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Educational Effects of Alternative Secondary School Tracking Regimes in Germany

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Abstract: This paper examines educational outcomes of pupils selected to secondary school types by different tracking regimes in a German state: The traditional regime of streaming pupils after fourth grade of elementary school is compared to a regime in which pupils are selected into different secondary school tracks after sixth grade. Descriptive evidence demonstrates that the proportion of pupils reaching the highest level of secondary education is relatively small for those who attended later tracking schools. Additionally, the incidence of track modification is relatively frequent for schools with a high proportion of incoming pupils from the later tracking regime. However, less favorable educational outcomes of the later tracking schools are due to self-selection of relative low performers into these schools: The downward bias in estimating tracking regime effects is reduced considerably by controlling for a broad variety of socio-economic background characteristics. Corresponding regression results mainly indicate that there are no negative effects of later tracking on observed educational outcomes measured in the middle of secondary school. Regression analyses for different subgroups suggest that the reading performance of immigrant pupils is better under the later tracking regime compared to the early tracking system.

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1 Introduction

Numerous European countries select pupils into more or less academic tracks at some point during their secondary education. The rationale behind educational tracking or streaming is to provide a homogeneous learning environment which is supposed to foster specific pupils' abilities and to improve educational outcomes. From a theoretical point of view the educational setup with respect to tracking may be considered as the result of an optimization process. Thus, recent studies by Brunello *et al.* (2007) and Ariga *et al.* (2005) model optimal tracking time as being determined by a trade-off between negative and positive effects of early tracking: The negative effect stems from the assumption that the tracking decision is the more appropriate (with respect to actual, unobserved individual ability) the later tracking takes place. The counteracting positive effect is due to more able pupils benefiting from a more selective system.[1]

In Germany pupils are generally tracked into three different types of secondary schools at a relatively early point of their educational careers (mostly at the age of ten). Track choice mainly depends on the parents' decisions. Recently, researchers have argued that this early tracking regime is an important source of high education inequality: For example Dustmann (2004) states that early tracking enforces intergenerational immobility because of strong influences of parental views on the children's (early) educational decision. The study shows that parental education and occupational status have a significant impact on the children's secondary school choice and subsequent educational attainment in Germany. In addition, these parental influences yield to differences in the children's earnings later in life. These

[1] Non-linear peer-effects are assumed in these models. Epple *et al.* (2002) is a further study modelling implications of school tracking. However, this paper refers to the somewhat different context of ability tracking within public and private schools. Different selection mechanisms to school tracks are examined in Fernandez (1998).

views are confirmed by recent studies mainly drawing on internationally standardized test score data for different countries: The cross-county comparisons by Hanushek and Wößmann (2006), Entorf and Lauk (2006), Ammermüller (2005), and Schütz *et al.* (2005)[2] and the Swiss cross-canton study by Bauer and Riphahn (2006) indicate that countries featuring tracking and especially early tracking systems are characterized by relatively high educational inequality and lower average performance. Pekkarinen (2005) shows that later tracking yields higher gender differences in education in favor of girls and decreases the subsequent gender wage gap.[3]

One special feature of the German educational system is that besides the traditional early tracking schools some later tracking schools exist, too: In so-called 'support stages' (*Förderstufe*) or 'orientation stages' (*Orientierungsstufe*) tracking is postponed for two years. The idea is that pupils are given more time to develop specific skills and interests and that teachers and parents receive improved information for the transition decisions to secondary schools. To date and to my knowledge, no empirical research has been undertaken to identify a causal effect of the 'support stages' on educational outcomes using appropriate statistical strategies.[4]

This study aims at examining educational effects of these special schools in one German state (*Hessen*), for which data on the entire pupil population is available. The central methodological problem when comparing educational outcomes by tracking regime is that tracking regime choice is endogenous to educational outcomes. Thus, estimates of the 'support stage effect' are likely to be biased in a simple regression framework. The contribution of

[2] The empirical paper by Schütz *et al.* (2005) also offers a theoretical model linking the timing of tracking to education inequality.

[3] While the focus of the present paper is on tracking of pupils to academic and vocational school types further empirical studies consider ability grouping within schools. Recent papers examining this version of tracking are for example Zimmer (2003), Figlio and Page (2002) and Betts and Shkolnik (2000).

[4] An early study of the 'support stages' in *Hessen* is provided by Hopf (1979) and describes the development and organisation of the schools as well as experiences of parents, teachers and pupils in this school type. The study does not compare 'support stage' outcomes to outcomes of alternative school types using evaluation techniques. A similar approach is taken in the studies of 'orientation stages' in Bremen by Eiko (1989) and Eiko (1991). Henze *et al.* (1996) focuses on low ability pupils within 'orientation stages' in the state of *Niedersachsen*.

this paper consists in addressing the issue of extended comprehensive schooling in Germany and in revealing and minimizing the bias that exists when estimating the regime effect on later educational outcomes. In brief, since the endogeneity bias can be considered to be an omitted variable bias, I examine how the estimated effect changes as one controls for a broad variety of background characteristics. The findings mainly suggest that there is no (negative) effect of the later tracking regime.

One additional feature of my research is that I use newly available administrative data on the entire pupil population for one German state (*Hessen*). To my knowledge, this data base covering four waves of data has not been used before in empirical research studies (with the exception of Puhani and Weber, 2006). Therefore, this is the first study providing detailed information on the importance of alternative tracking types in a German state based on individual level data.

This paper is organized as follows: Section 2 describes the German education system with an emphasis on the institutional framework of the state of *Hessen*. Section 3 provides descriptive evidence on tracking in *Hessen*. It is shown that pupils having attended later tracking schools perform worse (in terms of the reached secondary education level) than pupils who have been tracked early. However, these results are driven by the endogeneity of regime choice. The methodological framework for an analysis of track choice taking its endogeneity with respect to educational outcomes into account is introduced in Section 4 together with the results. Section 5 discusses the findings and concludes.

2 Institutional Background

Traditionally, the German school system is characterised by early ability streaming of pupils. Table 1 provides an overview of the tracking systems in selected industrialised countries:[5] While many European countries track pupils to more or less academic secondary school types, Germany's regular tracking age of ten is rather early in international comparison. To be more specific, in Germany pupils are selected into three school types after four years of elementary school:[6] The most 'able' pupils are supposed to attend the *Gymnasium* which is a nine (or eight) year higher level secondary school and enables pupils to pursue further academic studies (*e.g.* at universities).[7] An alternative school track is offered by the *Realschule* as an intermediate level secondary school which generally lasts six years and prepares students for a rather vocational education. Finally, the *Hauptschule* as the lowest level secondary school type is supposed to be the most vocational and least academic track and lasts five years. In principle, it is possible to change tracks after the initial track decision. However, different curricula for the different school types complicate switching tracks especially after sixth grade.[8]

Besides the system of streaming pupils to the different secondary school types after fourth grade, later tracking school types exist as well. These school types, which are called 'support stages' (*Förderstufe*) or 'orientation stages' (*Orientierungsstufe*), track pupils after sixth grade. Later tracking schools have been mainly introduced in different regions in the end of the 1950s and in the 1970s:[9] Especially, in the 1950s, educational experts devel-

[5] Besides explicitly streaming pupils to vocational and academic tracks, in some countries it is common to select pupils to different classes within comprehensive secondary schools according to ability (as it is the case in the U.S.). This version of tracking is not considered in Table 1.
[6] In the East German states of Berlin and Brandenburg, primary school generally covers six grades.
[7] Recently there is a tendency to shorten the duration to eight years. In the East German states of *Sachsen* and *Thüringen*, the higher secondary school generally takes eight years.
[8] Hardly any numbers on switching tracks exist. Baumert *et al.* (2003) states that 14.4 % of German 15 year old pupils in the PISA study report to have switched from initial secondary school track to another track. Pischke (2003) explains that 7 % of pupils switched to higher level schools from lower or intermediate secondary schools in 1966.
[9] For further information on the history of comprehensive secondary schooling see Hessisches Kultusministerium (1995) and Jürgens (1991).

oped the idea of so-called 'support stages'.[10] While the traditional elementary schools should be maintained, the *Förderstufe* should combine grades five and six in an autonomous comprehensive school type which would be located at traditional German lower secondary or primary schools. In the states of *Hessen* and *Niedersachsen*, this school type was introduced on a larger scale alongside the traditional tracking system.[11] Reasons for introducing 'support stages' may have been rather theoretical ones (*e.g.* to foster equal educational opportunities) or practical ones: Schools in rural areas tended to introduce 'support stages' so that all fifth and sixth graders could be provided with local secondary education.[12]

All in all, discussions of the idea of prolonged comprehensive schooling generated a mixed system of institutions in Germany: The state of *Hessen* introduced the offer of 'support stages' (*Förderstufe*) in some schools coexisting with the traditional selective school types. Children in these 'support stage' schools are normally taught in comprehensive classes while separate classes according to ability may exist for mathematics and the first foreign language (mostly English).

Concerning the regulations in the other German states, in most states, pupils are mainly still selected to different secondary school types after fourth grade. Furthermore, the states of *Bremen* and *Niedersachsen* used to have fully established comprehensive 'orientation stages' covering grades five and six but abolished them in 2005 and 2004 respectively. Only in *Berlin* and *Brandenburg*, elementary school traditionally takes six instead of four years.

In addition, general comprehensive schools exist in Germany, too. Pupils in the former German Democratic Republic used to be taught in comprehensive schools (*Einheitsschule*)

[10] This idea has been developed in the '*Rahmenplan zur Umgestaltung und Vereinheitlichung des allgemeinbildenden öffentlichen Schulwesens*' of the *Deutscher Ausschuß für das Erziehungs- und Bildungswesen* in 1959.

[11] The first *Förderstufe*-type school has already been introduced in 1955 in *Hessen* in the so-called *Schuldorf Bergstraße*. Whether a 'support stage' was introduced at a specific school was initiated by the school authority (*Schulträger*) and the respective school.

[12] A further discussion of the idea of prolonged comprehensive schooling emerged after the formation of the 'German Education Council' (*Deutscher Bildungsrat*) in 1965. In 1970, the council suggested that a comprehensive 'orientation stage' following the four years of elementary school should cover grades five and six. This is especially documented in the 'Strukturplan für das Bildungswesen' from 1970. In the following years, representatives of all German *Länder* in the *Bund-Länder-Kommission* discussed how to organise this new school type. However, the project of a system of homogenous nation-wide 'orientation stages' could not be enforced.

until tenth grade. In West Germany, comprehensive schools (*Gesamtschule*) have been introduced as an 'experiment' in few schools in the 1960s and lead to grade 10 or 13 respectively. From 1973 to 1982 all German states introduced some experimental comprehensive schools. Pupils in comprehensive schools are taught in different ability groups (only) in some subjects (*integrierte Gesamtschule*) or are allocated to an internal track according to their ability similar to the traditional school tracks (*kooperative Gesamtschule*). Nowadays, the acceptance of comprehensive schools largely varies between the German states: While there is only one comprehensive school left in Bavaria (as a leftover of the nation-wide experiment) it is widely established in the state of Berlin for example.

3 Descriptive Analysis

Before conducting a more sophisticated empirical analysis (section 4), I present some mere descriptive statistics indicating the quantitative dimension of the different tracking regimes and the streaming of pupils to the different secondary school types in *Hessen*. Further descriptive illustrations refer to the incidences of track modification and grade repetition[13] after pupils have been tracked by one or the other regime. Due to the pre-selection of different groups of pupils into the tracking regimes it is important to keep in mind that the presented stylized facts do not provide insights of the causal educational effects of one tracking regime compared to the other.

The following descriptive statistics are based on newly available individual level data provided by the local statistical office of the state of *Hessen*. The data set covers all pupils enrolled in general schools in *Hessen* in the school years 2002/2003 - 2005/2006. Until now, besides the official statistical tables, there exists only one empirical study drawing on this data base (Puhani and Weber, 2006). One drawback of the data is that it does not provide a panel, *i.e.* pupils cannot be tracked by an individual identification number. Thus, even if several data

[13] In Germany, low performing pupils have to repeat a grade if they are not able to reach certain marks.

waves exist, my analysis is based on a cross-section of observations. Little information is given on the prior development of the pupils (*i.e.* prior grade and school type) and this only refers to the previous year.

While the advantage of the data set is its large number of observations a clear general disadvantage is the limited number of reported variables for each individual. Besides variables indicating region, school and class, individual information is given on gender, birth year and month, school entry year and month and nationality. There are no outcome variables such as school marks or test scores. However, it is possible to identify the incidences of grade repetition and track modification (*i.e.* the correction of initial track choice) from one year to the following year.

Table 2 and Table 3 inform on the provision of different school types in *Hessen* based on the most recent wave of the administrative data-set: Generally, nearly 13 % of all the primary and secondary schools in *Hessen* offer 'support stages' (206 out of 1,642 schools as can be deduced from Table 2). Considering all schools offering secondary programmes, 15 % (87 out of 585) have fully comprehensive education programmes where pupils are not tracked into 'classical' secondary categories. Most of the 'support stages' are found at these fully comprehensive schools (45 % or 93 out of 206 schools). The remaining 'support stages' are located at elementary schools (22 %), schools hosting elementary schools as well as lower and intermediate secondary schools (17 %), schools offering the lower and intermediate secondary tracks (10 %) and schools offering elementary and lower secondary education (5 %). One further school offers elementary as well as intermediate education and hosts a 'support stage'. The corresponding numbers of pupils in each of these detailed primary and secondary types is provided in Table 3.

Table 4 considers the school track choice of pupils being streamed after fourth grade in 2003 and of those who opted for the 'support stage' in 2003 and are tracked after sixth

grade (in 2005). The corresponding numbers are calculated using two different waves of the data so that both groups under examination consist of pupils from approximately the same cohorts. Results from Table 4 indicate that most of the fifth graders have already been tracked to the 'classical' secondary school levels: The majority of them attends the higher secondary track (38 %) while the intermediate and lower secondary levels are less popular (14 % and 5 % respectively). Furthermore, 15 % of all fifth graders attend fully comprehensive schools and 28 % opt for the 'support stages'. The latter group of pupils is mostly streamed to secondary levels after sixth grade (except of those 2 % who decide to attend fully comprehensive schools): Pupils tracked in seventh grade mostly join the intermediate (46 %) or even the lower level (32 %) schools. There are no feasible gender differences when tracking to the secondary levels takes place after fourth grade. However, for the pupils tracked after the 'support stage', girls tend to choose higher educational tracks compared to their male classmates.

Additional evidence by nationality group is provided in Table 5. The two major subgroups under analysis are 'native' pupils (as defined by pupils holding nationalities of German speaking countries) and pupils holding another nationality ('non-natives'). Furthermore, I look at the two most frequent immigrant groups, which refer to pupils holding Turkish (about 6 % of the considered fifth graders) or Italian and Greek nationalities (1.6 % of the sample).[14] I do not consider further nationality groups because of the smaller sample sizes of these groups.

While 'native' pupils are most often tracked to the highest secondary schools after fourth grade (41 %) a relatively small proportion of 'non-native' fifth graders attend these schools (19 % of all 'non-natives', only 13 % of pupils from Turkey and 18 % of pupils from Italy/Greece). Most pupils with an immigrant background opt for the 'support stages' (34 % of all 'non-natives', 38 % and 32 % for pupils from Turkey and Italy/Greece respectively).

[14] The data at hand do not allow distinguishing between Greek and Italian nationalities.

This is consistent with the idea that these schools give them more time to integrate and learn the German language before having to decide on the educational (and professional) future.

The educational decision after the 'support stages' differs between immigrants and natives as well: While the highest proportion of natives reaches the intermediate secondary track after attending the 'support stages' (48 %), immigrants are most often selected to the lowest secondary schools (49 % of all 'non-natives', even 53 % of pupils from Turkey and 54 % of pupils from Italy/Greece).

Table 6 and Table 7 aim at answering the question whether modification of the initial track choice and grade repetitions are unusual if pupils are tracked after six instead of four years of comprehensive schooling. As described above, one rational behind the 'support stages' is that children are given more time to develop their abilities and skills and to obtain more information on their educational performance before deciding on the secondary track. If it is true that tracking after sixth grade is based on more reliable information on the pupils' abilities, one would expect that initial track choice and grade repetitions are not frequent under the later tracking regime.

Thus, Table 6 shows the numbers of pupils staying in the chosen track in fifth, sixth and seventh grade distinguishing between schools having no incoming pupils from the 'support stage' in grade seven and those having high shares (80 % or more) of incoming 'support stage' pupils. Since the number of incoming 'support stage' pupils differs by school track, I additionally distinguish between school tracks.

Generally, for the schools not educating any former 'support stage' pupils, the proportion of pupils staying in the previously chosen school type when moving to the following grade after a given grade amounts to 98 % in grades five, six, and seven. The share of stayers is lower (96 %) in the seventh grade for schools primarily recruiting former 'support stage' pupils. The difference in the shares of stayers between schools not educating any 'support stage' pupils and schools primarily educating 'support stage' pupils is especially high in the

highest secondary school track: While 99 % of the seventh graders remain in the highest level school track in the schools without former ‘support stage’ pupils, only 94 % are stayers in the schools featuring a high share of former ‘support stage’ pupils. Even if one takes into account that the seventh graders in the first type of schools (no ‘support stage’ pupils) possibly already revised their initial track decision after grades five and six, the number of six percents of track changers in the second type of schools (featuring a high share of ‘support stagers’) is comparably high.

All in all, a relatively high proportion of pupils in the higher secondary track decide to revise the track decision made after the ‘support stages’. While a primary objective of the ‘support stages’ is the optimisation of school track choice through a longer period of observation and support in the comprehensive system, the changer rates following the tracking grade suggest that the ‘support stage’ based decisions may not be as appropriate as expected. However, it must be noted again that this descriptive evidence does not provide causal effects of the tracking regime in the statistical sense but merely looks at the educational performance of self-selected groups of pupils who have chosen one or the other tracking regime.

Table 7 additionally presents rates of grade retainees following the same strategy as Table 6 above. Merely looking at the first set of rows of Table 7 gives the impression that the proportion of pupils not succeeding in the given grade is especially high for schools with high shares of incoming ‘support stage’ pupils. However, if the proportion of retained pupils is calculated by school track type (see the next sets of rows in Table 7) it is shown that the high proportion of retainees in schools receiving high shares of former ‘support stage’ pupils is due to the fact that these schools are mainly at the lower or intermediate secondary level. There are no feasible differences in the shares of retained pupils if the comparison relates to schools of the same track type.

4 Econometric Strategies and Regression Results

4.1 Identification Strategy

If the tracking regime were randomly assigned the causal effect of 'support stage' attendance on educational outcomes could be estimated using a simple OLS regression framework. The corresponding regression equation is given by:

$$Y_i^t = \beta X_i + \gamma S_i + \varepsilon_i, \qquad (1)$$

where Y_i^t is the educational outcome of individual *i* measured at time *t* (several years after the regime choice), X_i is a vector of explanatory variables, S_i refers to the tracking regime indicator, and ε_i is the error term. However, as stated above, the prior choice of the tracking regime is endogenous to educational outcomes. One may assume that pupils choosing to attend the 'support stages' differ from the average pupil in (unobserved) characteristics which are also related to the schooling outcome so that $corr(S_i, \varepsilon_i) \neq 0$. Thus, simply estimating the effect of 'support stage' attendance on later educational outcomes by OLS will yield biased results.[15]

One standard solution to such an endogeneity problem is to apply an instrumental variable strategy. The crux is whether it is possible to find a valid instrument which explains 'support stage' attendance but is not correlated to unobservable characteristics driving the outcome variable. In my opinion, it is not possible to find a valid instrument.[16] Therefore, I

[15] Regressing individual 'support stage' attendance on the variables available in the administrative data set for *Hessen* using probit estimation shows that pupils with an immigration background (specifically those from Turkey, Italy and Greece) are especially likely to attend the 'support stages'. The same fact has been demonstrated in section 2 above.

[16] One potential instrument one could spontaneously think of is the density of 'support stages' in region: Using this instrument it is assumed that pupils are more likely to decide to opt for the 'support stage' regime if there are many 'support stage' schools in their county of residence. The critical question is what are the factors influencing the local provision of 'support stages'? To put it in other words: Can the provision of 'support stages' really be considered as exogenous to educational outcomes? In my opinion, it cannot: The local 'support stage' density is potentially driven by the same or similar characteristics of a region's residents as the individual decision to attend the 'support stage'. Even if the decision to establish 'support stage' schools has been made in the past (often in the sixties or seventies) and the persons who decided during that time are not identical to the parents deciding on the 'support stage' attendance of today's children one may assume that the regional pattern of socio-economic residential characteristics remains similar over a couple of decades. Conducting regressions on the local provision of 'support stages' using county data shows that the local 'support stage' density is significantly

opt for a different strategy to pin down the effect of 'support stage' attendance. Formally, I assume that the true model equation is:

$$Y_i^t = \beta X_i + \gamma S_i + \delta U_i \qquad (2)$$

where U_i refers to a vector of non-controlled variables determining both the tracking regime choice after fourth grade and educational outcomes at a later point in time. The corresponding estimation equation is:

$$Y_i^t = \beta X_i + \gamma S_i + \delta U_i + u_i, \qquad (3)$$

where $corr(S_i, u_i) = 0$. Thus, the underlying problem is taken to be an omitted variable problem where the error term in equation 1 contains both the influences of the characteristics (δU_i) and the error term of equation 3 (u_i). The feasible solution to this problem is to control for as many of the variables (U_i) causing the bias as possible using a relatively rich data set (the PISA-E data) on the pupils' individual and family background.

4.2 Database and Specifications for the Econometric Analysis

For the econometric analysis part of the paper, I use the national PISA-E database covering about 2,300 ninth graders in the German state of *Hessen*. The PISA-E data are a national extension of the international PISA 2000 data including supplementary questions from pupils and parents questionnaires as well as test results from the standardized math, reading and science tests. No information is available from school questionnaires which are included in the PISA study. The main reason why I use PISA-E instead of PISA is that information on 'support stage' attendance in fifth grade is only available in the extension study.

In order to measure test results I use the averages of the plausible values of test scores which are given in PISA-E. For detailed information on the scaling of the PISA test results and test contents I refer the reader to the technical reports and documentaries (Adams and

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determined by observable regional variables which are also thought to be important determinants of educational outcomes (for example income and wealth variables).

Wu, 2002 and especially the publication by Deutsches PISA Konsortium, 2003 for the German extension study). The plausible values correspond to the ones measured in the PISA-study but are standardized for each German state so that the mean score equals 100 and the standard deviation is 30 for each state. Thus, comparisons of test results across German states are not possible and analyses must be conducted on the single state's level.[17] For the sake of representativeness, all statistics are weighted using the sampling weights provided in the dataset.

Table 8 gives an overview of the different specifications used in the regression analysis. The variables covered by the different specifications are explained in more detail in Table 9. Specification 1 simply includes the dummy variable of interest (indicating whether the pupils attended the 'support stage' regime) and a control dummy variable for attending the fully comprehensive system. In other words: the regression results differentiate between effects of three options of tracking regimes (*i.e.* the earlier and the later tracking regime and the comprehensive system). Individual characteristics (gender, immigration background and school entry age) are added in specification 2. Specification 3 additionally includes family background variables (*i.e.* indicating the presence of parents at home, parental employment, education, and behavior and the presence of siblings). I assume that the endogeneity bias is reduced as one moves from specification 1 to specification 3. Especially, the variables added in specification 3 are mainly parental characteristics that influence the tracking regime choice as well as the children's educational outcomes. Ideally one would also directly control for initial ability of pupils, *i.e.* compare pupils who performed similarly before entering the different tracking systems. However, no appropriate performance measure is available in the data.[18]

[17] In the original PISA-study scores are standardized to an international mean 500 and standard deviation 100 which allows international comparisons.

[18] The only measure is the school level the pupil had been recommended to attend after fourth grade. For pupils attending the 'support stages' the indicated level might also be the one recommended after sixth grade and thus be an outcome of 'support stage' attendance. This is why I decide not to condition on the secondary school level information.

A further issue is that in the PISA-E data there are missing observations for the variables of interest for some pupils. For each of the control variables up to five percent of the observations are missing. For parental education even 12 % (mother) and 16 % (father) of the observations are generally missing. Given that this might additionally bias the results, in the following regression analysis, I include dummy variables indicating missing observations.

4.3 Regression Results

Table 10 shows the results of OLS regressions of test performance on tracking regime dummies and different sets of explanatory variables (as explained in Table 8).[19] Generally, all the estimated effects are negative if they are significant. This might indicate that the attendance of a comprehensive class in fifth grade reduces school performance in ninth grade but the negative coefficients might also be the result of a negative selection of pupils into the comprehensive regimes after fourth grade. Including individual control variables in specification 2 hardly changes the estimated effects compared to specification 1. However, if parental background is considered in specification 3 the estimated coefficients decrease notably and become insignificant in most cases (except for the significance of the 'support stage' coefficient in the science regression and the coefficient on the comprehensive school indicator in the math regression).

The decrease in the absolute size of the negative coefficients as one moves from specification 2 to specification 3 suggests that there is in fact a negative selection to the comprehensive school systems, *i.e.* pupils with a less favorable family background select to these systems.[20] This finding corresponds to a situation where low performers at elementary school

[19] In addition to the presented regressions, I also conducted regressions where I allowed for a more flexible form by interacting the 'support stage' dummy and the explanatory variables. However, hardly any of the interaction coefficients proved to be significant in the full specification. Alternatively, I consider effects for some socio-economic sub-groups which will be discussed below.

[20] Directly examining the selection to the 'support stages', I have additionally conducted probit and logit regressions of 'support stage' attendance on alternative sets of explanatory variables. However, hardly any observed variable is significant using alternative specifications. One exception is the robust finding of an age of school entry effect, where pupils theoretically entering school at a relatively younger age (due to their month of birth)

who are recommended to the lower level schools opt for the comprehensive system in order to get a 'second chance' to find out whether they still have the ability to attend the high (or intermediate) level track.

Furthermore, the low and insignificant effects for specification 3 indicate that the choice of the tracking system does not matter at least for the math and reading outcomes of ninth graders. Even if the identification strategy does not allow for the identification of the true causal effect of the tracking regime, because of the negative selection into the comprehensive systems (as indicated by the change in coefficients between specification 2 and 3) there is no reason to believe that the presented coefficients suffer from a downward bias. Thus, it is reasonable to conclude that there is no *negative* effect of 'support stage' (or comprehensive school) attendance on fifth graders math (or science) and reading performance.

Table 11 and Table 12 repeat the regressions for different sub-samples characterised by gender and nationality. Generally, analysis by each gender yields similar findings as for the whole sample with the main conclusion that the 'support stage effect' drops down (mostly insignificant) if the full set of controls is included. However, there are two notable exceptions: For male pupils the negative reading score effect decreases but remains significant at the ten percent level and (more importantly) the negative science score effect does not decrease at all as more controls are included. Still, the methodological framework of this paper does not allow identifying whether the persistent negative effect concerning the science score is due to education in the 'support stage' or due to a persistent selection bias caused by unobserved characteristics.

Considering pupils with and without immigrant background the following pattern emerges: For natives the 'support stage' effects decrease but remain significant (at least at the ten percent level) as the full set of controls is included. For immigrants the effect is insignificant or becomes insignificant if measured by the math and science score respectively. How-

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are more likely to attend the later tracking schools. Based on the data for *Hessen*, it has also been demonstrated that immigrant pupils more often attend the 'support stages' compared to native pupils (cf. section 2).

ever, the immigrant pupils' reading score effect becomes significantly *positive* when using specification 3. If it is assumed that there is negative selection of pupils to the 'support stages' this finding suggests that there must be a positive regime effect related to the reading scores. Consequently, the results could be interpreted as demonstrating that immigrant pupils benefit (at least as far as their language skills are concerned) from being educated in the later tracking regime.

However, it might be argued that this conclusion only holds if there is in fact negative selection of immigrant pupils to the 'support stages'. This assumption would not be valid if immigrant pupils with initially higher language skills (*i.e.* pupils who have spent longer time in Germany and use the German language at home) self-selected to the 'support stages'. In order to take this objection into account, I estimate the 'support stage' effect separately for different groups of immigrants. The considered groups are: (1) pupils who were born abroad (*i.e.* mostly first generation immigrants), (2) pupils born in Germany whose parents were born abroad (second generation immigrants), (3) pupils who use a foreign language at home, (4) first generation immigrants who use a foreign language at home, and (5) second generation immigrants speaking a foreign-language at home. It is reasonable to assume that initial reading performance is better for second generation immigrants compared to first generation immigrants and especially compared to first generation immigrants speaking a foreign language at home.

The respective mathematics, reading and science score results by immigrant sub-group are presented in Table 13 - Table 15. Most of the considered findings are insignificant which might be due to limited sample sizes when considering sub-groups. However, looking at the point estimates, familiar patterns emerge for all sub-groups and subjects: If the 'support stage' effect is negative in the initial specification (without control variables) it decreases in absolute size or turns insignificant or positive in the full specification. For some sub-groups (second generation immigrants when considering mathematics; first generation immigrants and first

generation immigrants using a foreign language at home for reading) the 'support stage' effect is positive even if no control variables are included. In these cases, the positive effect becomes more pronounced (and is significant for the reading score) if the full set of control variables is included. Interestingly, the positive 'support stage' effect in reading is especially high for first generation immigrants and first generation immigrants using a foreign language at home who might be considered to be a 'negative selection' (as concerns their initial reading skills) among the group of immigrant pupils. Since the positive effect becomes more pronounced as additional control variables are included, this is indicative for a negative selection bias being reduced. Summing up, I interpret these robust and consistent finding as supportive for the conclusion that 'support stages' are beneficial for the reading performance of immigrants.

5 Conclusions

The optimal tracking system is an issue of controversial discussion among educationalists and social scientists. This paper considered an alternative tracking regime which allows streaming pupils to secondary school types after six instead of four years in the German state of *Hessen*. It has been argued that pre-selection into the alternative tracking regime (*i.e.* the 'support stages') is not random. It seems that especially lower performers are selected to the later tracking regime. Thus, it is not surprising, that children attending the 'support stages' are more often tracked to the lower secondary school types later as can be seen from the descriptive statistics.

In an attempt to reduce the endogeneity bias in estimating the regime choice effect, I controlled for a variety of individual and family characteristics such as parental education, employment and behavior. Overall, the estimated negative coefficients on the 'support stage' or comprehensive school indicators drop down in absolute size as one controls for family background (and turn insignificant in most cases): I conclude that there seems to be no gen-

eral negative effect of ‘support stage’ (or comprehensive school) attendance on educational outcomes of ninth graders. The results are robust across considered sub-groups by gender and immigrant background. As concerns pupils with a less favorable immigrant background in terms of potential German language skills, the robust and consistent results suggest that there is a significant positive effect of ‘support stage’ attendance on reading performance.

More extensive individual level (panel) data sets on school attendance and performance would be required for a more subtle analysis. Experimental data is needed, in order to identify the size of the causal effect of tracking regime choice. For future research, the recent changes in *Bremen* and *Niedersachsen* described in section 2 may provide an interesting exogenous source of variation. The effects of these regime changes away from the later tracking system can probably be examined as soon as data on secondary educational performance of the cohorts affected by the regime change exists given that it is made available to empirical researchers.

Tables

Table 1: First age of selection in the education system

10	11	12	13	14	15	16
Austria	Czech Republic	Belgium	Canada	Italy	France	Australia
Germany	Hungary	Mexico	Luxembourg	Korea	Greece	Denmark
	Slovak Republic	Netherlands			Ireland	Finland
	Turkey				Japan	Iceland
					Poland	New Zealand
					Portugal	Norway
					Switzerland	Spain
						Sweden
						U.K.
						U.S.

Source: OECD (2004), page 262.

Table 2: Frequencies of primary and secondary school types in *Hessen*:

Detailed type of school (offered programmes)	absolute frequency	(%)	support stages	integrated comprehensive
elementary school	1,057	(64.37)	45	0
elementary + lower secondary	47	(2.86)	10	0
elementary + intermediate secondary	2	(0.12)	1	0
elementary + lower/intermediate secondary	65	(3.96)	36	0
lower secondary	6	(0.37)	0	0
intermediate secondary	25	(1.52)	0	0
lower + intermediate secondary	62	(3.78)	21	0
higher secondary	143	(8.71)	0	0
further combined elementary + secondary	39	(2.38)	10	11
further combined secondary	196	(11.94)	83	76

Note: + indicates that several school types are located in the same school building or area. This does not necessarily mean that school types offer 'integrated' (comprehensive) education.
The numbers are calculated using the school-ID numbers in the data-set and considering for each school (as identified by its ID-number) the school types reported for the pupils of this school.
Source: Administrative data for *Hessen*, wave 2005/2006.

Table 3: Numbers of pupils in different primary and secondary school types in *Hessen*:

Detailed type of school (offered programmes)	absolute frequency	(%)	in support stages	in integrated comprehensive
elementary school	221,303	(32.86)	3,153	0
elementary + lower secondary	15,850	(2.35)	607	0
elementary + intermediate secondary	245	(0.04)	22	0
elementary + lower/intermediate secondary	38,753	(5.75)	4,169	0
lower secondary	1,493	(0.22)	0	0
intermediate secondary	12,917	(1.92)	0	0
lower + intermediate secondary	37,992	(5.64)	3,585	0
higher secondary	142,196	(21.12)	0	0
further combined elementary + secondary	27,245	(4.05)	1,464	4,755
further combined secondary	175,392	(26.05)	16,149	53,284

Note: + indicates that several school types are located in the same school building or area. This does not necessarily mean that school types offer 'integrated' (comprehensive) education.
The numbers are calculated using the school-ID numbers in the data-set and considering for each school (as identified by its ID-number) the school types reported for the pupils of this school.
Source: Administrative data for *Hessen*, wave 2005/2006.

Table 4: Track choice in the earlier and in the later tracking regime

selection after / into	4th grade			6th grade		
	all (%)	male (%)	female (%)	all (%)	male (%)	female (%)
lower secondary	4.64	5.13	4.14	32.09	35.49	28.42
intermediate secondary	14.40	14.39	14.42	46.37	44.66	48.22
higher secondary	37.74	36.16	39.37	19.15	17.24	21.21
fully comprehensive	15.27	15.59	14.95	2.38	2.61	2.14
support stage	27.94	28.73	27.13	---	---	---

Note: Sample of pupils tracked after fourth grade of elementary school in 2003/2004 and after sixth grade of the 'support stage' in 2005/2006 respectively.
Source: Administrative data for *Hessen*, wave 2003/2004 and 2005/2006, own calculations.

Table 5: Track choice by nationality

selection after / into	4th grade				6th grade			
	native	non-native	Turkey	Italy/ Greece	native	non-native	Turkey	Italy/ Greece
lower secondary	3.66	10.53	10.78	11.25	28.65	49.26	52.64	53.57
intermediate sec.	13.74	18.38	20.05	17.19	47.99	38.31	37.12	37.14
higher secondary	40.96	18.56	13.00	18.02	20.99	9.97	7.54	6.79
comprehensive	14.69	18.72	18.59	21.67	2.37	2.45	2.71	2.50
support stage	29.96	33.81	37.58	31.87	---	---	---	---

Note: Sample of pupils tracked after fourth grade of elementary school in 2003/2004 and after sixth grade of the 'support stage' in 2005/2006 respectively.
Source: Administrative data for *Hessen*, wave 2003/2004 and 2005/2006, own calculations.

Table 6: Shares of stayers in school tracks by share of incoming 'support stage' pupils

Stayers after …	No incoming support stage pupils (0%)			High share of incoming support stage pupils (>80%)		
	All Track Types					
	ratio	(s.d.)	observ.	ratio	(s.d.)	observ.
… 5th grade (2003/04)	0.98	(0.14)	15,938	---	---	---
… 6th grade (2004/05)	0.98	(0.13)	16,053	---	---	---
… 7th grade (2005/06)	0.98	(0.14)	15,937	0.96	(0.18)	13,877
	Lower Secondary					
… 5th grade (2003/04)	0.97	(0.17)	1,640	---	---	---
… 6th grade (2004/05)	0.96	(0.19)	1,859	---	---	---
… 7th grade (2005/06)	0.98	(0.13)	1,975	0.99	(0.11)	4,561
	Intermediate Secondary					
… 5th grade (2003/04)	0.95	(0.23)	3,539	---	---	---
… 6th grade (2004/05)	0.96	(0.21)	3,579	---	---	---
… 7th grade (2005/06)	0.95	(0.21)	3,620	0.96	(0.19)	6,455
	Higher Secondary					
… 5th grade (2003/04)	0.99	(0.09)	10,759	---	---	---
… 6th grade (2004/05)	0.99	(0.08)	10,615	---	---	---
… 7th grade (2005/06)	0.99	(0.10)	10,342	0.94	(0.24)	2,861

Note: Only pupils in tracked school types moving from one grade to the following grade (i.e. from grade 5 to grade 6 in 2003/2004) are considered. The total number of pupils in a given grade is not equal to the total number of pupils in the previous grade times the share of stayers since grade retainees additionally lower the number of remaining pupils. Pupils dropping out of the school system or moving to another German state are not observed, grade retainees are not considered. The share of incoming pupils from the 'support stages' is calculated by the proportion of seventh graders in the respective school in 2004/2005 having attended 'support stages' in sixth grade. The shares are very similar (and thus robust) if grade retainees are kept in the sample.
Source: Administrative data for *Hessen*, waves 2003/2004 to 2005/2006, own calculations.

Table 7: Proportions of retained pupils by share of incoming 'support stage' pupils

Retainees in …	No incoming support stage pupils (0%)			High share of incoming support stage pupils (>80%)		
	All Track Types					
	retained	(s.d.)	observ.	retained	(s.d.)	observ.
… 5th grade (2003/04)	0.03	(0.17)	16,417	---	---	---
… 6th grade (2004/05)	0.03	(0.16)	16,480	---	---	---
… 7th grade (2005/06)	0.04	(0.20)	16,550	0.07	(0.25)	14,789
	Lower Secondary					
… 5th grade (2003/04)	0.07	(0.26)	1,765	---	---	---
… 6th grade (2004/05)	0.06	(0.23)	1,973	---	---	---
… 7th grade (2005/06)	0.08	(0.27)	2,261	0.08	(0.28)	5,070
	Intermediate Secondary					
… 5th grade (2003/04)	0.04	(0.20)	3,693	---	---	---
… 6th grade (2004/05)	0.04	(0.20)	3,736	---	---	---
… 7th grade (2005/06)	0.06	(0.24)	3,806	0.07	(0.26)	6,970
	Higher Secondary					
… 5th grade (2003/04)	0.02	(0.13)	10,959	---	---	---
… 6th grade (2004/05)	0.01	(0.12)	10,771	---	---	---
… 7th grade (2005/06)	0.03	(0.17)	10,483	0.03	(0.16)	2,749

Note: Only pupils in tracked school types are considered. Pupils dropping out of the school system or moving to another German state are not observed. Retainees include pupils changing to another track if they are repeating the grade in this track.
Source: Administrative data for *Hessen*, waves 2003/2004 to 2005/2006, own calculations.

Table 8: Specifications for the econometric analysis

Specification	Included Variables
specification 1	tracking regime indicators
specification 2	specification 1 + individual characteristics (gender, immigration background indicator, proxy for school entry age)
specification 3	specification 2 + family background (presence of parents at home, employment of parents, education of parents, parental reading encouragement, siblings)

Note: The variables used in the different specifications are explained in Table 9.

Table 9: Variables used in the different specifications

Variable	**Explanation**
Tracking Regime Indicators (Reference = Tracking after fourth grade):	
support stage	dummy variable for support stage attendance in fifth grade
comprehensive school	dummy for comprehensive school attendance in fifth grade
Variables Added in Specification 2 (Individual Characteristics):	
gender	dummy for male gender
immigration	dummy indicating whether pupil or parents were born abroad
proxy for school entry age	dummy indicating whether pupil is born before the official school entry cut-off date of June (= theoretically entered school relatively young according to the official school entry rule)[A]
Variables Added in Specification 3 (Family Characteristics):	
father	dummy indicating whether only a male guardian (mostly the father) lives with the child
mother	dummy indicating whether only a female guardian (mostly the mother) lives with the child
employment of mother	dummy indicating whether the mother is employed
employment of father	dummy indicating whether the father is employed
mother: no vocational education [B]	dummy indicating whether mother does not hold a vocational degree
mother: tertiary education [B]	dummy indicating whether mother holds a tertiary educational degree
father: no vocational education [C]	dummy indicating whether mother does not hold a vocational degree
father: tertiary education [C]	dummy indicating whether mother holds a tertiary educational degree
parental reading encouragement	parents often read to child before child learned to read
siblings	dummy indicating whether there are siblings of the child

Note: [A] See the paper by Puhani and Weber (2006) for the motivation of this variable. [B] The reference category are mothers holding a vocational (upper secondary) degree. [C] The reference category are fathers holding a vocational (upper secondary) degree.
In addition to these variables dummy variables for missing information are included.

Table 10: Results of OLS regressions of PISA-E scores on 'support stage' attendance for ninth graders

test		maths	reading	science
specifi-cation	regime	coefficients (s.e.)	coefficients (s.e.)	coefficients (s.e.)
1	support stage	-5.90** (2.39)	-4.12** (1.63)	-7.17** (2.54)
	comprehensive school	*-6.65** (2.37)*	*-2.67 (1.67)*	*0.71 (2.20)*
2	support stage	-5.38** (2.47)	-4.39** (1.63)	-8.48** (2.47)
	comprehensive school	*-7.24** (2.29)*	*-3.28** (1.61)*	*0.59 (1.10)*
3	support stage	-1.94 (2.14)	-1.08 (1.47)	-5.25** (2.29)
	comprehensive school	*-4.68** (2.10)*	*-0.96 (1.48)*	*2.45 (2.07)*
	observations	1,222	2,306	1,262
	# support stage in 5th grade	245	464	261
	# compr. school in 5th grade	208	386	196

Note: The reported coefficients refer to the 'support stage' dummy and the dummy variable for attendance of a general comprehensive school in fifth grade. The different specifications are explained in Table 8. * Significant at the ten percent level. ** Significant at the five percent level.
Source: PISA-E 2000, own estimations.

Table 11: OLS results by gender

test			maths		reading		science	
specifi-cation		regime	coefficients (s.e.)		coefficients (s.e.)		coefficients (s.e.)	
			female	male	female	male	female	male
SPECIFICATION	1	support stage	-6.04	-5.28*	-3.23	-5.63**	-6.11*	-7.95**
			(4.02)	(2.79)	(2.39)	(2.18)	(3.62)	(3.55)
		comprehensive	*-10.44**	*-2.91*	*-4.67**	*-1.27*	*0.35*	*1.14*
			(3.35)	*(3.15)*	*(2.25)*	*(2.45)*	*(2.75)*	*(3.33)*
	2	support stage	-5.44	-5.95**	-3.37	-5.74**	-7.52**	-9.54**
			(4.24)	(2.66)	(2.46)	(2.16)	(3.59)	(3.41)
		comprehensive	*-10.89**	*-4.51*	*-4.61*	*-2.26*	*0.34*	*0.03*
			(3.50)	*(2.97)*	*(2.23)*	*(2.33)*	*(2.80)*	*(3.01)*
	3	support stage	-0.32	-3.35	0.98	-3.43*	-2.48	-7.98**
			(3.13)	(2.60)	(2.08)	(2.06)	(3.18)	(3.02)
		comprehensive	*-7.06**	*-2.88*	*-1.49*	*-0.91*	*2.25*	*0.91*
			(3.02)	*(2.83)*	*(1.96)*	*(2.17)*	*(2.65)*	*(2.96)*
observations			548	674	1,074	1,232	577	685
# support stage			114	131	224	240	117	144
# comprehensive school			96	112	190	196	90	106

Note: The reported coefficients refer to the 'support stage' dummy and the dummy variable for attendance of a general comprehensive school in fifth grade. The different specifications are explained in Table 8. * Significant at the ten percent level. ** Significant at the five percent level.
Source: PISA-E 2000, own estimations.

Table 12: OLS results by immigration background[A]

			maths		reading		science	
	regime		coefficients (s.e.)		coefficients (s.e.)		coefficients (s.e.)	
			native	immi-grant	native	immi-grant	native	immigrant
SPECIFICATION	1	support stage	-9.29**	-0.56	-6.70**	0.45	-7.63**	-11.61**
			(2.35)	(5.15)	(1.90)	(3.16)	(3.07)	(4.41)
		comprehensive	*-9.12***	*-4.96*	*-3.75***	*-2.19*	*0.14*	*1.53*
			(2.94)	*(3.77)*	*(1.91)*	*(2.99)*	*(2.65)*	*(3.43)*
	2	support stage	-9.28**	0.20	-6.89**	0.58	-7.52**	-10.52**
			(2.30)	(4.97)	(1.86)	(3.04)	(2.97)	(4.38)
		comprehensive	*-8.92***	*-4.35*	*-3.74**	*-2.54*	*-0.18*	*1.46*
			(2.78)	*(3.95)*	*(1.92)*	*(2.95)*	*(2.57)*	*(3.39)*
	3	support stage	-4.87**	2.59	-3.11*	4.19*	-4.89*	-5.12
			(2.32)	(3.84)	(1.77)	(2.47)	(2.74)	(3.59)
		comprehensive	*-6.96***	*0.42*	*-2.27*	*2.66*	*0.47*	*6.67**
			(2.39)	*(3.80)*	*(1.74)*	*(2.80)*	*(2.49)*	*(3.62)*
observations			802	420	1,562	744	866	396
# support stage			169	76	329	135	192	69
# comprehensive school			148	60	274	112	136	60

Note: [A]'Immigrant' refers to pupils who were born abroad or whose parents were born abroad (compare Table 9). The reported coefficients refer to the 'support stage' dummy and the dummy variable for attendance of a general comprehensive school in fifth grade. The different specifications are explained in Table 8. * Significant at the ten percent level. ** Significant at the five percent level.
Source: PISA-E 2000, own estimations.

Table 13: OLS mathematics results for different groups of immigrants

	regime		first generation immigrants	second generation immigrants	foreign language spoken at home	first generation immigrants + foreign language spoken at home	second generation immigrants + foreign language spoken at home
SPECIFICATION	1	support stage	-3.56	3.50	-5.10	-2.72	-12.69
			(4.68)	(9.66)	(4.16)	(4.76)	(7.83)
		comprehensive	*-1.86*	*-8.64**	*-2.27*	*-2.06*	*-9.42**
			(5.36)	*(5.19)*	*(4.21)*	*(5.56)*	*(5.12)*
	2	support stage	-2.25	2.45	-4.92	-1.49	-15.79**
			(4.27)	(9.67)	(3.81)	(4.24)	(6.76)
		comprehensive	*-1.53*	*-8.03*	*-2.33*	*-1.26*	*-8.54*
			(5.66)	*(5.38)*	*(4.35)*	*(5.86)*	*(5.42)*
	3	support stage	-1.38	5.65	-1.90	1.22	-11.75**
			(4.01)	(5.75)	(3.48)	(4.16)	(5.94)
		comprehensive	*0.97*	*2.86*	*1.35*	*1.45*	*0.82*
			(5.25)	*(6.55)*	*(3.98)*	*(5.46)*	*(7.37)*
observations			227	193	300	200	86
# support stage			48	28	50	37	12
# comprehens. school			31	29	51	29	16

Note: The reported coefficients refer to the 'support stage' dummy and the dummy variable for attendance of a general comprehensive school in fifth grade. The different specifications are explained in Table 8. * Significant at the ten percent level. ** Significant at the five percent level.
Source: PISA-E 2000, own estimations.

Table 14: OLS reading results for different groups of immigrants

	regime	first generation immigrants	second generation immigrants	foreign language spoken at home	first generation immigrants + foreign language spoken at home	second generation immigrants + foreign language spoken at home
SPECIFICATION	1 support stage	6.52*	-5.98	-1.89	4.29	-15.43**
		(3.45)	(6.08)	(3.05)	(3.51)	(6.02)
	comprehensive	*2.94*	*-7.50**	*-0.42*	*3.22*	*-5.96*
		(3.88)	*(4.53)*	*(3.27)*	*(4.08)*	*(6.07)*
	2 support stage	6.62**	-6.18	-1.66	4.35	-15.67**
		(3.37)	(5.96)	(3.03)	(3.47)	(6.33)
	comprehensive	*2.45*	*-8.17**	*-0.49*	*2.79*	*-6.62*
		(3.89)	*(4.45)*	*(3.23)*	*(4.08)*	*(5.84)*
	3 support stage	10.22**	-2.71	1.77	7.10**	-7.96
		(3.11)	(3.89)	(2.96)	(3.32)	(5.46)
	comprehensive	*5.45*	*0.76*	*2.61*	*4.70*	*0.63*
		(3.75)	*(4.07)*	*(3.18)*	*(3.86)*	*(5.16)*
observations		386	358	539	334	176
# support stage		82	53	101	68	28
# comprehens. school		53	59	88	48	32

Note: The reported coefficients refer to the 'support stage' dummy and the dummy variable for attendance of a general comprehensive school in fifth grade. The different specifications are explained in Table 8. * Significant at the ten percent level. ** Significant at the five percent level.
Source: PISA-E 2000, own estimations.

Table 15: OLS science results for different groups of immigrants

	regime	first generation immigrants	second generation immigrants	foreign language spoken at home	first generation immigrants + foreign language spoken at home	second generation immigrants + foreign language spoken at home
SPECIFICATION	1 support stage	-8.87	-13.83*	-10.89**	-9.29	-15.34
		(5.63)	(7.09)	(5.45)	(6.77)	(10.31)
	comprehensive	*3.76*	*-0.67*	*1.27*	*4.88*	*-3.86*
		(5.25)	*(4.44)*	*(4.13)*	*(5.79)*	*(5.76)*
	2 support stage	-7.61	-13.23*	-9.94*	-8.06	-15.52
		(5.64)	(7.17)	(5.39)	(6.65)	(10.53)
	comprehensive	*3.01*	*-1.35*	*0.39*	*4.00*	*-7.01*
		(5.34)	*(4.54)*	*(4.08)*	*(5.80)*	*(5.57)*
	3 support stage	1.52	-8.88	-5.12	0.08	-13.26
		(4.74)	(5.74)	(4.57)	(5.89)	(8.80)
	comprehensive	*9.64*	*2.77*	*5.57*	*9.07*	*-2.06*
		(6.09)	*(4.76)*	*(4.56)*	*(6.66)*	*(5.99)*
observations		203	193	286	174	98
# support stage		38	31	52	30	19
# comprehens. school		30	30	46	25	17

Note: The reported coefficients refer to the 'support stage' dummy and the dummy variable for attendance of a general comprehensive school in fifth grade. The different specifications are explained in Table 8. * Significant at the ten percent level. ** Significant at the five percent level.
Source: PISA-E 2000, own estimations.

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