Institutional Variation and Meritocracy: Primary and Secondary Origin Effects at the Transition to Upper Secondary School across German 'Länder'

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Abstract: According to Boudon's (1974) well-known micro-theoretical model of educational transitions, educational inequality stems from two sources: primary effects – which are all those that are expressed by the association between social origin and academic performance; and secondary effects – which are transition propensities differing between families of different social origin – even at the same level of performance. The evaluation of the relative importance of primary and secondary effects is the aim of a growing body of literature. I contribute to this line of research by *firstly* evaluating the relative importance of these two effects at the transition to upper secondary school in Germany and *secondly* assessing whether the substantive federal state (*'Länder'*) differences in the transition regulations affect the relative importance of these effects. Employing nationwide panel data (years 2002-2005) developed by the German Youth Institute (DJI), primary and secondary effects can be decomposed through counterfactual analysis. Results indicate that secondary effects are the main source of educational inequality, accounting for 59% of the total inequality. They are especially strong for children with medium (as opposed to very high or very low) grades. Furthermore, the relative importance of secondary effects is higher when parents can freely choose a secondary school track and lower when the parents' freedom to choose is restricted because teachers decide instead of them. Theoretical and policy implications are discussed.

1. Introduction

One of the most stable finding in educational research is this: students from low socio-economic backgrounds, on average, choose less ambitious educational pathways than their peers from more privileged backgrounds (e.g. Shavit & Blossfeld 1993). In Germany, the most important decision between such pathways is the transition from primary to one of several secondary school tracks, when students are usually 10 years old. Only the upper secondary school type, the so called 'Gymnasium', leads directly to the university entrance certificate and hence enables students to obtain tertiary education. Despite educational expansion high socio-economic status children are still more likely to enrol in 'Gymnasium' than their lower socio-economic counterparts (e.g. Baumert et al. 2006, Müller & Haun 1994, Stocké 2007a).

Why is this the case? According to Boudon's (1974) well-known micro-theoretical model of educational transitions, inequality stems from two sources: primary effects – which are all those that are expressed by the association between social origin and academic performance; and secondary effects – which are transition propensities differing between families of different social origin – at the same level of academic performance. Boudon's concept in its formalized rational-choice version (Breen & Goldthorpe 1997, Erikson & Jonsson 1996, Esser 1999) has served as a theoretical framework in numerous studies on inequalities in educational attainment (for a review of studies, see Goldthorpe 2007, vol II chap. 4). However, until recently it was up to speculation, whether primary or secondary effects contribute more to educational inequality. One reason why it seems meaningful to assess the relative importance of primary and secondary effects is that we expect different causal mechanisms behind them. While primary effects can be assumed to depend on various family related factors, like material conditions and socialisation, secondary factors depend on choices made by children, their parents and by school teachers. Knowledge about the relative importance of primary and secondary effects may thus allow inferences on the effectiveness of policy measures to reduce inequality in educational opportunity. Furthermore, the distinction between primary and secondary effects closely relates to the concept of meritocracy (Young 1958).[1] A schooling system is perceived to be 'meritocratic' in the sense of fair and just, if academic appraisal and educational transitions are based on demonstrated ability (merit) rather than social origin. The existence of secondary effects, i.e. direct origin effects over and above demonstrated ability are not accordable with such an understanding of

[1] Note that Young had a quite pejorative connotation in mind when he introduced the concept of meritocracy some 50 years ago. Sociologists largely ignored this, and euphemized the term into something like 'performance fairness', which is compatible with egalitarianism (cf. Celarent's (2009) astucious review in AJS).

equity. From this perspective, the relative contribution of primary effects can serve as a measure for 'degree of meritocracy' at a transition node of a schooling system. Consequently, the evaluation of the relative importance of primary and secondary effects is the aim of a growing body of recent literature. These studies employ a counterfactual decomposition method which allows us to disentangle effects and assess their relative contribution to educational inequality (Contini et al. 2008, Erikson 2007, Erikson et al. 2005, Erikson & Rudolphi 2009, Jackson et al. 2007, Kloosterman et al. 2009, Schindler & Reimer 2008). In this article I would like to contribute to this line of research by evaluating the relative importance of these two effects at the transition to upper secondary school in Germany, employing the above mentioned decomposition technique.

Specific institutional characteristics can be hypothesized to play a crucial role for the intergenerational association of educational status (e.g. Hanushek & Wößmann 2005, Pfeffer 2008). In the second part, this article focuses on one central institutional feature – namely the transition regulations, and assesses whether differences across federal states ('Länder') affects the total and relative importance of primary and secondary effects. When it comes to educational decisions, it is the schooling system that defines the set of alternatives, the points in time, and for the German context, also the 'decision-maker'. Primary school teachers have to evaluate a students' potential based on demonstrated ability, and rate which subsequent secondary school track would be most suitable to foster the future academic development of a student.[2] If parents agree with the teacher's evaluation, the child will be admitted to the respective school track. If, however, the recommendations conflict with the parents' wishes, we observe quite substantial institutional variation between federal states (*Länder*) concerning transition regulations: In some *Länder* the final decision about the future course of education is taken by the parents and in others by the school teacher. This *Länder* heterogeneity in decision authority has long been neglected by empirical research. I argue that this variation has to be taken into account when making inferences about the importance of primary and secondary effects for the entire country. From a more general perspective, the heterogeneity in decision authority seems to be a good case to study institutional effects on individual outcomes, as within-country differences allow me to keep most covariates (observed and unobserved) constant - which typically poses a problem to cross-country analyses.

The paper is organized as follows: I will first provide an overview of previous research on the relative importance of primary and secondary effects and then describe the transition to secondary school and the *Länder* variation in the transition regulations. From this theoretical

[2] Obviously, this is not an easy task, especially at this early age, and the predictive quality of such an assessment is heavily questioned (e.g. Einsiedler 2003).

expectations will be derived about a) the overall weight of secondary effects in Germany and b) the variation in effect strength according to the different regulations. After describing the data set I present my results: in the first part findings for the entire country and in the second part separate analysis for the 'Länder' groups with different transition regulations. The paper ends with a discussion of the findings.

2. Theoretical Background

To understand why students from different social backgrounds reach different levels of educational attainment, Boudon (1974) introduced a useful distinction: He assumed that social background differences in educational attainment come about through the operation of two kinds of effects, which he labels 'primary' and 'secondary'. Primary effects are all those that exist between social origin of students and their demonstrated academic ability. These effects are assumed to be grounded in class specific socialization processes, material and intellectual support in the home environment, and (potentially) genetic differences between parents from different social origins (cf. Erikson & Jonsson 1996).

Secondary effects, on the other hand, are the results of socially differentiated cost- and benefit considerations regarding different educational alternatives. The fundamental argument is based on the assumption of downward mobility avoidance (or relative risk aversion): It is assumed that all families try to avoid intergenerational downward mobility; however, the implications differ by their position in the social structure. Parents with higher socioeconomic status urge their children towards the more demanding educational track in order to maintain their social status in the next generation, whereas parents with lower socioeconomic status can choose less demanding tracks for their offspring without running danger to demolish their social status (e.g. Breen & Goldthorpe 1997, Erikson & Jonsson 1996).[3] Besides the above mentioned *utility* considerations, families might also differ in their perception of *costs* that are associated with different school tracks. Now, secondary education is tuition free in Germany; however, it is plausible to assume that opportunity costs (which occur when children opt for the longer 'Gymnasium' track and delay their labour market entrance) weigh heavier for families with low income and status. As a third variable rational choice theory takes into account the perceived *probability* of actually realizing the potential benefits attached to an educational alternative (Breen & Goldthorpe 1997; Erikson & Jonsson 1996; Esser 1999: 265ff). The parental evaluation of whether or not their child will successfully complete

[3] In addition, cultural factors like a stronger appreciation of (academic) education in general might lead offspring from higher social origins towards preferring the academic 'Gymnasium' track, while children from disadvantaged backgrounds might prefer tracks that are more practically oriented.

'Gymnasium' will certainly be influenced by knowledge about the level of demand at this track, as well as parental resources to help their children with potential difficulties. It can be expected that parents with Abitur should, on average, rate their child's success probability higher. Rational-choice theory has been criticized for not explicating how primary effects operate in this decision-centered perspective (Nash 2003). However, in addition to the above mentioned factors, social origin differences in prior academic achievement affect the evaluation of future probabilities of school success. Hence, primary effects are taken into account when families evaluate the success probabilities (p). The bottom line is that selections of educational pathways depend on demonstrated ability and on cost-benefit considerations weighted by success probabilities. Both differ according to social origin.

3. Empirical Findings of the Relative Importance of Primary and Secondary Effects

A growing body of research has recently started to separate primary and secondary effects and assess their relative importance in the creation of inequality of educational opportunity (IEO). Results vary substantially between countries and transitions under investigation. Jackson and colleagues (2007) investigated the relative weight of effects at the transition to A-levels in England and Wales. They show that secondary effects account for at least one quarter and up to one half of observed class differentials (see Erikson et al. (2005) for an earlier version of this paper). Similar results are found in Sweden, where Erikson & Rudolphi (2009) and Erikson (2007) show that secondary effects account for around one third and up to one half of class differentials for the transition to academic tracks at upper secondary school. For the Netherlands, Kloostermann et al. (2009) estimate the relative importance of secondary effects to be 40-48% at the transition to higher secondary education. Instead of class they use parental education as an indicator of social origin. Also using parents' education, Contini et al. (2008) find a substantially larger contribution of secondary effects at the transition to secondary school in Italy: Here, secondary effects account for 60-71% of the total origin effect.

For Germany, two studies investigate the relative importance of primary and secondary effects at the transition to 'Gymnasium' compared to lower secondary school types (Müller-Benedict 2007, Stocké 2007b). Both studies find primary and secondary effects to be about equally important in creating IEO. However, both studies have data based shortcomings: Müller-Benedict (2007) uses cross-sectional PISA data, where academic performance was assessed when students were in 9th grade. 5 years after the actual decision, performance measures are biased. There is strong evidence, that the secondary school type

attended substantially influences student performance (Baumert et al. 2003). Stocké's (2007b) data is longitudinal, but covers only one federal state (Rhineland-Palatinate) and hence does not allow inferences about the entire country. In addition, both German studies do not employ the Erikson-Jonsson decomposition approach. An application of this analytical strategy seems to be sensible not only because of its conceptual clarity, but also to obtain internationally comparable results for Germany.

4. The Education System in Germany

I now give a brief description of the German school system, where I emphasize two aspects that I believe are most relevant for understanding a) the weight of primary and secondary effects in comparison with other countries and b) potential *Länder* differences in a within-country comparison: namely the early selection and the state heterogeneity in teacher recommendations.

In Germany competence for school has been given to the 16 federal states (*Länder*); accordingly the transition to secondary school is dealt with differently depending on *Länder* legislation. Schooling is compulsory from age 6, when students enter primary school. After 4 years (6 years in Berlin and Brandenburg) of primary school with mixed-ability classes children are selected, according to their performance at primary level, into one of the different secondary school types. The main types are *Hauptschule*, *Realschule*, and *Gymnasium*. The *Hauptschule* (lower sec.) prepares mainly practically oriented students for craft professions and usually comprises grades 5 through 9 (10 in some states). The *Realschule* (intermediate sec.) prepares students for trade, technical and administrative professions, comprising grades 5 to 10. The *Gymnasium* (upper sec.) which rums from grade 5 to 12 or 13 (depending on state), caters mainly to theoretically oriented students, who are to be prepared for various studies at universities. In addition, most states offer *Gesamtschule*, which is a track that integrates the three other ones into one comprehensive track, but it is less common. Seven states have combined Realschule and Hauptschule, so that 'Gymnasium' is the only distinct track available in all states[4]. For this reason, the following description and analysis will focus on the transition into 'Gymnasium'.[5]

About 1/3 of all students transfer to 'Gymnasium' (Prenzel et al. 2005), which is the most demanding and prestigious track, and the only one leading directly to the 'Abitur'. 'Abitur' is the required entrance qualification for tertiary education. In addition, it keeps all

[4] Some states offer an integrated Real-Hauptschul-track not instead of separate ones, but in addition.
[5] For a more detailed description of the educational system see for example The Standing Conference of the Ministers of Education and Culture (2009).

options open for any type of vocational training. There are other ways to become eligible for tertiary education, however these are very rarely taken.[6] Most students commence 'Gymnasium' directly after primary school, because in later years, it is virtually impossible to switch to this track. (Bellenberg et al. 2004, Schneider 2008). Thus, the 'Gymnasium' is the most important school type for obtaining advanced degrees and achieving high social positions.

Early Tracking

One of the most debated features of the German schooling system is the selection of students into different secondary school tracks when they are usually 10 years old (e.g. Hanushek & Wößmann 2005); no other European country divides students at such an early age (see for example Brunello et al. 2004 for a comparison).[7] One major problem of early tracking is that a child's potential ability and future achievement is hard to evaluate when s/he is very young. The life-course hypothesis suggests that parental background heavily influences school choices at such an early age, while social origin effects decline from earliest to later branching points in nearly all industrialized countries (Blossfeld & Shavit, 1993; Müller & Karle, 1993). *In comparison with other countries, I therefore expect direct origin effects (secondary effects) to be more pronounced in Germany*. Because of its life chance implications ('Gymnasium' is the only track that provides direct entry into tertiary education), potential negative effects of early tracking in Germany are eminently severe.

Institutional differences in teacher recommendations

The selection procedures into 'Gymnasium' differ markedly across the *Länder* (federal states) as they allow for different degrees of teacher influence in the decision process. In some states (e.g. Bavaria or Baden-Württemberg), students can only enter 'Gymnasium' (or Realschule) after receiving a respective teacher recommendation, or alternatively, after passing an entrance examination. In other federal states (e.g. North Rhine-Westphalia or Hesse) the teacher recommendation is merely a suggestion for parents. Although parents usually follow through, research reveals that parents holding a higher social position follow the teachers' recommendations less often, and send their offspring to 'Gymnasium' even if the teacher thinks that this school type is too demanding for the child (Ditton et al., 2005). In general, the

[6] Over 89 per cent of the general university entrance qualifications awarded in the year 2007 were obtained by attending 'Gymnasium' Statistisches Bundesamt. (Federal Statistical Office) 2008. *Fachserie 11, Reihe 1: Absolventen/Abgänger 2007*.
[7] In some cases the first two years in secondary school are considered to be a „trail" period ('Orientierungsstufe').

decision about secondary school track is based on a dialog between teachers and parents and in most cases a consensus is reached (Cortina & Trommer 2003). However, in case of discrepancies, it is either the teachers or the parents who have the final say, depending on federal state regulation. In other words: the *ultimate decision authority* lies in the hands of the teachers in some states, while it lies in the hands of the parents in others.[8] While largely ignoring the state differences in recommendation regulations, abundant evidence proves that the recommendation plays a crucial role in the actual choice of secondary school track (Arnold et al. 2007, Bos et al. 2004, Ditton 1992, Ditton & Krüsken 2006, Stubbe & Bos 2008, Wiese 1982). As a general guideline, teachers are supposed to take into account a child's demonstrated academic ability and its development over time, but also "soft factors" like social behaviour and work habits. Essentially, teachers are supposed to base their recommendation on factors signalling success probability; social origin is not to be taken into consideration. The Standing Conference of the Ministers of Education and Culture (2006) puts it like this: 'The educational track that suits a child's learning ability best should be open to this child – independent of parental status or wealth'. In states with a binding recommendation the link between grades and recommendation is closer for policy reasons. The school laws state that certain grade limits have to be met (e.g. an average Mathematics and German grade of 2.5 in Baden-Württemberg) in order to obtain a 'Gymnasium'-recommendation. In non-binding states a grade limit is not so clearly stated.

From a rational-choice perspective, it has a lot to commend that teachers follow the guidelines and base their recommendation much less on the socio-economic situation of the family than parents. As opposed to the parental decision, teachers should have no interest to maintain the status of a family. In the same manner, (opportunity) costs that families might be faced with when sending their offspring to a 'Gymnasium' should not be part of the teachers' considerations. The dominant factor in the decision situation of the teacher should be the perceived success probability (p): Children who show good performance in primary school should receive a recommendation for 'Gymnasium', for as these children are likely to complete the track successfully. Hence, one would expect primary effects to clearly dominate the transition in states with binding recommendations.

Note however, that according to results from the German PIRLS-Extension children from salariat classes (EGP I and II) have 2.63 higher chance of receiving a recommendation for 'Gymnasium' than children from lower classes, net off cognitive and reading skills (Bos et

[8] For a current overview of regulations specific to the various Länder with regard to the transition from the Grundschule (primary school) to lower secondary education, see the website of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder (www.kmk.org).

al. 2004, cf. Lehmann & Peek 1997 for similar findings). Even though direct origin effects in teacher recommendations are weak in comparison with parents aspiration (Ditton 1989, 2007, Lehmann & Peek 1997), how can they be explained? Socially selective recommendations do not necessarily have to reflect discrimination or exclusion by middle class teachers (cf. Bourdieu 1971). Quite rational explanations might well account for such an effect: Firstly, it is plausible that teachers anticipate the more beneficial support in high socioeconomic families. In order to survive in the intellectually most demanding track, it is helpful to have highly educated parents who can help with homework and give support if the child is facing difficulties. Especially for children for whom the evaluation of success probability is ambiguous, it would be 'rational' to take social origin into account when forming a recommendation. Another reason might be connected to the vague formulation of the factors (social behaviour and work habits) that should be taken into account when forming a recommendation (as formulated in the respective school laws of the 'Länder'). Perhaps the teachers' conceptions about appropriate social and work behaviour for 'Gymnasium' correlate with the social background of the children.

In sum, secondary effects can be assumed to be prevalent not only in the parental aspiration but also in the teacher recommendation, although to a lesser extend. *I expect stronger secondary effects in states with non-binding recommendations, as the parents can easily get their way. In states with binding recommendation, teachers interfere and enforce more meritocratic transitions. Hence, secondary effects should still be prevalent, but weaker.*

5. Data and variables

For my analysis I rely on a nationwide children panel study by the German Youth Institute (DJI).[9] Encompassing three waves, this longitudinal study maps the transition to secondary school for a 1993/94 birth cohort (Infas 2003, 2004, 2006). At each wave, children as well as mothers were interviewed face-to-face.[10] The first wave was carried out in the fall of 2002, when children attended 3rd grade. The second wave was administered in spring 2004, just around the time when families and teachers make their decision about secondary school track. The actual decision was observed in wave 3 (fall 2005), when children had transferred to a secondary school track. Unfortunately, the sample size is rather small, with complete information for 570 families. However, to my knowledge the German Youth Institute data is the only panel study to date covering the transition to secondary school for the entire country. Other studies are regionally restricted, cross-sectional, or do not include performance

[9] Official registration office address data drawn from 100 representatively chosen communities.
[10] In addition, there was a drop-off questionnaire for fathers with complementary information.

measures, and thus do not permit a clean separation of primary and secondary effects for the entire country.

In order to employ the Erikson-Jonsson approach, the following information is needed: student's social origin, their academic performance prior to transition, and, as a dependent variable, the transition to secondary school. In addition, the 'Länder' need to be identified to test for within-country differences. I attempt to measure this information in the following way:

Transition. Because 'Gymnasium' is the only distinct track available in all states, I construct a dummy choice variable of 'Gymnasium' versus 'lower'. In the lower category are children who transferred to Realschule, Hauptschule, or a combined Real- and Hauptschultrack.[11] Out of 570 families, 272 (48%) chose 'Gymnasium', while 230 (40%) did not. 68 (12%) families have not unambiguously opted for or against 'Gymnasium', either because their child has to repeat a school year or because s/he is attending a comprehensive track ('Gesamtschule'), where different degrees (including Abitur) can be obtained. These families are excluded from the following analysis, so that a sample of 502 families remains.

Social Origin. Social origin is measured as socioeconomic status (SES) of family – a combined measure of the families' social and economic position. The measure is based on education and occupation of both, father and mother; in each case the highest value is used when both pieces of information are available. Education captures educational degrees, running from 1 ("no degree") to 11 ("university degree"). Occupation was classified using a crude 3-class measure (Working, Intermediate, Salariat). As a third dimension, the SES index includes net household income (cf. Alt & Quellenberg 2005). At first, I broke the index into the conventional 3 categories, high, middle, and low. However, because of the reduced sample sizes in the *Länder*-specific analysis, I had to reduce the index to 2 categories, for which I will present results here, collapsing "middle" and "low" into "low". Results on the relative importance of primary and secondary effects based on the 3-category measure (for Germany as a whole) are provided in the appendix.

Academic performance. I measure primary effects using the average of the two most important grades, German and Mathematics, from the mid-year report of grade 4. At this time, approximately half a year prior to the actual transition, parents and teachers form their educational decision.[12] In my view, grades are the most sensible measure for primary effects in Germany, because they are the most visible and available information about performance to

[11] Hauptschule exists as an independent track only in 10 out of 16 states, Realschule only in 8.
[12] Using grades from the final report does not make much sense, as the decision has already been taken by then.

the parents, as there is no such thing as test results or cognitive competence measures. Furthermore, school teachers are obliged to base much of their recommendation on the mid-year report. In comparison with other performance measures, grades proved to be the best single indicator for primary effects in Germany (Stocké 2007b). To account for missing values in grades (5.4% of the analysis sample), I imputed values using the parents' as well as the childrens' subjective evaluation of mathematical and literacy competence respectively.[13] In theory grades can run from 1 to 6, in which 6 is the worst grade. In reality 6 is almost never assigned; this is reflected in the data where 5 is the worst grade.

Länder heterogeneity. In order to test for state variation in relative importance of primary and secondary effects, places of residence of the families where assigned to the respective states. At the time the observed cohort made the transition, 10 out of 16 states had a non-binding recommendation, while the recommendation was binding in Baden-Württemberg, Bavaria, Brandenburg, Saxony, Saarland, and Thuringia.

Methodological Approach

To partition the total IEO into its primary and secondary elements, I apply a method developed by Erikson et al. (2005, cf. also Jackson et al. 2007) and extended by Buis (2008).[14] By now, this method has been described and applied in a series of papers; therefore I limit myself to merely sketching out the logic of the method: Secondary effects are isolated by comparing the transition rates into 'Gymnasium' of an actual and a counterfactual group, which only differ with respect to transition propensities (thus secondary effects). Similarly, primary effects can be isolated by comparing transition rates of an actual and a counterfactual group which only differ with respect to their performance distributions. In a second step, from the factual and counterfactual transition rates, factual and counterfactual log odds ratios can be computed, and subsequently the relative contribution of primary and secondary effects, as percentage of log odds ratios can be derived. For detailed description of the method cf. (Contini et al. 2008, Erikson 2007, Erikson et al. 2005, Erikson & Rudolphi 2009, Jackson et al. 2007, Kloosterman et al. 2009, Schindler & Reimer 2008). In its original version, Erikson et al. (2005) assumed that the variable through which the primary effect occurs is normally distributed. In my analyses I follow the specification by Buis (2008) who relaxes the

[13] These variables explain 44% and 52% of variance in the respective grades. Results do not change significantly when computing models without imputed values.
[14] cf. Fairlie (2005) for a similar method.

assumption of normal distributed performance values and take the empirical distribution instead.

6. Results

Initial Results

I will first report results for Germany as a whole, before presenting findings with respect to *Länder* differences. To begin with, I display in table 1 transition rates into 'Gymnasium' and grade point averages for children with high and low socioeconomic backgrounds. Comparing transition rates, it is readily apparent that students from high socioeconomic backgrounds, on average, opt more often for the most ambitious secondary track (77%) than their peers from less privileged backgrounds (38%). This substantial difference is also reflected by the odds ratio of 5.33 shown at the foot of the table, which is the preferred measure of social origin differences in educational attainment. Next, looking at the grade point averages for both groups, it becomes evident that some of the differences in transition rates are due to primary effects. Students from high socioeconomic backgrounds reach, on average, a grade point average (gpa) of 2.11, while children from low socioeconomic backgrounds reach a significantly lower gpa of 2.53[15] (t=5.89, df=500, Pr (|T| > |t|) = .000). Note that for the subgroups continuing to 'Gymnasium', the grade difference disappears (t=1.06, df=270, Pr (|T| > |t|) = .289), indicating that students need good grades no matter where they are from when continuing to 'Gymnasium'.

Table 1: Transition rates into 'Gymnasium', GPAs, and odds ratio of students from different socioeconomic backgrounds

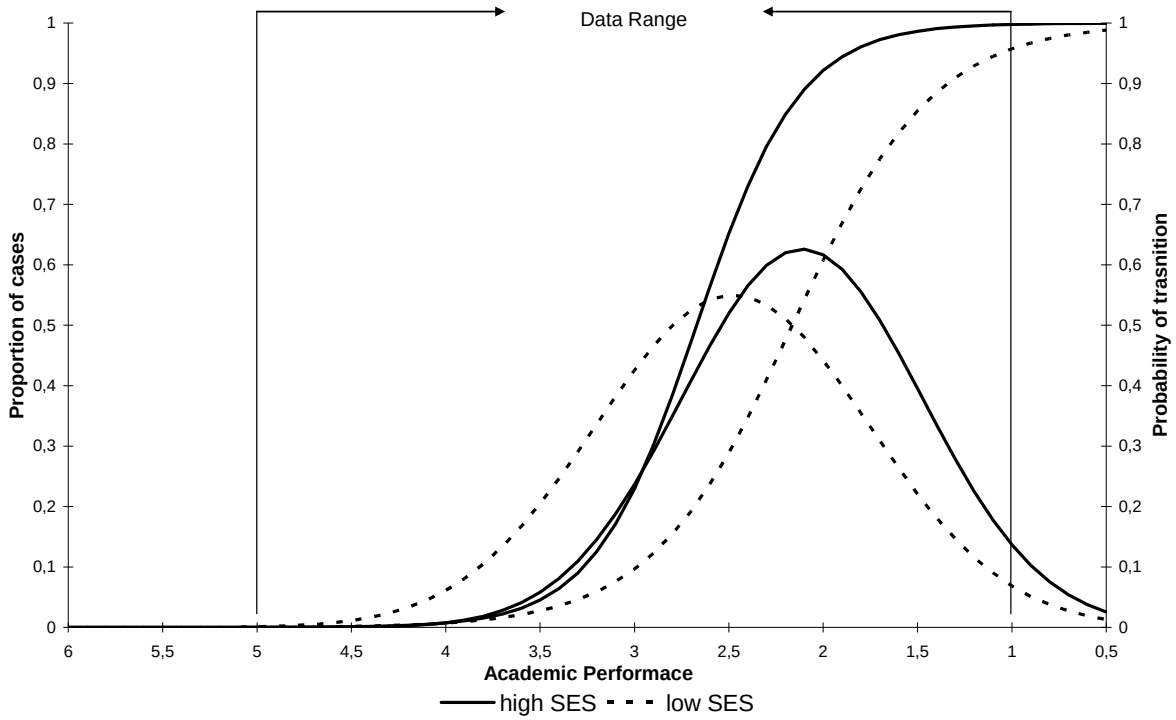
Socioeconomic Status	transition rate		grade point average (gpa)	
	%	N	of entire group	of subgroup continuing to 'Gymnasium'
high	77	207	2.11	1.90
low	38	295	2.48	1.96
total	54	502	2.33	1.92
odds ratio high / low	5.33 (z=8.22)***			

I now move on to a graphical representation, that relates the transition into 'Gymnasium' to both, performance and social origin. For each student transition probabilities are estimated using binomial logistic regressions in which gpa is used as an explanatory variable. In

[15] note that a 1 is the best and a 6 the worst grade in Germany.

addition, the standardized gpa distributions for each group are plotted (i.e. I take the mean and standard deviations of the gpa distribution).

Figure 1: Graphical representation of regression of transition into 'Gymnasium' on academic performance



The logistic curves in figure 1 show, for each group, the proportion of students continuing to 'Gymnasium' at every point on the performance axis. Two expected features become immediately evident: First, from the performance curves we again see that students with high educated parents perform better in primary school than their peers with low educated parents. Hence, the difference between the performance distributions point to primary effects. Second, when looking at the logistic curves, we see that transition probabilities are higher for students from high socioeconomic backgrounds at each level of academic performance, reflecting secondary effects. When we examine the slopes of the logistic curves in more detail, a third feature becomes evident: The 'gaps' between the curves are at their widest at intermediate levels of performance. This points to the fact that families with different SES choose different secondary school tracks when their children are neither exceptionally good nor really bad in school, but somewhere in between. For example, at the mean performance score of 2.33 79% of high SES children transfer to ''Gymnasium'', but only 40% of low SES children. On the other hand, among the top 20% of students (≤1.5), the difference is markedly smaller with 100% (high SES) and 95% (low SES) children transferring to 'Gymnasium'. From a rational-choice perspective, this seems perfectly reasonable: When a child is performing exceptionally

good in school, parents (and teachers) will almost always send him/her to 'Gymnasium', independent of the parents socioeconomic position. Inversely, a student will not be sent to 'Gymnasium' if s/he is a big underachiever, even if his/her parents are of high status and would most likely feel very inclined to do so. Simply speaking, the risk of failing is to high. With mid-range performance, however, information about academic potential of a student is ambiguous. Here, leeway for secondary effects to operate is greatest. While high educated parents may take into account their ability to support the child in case of difficulties, parents with low education refrain from opting for the most demanding track. It might be suspected that this finding is an artefact due to the logistic regression function. To check on this, I plotted non-parametric lowess smoothers for the actual transition probabilities, which do not force a functional term onto the data (cf. appendix). This procedure reproduces the slope characteristics, indicating that secondary effects are in fact more prevalent at intermediate performance range (cf. Jackson et al. 2007 for similar findings for England/Wales).

Relative Importance of Primary and Secondary Effects

In table 2, actual and counterfactual transition rates into 'Gymnasium' are estimated using the method proposed by Erikson et al. (2005) and Jackson et al. (2007).[16] P_{hl} denotes the estimated transition probabilities, with the first subscript indicating the performance distribution of group *h* (*high SES)* and the second subscript indicating the conditional transition propensities of group *l (low SES)*. For the actually existing combinations displayed in the first half of the table, the estimated transition rates match with the observed transition rates as reported in table 1, indicating that the regression model is not badly specified. The impact of secondary effects becomes apparent if one compares groups that only differ with respect to transition propensity. For example, the transition rate for students from high socioeconomic background is 77% (P_{hh}). If these students had had the same performance but the transition propensity of students from low socioeconomic backgrounds (P_{hl}), the estimated proportion proceeding to 'Gymnasium' would have been only 54%. This makes a difference of 23 percentage points which is solely due to transition behaviour, independent of performance. Similarly, the impact of primary effects can be estimated when comparing, for example, P_{hh} (77%) with P_{lh} (62%). Here the difference denotes 15 percentage points, which is merely driven by primary effects.

[16] Calculations were carried out using the STATA ado ldecomp (Buis 2008).

Table 2: Estimated factual and counterfactual transition rates into 'Gymnasium'

actual combinations*	transition rates into ‚Gymnasium'(in %)
P_{hh}	77
P_{ll}	38
counterfactual combinations	
P_{hl}	54
P_{lh}	62

* The first subscript represents the performance distribution, while the second subscript represents the transition propensity respectively.

To estimate the relative impact of secondary effects in the transition gap between the two groups, I divide the counterfactual odds ratios by the factual odds ratios and vice versa, as proposed by Erikson et al. (2005). Secondary effects can be isolated by

$$Q_{hh.hl} = (P_{hh}/(1-P_{hh})) / (P_{hl}/(1-P_{hl})) \quad (1a)$$

or $$Q_{lh.ll} = (P_{lh}/(1-P_{lh})) / (P_{ll}/(1-P_{ll})) \quad (1b)$$

While primary effects can be isolated by

$$Q_{hl.ll} = (P_{hl}/(1-P_{hl})) / (P_{ll}/(1-P_{ll})) \quad (2a)$$

or $$Q_{hh.lh} = (P_{hh}/(1-P_{hh})) / (P_{lh}/(1-P_{lh})) \quad (2b)$$

respectively. Taking the log, the relative importance of secondary effects can then be calculated as

$$L_{hh.hl} / L_{hh.ll} \quad (3a)$$

or $$L_{lh.ll} / L_{hh.ll} \quad (3b)$$

Results are presented in table 3. Secondary effects account for 59% of social background differences in transition rates to ‘Gymnasium’. Note that, in contrast to most other countries, secondary effects are dominating the educational choice at the first important transition node in Germany (with the exception of Italy; cf. Contini et al. 2008).

Table 3: Factual and counterfactual odds-ratios and relative importance of secondary effects as percentage of log-odds ratios

	total IEO	primary effect	secondary effect
method (a)	$Q_{hh.ll}$	$Q_{hl.ll}$	$Q_{hh.hl}$
odds-ratio	5.33	1.90	2.82
ln (odds-ratio)	1.67	0.64	1.04
method (b)	$Q_{hh.ll}$	$Q_{hh.lh}$	$Q_{lh.ll}$
odds-oatio	5.33	2.06	2.59
ln (odds-ratio)	1.67	0.72	0.95
	relative importance of secondary effects (in %)		
	formula (a)	formula (b)	average
	$L_{hh.hl} / L_{hh.ll}$	$L_{lh.ll} / L_{hh.ll}$	(a+b) / 2
	62	57	59

Länder differences

In order to test for 'Länder' differences in transition regulations, I split the sample into families living in 'Länder' with non-binding recommendation (62% of the sample) and families living in 'Länder' where the recommendation is binding (38% of the sample). Subsequently, the same decomposition strategy is applied to both subgroups. Table 4 indicates that secondary effects are less pronounced in 'Länder' where parents can hardly deviate from the teacher's recommendation. Here, secondary effects account for 55%, while they constitute 63% of IEO in 'Länder' with a non-binding recommendation. This finding goes well with Stocké's (2007b) results, who analysed the same transition for Rhineland-Palentine which has a non-binding recommendation. With a different methodological approach he estimated secondary effects to account for 53-71% when measuring primary effects via grades as well. The finding points to an expected, yet interesting phenomenon: More parental freedom of choice produces higher inequality in choices, net of ability.[17] Yet, the contribution of secondary effects is still (unexpectedly) high in binding states.

[17] Note that it is uncertain whether the 'Länder' difference is significant, as a validated approach that produces confidence intervals for the decomposition method is unavailable to date.

Table 4: Performance, transition rates, odds-ratios, and relative importance of secondary effects by 'Länder'-groups

Socio-economic status	N	grade point average		transition rates into 'Gymnasium' (in %)
non-binding recommendation (10 Länder)				
high	132	2.13	.29	80
low	177	2.42		46
total	309	2.30		60
odds-ratio (high / low):		4.61 (z=5.80)***		
relative importance of secondary effects#:		63 %		
binding recommendation (6 Länder)				
high	75	2.07	.50	72
low	118	2.57		27
total	193	2.38		45
odds-ratio (high / low):		6.91 (z=6.25)***		
relative importance of secondary effects#:		55 %		

average of methods a ($L_{hh.hl}$ / $L_{hh.ll}$) and b ($L_{lh.ll}$ / $L_{hh.ll}$)

Table 4 reveals some other interesting 'Länder' differences. Although the decision seems to be more 'meritocratic' in binding 'Länder', the total IEO is larger, if anything (or=6.91 vs. or=4.61). Looking at the gpa we get a hint on why this could be the case: in binding states grades are more socially differentiated than in non-binding states, which causes more variance (in primary effects) to be explained. To shed some more light on this puzzle, I tested whether the two institutional regimes lead in fact to more or less inequality in students' performance. Results from OLS-regression (table 5) confirm that grades are in fact more socially differentiated in states where teachers decide ultimately upon secondary school track. In binding states the SES coefficient is almost double the size and R^2 is three times the size compared to non-binding states. In a combined model the interaction-effect is marginally significant. Possible explanations will be discussed in the concluding section.

Table 5: OLS Regression of socioeconomic background on grade point average by 'Länder'-group

	non-binding	binding	combined model
	β (t)	β (t)	β (t)
high SES	.28 (3.62)***	.50 (4.85)***	.28 (3.59)***
binding recommendation	-	-	-.16 (-1.92)+
high SES * binding	-	-	.22 (1.68)+
Costant	4.59 (89.34)***	4.42 (68.77)***	4.58 (88.50)***
R^2	.04	.12	.07
N	309	193	502

Significance: *** $p \leq .001$, + $p \leq .10$. Reference category: low SES

7. Discussion

In this paper, my aim was to contribute to a body of recent literature by evaluating the relative importance of primary and secondary effects at the transition to upper secondary school ('Gymnasium') in Germany. *Firstly*, analysis showed that, overall, secondary effects dominate the transition, accounting for 59 % of total inequality. In comparison with other countries for which the analysis has been carried out, this is a relatively high contribution of secondary effects.[18] In line with the life-course hypothesis, it is conceivable that the early transition point in time is in part responsible for a strong impact of social origin vis-à-vis ability at this node. Of course, findings are somewhat hard to compare, given the different measures of social origin and performance. *Secondly*, there is some evidence that secondary effects are most relevant when children are in the mid-range of the performance distribution. From a rational-choice perspective it is plausible that leeway for secondary effects is greatest when success probability is uncertain. *Thirdly*, I assessed whether institutional differences in the transition regulations between federal states alter the relative impact of the effects. The heterogeneity between federal states concerning the teacher recommendations and the effect on inequality had not been the subject of research. From a policy perspective, this is quite surprising, because unlike other factors influencing educational decisions, the impact of the teacher recommendation can be politically altered. Should we keep up the parents' freedom of choice as in most states, or ultimately let the teachers decide about the secondary school type? There is some support for the assumption, that secondary effects are less pronounced when teachers ultimately decide instead of parents, because they are less interested in status maintenance of the students' families and decide in a more 'meritocratic fashion'. The reduction in relative impact of secondary effects is, however, only moderate. When forming a recommendation, teachers are strongly influenced by the social origin of a child, over and above demonstrated ability. It is plausible that teachers anticipate the potential parental support for children from high socioeconomic backgrounds in case of difficulties. Therefore, they may rank their success probability higher at the same level of demonstrated performance. Likewise, teachers conceptions about social and work behaviour which is required to successfully complete 'Gymnasium' may correlate with the characteristics of children from privileged families. It would be an area of further research to directly test these hypotheses.

The 'Länder'-analysis revealed another interesting aspect, which I would like to emphasize. While the *relative* contribution of secondary effects is lower in binding states the

[18] A notable exception is Italy, for which a relative contribution of 71-60% of secondary effects has been estimated (Contini et al. 2008).

total inequality is slightly higher, because grades are more socially differentiated. With two main actors in the decision situation (teachers and parents), I see at least two starting-points for possible explanations:

a) Teachers may try to avoid potential conflicts over disagreeable recommendations with high-SES parents, by giving away better grades to their offspring. Based on these favourable grades, they can easily recommend the students to 'Gymnasium'. Similarly, a grade discrimination of children from low socioeconomic backgrounds is conceivable, because teachers are urged to give away a certain proportion of 'bad' grades, which make students only eligible for lower secondary tracks. This is to conserve the stratified schooling system.[19]
b) Parents with high socioeconomic status know about the strict grade cut-off point and hence may invest more in their children's academic performance, in order to make the limit.

These explanations are cases of "anticipatory decisions" (Jackson et al. 2007: 212) that come about because of institutional factors, namely the 'bindingness' of the recommendation. Whether they really apply, however, remains an open question. Nevertheless, these hypotheses point to a theoretical difficulty which is related to the process character of educational decisions: primary and secondary effects do not operate independent of each other. On the one hand, demonstrated ability, of course, influences secondary effects, mostly by operating via 'success probability (p)' in the decision situation. On the other hand, it is likely that families, until they reach the decision node, make a number of quite conscious (not to mention unconscious) decisions which influence the performance at the time point of the track decision (e.g. homework check-up, or music lessons). Thus, the causal direction is reversed – decision based secondary effects influence performance based primary effects, instead of the other way around. In this sense, the results reported here represent the "lower bounds" of secondary effects. A binding recommendation might amplify such anticipatory decisions as sketched out above.

Are there any policy implications that can be derived from the analysis? It became evident that policy measures aimed at reducing primary effects (e.g. the introduction of all-day school or assistance to disadvantaged children) can only reduce a certain proportion of the inequality. Findings suggest that it might be more effective for the reduction of inequality to tackle secondary effects. How so? More research is needed to clarify by what secondary

[19] In 2008, Sabine Czerny, a Bavarian primary school teacher has been fired for giving away too many good grades, although tests actually showed that her students did perform better as well. The case was a prominent media event for a few days.

effects are driven. The larger secondary effects in the mid-range of the performance distribution suggest that they might be due to insecurity in the decision, but origin specific cost-benefit considerations or educational aspirations are just as conceivable. Furthermore, the higher proportion of secondary effects in comparison with other countries is another piece of evidence suggesting that the early tracking is not favourable for children from low socioeconomic backgrounds. Last but not least, there is no clear-cut answer whether parents or teachers should ultimately decide about the track. Whether a binding recommendation triggers anticipatory decisions, thereby 'levelling out' the more meritocratic teacher decision, is an open question for further research.

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Appendix

Table A: Estimated factual and counterfactual transition rates into 'Gymnasium' based on a 3-category SES measure ("high", "medium", "low")

actual combinations*	**transition rates into ‚Gymnasium'(in %)**
$\mathbf{P_{hh}}$	**77**
$\mathbf{P_{mm}}$	**47**
$\mathbf{P_{ll}}$	**23**
counterfactual combinations	
$\mathbf{P_{hm}}$	**59**
$\mathbf{P_{hl}}$	**44**
$\mathbf{P_{mh}}$	**66**
$\mathbf{P_{ml}}$	**33**
$\mathbf{P_{lh}}$	**54**
$\mathbf{P_{lm}}$	**35**

*** The first subscript represents the performance distribution, while the second subscript represents the transition propensity respectively.**

Table B: total inequality (as measured in odds ratios of transition rates into ‚Gymnasium') and relative importance of secondary effects based on a 3-category SES measure

SES	Odds Ratio	relative importance of secondary effects (in %)		
		formula (a)	formula (b)	Average
High / Low	10.99	61	57	59
High / Med	3.73	64	59	62
Med / Low	2.95	55	54	54

Figure A: Lowess Regression of transition rates into 'Gymnasium' by socioeconomic status

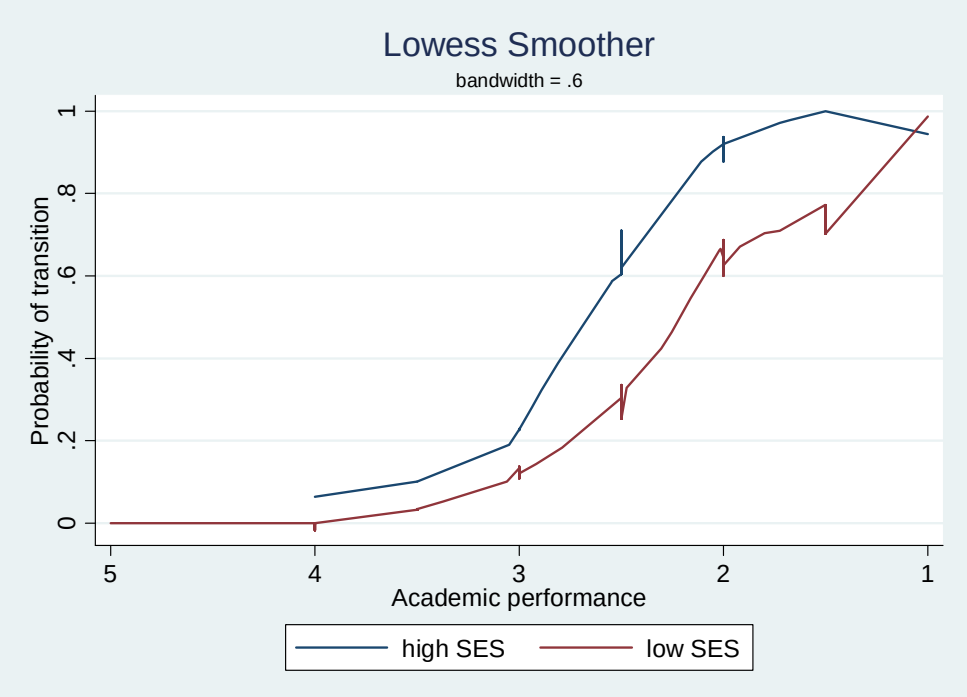

Table C: Transition regulations into 'Gymnasium' by 'Länder', simplified description based on resp. federal acts.

'Länder'	Criteria for 'Gymnasium' recom-mendation; rec. degrees of bindingness (++ - 0)	Decision taking authority	Possibility to influence decision taking authority
			parents are able to influence teachers' decision:
BW	Ø Math and German ≤ 2,5; previous learning and study habits (++)	teacher	consultation procedure; entrance examination (has to be passed with ≤ 2,5).
BY	Ø Math, German, and Social Studies ≤ 2,33, while Math a. German ≤ 2,0; pedagogical report (++)	teacher	if a 3 in Math or German is obtained, transition into 'Gymnasium' possible after consultation; lesson on trail[a].
SN	Ø Math and German ≤ 2,5 (++)	teacher	written entrance examination (has to be passed with ≤ 2,5).
TH	Ø Math, German, and Soc. Studies ≤ 2,0; competency development (++)	teacher	possibility of making an application for 'Gymnasium'-recommendation; three-day lesson on trail.
BB	Ø Math, German, and first foreign language ≤ 2,33 [b]; pedagogical report (++)	teacher	two-day aptitude test.
SL	German and Math at least a 2 and a 3; differing grades cause discretionary decision by teacher conference (++)	teacher	written test in German and Math.
			teachers are able to influence pareants' decision:
BE	Ø Math, German, first foreign language, and Science ≤ 2,2; rating of learning skills (+)	parents	If child incapable to fulfil requirements after 1 term trail period , child has to be taken out of 'Gymnasium'.
SH	recommendation based on competency development and current grades (+)	parents	exception only possible after prior consultation; impossibie to deviate by more than one track from recommendation (e.g. attend 'Gymnasium' with 'Hauptschule'-recommendation).
HE	competency development, grades, work attitude (+)	parents	If child incapable to fulfil requirements after 1 term trail period , child has to be taken out of 'Gymnasium'.
ST	grades, competency development and –behaviour (0)	parents	--
HB	grades, competency development, personality-development [c] (0)	parents	--
HH	skill level and –development, autonomy of learning (0)	parents	--
MV	grades, work and social behaviour (0)	parents	--
NI	work and social behaviour , grades, competency development (0)	parents	--
NW	grades, dialogue with parents [d] (0)	parents	--
RP	grades, academic behaviour and –development (0)	parents	--

Abbr.: Ø – grade point average.

[a] About 4% of all students attend lesson on trail during transition, 50% of them pass the lesson and can transfer to 'Gymnasium' (official statistics of the bavarian ministry of education, school year 2004/05).

[b] Because of the usually six-year primary school, mid-term reports of 6th grade are authoritative.

[c] There are a few six-year primary schools in Bremen (5 out of 84) where the recommendation is binding.

[d] The free parental decision has been restrained 2006 (doesn't concern the observed cohort).