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## **Does the Selectivity of an Educational System Affect Social Inequality in Educational Attainment? Empirical Findings for the Transition from Primary to Secondary Level in Germany**

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### **Abstract**

Previous research has shown that educational transitions are decisive for the explanation of social educational inequalities. One key factor for social-class-specific transitions at crucial branching points in the educational system is the difference in educational decisions of higher and lower social classes even at the same level of performance. Therefore, it is often assumed that an institutional setting in which families do not have a free choice, but where transitions are determined by binding teacher recommendations that are based on educational performance, is one possibility to reduce social inequality in educational opportunity. To test the effectiveness of such an institutional arrangement, we use Germany as a strategic test case. We investigate differences in social inequality in educational attainment between German federal states with differing transition rules and examine two changes in the transition regulations that have taken place in one federal state within the past 10 years. Our results indicate that the binding nature of the transition recommendation given by primary schools for the different secondary school types does not substantially alter the effect of social background on the probability of attending the higher secondary school track in secondary level I.

### **Introduction**

Social inequality of educational opportunity (IEO)<sup>1</sup> is one of the permanent key topics in sociology, and finding cost-effective ways of reducing IEO is a major social policy objective. Over the past few decades, great progress has been made in better understanding how inequalities evolve, and it has been shown that educational transitions are crucial for the explanation of educational inequalities (Boudon, 1974; Jackson, 2013).

With respect to educational institutions that might affect the extent of IEO, the stratification of educational systems<sup>2</sup> is often in the limelight (e.g. Maaz et al., 2008; Pfeffer, 2008; Van de Werfhorst and Mijs, 2010). Due to the importance of educational transitions for IEO, also another aspect has increasingly come into the focus of educational inequality research in recent years, namely the degree to which families are free to decide about the course of education of a child at crucial

transition points, irrespective of its actual performance. Following Jackson and Jonsson (2013), we call this feature the selectivity of an educational system. In completely selective systems, the transition is strictly determined by the performance of a student, while in completely non-selective systems, the families can decide about the continuation of education and/or choose the educational track totally irrespective of educational performance.

While the expectation is widely shared that restricting families' freedom of choice might reduce IEO, our empirical knowledge about the effect of selectivity on IEO is overall incomplete since empirical studies are rare and results are not completely consistent. Therefore, our aim is to empirically evaluate, as convincingly as possible, whether the implementation of a highly selective system is an adequate institutional regulation to reduce overall IEO. This is important since, if such a regulation is really effective, it would be a cost-efficient and rather easy-to-implement way to approach an important goal of education and social policy. We intend to achieve our research objective by using Germany as a strategic test case.

Our article is structured as follows: we start by discussing the theoretically expected impact of granting or restricting a family's free school track choice at the end of primary schooling on social inequality at secondary level. Next, we present the results of previous studies on this subject. This is important since many of them are written in German and therefore have hitherto not been recognized by an international audience. After that, we introduce the data and analytical strategy and present the unique possibilities of the big representative sample used by us to investigate our research question further. We then go on to present and interpret the results of our analyses. We conclude the paper with a summary and a discussion.

### **Freedom of Choice and IEO**

Class-specific transition patterns can be traced back to differences in performance (primary effects) on the one hand, and to different transition decisions even in the case of equal performance in school (secondary effects) on the other (Boudon, 1974).

The better performance of children from higher social classes is attributed to a high level of education-enhancing resources as well as to corresponding attitudes and interests of such families (Boudon, 1974). With regard to secondary effects, especially the motive of status maintenance—which highlights the importance for parents that their children reach at least the same social status as themselves—is considered to be decisive for the more ambitious transition decisions of higher social classes even at the same level of performance (Erikson and Jonsson, 1996). All in all, existing research has clearly shown that social-class-specific transitions at crucial branching points in an educational system are of key importance and that both primary and secondary effects play a vital role in creating IEO (Jackson, 2013).

Against this background, it is widely assumed that higher social classes benefit from free school track choice more than lower social classes. The reasoning behind this assumption is that in highly selective systems, the chances of parents to choose a more demanding type of secondary school than the one their child is assigned to are clearly restricted (in contrast, it is allowed to deviate downwards from the recommendation). These restrictions should particularly affect higher class parents since, compared to lower class parents, they are more likely to try to assert their (ambitious) educational aspirations even if their children's performance might not suggest an academically demanding school track (Jackson and Jonsson, 2013; Neugebauer, 2010). As a result, binding place assignments should limit secondary effects, while a free school track choice should lead to a full unfolding of secondary effects.

Therefore, it is often theoretically argued that overall IEO should be weaker in selective systems compared to less selective ones, since secondary effects should be reduced, whereas primary effects are expected to be not substantially influenced by selectivity (e.g. Dollmann, 2016; Jackson and Jonsson, 2013; Jähnen and Helbig, 2015; Maaz et al., 2008; Roth and Siebert, 2015).

Concerning the effects of freedom of choice on educational inequality, previous international empirical research has predominantly concentrated on school choice in general, e.g. on the question whether students have to attend the nearest school in the neighbourhood or not. Overall, results indicate that freedom of choice rather intensifies social inequality. One reason for this finding could be that higher social classes usually possess more economic resources, better information, and more helpful social contacts to find, choose, and attain the best schools (e.g. Allen et al., 2014; Ambler, 1994).

In contrast, empirical studies which explicitly investigate the effects of a free secondary school track choice on IEO are scarce and inconclusive. Based on analyses on the French education system, Barg (2013) even sup-poses that ‘shifting decision-making power from the families to the school can be counterproductive under certain institutional circumstances’. However, Barg can-not directly compare in her analyses the level of IEO between a situation with high selectivity and a situation with low selectivity.

Based on cross-national comparative research on seven European countries and the United States, Jackson and Jonsson (2013) investigated the impact of stratification and selectivity at the first transition point in the educational system on the share of primary and secondary effects as well as on IEO. Overall, their findings are inconclusive. For the effects of selectivity on IEO, the same is true for a cross-national comparison of Germany, Italy, and the Netherlands (Contini and Scagni, 2011). As the authors themselves point out, this could be due to several shortcomings of their design that might undermine the correlation between selectivity and inequality. Most prominently, selectivity and stratification of educational systems are highly correlated be-tween countries, both of which should have opposite effects on inequality.

We therefore believe that it is crucial to find a setting in which stratification tends to be constant while selectivity differs. For this reason, Germany seems to be an ideal strategic test case since—although in Germany each federal state can decide its own educational policies by law—there are also institutions that coordinate the educational policies of the federal states. As a result, the general structure and especially the stratification (Müller, 2005) of the educational systems are similar, while selectivity at the point of transition at the end of primary school varies considerably between federal states.

In all federal states, at the end of primary school education, primary schools recommend to families a secondary school type for their children. This recommendation is primarily based on school grades and therefore on previous performance. In some federal states, these recommendations are binding, which means that pupils cannot readily make a transition to a higher secondary school type other than the one recommended. In other federal states, however, families are not bound by the recommendation and can therefore choose the secondary school type for the child more freely. Thus, in cross-federal-state comparisons within Germany, we find a setting which is better suited to reveal the actual impact of selectivity on IEO than in cross-national comparative research settings. Additionally, some federal states have changed the rules with respect to selectivity. These changes can be utilized as natural experiments in the analyses.

While previous German empirical studies suggest that secondary effects of social origin are stronger when selectivity is low (Gresch et al., 2009; Neugebauer, 2010; Dollmann, 2011, 2016), results with regard to the impact of selectivity on IEO are not completely consistent. Neugebauer (2010), Gresch et al. (2009), and Roth and Siegert (2015) do not find clear differences between federal states with high selectivity and federal states with low selectivity, whereas Contini and Scagni (2011) find that parental background appears to be less import-ant in federal states with high selectivity. Although problems of cross-national comparisons should be di-minished in a cross-federal-state comparison within one country, there are still relevant differences between the individual German states. If these factors have an impact on social inequality at secondary level and, at the same time, vary systematically between federal states with and federal states without binding recommendations, effects of the transition provision might be hidden.

Therefore, apart from cross-federal-state comparisons, also natural experiments were exploited to analyse the effects of a change in the transition regulations. While Dollmann (2011, 2016) finds the expected reducing effect of binding transition recommendations on overall IEO, results from Roth and Siebert (2015) as well as from Jähnen and Helbig (2015) do not generally support this finding.<sup>3</sup> However, these studies also have some shortcomings. Dollmann's studies (2011, 2016) are restricted to the city of Cologne and can therefore not be compared to other federal states without a change in the regulation as control group. While the studies of Roth and Siebert (2015) and of Jähnen and Helbig (2015) overcome this issue, some of their natural experiments took place more than 30 years ago and in most of them, relevant changes in the educational system that could bias the results took place simultaneously. Additionally, while Dollmann (2011, 2016) analyses the effects directly at the point of transition, the other authors analyse the effects a few years after the transition. Therefore, it could be the case that the different results are due to modified social-class-specific changes of school types during the beginning of secondary level I.

In summary, there is no unambiguous empirical support for the widespread theoretical assumption that a highly selective educational system substantially reduces the total educational inequality between social classes. Due to the limitations of previous research and because of the great relevance for educational policy, further studies are imperative.

### **Data Base and Analysis Strategy**

For our analyses we use the German Microcensus, which is an annual, official, and representative survey including 1 per cent of German households (Statistisches Bundesamt, 2014). For the households selected, participation is mandatory. Since all persons in one household are polled, it is possible to analyse how young persons with different social backgrounds are distributed over the different types of schools at secondary level. Our analyses refer to the Microcensus surveys of the years 2008 to 2012 because information on the school type attended by adolescents was not collected in the Microcensus between 1990 and 2007.<sup>4</sup> The Microcensus does not provide information on the grade the pupils attended, so we approximate the grade and the year of the transition to secondary level on the basis of the pupils' age.

As argued above, it is important for our analyses to use a setting in which stratification tends to be constant while selectivity differs. Therefore, Berlin, Brandenburg, and Mecklenburg-Western Pomerania are excluded because in these federal states pupils enter the stratified system with secondary school types of varying difficulty after grade six instead of grade four. Also the Saarland is excluded since in this federal state the transition regulation was changed in summer 2010.<sup>5</sup> Thus, the analyses cover persons living in private households in 12 of 16 German federal states.

To classify the social origin, information about the head of the household and his/her partner is taken into consideration. The highest educational achievement is used and a distinction is made between a higher education entrance qualification (Abitur/Fachabitur) and a lower school qualification.

The dependent variable is the type of secondary school of general education a child attends at a certain age, and a distinction is made between attending Gymnasium and attending another type of secondary school.<sup>6</sup>

In the multivariate analyses, we run linear probability models with cluster-robust standard errors that take into account that the model errors might be correlated within federal states. Since the number of federal states is small, we use a wild cluster bootstrap procedure to prevent standard errors from being downward biased (Cameron and Miller, 2015).

The empirical part of the article is structured as follows. First of all, cross-federal-state comparisons are carried out, comparing federal states where transition provisions are binding throughout the period of observation with those where provisions are continuously non-binding. To evaluate whether binding and

non-binding federal states differ systematically with respect to IEO, we run pooled models and include an inter-action term between social origin and the transition regulation.

For the purpose of getting as conclusive results as possible, we analyse short-term as well as medium-term effects. The extent of IEO is examined not only for 11-year-old pupils, who predominantly made their transition to secondary level I just in the year before, but also for 12- to 15-year-olds and thus throughout secondary level I.

On the individual level, we control for gender and migration background. On the federal state level, we include aspects that might affect IEO and differ systematically between binding and non-binding federal states. These are variables that indicate the number of those different secondary school types which at least 10 per cent of the secondary level I students attend and a dummy for East Germany. Additionally, we take into account time-varying federal state and age-specific information on whether it takes 12 or 13 school years to achieve the Abitur, the share of students whose parents have a higher education entrance qualification, the share attending the Gymnasium and the share who left the Gymnasium in secondary level I.<sup>7</sup> Besides main effects, we also run analyses in which we additionally include the interaction terms between social background and all federal state-level variables. It should be noted that the latter two federal state variables might be not entirely exogenous but to some extent a result of differing transition regulations. Including these variables into the analyses does, however, not substantially change our main results.

As already explained, a cross-federal-state comparison is a good but not an ideal design since the correct identification of the causal influence of institutional provisions depends on whether relevant differences between federal states can be adequately controlled. Thus, we also analyse the impact of two changes of the transition rule in North Rhine-Westphalia (NRW). In the case of pre- and post-measurements, we compare the trend of IEO in NRW with the trend of IEO in federal states without a change in the transition regulations. The impact of the legislative amendment results from the difference between the trends of the treatment group and the control group. This has the advantage that period effects and unobserved group characteristics that exist in both groups are controlled for (Legewie, 2012).

Concerning the introduction of binding teacher recommendations after a change in the government at the end of the 2006/07 school year, we cannot investigate IEO directly after the transition, but we analyse whether the change has a lasting effect on social inequality until the middle or the end of secondary level I by using 12- to 15-year-old pupils.<sup>8</sup> After an additional change of government in NRW, since the end of the 2010/11 school year families are again free to decide without restriction about the type of secondary school for their children (Ministerium für Inneres und Kommunales des Landes Nordrhein-Westfalen, 2010). While we investigate the medium-term consequences for the first change, we analyse the short-term consequences for the second one.<sup>9</sup>

To investigate whether these institutional changes affected IEO, we use a ‘difference-in-difference-in-differences’ (DDD) approach (Gangl, 2010; Kroth, 2015). Key independent variables are social background, a variable which differentiates between the treatment (NRW) and the control group as well as a variable that differentiates between the pre- and post-treatment period. The DDD estimate of interest is a triple interaction between social background (SB), treatment group (TR), and post-treatment period (TP) in a model that also includes the corresponding main effects and two-way interactions. This triple interaction indicates whether IEO has significantly changed in NRW relative to the control group after the transition regulation had been changed.

The key identifying assumption is that there were no other factors besides the change in the transition regulations that differentially affected the transition to the Gymnasium of lower and higher social classes before and after the treatment in only one of the two experimental groups. While this assumption is clearly easier fulfilled than the identifying assumption of simple cross-federal-state comparisons, results could still

be biased by time-varying confounders (X). Therefore, we also include the above described individual and time-varying federal state control variables to control for changes in the student composition or state characteristics. We additionally run analyses in which we include the inter-action terms between social background and the federal state level variables. We estimate variants of the following linear probability model:

$$Y = \alpha + \beta_1 SB + \beta_2 T + \beta_3 TP + \gamma_1 SB \times T + \gamma_2 SB \times TP + \gamma_3 T \times TP + \delta SB \times T \times TP + \varepsilon + \epsilon$$

Our data and research strategy improve previous studies in several ways. First of all, it is the first study that controls for several relevant federal state characteristics that could bias the results and implements proper DDD analyses.

Furthermore, it is the first study that analyses the re-cent change from binding to non-binding recommendation in NRW in the summer of 2011. This gives us the very rare opportunity to have a design in which, in a single educational system, a legislative amendment towards more selectivity was first executed (summer 2007) and, just a few years later, was abolished again (summer 2011). As a result, we can examine short-term and medium-term effects on IEO for cross-federal-state comparison and for changes within one federal state over time. This is relevant because the short-term consequences should be unbiased by later school type changes, while the medium-term effects tell us if binding provisions are an effective way of reducing IEO sustain-ably. Additionally, analysing various age groups and several transition cohorts before and/or after the changes leads to more robust results and allows us to investigate if a change in IEO is exceptional in size.

Finally, unlike Roth and Siegert (2015) and Jähnen and Helbig (2015), we do not rely on the 70 per cent subsample of the scientific use files of the Microcensus, but instead we make use of the whole sample, which gives us 30 per cent more cases. This should also lead to more precise and robust results.

## Analyses

Comparison of IEO in Secondary Level I in Federal States with Binding and Federal States with Non-binding Transition Recommendations In a first step, we examine whether the extent of social inequality in the allocation to different types of schools in secondary level I differs depending on the binding nature of the transition recommendation. To this end, analyses are carried out for 11-, 12-, 13-, 14-, and 15-year-old children.

Table 1 shows descriptively for the single federal states the number of cases and the level of IEO measured as the difference in the probability of attending a Gymnasium between children with low and children with high social background. To obtain sufficient case numbers to get robust estimates for the less populous federal states, data were pooled from the Microcensus surveys of 2008 to 2012.

The data show that children with higher social back-ground have a substantially higher probability of attending the Gymnasium in all federal states (usually 30–40 percentage points higher than children with lower social background). Although the degree of IEO varies considerably between individual federal states, it does not differ systematically in the expected direction between binding and non-binding states. Instead, in both groups there are federal states with low and with high IEO.

Multivariate linear probability models confirm this result. In Table 2, estimates for the interaction between social background and living in a federal state with binding recommendation are shown (full models with estimates for all variables are shown in Tables A2a –

**Table 1.** Level of IEO and number of cases in single federal states for 11- to 15-year-old pupils

Pupils' age	11		12		13		14		15	
	Level of IEO	N	Level of IEO	N	Level of IEO	N	Level of IEO	N	Level of IEO	N
NRW	0.369	6,154	0.372	6,819	0.381	6,872	0.379	6,873	0.370	6,546
Federal states with binding school recommendations (high selectivity)										
Baden-Wuerttemberg	0.368	4,078	0.355	4,470	0.388	4,593	0.384	4,640	0.352	4,377
Bavaria	0.412	4,943	0.426	5,340	0.432	5,329	0.412	5,466	0.408	5,171
Saxony	0.442	1,115	0.433	1,207	0.500	1,092	0.433	1,046	0.411	939
Saxony-Anhalt	0.374	631	0.383	674	0.490	613	0.467	549	0.472	510
Thuringia	0.273	610	0.336	619	0.365	576	0.324	531	0.303	500
Federal states with non-binding school recommendations (low selectivity)										
Schleswig-Holstein	0.338	1,173	0.406	1,241	0.385	1,194	0.390	1,226	0.412	1,177
Hamburg	0.363	505	0.426	501	0.440	523	0.398	487	0.388	468
Lower Saxony	0.383	2,938	0.349	3,375	0.377	3,252	0.386	3,367	0.365	3,332
Bremen	0.302	193	0.234	205	0.316	193	0.443	202	0.498	199
Hesse	0.326	2,200	0.348	2,392	0.320	2,409	0.349	2,414	0.336	2,224
Rhineland-Palatinate	0.410	1,440	0.348	1,527	0.366	1,566	0.406	1,580	0.402	1,534

Source: Microcensus 2008-2012, own calculations.

A2f). Students from NRW are excluded from these analyses since a part of them made their transition under a binding and another part under a non-binding regulation.

In none of the models, IEO is significantly lower in binding than in non-binding federal states. In contrary, all estimates point in the opposite direction; however, none is statistically significant at the 5 per cent level neither in the separate analyses for the single age groups nor in the combined analyses for 11- to 15-year-olds.

In summary, it can be noted that—in line with most results of previous studies but contrary to the theoretical expectations—absolute IEO is not lower in selective transition regimes than in non-selective regimes. This holds true throughout secondary level I.

### Effects of the Introduction and Abolition of Binding Transition Recommendations on IEO in Secondary Level I

In the following, we examine the impact of the change from non-binding to binding transition recommendations in NRW in summer 2007 and the reinstatement of non-binding recommendations in summer 2011. While we can investigate the medium-term consequences of the first amendment (12- to 15-year-old pupils), we are able to analyse the short-term consequences in terms of the second (11-year-old pupils).

Students aged 11–15 years made their transition to secondary level under different rules in NRW, depending on the survey year of the Microcensus. For example, those 13-year-olds surveyed in 2008 and 2009 made the Transition to secondary level primarily before 2007 (non-binding recommendation), those who took part in the survey in 2010 to 2012 mainly in 2007 or later (binding recommendation). Pupils aged 11 at the time of survey years 2008 to 2011 transferred predominantly to secondary level between 2007 and 2010 (binding recommendation), those of survey year 2012 mainly in 2011 or later (again non-binding recommendation). In theory, it is to be expected that, due to the restriction of the family's free choice between 2007 and 2010, the influence of social origin on the likelihood of attending Gymnasium instead of another type of school is lower for those students who made their transition to secondary level in NRW during this time period.

In Figure 1, descriptive findings on the differences of IEO between NRW and other federal states over time are summarized for the five age groups separately. The x-axis indicates the year the pupils predominantly made their transition to secondary level I. The y-axis indicates the percentage point differences between NRW and the other federal states with respect to the gap between higher and lower social classes concerning the share of students attending the Gymnasium (for a more detailed overview see Table A1). Subtracting general trends of IEO that can also be observed in federal states without a change of the binding nature of the transition recommendation provides convincing information on the extent to which the developments in NRW are unique and therefore due to the institutional changes.

For 15-year-olds who made their transition predominantly in 2003 and 2004, there was nearly no difference



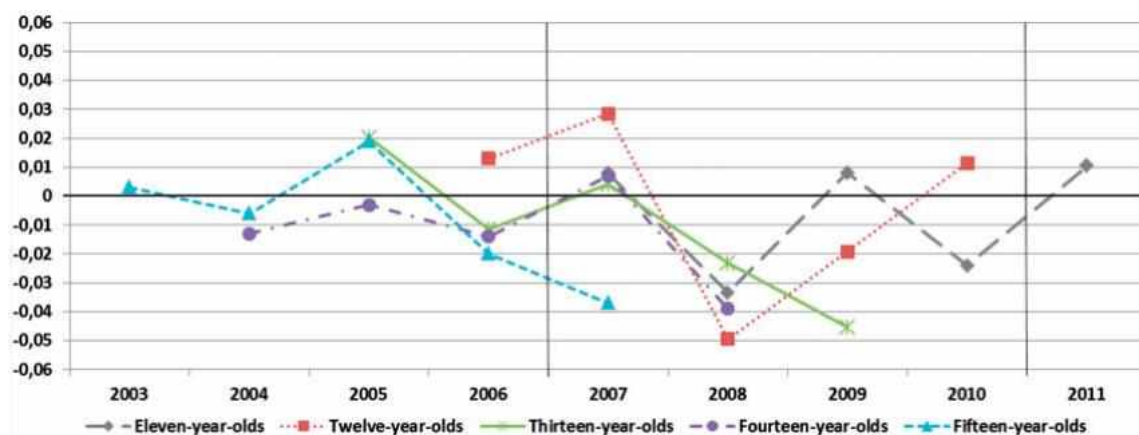
**Table 2.** Difference in the level of IEO between binding and non-binding federal states for 11- to 15-year-old pupils (linear probability models)

Pupils' age	Model 1	Model 2	Model 3	Model 4
11-year-olds				
Higher class x binding recommendation	0.023 (0.378)	0.028 (0.302)	0.028 (0.404)	0.041 (0.212)
N	19,826	19,826	19,826	19,826
12-year-olds				
Higher class x binding recommendation	0.032 (0.488)	0.036 (0.454)	0.041 (0.494)	0.041 (0.066)
N	21,551	21,551	21,551	21,551
13-year-olds				
Higher class x binding recommendation	0.053 (0.102)	0.058 (0.062)	0.048 (0.166)	0.040 (0.210)
N	21,340	21,340	21,340	21,340
14-year-olds				
Higher class x binding recommendation	0.017 (0.430)	0.022 (0.270)	0.014 (0.464)	0.031 (0.076)
N	21,508	21,508	21,508	21,508
15-year-olds				
Higher class x binding recommendation	0.007 (0.796)	0.011 (0.694)	0.013 (0.514)	0.023 (0.278)
N	20,431	20,431	20,431	20,431
11- to 15-year-olds				
Higher class x binding recommendation	0.027 (0.394)	0.031 (0.342)	0.028 (0.500)	0.036 (0.296)
N	104,656	104,656	104,656	104,656

Model 1: Main effects of higher class and of binding recommendation, survey year dummies, sex, migration background. Model 2: Model 1 +East Germany, share of higher class students, number of secondary school types, years until Abitur. Model 3: Model 2 +interactions between higher class and East Germany, share of higher class students, number of secondary school types, years until Abitur. Model 4: Model 3 +share of students at the Gymnasium, share who left the Gymnasium +interactions between higher class and share of students at the Gymnasium, share who left the Gymnasium. All combined models for 11- to 15-year-olds additionally include age dummies.

Source: Microcensus 2008–2012, own calculations.

\*Significance level: P 0.05, \*\*P 0.01. P-values for t-statistics in brackets.



**Figure 1.** Difference of IEO between NRW and other federal states over time.

X-axis: Year pupils predominantly made the transition to secondary level I  
Y-axis: Percentage point difference of IEO between NRW and other federal states  
Source: Microcensus 2008-2012, own calculations.

of IEO between NRW and the other federal states. In 2005, the gap is 2 percentage points higher in NRW than in the other federal states, whereas it is 2 percentage points smaller in 2006 and nearly four percentage points smaller in 2007.

The fact that IEO in NRW compared with IEO in the control group is smallest for those who made their transition predominantly after 2006 is in line with our expectation that the introduction of a binding recommendation in 2007 reduced IEO. However, the decrease of less than 2 percentage points between 2006 and 2007 is small and the changes between 2004, 2005, and 2006 are even stronger although most students in all of these years made their transition under a non-selective regulation. Furthermore, while IEO becomes smaller for the 15-year-olds, it unexpectedly goes up for the 12-, 13-, and 14-year-olds between 2006 and 2007.

From 2007 to 2008, IEO becomes smaller in NRW compared to the other federal states for all 11- to 14-year-olds, which could be an indication of a lagged effect of the change in the transition regulation. This is contradicted, however, by the fact that the difference of IEO for the 11-year-olds rises again to the level of 2007 in 2009 and for the 12-year-olds it rises to the level of 2006 in 2010.

Concerning the change towards less selectivity in 2011, it shows that, as expected, the difference in IEO for 11-year-olds rises between 2010 and 2011. However, the level is similar in size in 2011 (non-binding recommendations) like in 2007 and 2009 (binding recommendations), and overall variations between the years 2007 and 2011 show trendless fluctuations.

It can be summarized that some of the descriptive results could be interpreted in favour of the expectation that a legislative amendment towards more/less selectivity reduces/increases IEO. However, compared with the overall gap between lower and higher social classes concerning the Gymnasium attendance in NRW of about 37 percentage points, most changes are rather small in size and many of the more substantial changes take place between transition years in which no change of the selectivity took place. Additionally, the directions of the changes between two transition years often differ between the different age groups. It must therefore be concluded that the picture is rather unclear.

This impression is substantiated in the multivariate analyses. In Table 3, we show estimates of triple interactions between social background, post-treatment period and treatment group (full models with estimates for all variables are shown in Tables A3a–A3f). These triple difference estimates (DDD) indicate whether IEO has significantly changed in NRW relative to the other federal states after the transition regulation had been changed.

The DDD estimates consistently point in the expected direction and the effect sizes are similar between the incrementally built-up models 1 to 4, irrespective of the additional variables controlled for. However, taking into account the generally high level of IEO, DDD estimates between 0 and 3 percentage points are rather small. Moreover, despite the unusual high number of cases at the individual level in our analyses, only the DDD estimates for 11-year-olds in models 3 and 4, which include the interaction terms between social background and the federal state control variables, are statistically significant at the 5 per cent level. Since our descriptive findings from Figure 1 show that for this age group variations between the years 2007 and 2011 show trendless fluctuations and the difference in IEO between NRW and the other federal states in 2011 is similar to those in 2007 and 2009, the significant DDD estimates can hardly be interpreted as a consequence of the amendment towards less selectivity.

Despite separate analyses for the single age groups, we additionally conducted combined analyses for all 11-to 15-year-olds in which we investigate whether IEO in NRW, compared to IEO in the other federal states, is smaller for students who made their transition to secondary level I in the years 2007–2010 (binding recommendation) than for those who made their transition before or after this time period (non-binding recommendation). DDD estimates are small, and despite 137,920 respondents at the individual level, none is statistically significant.

It can therefore be concluded that there is no clear evidence to suggest that IEO in secondary level I has actually changed as a result of the change in the selectivity. But even if one wishes to interpret the slight changes as an effect of the legislative amendments, it needs to be noted that a binding transition regulation has only very limited influence and does not seem suitable to substantially reduce IEO in secondary level I.

### Summary and Discussion

Previous research findings indicate that social-class-specific transitions at central branching points in the educational system play an important role in generating IEO. However, previous studies regarding the effects of the transition rules on IEO are scarce and ambiguous. The aim of this study was therefore to obtain the best possible reliable information about which effect the extent of selectivity at the first transition into different school tracks has on IEO.

**Table 3.** Triple difference estimates between social background, treatment group, and post-treatment period (linear probability models)

Pupils' age	Model 1	Model 2	Model 3	Model 4
11-year-olds				
Higher class x after 2010 x NRW	0.021 (0.056)	0.020 (0.056)	0.022* (0.022)	0.024* (0.024)
N	25,980	25,980	25,980	25,980
12-year-olds				
Higher class x after 2006 x NRW	-0.021 (0.114)	-0.021 (0.112)	-0.020 (0.252)	-0.019 (0.286)
N	28,370	28,370	28,370	28,370
13-year-olds				
Higher class x after 2006 x NRW	-0.023 (0.102)	-0.023 (0.096)	-0.029 (0.066)	-0.021 (0.186)
N	28,212	28,212	28,212	28,212
14-year-olds				
Higher class x after 2006 x NRW	-0.004 (0.780)	-0.004 (0.764)	-0.007 (0.636)	0.003 (0.870)
N	28,381	28,381	28,381	28,381
15-year-olds				
Higher class x after 2006 x NRW	-0.032 (0.182)	-0.032 (0.180)	-0.031 (0.192)	-0.022 (0.344)
N	26,977	26,977	26,977	26,977
11- to 15-year-olds				
Higher class x 2007–2010 x NRW	-0.012 (0.210)	-0.013 (0.200)	-0.015 (0.202)	-0.011 (0.348)
N	137,920	137,920	137,920	137,920

Model 1: Main effects and two-way interactions for NRW, treatment, higher class psex, migration background.

Model 2: Model 1 +share of higher class students, years until Abitur.

Model 3: Model 2 +interactions between higher class and share of higher class students, years until Abitur.

Model 4: Model 3 +share of students at the Gymnasium, share who left the Gymnasium +interactions between higher class and share of students at the Gymnasium, share who left the Gymnasium.

All combined models for 11- to 15-year-olds include age dummies and survey year dummies.

Source: Microcensus 2008–2012, own calculations.

\*Significance level:  $P \leq 0.05$ , \*\* $P \leq 0.01$ . P-values for t-statistics in brackets.

We analysed the effects of selectivity on IEO on the basis of a comparison between German federal states, thereby reducing problems of cross-national comparative research. In particular, it was possible to estimate the effects of selectivity while keeping stratification constant to a large extent and while controlling for other important aspects on the federal state level.

In addition, analyses were carried out for NRW on the impact of the change from a less to a more selective transition regulation in the summer of 2007 as well as from a more to a less selective system in the summer of 2011 on social inequality in secondary level I. In this respect, trends in NRW were compared with trends in federal states where regulations did not change to exclude an influence of general trends independent of the changes in regulations.

Contrary to our expectations, our results consistently indicate that selectivity of the educational system does not substantially affect the extent of IEO in secondary level I. This is true for short-term as well as for medium-term effects. Although concerning the legislative amendments in NRW results point by tendency in the expected direction, detailed descriptive results show an ambiguous picture and DDD estimates are small in size and, despite very high number of cases at the individual level, hardly ever significant at the 5 per cent level. In view of the strong data base, we definitely would expect clearer results if selectivity really had substantial effects on IEO. Overall, our results show a surprising stability of the influence of social background on school placement throughout secondary level I. Parents from higher social classes seem to be more successful than parents from lower social classes in ensuring an advantageous position for their children in the educational system, largely independent of the extent of selectivity.

Although our data base and research strategy gave us unique opportunities to examine the effect of selectivity on IEO, we cannot completely rule out that the unexpected results are due to (time-varying) confounders we cannot control in our analyses. However, we controlled for several theoretically important confounders in the comparison of the federal states as well as in the analyses on the regulation changes in NRW and results turned out to be pretty robust. Additionally, the results do not only relate to one but to three different contexts—a comparison between federal states, the introduction of free parental will, and the restriction of parental will—each with different potentially distorting effects. Since in none of the three contexts unequivocal evidence for effects of selectivity on IEO is found, it hardly appears plausible that this consistent finding could be solely put down to aforementioned restrictions.

From a more theoretical perspective, the absence of the expected effects of the selectivity could be due to the fact that ‘in practice, every educational system leaves plenty of room for maneuver’ (Jackson and Jonsson, 2013). In our case, it may indeed be possible that parents from higher social classes, when faced with binding transition recommendations, use their substantial re-sources to improve the primary school performance of their children by increasing their workload and/or by supporting them more strongly in school matters (e.g. homework or preparation for tests and exams) to guarantee the desired transition (Roth and Siegert, 2015). Even at the rather sudden change of transition regulations in NRW, families could adapt the learning behaviour of the child in the last year of primary school.

Further, even in federal states with highly selective systems, it is possible to try to circumvent the recommendation of the primary school. For instance, one can retroactively prove the qualification of a child for the desired type of school by means of an advisory consultation, a qualifying test or trial lessons and

thus correct the initial recommendation (e.g. Sekretariat der Kultusministerkonferenz, 2010). Moreover, it is always possible to choose a less demanding type of secondary school than the one the child is assigned to.

Additionally, binding place assignments should limit IEO only if the assignment process is less influenced by social class than parents' decisions. In this regard, cultural reproduction theory (Bourdieu and Passeron, 1990) would claim that teachers act according to the interests of the dominant social classes and assignment processes that rest on teachers' judgments would rather not reduce IEO. For Germany, there are indeed indications that higher class parents apply more pressure on teachers in more selective systems to influence the marks as well as teachers' school recommendations according to their needs and that teachers in selective systems are more inclined to preventively adjust their grading to the wishes of parents to avoid a conflict (Pohlmann, 2008). Like in France (Barg, 2013), parents in NRW possibly applied more pressure on the teachers, whilst the system was more selective to get the recommendation they wanted.

Finally, what is mostly ignored is the fact that, even without the just described adaption processes, binding teacher recommendations do not necessarily decrease IEO. This is because the implementation of a selective educational system only reduces IEO if the amount of students who aspire to attend the most prestigious school track, but are not allowed to due to insufficient academic achievements, is larger among students from upper than from lower social classes. This relation is often taken as granted, because at a given ability level higher classes more often aspire for a higher school track than lower classes. However, it must also be considered that, at the same time, higher classes show on average better school performance, which is why a higher fraction of them gets a recommendation for a Gymnasium and is therefore unaffected from binding recommendations. Consequently, the total effect of selectivity on IEO depends on the actual extent of differences between social classes with respect to their ability and aspiration distributions (for a more comprehensive discussion, see Contini and Scagni, 2011). For Germany, empirical results show that the percentage point differences between the aspirations and the recommendations for the Gymnasium are similar for parents with an Abitur and parents with a lower school qualification (Jonkmann et al., 2010).

While on the basis of the information available, it is unfortunately not possible to clarify which of the potential causes are responsible for the lack of effects of the way the transition is designed, we believe that it is most likely a mix of the just outlined reasons. These aspects should be examined in more detail in future research. Although the empirical analyses are restricted on the German case, they are for several reasons also of high strategic value for international research which goes beyond the specific case of application. First of all, our data base and research strategy gave us unique opportunities to overcome many shortcomings of international comparative research that aimed at analysing the causal effect of selectivity on IEO.

Secondly, although generalizability of empirical results to other institutional settings is always subject to restrictions, it nevertheless appears likely that constraining the freedom of choice through binding teacher recommendations would not substantially contribute to a reduction of inequality in numerous other countries either. This is because, due to the high stratification of the German educational system, the transition after comprehensive primary school is a very crucial stage with long-lasting effects on educational success and educational inequality (Kristen et al., 2014). High-status families should therefore be very interested to ensure their child's transition to Gymnasium even if the child only achieves lower grades and aspiration differences between high and low social classes should be pronounced. At the same time, compared to other countries, performance differences at the end of primary school are of medium size in Germany (Bos et al., 2012).

Over and above the strategic value of our empirical analyses, the discussion of possible reasons for why we, in accordance with most other empirical studies, do not find substantive reducing effects of selectivity on IEO accentuates that this often assumed connection is not only empirically contested but that there are also

theoretically several plausible reasons for why such a relationship might not be found. This is important as it shows that binding transition recommendations by no means generally reduce IEO but that this might be the case only under specific conditions.

On a more general level, our empirical results and theoretical argumentation cast some doubts on whether IEO can really be substantially reduced by policy interventions that are solely designed to reduce secondary effects without addressing the fundamental social inequalities in educational performance. If at all, policies that are designed to reduce secondary effects should rather aim at encouraging children from disadvantaged background with sufficient school performance to make more ambitious decisions than try to restrict the opportunities of children from advantaged backgrounds with rather weak performance (Jackson and Jonsson, 2013; Dollmann, 2016). However, if not accompanied with additional policies that foster the actual success of these children from disadvantaged backgrounds at the higher school track, long-lasting effects on IEO might be small.

## Notes

- 1 In this article, IEO stands for inequality of educational opportunity between social classes.
- 2 In highly stratified education systems, students are assigned at an early age to different school tracks with substantially varying prestige, curriculum, level of difficulty, and clearly distinct school-leaving qualifications that strongly influence the chances at the labour market and access to higher education.
- 3 Out of the four changes in the examined transition regulations, expected effects on IEO were found only for Brandenburg, while the changes in the other three federal states had either no or unexpected effects on IEO.
- 4 We thank the statistical offices of the German state and the federal states (research data centres) for making the analysis of the data possible.
- 5 Including Saarland in the analyses does not alter the substantive results. The rule change in Saarland cannot be investigated due to the very small number of cases in this federal state.
- 6 The federal states differ with respect to the number and precise types of general secondary schools. Besides the Gymnasium, lower secondary schools (Hauptschule), intermediate secondary schools (Realschule), combined lower and inter-mediate secondary schools as well as comprehensive schools (Gesamtschule) exist in Germany. The Gymnasium is the most prestigious and most challenging school type in all federal states and a graduation from it entitles pupils to enrol at uni-versity. Therefore, a dichotomization of the de-pendent variable is appropriate.
- 7 The information on the Gymnasium leavers and the number of secondary school types was obtained from the Federal Office of Statistics (Statistisches Bundesamt. Fachserie 11 Reihe 1 – Allgemeinbildende Schulen).
- 8 This is because the Microcensus did not include information on the school type attended by adolescents from 1990 to 2007.
- 9 We cannot investigate the medium-term consequences for the second rule change, because to date we have only had access to the Microcensus surveys until 2012.

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## Supplementary Data

Supplementary data are available at ESR online.

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