strong overall tendency to enter higher education⁷. Hence, social origin differences in participation in education persist into adulthood. This is noteworthy, as adults depend less on their parents than secondary school students. Late inequalities are more pronounced in Sweden and the US, where inequality in early educational transitions is lower than in Germany.

Inequalities in transitions – multivariate results

Germany

In order to account for compositional differences between classes e.g. in regional distribution, I keep a number of variables constant in the multivariate parametric models. For Germany, these are the federal states in which the higher education entrance qualification was obtained, the number of siblings, gender, and the birth cohort

⁶ For Sweden, the population at risk is here limited to individuals who are eligible directly on the basis of their secondary education. This definition follows Jonsson and Erikson (2007) and deviates from the survivor curve on ‘qualifying for higher education’ in the left column.

⁷ This reflects the difficulty of getting a job in Germany without a vocational qualification – be it non-tertiary VET or higher education.

of the respondents. The responding models are reported in the ‘a.’-columns in Table 4. Model ‘b.’ also includes the grade point average (GPA) of the secondary school leaving certificates⁸ and whether respondents achieved the *Abitur*, a higher education entrance qualification entitling them to study at a university, or the *Fachhochschulreife* (FHR), which entitles to study at a university of applied sciences. The coefficients of the AFT models can be interpreted as exponentiated time ratios. For example, the coefficient in the last column of table 4, model a. for intermediate classes is 0.52. This means that being intermediate class origin delays re-enrollment by $\exp(0.52)=1.68$ -times (but note that the coefficient is not significant in the German case). A graphical illustration of these results using predicted hazard rates can be found in the online Appendix.

Table 4: Parametric AFT regression: Germany.

	All cases: <i>Abitur</i> or FHR	If <i>Abitur</i> or FHR: labor market entry before higher education	If in the labor market before HE: re-entering postsecondary education		
	a.	a.	b.	a.	b.
<i>Parents' class (ref.: service classes)</i>					
- intermediate classes	0.40*** (11.83)	-0.07*** (-5.78)	-0.06*** (-5.50)	0.52 (1.81)	0.51 (1.77)
- working classes	0.66*** (10.98)	-0.04 (-1.5)	-0.02 (-0.90)	-0.43 (-0.76)	-0.43 (-0.79)
<i>Male</i>	-0.06* (-2.05)	0.05*** (4.64)	0.06*** (5.50)	-0.84* (-2.98)	-0.96** (-3.37)
<i>Abitur or FHR GPA</i>			-0.03** (-3.05)		0.32 (1.23)
<i>Abitur (ref.: FHR)</i>			0.12*** (6.26)		-1.11* (-2.24)
<i>Constant</i>	3.36*** (37.77)	3.20*** (93.00)	3.10*** (85.33)	4.68*** (6.51)	5.64*** (6.72)
$\ln \gamma$	-1.08	-2.43***	-2.48***	0.35***	0.34***
N	2227	761		459	

standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; FHR: *Fachhochschulreife*. Covariates not shown in the table: birth cohort, number of siblings (dummy variables), federal state in which the *Abitur* or *Fachhochschulreife* was obtained.

a. compositional covariates kept constant.

b. compositional covariates and scholastic performance kept constant.

Data source: GLHS 64/71; own calculations.

⁸ Besides estimating what Boudon (1974) has termed ‘primary effects,’ controlling for GPA is of interest for another reason, namely that selection into higher education is in most cases regulated by this score. For some programs, waiting time can compensate low scores. In this case, individuals with low performance could wait and (re)-enroll later. Thus, class effects would only become visible after controlling for performance as a suppressor variable.

The results confirm the patterns reported in Figure 2 throughout: inequality is high in both of the earlier transitions. For entering the workforce, coefficients are small, but at least for the intermediate classes significant. By comparison, inequality in later re-enrollment in Germany is low. The b.-model series which reports coefficients net of performance does not differ much. It seems that the fact that re-enrollment is almost universal among the relevant population removes class difference in re-enrollment.

Sweden

For Sweden, I keep the birth cohort and the size of the municipality, the number of siblings, gender and whether the respondent was born in Sweden constant in the a.-model series.

Table 5: Parametric AFT regression: Sweden.

	All cases: qualifying for higher ed. via secondary education	If qualified by sec. ed.: labor market entry before higher education	If in the labor market before completing HE: (re)-entering postsecondary education		
	a.	a.	b.	a.	b.
<i>Parents' class (ref.: service classes)</i>					
- intermediate classes	0.44*** (5.45)	-0.03* (-2.42)	-0.01 (-0.82)	0.30 (1.75)	0.14 (0.69)
- working classes	0.67*** (8.49)	-0.08*** (-7.11)	-0.05*** (-4.63)	0.55*** (3.45)	0.33* (1.96)
<i>Male</i>	0.09 (1.44)	0.02* (2.07)	0.02 (1.83)	0.88*** (6.58)	0.88*** (6.64)
<i>Born outside SE</i>	1.48*** (7.81)	0.07* (2.27)	0.05 (1.72)	0.48 (1.51)	0.36 (1.11)
<i>Full HE entrance qualification</i>			0.09*** (10.07)		-0.71*** (-4.51)
<i>Constant</i>	1.21*** (7.48)	3.02*** (138.84)	2.94*** (137.62)	5.23*** (15.14)	5.62*** (15.87)
$\ln \gamma$	-0.42	-2.64	-2.71	0.32	0.31
N	1822	765		1622	

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Covariates not shown in table: birth cohort, number of siblings (dummy variables), municipality size of place of birth.

a. compositional covariates kept constant.

b. compositional covariates and scholastic performance kept constant.

Data source: LNU 1990 and 2000; own calculations.

Qualification for higher education is not defined in terms of the 25/4-rule, instead I apply the definition of Jonsson and Erikson (2007). In Table 5 the coefficients of the AFT models show class inequality in all three transitions in Sweden. Young people from an upper-class origin have a higher rate of early qualification for higher education and a lower rate of labor market entry directly after school. Those who enter the labor market directly after school despite having a higher education entrance qualification re-enroll more often. However, the flexible parametric models in the online Appendix (www.XX.xx) show that class matters only for the first four years after labor market entry. In the case of later re-enrollments, which are comparatively frequent in Sweden, inequality is much lower.

Regression results confirm the conclusion derived from descriptive survivor curves: in Sweden, inequality occurs in all of the three transitions – even though none of the coefficients for the intermediate classes is statistically significant. Inequality in enrollment persists until adulthood. To exemplify, the models would predict that a young male adult born in Sweden between 1955 and 1957, who grew up in a large city without siblings had a predicted probability of not re-entering education after five years of 0.64 (service class origin), 0.68 (intermediate-class origin), and 0.71 (working-class origin), respectively.

An important dimension of scholastic experience and, indirectly, of performance is the type of higher education entrance qualification held. It also predicts whether a full research university can be accessed. In the ‘b’ model in Table 5, the type of eligibility (full vs. limited) for higher education is kept constant. The extent of its impact on re-entry itself is striking – but more importantly it strongly reduces the effect of social background from the ‘a’ columns. While inequality was large in Sweden without this control compared to Germany, not much of it is left when accounting for the different tracks leading to qualification for tertiary education. Hence, the filtering function of the secondary education system seems to be stronger than the nominally strong openness of the system suggests.

United States

For the US, the a.-models control for the following compositional variables: Race, a dummy variables for being born in a rural area, growing up in the southern states of the

US, and being born outside the country are included into the models as well as the birth cohort (within the small range of cohorts in the sample) and the number of siblings.

The models show a significant coefficient for the disadvantage of the two lower classes (intermediate- and working-classes) for all transitions. Late re-enrollments are still unequal in the US.

In the ‘b’ models, performance, being measured as test-scores from the Armed Forces Qualification Test (AFQT)⁹ as well as the track chosen in high school (academic vs. other), are kept constant. For the cohorts I selected, the AFQT-test was taken before completion of high school. Additionally, I keep the poverty status of the respondent’s household at the age of 18 constant, as costs of higher education are higher in the US than in Germany or Sweden and thus financial constraints can be assumed to play a stronger role. Holding these variables constant as in the ‘b’ models in Table 6 drastically reduces inequality in re-enrollment to an insignificant coefficient. Additional analyses that are not shown here reveal that the most important intermediate variables are the AFQT scores and the pursuit of an academic track in high school, but not household poverty. Just like in the Swedish case, this shows that inequality in earlier educational outcomes explains well the somewhat higher inequality in the later enrollment in the flexible and open postsecondary education in the US.

⁹ The AFQT is a test of cognitive performance (IQ) that tests different dimensions such as word-knowledge, math skills, and paragraph comprehension. The AFQT score is also referred to as the ASVAB (Armed Forces Vocational Aptitude Battery) score.

Table 6: Parametric AFT regression: United States.

	All cases: high school diploma or GED		If HS diploma or GED: labor market entry before higher education		If in the labor market: re-entering postsecondary education	
	a.	b.	a.	b.	a.	b.
<i>Parents' class (ref.: service classes)</i>						
- intermediate classes	0.04*** (3.32)	-0.00 (-0.31)	-0.14*** (-4.91)	-0.10** (-3.88)	0.44** (2.42)	0.21 (1.12)
- working classes	0.07*** (6.33)	0.01 (0.45)	-0.17*** (6.10)	-0.12*** (-4.11)	0.59** (2.97)	0.18 (0.87)
- single parent, inactive	0.22*** (8.95)	0.16*** (4.96)	0.01 (0.24)	0.03 (0.51)	.16 (0.42)	-0.26 (-0.68)
<i>Male</i>	0.04*** (4.62)	0.04*** (4.44)	-0.09*** (-4.14)	-0.09*** (-4.77)	0.62*** (4.14)	0.59*** (3.79)
<i>Race (ref.: White)</i>						
- Black	-0.01 (-0.65)	-0.08*** (-5.01)	0.15*** (3.99)	0.13*** (3.42)	0.08 (0.29)	-0.26 (-0.90)
- Hispanic	0.01 (0.45)	-0.03 (-1.71)	0.04 (0.84)	0.03 (0.59)	-0.06 (-0.21)	-0.20 (-0.66)
<i>Rural</i>	-0.00 (-0.64)	-0.01 (-0.62)	0.01 (0.30)	0.03 (1.46)	0.15 (0.84)	0.10 (0.54)
<i>Place of birth (ref.: non-south)</i>						
- South	0.04*** (4.54)	0.03** (2.91)	0.01 (0.28)	0.01 (0.27)	0.23 (1.35)	0.13 (0.78)
- non-US	0.04 (1.80)	0.03 (1.16)	0.18** (3.18)	0.16** (2.88)	0.02 (0.05)	-0.08 (-0.19)
<i>AFQT percentiles</i>		-0.003*** (-13.71)		0.001** (3.25)		-0.01*** (-4.19)
<i>High school track:</i>		-0.05*** (-5.00)		0.13*** (5.83)		-0.33 (-1.99)
college preparatory						
Household at age 18		0.08*** (6.45)		0.05* (1.99)		0.15 (0.72)
poor						
<i>Constant</i>	2.83*** (99.87)	3.06*** (98.93)	1.29*** (18.55)	1.07*** (14.50)	5.83*** (13.10)	7.17*** (6.12)
$\ln \gamma$	-1.93	-1.98	-1.22	-1.26	0.29	0.28
N	3107		2522		2233	

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Covariates not shown in table: birth cohort, number of siblings (dummy variables).

a. compositional covariates kept constant.

b. compositional covariates and mechanisms related to scholastic performance kept constant.

Data source: NLSY79; own calculations. Not weighted.

Discussion and Conclusion: Early Openness, Late Inequality?

The results show a divide between Germany on the one side and Sweden and the US on the other. The Swedish and US systems are both characterized by lower inequality in the early transitions and higher inequality in the latest transitions into education. By contrast, the German system manifests stronger inequalities in the earlier transitions,

but once general upper-secondary level has been successfully completed, postsecondary education is almost universal.

The fact that Sweden and the US are more alike than the two European cases Sweden and Germany indicates that flexibility and openness of the education system are more decisive for inequality in late transitions than e.g. the labor market or the costs of higher education. Sweden and the US share a policy of providing broad access to higher education, while Sweden's employment protection legislation is similar to Germany's, and both countries did not charge tuition fees in the respective period. What is similar between the US and Swedish systems is a combination of low nominal higher education entrance requirements and high flexibility of the education system for non-traditional learners, which means that commitments in other life domains can be combined with studies. These differences between Sweden and the US and likewise the similarities between Germany and Sweden support the claim that openness and flexibility are indeed the central system characteristics.

Whether these system characteristics may reduce intergenerational inequality overall is difficult to infer from the present analysis. Besides the difficulty, which is inherent in small N research, that other country differences could account the results, the contribution to overall inequality could go into different directions. On the one hand, inequality overall could still be lower due to the lower inequality in late transitions which replace transitions in the rigid sorting system in Germany. Flexibility may reduce inequality as transitions at older ages replace the early sorting, which would probably be even more strongly affected by social origins.

On the other hand, inequality in entry into postsecondary is not as low in open and flexible systems as we would think if we looked only at young entrants, since inequality in late education adds up. Thus, even though these systems equalize educational opportunities by expanding access, at least a part of the inequality 'is saved' for later and manifests itself in unequal re-enrollment rates, in particular on the part of young people from a lower-class origins in Sweden and the US. This finding calls for a discussion of how opportunities for formal adult learning should be designed in order to attract those who are disadvantaged in earlier transitions in the education system. Note, however, that they persist also in Sweden, where preparatory programs for later entrants are available on the on the municipality level.

Furthermore, to evaluate inequality full, one would have to take into account completion of the educational program entered as well as qualitative differentiation of

postsecondary education, e.g. the difference between 2- und 4-year colleges in the US or between the *Vocational Education, Fachhochschule* and *Universität* in Germany.

More importantly, the results suggest that educational inequality differs in its manifestation. New inequalities in the way students move through the postsecondary education system and the differences in the timing of educational attainment become important questions for research into educational inequality when higher education systems open up for adult and non-traditional learners.

In both cases with inequality in later entries, this ‘rollback’ of inequality can be explained to a large degree by scholastic performance in secondary school. Thus, the roots of late inequality are to be found much earlier in the educational career. In this respect, the open and flexible systems are in the end more similar to the German case than it looks at first sight, since educational careers are guided into certain directions early on. Even though this is likely to be less deterministic in open systems, it shows that broadening nominal eligibility is no substitute for early preparation for academic education. The overall pattern of the results can be seen as a further indication that early investments into the cognitive development of children may be a more promising way to reduce educational inequalities.

The similarities between Sweden and the US confirm previous studies comparing the US to Scandinavian contexts, which have revealed a similar degree of educational inequality (e.g. the US and Norway: Reisel 2011). This finding contradicts the hypothesis that costs cause inequality in late enrollment. It also contradicts the opposing hypothesis that high school graduates from poorer families delay enrollment, or prefer to work until they enroll, and that inequality in later enrollments in the US is therefore lower than in other countries – or even reversed.

One explanation for the lower inequality in Germany is the higher selectivity of earlier transitions and the resulting more homogeneous population of potential re-enrollers. Coefficients for social origins are small in later compared to earlier transitions. Cameron and Heckman (1998) challenged this common finding of waning coefficients over the life course. If institutional selectivity rather than flexibility for adult learners causes the country differences, variables truncated by earlier transitions should explain more of the origin coefficients in flexible contexts. Obvious candidates for variables that are presumably truncated in more selective systems are scholastic performance and educational motivation or aspiration. Including them though leads to a dilemma that Mare (2011) discusses – namely that many of the variables causing

selection at earlier transitions also depend on social origins. As a consequence, keeping these variables statistically constant results in estimates, which are net of selection but also net of a mechanism explaining late inequality. As Mare sums up: ‘A blanket control for all unobserved variables is likely to over-control for the effects of the treatment’ (Mare 2011, 244). The possibilities of statistical modeling are limited at this point by the nature of the situation. Attempting to separate the two explanations, ‘openness’ and ‘flexibility’, I applied common strategies to model the selection process. These, however, all rely on very restrictive assumptions. Multivariate probit models indicate downwardly ‘biased’ class coefficients in all three countries.

Ultimately, separating ‘flexibility’ and ‘openness’ (or selection) as explanations for differences in inequality between countries did not succeed in the present analyses. In order to gain an insight into this question, it would be useful to undertake qualitative comparisons of other systems, for example comparisons of selective and inflexible contexts that change only one of the two aspects over historic time. However, such cases hardly exist in practice because reforms such as those initiated by the Bologna Process in Europe are usually aimed at changing both aspects at once.

The present study suggests that the education system should be regarded as central for explaining late educational inequalities. The identification of different aspects of its institutional set-up remains a task for future research. This also includes a more detailed evaluation how the promotion of ‘second chance’ education relates to intergenerational inequality in occupational outcomes, which raises many new questions such as on differences in success within postsecondary education or on the worth of delayed educational attainment for the labor market.

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Appendix

Qualitative comparative case studies allow for a much more detailed study of processes within the single countries. This has the great advantage that, besides consideration of substantive historic differences, the methodological approach can be much better evaluated for each single case, avoiding e.g. misinterpretation from simplified findings due to wrong parameterization. This Appendix shows the derivation of the event history model assuming a log-logistic distribution in three steps:

- first, I plot non-parametric hazard rates, in addition to the survivor curves in the article.
- second, I estimate hazard rate models with flexible shapes and hence fewer parametric assumptions and plot a set of predicted hazard rates.
- and third, I compare these models to the fully parametric models reported in this article, using a graphical illustration as well as comparing the coefficients and the entire models according to the AIC-statistic.

There are, at least, two things that can be learned from such an investigation. First, it provides a more refined picture than the survivor curves, in how far a certain transition is indeed time-dependent. And second, whether the log-logistic model-specification used throughout this article is an appropriate representation of the timing process for all three transitions in all three countries.

When modeling event histories, the choice of a model can be a crucial decision with a strong impact on the results. In this article, I have modeled each transition assuming a log-logistic distribution on the hazard curve. Although this shape is rather flexible and can take many forms, it can still be a wrong specification of the fundamental process. The alternative, the widely used Cox-model, leaves the shape of the hazard function unspecified, but makes the assumption that the curves for different values of independent variables are parallel (parallel hazards assumption). This assumption is violated in several instances what makes the Cox-model a not very useful alternative. Another alternative to the fully parametric models above are semi-parametric models using cubic splines or fractional polynomials. Their underlying strategy is to model the baseline hazard, but allow more flexibility by modeling the shape on different sections of the time scale in a different way. This is achieved by adding a set of additional shape parameters for different ‘slices’ of the time axis. One class of such models using splines have been suggested by Royston, Lambert and Parmar (Royston and Parmar, 2002; Lambert and Royston, 2009; Royston, 2001). These models allow a very flexible modeling of the shape of the baseline hazard which is much closer to the ‘real’ shape. But in contrast to the Cox-model, they are able to specify the shape of the hazard function and model it. That enables to compare these models with fully parametric models, both on the basis of model-fit statistics such as the Bayesian (BIC) or Akaike’s information criterion (AIC) and on the basis of the graphical illustration of predicted hazard rates from the model (e.g. the baseline hazard rate).

The following models will be compared to the AFT-models in the article. For each model, three figures show the ‘evolution’ of the parametric baseline hazard rate:

- first, the non-parametric hazard rate by social origin. This curve gives the real hazard rate without any parameterization and without modeling of any covariate. The curves are

smoothed with a Gaussian kernel to visualize a somewhat more general pattern and cancel out small bumps in the distribution.

- Second, a set of hazard rates predicted from the ‘Royston-Parmar’- or semi-parametric spline models for an ideal case for all three classes of social origin and
- third, the same set of predictions as above from the fully parametric AFT regressions with a log-logistic distribution used in the article.

Further, I report all models in order to check whether strong violations of functional assumptions lead to fundamentally different results. Finally, I report the AIC in order to evaluate the trade-off between model parsimony and correct specification of the hazard rate.

Altogether, this set of robustness check should enable an informed decision for the choice of the models. It serves the purpose of checking whether central results for the different countries could be influenced by modeling issues. Thus, for comparative research such robustness checks seem to be indispensable. As a result, although the log-logistic model turns out to be an extremely rough and imprecise specification, the fundamental conclusions of the article are unaffected.

The semi-parametric models are estimated using different sets of knots, but generally a quite large number of user defined knots are set. Increasing the number of knots reduces the model fit due to a loss of degrees of freedom, but leads to a closer approximation of the true shape. The odds metric is chosen over the hazard metric since models derived from odds metric closely correspond to log-logistic models and the model fit often turned out to be slightly better in previous work (Royston and Lambert, 2011).

In conclusion, for most cases the figures show that the models represent by and large the process appropriately – with few exceptions. The BIC statistics show that the AFT-models are a possible and more parsimonious simplification of the modeling. In the following, I will discuss the models and the graphical illustrations country by country.

As discussed in the article, the German system filters early and early inequality is comparatively high. This is mirrored in the hazard rates in the first column of figure A1. Hazard rates of qualifying for higher education are heavily concentrated around the age at which this transition is expected in the education system, between 18 and 21, and class inequality is high. Only very few young adults catch up. The other two graphs in the first column confirm the results of the survivor curves: there are almost no differences between classes on later transitions.

The second and the third column show predicted hazard curves for a man from the state of Schleswig-Holstein, born in 1964 and without any siblings. In the second column the underlying model is the flexible parametric solution. The third column shows the identical prediction from a log-logistic accelerated failure time regression. The shape of the hazards approximates the non-parametric curves fairly well, with the exception of the transition to qualification for higher education, where the parametric model fails to capture the strong decline of all classes. As, however, only very few cases are entering postsecondary education late, coefficients depend on the first section of the time axis. Therefore, this circumstance is not problematic and the coefficients from the non-parametric and the parametric model are in line.

Variables

In the main text, variables held constant in the different models are only listed, but due restriction in space and in order to improve readability, there is no discussion why each of why the different variables were included into the model. Therefore, I will introduce the models in this Appendix somewhat more detailed country by country.

Because the social composition, the rates of young adults who hold a higher education entrance qualification, the labor market chances, and the rates of immediate enrollment in higher education vary across federal states for Germany, I have kept constant the federal states in which the higher education entrance qualification was obtained. Furthermore, the number of siblings, the gender, and the birth cohort of the respondents are included in the model. The number of siblings can be correlated with both social background and parents' ability to finance their children's higher education. Gender and birth cohort may be unequally distributed by class after qualification for higher education if, for example, more males than females from a lower class background typically qualify. These variables are kept constant in the first series of models, presented in the 'a.'-columns in Table 3. Model b also includes the grade point average (GPA) of the secondary school leaving certificates and whether respondents achieved the Abitur, a higher education entrance qualification entitling them to study at a university, or the Fachhochschulreife (FHR), which entitles them to study at a university of applied sciences.

For Sweden, I keep the birth cohort and the size of the municipality constant in order to approximate the availability of options for higher education; the number of siblings, gender and whether the respondent was born in Sweden are kept constant for the same reasons as in the German case.

For the US, important compositional variables are:

- Race, as affirmative action policies might otherwise lead to an underestimation of the effect of social background.
- Regional disparities, captured by dummy variables for being born in a rural area, growing up in the southern states of the US, and being born outside the country.
- Birth cohort (within the small range of cohorts in the sample) to correct for business cycle effects.
- Number of siblings for the same reasons as in the other country contexts.

First, performance measured as test-scores from the Armed Forces Qualification Test (AFQT)ⁱⁱ and the track chosen in high school (academic vs. other). For the cohorts I selected, the AFQT was taken before completion of high school. Second, the poverty status of the respondent's household at the age of 18 corrects for affordability of higher education. Compared to Germany and Sweden, costs are much higher in the US and financial constraints can be assumed to play a stronger role.

Table A1: Distribution of independent variables for all three countries: sample of potential re-entrants.

Independent Variables	<u>Proportion / Mean</u>		
	Sweden	Germany	United States
Born 1955	.06		.24
Born 1956	.06		.24
Born 1957	.05		.24
Born 1958	.05		.24
Born 1959	.05		.24
Born 1960	.07		.24
Born 1961	.07		.24
Born 1962	.06		.27
Born 1963	.07		.25
Born 1964	.08	.47	.24
Born 1965	.08		
Born 1966	.08		
Born 1967	.05		
Born 1968	.07		
Born 1969	.06		
Born 1970	.06		
Born 1971		.53	
Male	.52	.53	.53
Race: White			.82
Race: Black			.11
Race: Hispanic			.07
Born in rural area			.25
Born: US non-south			.66
Born: US south			.31
Born: non-US			.03
Born: non-Sweden	.14		
No siblings	.06	.15	.03
1 sibling	.35	.45	.16
2 siblings	.28	.24	.25
3 siblings	.14	.09	.23
4 siblings	...or more: .18	...or more: .07	.14
5 siblings			.08
6 or more siblings			.12
College preparatory track in High School			.47
GED (all other: High School Diploma)			.14
Percentiles of AFQT test			Mean: 51.56
Abitur (vs. Fachhochschulreife) Germany		.87	
Abitur grade (centered, rescaled)		Mean: .16	
Full eligibility for higher education: Sweden	.24		
N	1622	458	2233

For Germany additionally: Federal States; For Sweden additionally: size of municipality where respondent was raised in groups.

Figure A1: From non-parametric to parametric models, Germany.

Table A2: Semi-parametric cubic spline model (Royston-Parmar model), three transitions to re-enrollment, Germany.

	all cases: Abitur or FHR	if Abitur or FHR: entering the labor market before higher education		if in the labor market: re-entering postsecondary education	
	a.	a.	b.	a.	b.
<i>parents class (ref.: service classes)</i>					
- intermediated classes	-1.10*** (-11.10)	0.75*** (5.55)	0.82*** (5.92)	-0.20 (-0.65)	-0.20 (-0.66)
- working classes	-1.87*** (-10.37)	0.39 (1.38)	-0.06 (-0.22)	0.23 (0.35)	0.29 (0.42)
<i>male</i>	0.08 (0.82)	-0.52*** (-3.94)	-0.65*** (-4.80)	0.26* (0.89)	0.36 (1.18)
<i>Abitur or FHR-GPA</i>			0.40** (3.09)		-0.58* (-2.24)
<i>Abitur (ref.: FHR)</i>			-1.29*** (-5.78)		2.24 (2.13)
<i>constant</i>	-0.36 (-0.38)	-0.30 (-0.78)	2.02 (4.46)	-2.02** (-2.24)	-4.31 (-3.38)
AIC*	302	-613	-803	989	1000
AIC*: corresponding ll-AFT-model	2657	-598	-612	646	648
N	2227	761		459	

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; FHR: Fachhochschulreife.

Further compositional covariates, not shown in the output are: birth cohort, number of siblings (dummy variables), state of *Abitur* or *Fachhochschulreife*.

Coefficients for knots omitted.

a. compositional covariates kept constant.

b. compositional covariates and scholastic performance kept constant.

Data source: German Life History Study; own calculations.

The main focus of the article is on re-entry. Here, the picture differs. The non-parametric hazard rates show no bivariate class differences and the semi-parametric model controlling for compositional effects confirms this result, even though the parametric model points towards a disadvantage of intermediate class children. Therefore, in order to make a conservative decision, the disadvantage of the middle class has to be attributed to the choice of parameterization. We cannot conclude that social origin has any effect on later entry into postsecondary education in Germany.

The AIC-values show that the first two transitions would both be modeled better with a flexible model than using the fully parametric model. Predicted hazard rates show that inequality is centered on the first months, at overall higher hazard rates around this time. In other words, what happens later does not matter too much for the overall process. For re-enrollment, the AFT-model is to be preferred over the flexible parametric model according to the AIC.

Figure A2: From non-parametric to parametric models, United States.

For the achievement of a high school degree, inequalities in the hazard rates are centered on the first years in accordance with typical age when this degree is achieved. In later years, the hazard rates reverse at least somewhat and lower-origin young adults manage to catch up slightly. However, this should be interpreted with caution. First, since the rates are overall, so the initial inequality will weigh more heavily. Therefore the survival curves above showed rather stable inequality, which still exists in the achievement of a high school diploma. Hazard curves simply show that this pattern is already produced in early years. Second, the later achievements are quite often GEDs. As Cameron and Heckman highlight (Cameron and Heckman, 1993), these are not a full equivalent to a high school degree.

Young adults from lower social origins have a higher hazard rate of entering the labor market earlier in their life, instead of education being the obvious decision during this phase. After these first years, upper-class children – who are still in the risk set (i.e. who have not yet completed higher education) – have a higher chance of starting to work. A possible modeling procedure for this would be piecewise effects models (Bernardi, 2001). However, as the major concern here are early entrants into the labor market instead of postsecondary education, the later catching up of upper-class young adults will be ignored in the following. Given the complex shape of the hazard rate, finding a good approximation for the shape of the survivor curve is rather difficult, as shown by the inconsistent baseline hazard rates for the semi-parametric and fully parametric models. Again, as class differences in early entrance are the main interest and these are captured well by both models, this simplification seems to be not problematic.

For the re-enrollment, there seems indeed to be a violation of the functional form assumptions – as well as from the parallel hazard assumption. Even though, modeling with a rather flexible model can account for the crossing of the hazard curves, a non-continuous effect would thus be the better specification. For the international comparison it should be noted that the finding of continuous inequality is driven by the first three or four years after the labor market entry – and cannot be generalized to later re-entries. This might also be the reason that the AIC-values of the AFT-model are about the same size as for the more flexible model. As the flexible model, however, also suffers from the problem that it cannot model piecewise effects on the time axis, which would require yet different modeling strategies, I will stick to the AFT model for the purposes of this article.

Table A3: Semi-parametric cubic spline model (Royston-Parmar model), three transitions to re-enrollment, United States.

	all cases: high school diploma or GED		if HS-Diploma or GED: entering the labor market before higher education		if in the labor market: re-entering postsecondary education	
	a.	b.	a.	b.	a.	b.
<i>parents class (ref.: service classes)</i>						
- intermediated classes	-0.42*** (-4.94)	-0.08 (-0.88)	0.26** (2.97)	0.21** (2.36)	-0.31* (-2.30)	-0.17 (-1.20)
- working classes	-0.65*** (-7.18)	-0.05 (-0.49)	0.34*** (3.60)	0.25** (2.50)	-0.43** (-2.95)	-0.16 (-1.01)
- single parent, inactive	-1.31*** (-8.58)	-0.47** (-3.03)	0.15 (0.82)	0.14 (0.74)	0.11 (0.75)	0.15 (0.52)
<i>male</i>	-0.42*** (-6.60)	-0.37*** (-5.56)	0.21*** (3.10)	0.23*** (3.19)	-0.40*** (-3.64)	-0.45*** (-3.89)
<i>race (ref.: white)</i>						
- black	0.01 (0.05)	0.52*** (4.40)	-0.34** (-2.78)	-0.28* (-2.16)	0.00 (0.02)	0.17 (0.79)
- hispanic	-0.20 (-1.49)	0.12 (0.87)	-0.02 (-0.11)	0.03 (0.18)	-0.02 (-0.10)	0.15 (0.64)
<i>rural</i>	-0.11 (-1.41)	-0.08 (1.05)	-0.06 (-0.69)	-0.12 (-1.43)	-0.16 (-1.19)	-0.08 (-0.57)
<i>place of birth (ref.: non-south)</i>						
- south	-0.26*** (-3.59)	-0.11 (-1.46)	-0.04 (0.58)	0.05 (0.62)	-0.13 (-1.00)	-0.10 (-0.76)
- non-US	-0.38* (-2.19)	-0.31 (-1.76)	-0.42* (-2.18)	-0.40* (-2.07)	0.04 (0.13)	0.07 (0.22)
<i>afqt percentiles</i>		0.02*** (15.32)		-0.003 (-1.65)		0.01*** (4.25)
<i>high school track:</i>		0.31*** (4.21)		-0.30*** (-3.79)		0.24* (1.95)
college preparatory						
hh at age 18 poor		-0.43*** (-5.18)		-0.11 (-1.15)		-0.14* (-0.86)
<i>class aspiration (ref.: service)</i>						
- intermediate class		0.06 (0.64)		0.06 (0.69)		-0.15 (-1.01)
- skilled working		-0.11 (-1.13)		0.15 (1.45)		-0.23 (-1.33)
- unskilled working		-0.10 (-0.81)		0.18 (1.17)		-0.60* (-2.17)
<i>constant</i>				-1.11 (-9.33)		0.27 (1.53)
AIC*	-7277	-7114	-4849	-4698	3052	2795
AIC*: corresponding ll-AFT-model	-5862	-5914	-3909	-3839	3057	2798
N	3107		2522		2233	

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Data source: NLSY79; own calculations. Further compositional covariates, not shown in the output: birth cohort, number of siblings (dummy variables); Coefficients for knots omitted.

a. compositional covariates kept constant.

b. compositional covariates and likely mechanisms related to scholastic performance and motivation kept constant.

Figure A3: From non-parametric to parametric models, Sweden.

The predicted survivor curves in columns two and three of figure A3 refer to a male born between 1955 and 1957 in a large city in Sweden who grew up without siblings. The shape of the hazard rates can, overall, be approximated well by the semi-parametric model. The log-logistic AFT-model fails to model the process of early sorting out, as the distribution is extremely right-skewed. In this case, the model cannot capture the basic process. The reason is the definition for ‘qualifying for higher education’: only qualifying by secondary education is counted as an even in this model. Thus, the underlying event typically happens early and class inequality in this ‘regular’ way to higher education is much stronger than a plot of nominal eligibility – such as the survivor curves in figure A3 – would suggest.

Table A4: Semi-parametric cubic spline model (Royston-Parmar model), three transitions to re-enrollment, Sweden.

	all cases: qualifying for higher ed. by secondary ed.	if qualified by sec. ed.: entering the labor market before higher education	if in the labor market before completing HE: re-entering postsecondary education		
	a.	a.	b.	a.	b.
<i>parents class (ref.: service classes)</i>					
- intermediated classes	-0.52*** (-4.31)	0.39** (2.42)	0.09 (0.53)	-0.18 (-1.31)	-0.07 (-0.53)
- working classes	-0.84*** (-7.18)	1.18*** (7.38)	0.77*** (4.77)	-0.42*** (-3.24)	-0.27* (-1.95)
<i>male</i>	-0.25** (-2.67)	-0.27* (-2.12)	-0.23 (-1.84)	-0.55*** (-5.15)	-0.56*** (-5.22)
<i>born outside of SE</i>	-1.59*** (-5.81)	-1.04** (-2.49)	-0.85** (-2.00)	-0.07 (-0.28)	-0.02 (-0.07)
<i>full qualification for higher education</i>			-1.76*** (-11.35)		-0.55*** (4.27)
<i>constant</i>	0.45 (1.85)	-0.16* (-0.52)	1.28*** (3.81)	-0.48 (-1.73)	-0.78*** (-2.70)
AIC*	-32.12	-1016	-1149	3327	3880
AIC*: corresponding ll-AFT-model	1556	-888	-979	3890	3311
N	1822		765		1622

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Further compositional covariates, not shown in the output: birth cohort, number of siblings (dummy variables), size of community of birth place. Coefficients for knots omitted.

a. compositional covariates kept constant

b. compositional covariates and scholastic performance kept constant

Data source: LNU; own calculations.

As with the AFT-models, most of the inequality in re-enrollment can be explained by the type of eligibility. I.e. early inequality in the eligibility has long-lasting consequences. For the labor market entry and for re-enrollment, the shape of the hazard function is well approximated by the AFT-model, but not

for the transition to eligibility. The AIC-values suggest that a more complex modeling in Sweden would lead to a better fit – however leading to the substantive conclusion as the AFT-models in the main text.

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ⁱ Besides estimating what Boudon (1974) has termed 'primary effects,' controlling for GPA is of interest for another reason, namely that selection into higher education is in most cases regulated by this score. For some programs, waiting time can compensate low scores. In this case, individuals with low performance could wait and (re)-enroll later. Thus, class effects would only become visible after controlling for performance as a suppressor variable.

ⁱⁱ The AFQT is a test of cognitive performance (IQ) that tests different dimensions such as word-knowledge, math skills, and paragraph comprehension. The AFQT score is also referred to as the ASVAB (Armed Forces Vocational Aptitude Battery) score.