Chapter 6
School Accountability, Autonomy, Choice, and the Equality of Educational Opportunities

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6.1 Introduction

Accountability, autonomy, and choice are the watchwords of contemporary education reformers around the globe. Concerned with the efficiency of the educational process, many countries have implemented policies in each of these areas in hopes of advancing the learning of all students in the system. A notable example of the introduction of far-reaching accountability systems is the 2001 No Child Left Behind legislation in the United States, which requires each state to establish standards for student achievement, to test students annually to see whether those

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standards have been met, and to impose sanctions on low-performing schools. Several countries with traditionally centralized school systems are considering the decentralization of decision-making authority in certain domains by transferring it from the state to the schools, a policy that has been implemented on a pilot basis in two German states. Still other countries have expanded parental choice among schools, like Sweden, which introduced both free parental choice of school and a voucher system that placed privately operated schools on an equal footing with public schools in terms of access to public funding in the 1990 s. The introduction of the 'quasi-market' of education in the United Kingdom in 1988 has included aspects of all three strategies: the publication of external exam results, devolution of control over resource allocation to the school level, and increased parental choice with public funding following students to the schools of their choice within a given district.

Proponents of greater accountability, autonomy and choice contend that these reforms will improve student outcomes by heightening incentives for various actors to perform at high levels. Accountability systems combine clear standards, external monitoring of results and corresponding rewards and sanctions based on performance indicators. By providing better information on student outcomes, proponents argue, such systems directly and indirectly reward students, teachers, and principals for their efforts. Decentralizing decision-making to the schools, advocates suggest, substitutes the creativity and knowledge of local decision-makers for the inertia and rigidity of centralized bureaucracies. Supporters of school choice contend that giving parents free choice among schools and enabling private providers of education to receive government funding unleashes competitive forces that will drive school improvement. And indeed, in a closely related analysis, Woessmann et al. (2009, Chaps. 1–6) find that many different forms of school accountability, autonomy, and choice are strongly associated with higher levels of student achievement across countries.

Incentive-based reform strategies are not without controversy. Much of the criticism of market-oriented education reforms emphasizes their potentially negative consequences for equity. Besides efficiency, school systems aspire to provide equal opportunity for all, irrespective of socio-economic or socio-cultural background (cf. e.g. OECD 2007). Equity goals are particularly salient in education because schooling decisions that are made on behalf of underage children by their parents have important consequences for their future wellbeing. School systems can therefore play a leading role in building equal opportunity by providing equal starting points in life. In fact, leading examples of the recent reform wave, such as the No Child Left Behind Act, are expressly intended to improve the achievement of disadvantaged students. So how do accountability, autonomy, and choice affect the equity of student achievement? Do they raise the educational performance of children with high socio-economic status (SES) to the detriment of low-SES children? Or are they tides that lift all boats? Could they even provide an additional boost for disadvantaged children? In this chapter, we examine how these market-oriented reforms affect the equality of educational opportunities as

measured by the dependence of student achievement on socio-economic background (SES).[1]

We construct a comprehensive student-level database of more than 180,000 students from 27 OECD countries from the Programme for International Student Assessment (PISA) 2003 to analyze how accountability, autonomy, and choice are related to the equality of educational opportunities. We operationalize equality of opportunities by estimating how strongly the educational achievement measured by PISA test scores depends on the socio-economic background of the students' families in each country. We exploit cross-country variation in school accountability, autonomy, and choice in order to provide new evidence on whether the distribution of student achievement in school systems employing these institutional features is more or less equitable.

Success within the school system is crucial for outcomes later in life. The labor-market returns to education, and in particular to the quality of education as measured by cognitive achievement tests, are very high (cf. Hanushek and Woessmann 2008 for a survey). Several recent studies indicate that a one-standard-deviation increase in mathematics test scores at the end of high school is associated with about 12 percent higher annual earnings later in life (e.g. Mulligan 1999; Murnane et al. 2000; Lazear 2003). In addition, cognitive achievement is strongly related to employment (e.g. Bishop 1992; OECD 2000; McIntosh and Vignoles 2001).

Given these individual returns to education, it comes as no surprise that equality of educational opportunity is crucial for the extent of equality of opportunity and the intergenerational mobility that societies achieve in general. Nickell (2004), for example, shows that most of the existing cross-country variation in earnings inequality can be attributed to cross-country variation in skill dispersion. Within-country studies for the United States (e.g. Juhn et al. 1993) have also concluded that skill differences have a strong and growing impact on the distribution of income. Understanding how the institutional structure of school systems—and in particular the changes in those institutions brought about by recent reforms—affect the equity of student achievement is therefore critical.

The remainder of this chapter is structured as follows. Section 6.2 summarizes the previous literature. Section 6.3 briefly describes the data, then discusses the empirical model in greater detail, and presents results of a basic model that provides a first glimpse of how accountability, autonomy, and choice are related to the equality of educational opportunity. Sections 6.4–6.6 then present more detailed analyses of different aspects of accountability, autonomy, and choice, respectively. Section 6.7 concludes the chapter.

[1] Please note that we use the terms "equality of opportunities" and "equity" interchangeably here.

6.2 Related Literature

Much of the criticism of education reforms that veer towards increased school accountability, autonomy, and choice emphasizes their potentially negative consequences for the equality of opportunities within the school systems. This section reviews the existing literature on this issue.[2]

6.2.1 Accountability

One fear associated with the introduction of accountability into the education sector is linked to the perceived danger of the strategic behavior of schools and teachers (cf. e.g. Jacob and Levitt 2003; Jacob 2005). Opponents argue that high-stakes accountability policies have, in design and implementation, ignored equity issues (e.g. Diamond and Spillane 2004). If school accountability policies are based on performance levels rather than on added value, they may give undue advantages to schools serving students from high socio-economic backgrounds (e.g. Ladd and Walsh 2002). Furthermore, teachers may respond strategically to accountability measures by weeding out or retaining disadvantaged students (Jacob 2005). However, proponents argue that such effects can be avoided by introducing the right testing practices and by incentivizing schools to raise the academic achievement of all of their students. Thus, the effects of accountability systems on equity likely depend on the specific characteristics of the accountability system.

In an empirical cross-country study, Woessmann (2005) finds that immigrants benefit more than native-born students from the existence of external exit exams, suggesting a positive effect of the accountability feature on equity in this dimension. Using student-level data from three different international student achievement tests (TIMSS, TIMSS-Repeat and PISA 2000), he finds that the effect of external exit exams does not differ substantially for most other measured family-background characteristics. This suggests that external exit exams may be mostly neutral with respect to equality of opportunity.

6.2.2 Autonomy

There is little research on the possible effects of school autonomy on equity, be it theoretical or empirical. It may be expected that the autonomy of schools to admit students may facilitate cream-skimming. More generally, certain forms of school

[2] For a detailed review of the literature on the effects of accountability, autonomy, and choice on the level of student achievement, see Woessmann et al. (2009).

autonomy may provide a form of differentiation for schools that may affect students with different SES differently. Ammermüller (2005) hypothesizes that school autonomy may help to transform parents' commitment to educational success into higher achievement for their children. Educational inequalities may increase when parents committed to their children's education can exert additional influence on teachers and schools to further their children's educational progress. On the other hand, additional autonomy may allow schools to focus particularly on students with low SES. Theoretical predictions of the possible effects of autonomy on equity therefore seem limited.

Using data from the PISA 2000 international student achievement test and a combined index of school autonomy in different decision-making areas, Ammermüller (2005) provides evidence that strong parental commitment to their children's education impacts achievement more strongly when schools are more autonomous, suggesting that school autonomy may increase parents' chances to influence their children's educational achievement. However, he does not find an association between school autonomy and of the impact of attending a rural versus an urban school, and he does not report results on differential effects of autonomy on children with different SES.

6.2.3 Choice

The theoretical case of the effect of choice on equity is hotly debated. In general, issues of implementation seem crucial when choice is introduced into schooling. Without proper safeguards, choice and competition may reduce equity by increasing segregation, inducing cream-skimming and neglecting disadvantaged students (e.g., Ladd 2002; Cullen et al. 2005; Burgess et al. 2007). By contrast, simulation studies by Nechyba (2000) show that a voucher system that provides choice for poor families can actually improve equity, among other things by integrating neighborhoods. This is even more so when voucher choices are explicitly designed to target disadvantaged families. In particular, because existing systems are already substantially segregated, introducing choice can decrease segregation due to mobility, and because existing schools for low-SES students are often of bad quality, providing them with choice can help them enter better schools. A lot depends on the specific design and implementation of school choice; measures such as the flow of information from schools to parents and regulatory and financial frameworks and incentives can be devised to encourage socio-economic integration (cf. Betts and Loveless 2005).

The evidence to date regarding the effects of choice on equity, as gathered from international student achievement tests, focuses on the effects that private operation and government funding have on schools. Based on data from TIMSS and TIMSS-Repeat, the results of Schuetz et al. (2008) indicate that private operation is associated with higher equality of opportunity, while private funding is associated with lower equality of opportunity. Using PISA 2000 data, Ammermüller

(2005) finds a positive association between private operation and inequality, which is likely to be due to the neglect of the effects of the source of funding in the model specification, though.

In summary, the existing evidence suggests that the specific design and implementation of education reforms towards increased accountability, autonomy, and choice is crucial for the equality of opportunities. Proponents of all three institutional features argue that, if properly designed, accountability, autonomy, and choice may be particularly important for the educational achievement of children who do not have the advantage of an educationally rich home environment.

6.3 A Basic Model of Educational Opportunities

This section first briefly describes the database, and then presents a basic empirical model that provides a first overview of the effects of accountability, autonomy, and choice on the equality of educational opportunity within national education systems. We describe the key features of the modeling approach, and finally we report and discuss the main results of the basic equity model.

6.3.1 Data and Estimation Approach

The data we use to perform our analysis of the equality of opportunities come from the international database of the 2003 Programme for International Student Assessment (PISA; cf. OECD 2004 for details), a representative sample of 15-year-old students. It contains student-level information on cognitive achievement and socio-economic background and school-level information on several aspects of accountability, autonomy, and choice, as well as information on additional student and school background characteristics, taken mostly from student and school background questionnaires.[3]

Our analyses concentrate on student achievement in mathematics, the focus of the PISA 2003 study. Test scores are mapped on a scale with an international mean of 500 and an international standard deviation of 100 test-score points. The "grade-level equivalent" of the simple test-score difference between 9th graders and 10th graders is 22.1 for mathematics test-score points, which provides a rough benchmark of how much students learn on average during one school year.

In order to estimate the effects of accountability, autonomy, and choice on equality of educational opportunity, we exploit institutional variation across

[3] For details on the construction of the database as well as for descriptive statistics, see Appendix A of Woessmann et al. (2009, pp. 113–126).

countries. More specifically, we examine how the relationship between student achievement and family background characteristics varies across countries with different accountability, autonomy, and choice policies in place. Because student achievement clearly depends on many factors that operate independently of educational institutions, we estimate so-called "education production functions" (cf. e.g. Hanushek 1994) that control simultaneously for differences in various student, family, school, and country characteristics that may influence student achievement. In order to exclude intervening effects of other student and school characteristics, our model also controls for a set of student characteristics such as gender, age, and immigration status, as well as school characteristics such as community location, class size, instruction time and material, and teacher training. To control for other influences as rigorously and efficiently as possible, we perform the cross-country regressions at the student level, which allows us to account for possible intervening effects at the level of each individual student.

Our international education production functions combine individual student-level data on educational achievement (using the first plausible value of the PISA tests) with extensive background information at the school and student level. Thus, our empirical model has three important features: It uses cross-country variation, it estimates the effects of many variables simultaneously, and it is performed at the level of individual students.

We operationalize equity by estimating how strongly the educational achievement measured by PISA test scores depends on the socio-economic background of the students' families in each country. The size of the achievement difference between students with high and low SES provides a measure of how fair and inclusive each school system is: the smaller the difference, the more equally distributed is educational opportunity. This operationalization comports with the concept of equality of opportunity proposed by Roemer (1998; cf. Betts and Roemer 2007), who suggests that the educational achievement of children should be independent of family socio-economic background. Roemer's concept suggests that inequality should be tolerated only if it results from differences in effort, not if it reflects circumstances that are beyond a person's control–including the socio-economic background of their parents.

We regress student test scores on student characteristics, family background, school resources, country characteristics, accountability, autonomy, and choice. In addition, we estimate interaction effects between family background and each institutional characteristic, that is, accountability, autonomy, and choice. The estimated coefficient on the interaction terms shows whether and how the institutional features are associated with the strength of the effect of SES on student achievement, i.e. with inequality of opportunity. In effect, such models reveal whether national features of accountability, autonomy, and choice affect students from different backgrounds differently.

More formally, the achievement test score T_{isc} of student i in school s in country c is regressed on the following sets of potential influences:

$$T_{isc} = F_{isc}\alpha + B_{isc}\beta + R_{sc}\gamma + I_c\delta + (F_{isc} \times I_c)\eta + \varepsilon_{isc} \qquad (6.1a)$$

In this specification, F is the summary measure of family background described in more detail below. B is a vector consisting of student characteristics and country characteristics, such as student's gender and age and the per-capita GDP of the country. R is the vector of schools' resource endowments and location, and the vector I contains the institutional characteristics of interest, all of which are measured as averages at the country level.

To account for the complex sampling design of the PISA study, and the non-trivial structure of the error term ε_{isc}, we use clustering-robust linear regression to estimate standard errors (cf. Deaton 1997). This method relaxes the classical assumption of independence across individual observations.[4] To allow for the different sampling probabilities, and to obtain consistent student population estimates, we use sampling weights. To avoid that the coefficient estimates are driven by the student population size of a country, the sampling weight is normalized in a way that all countries contribute equally to the coefficient estimates of the international education production function.[5]

We measure family background F as the SES of the student's family. The most encompassing measure of family SES provided in the PISA 2003 database is the ESCS index. The ESCS index is derived from the highest occupational status of each student's parents, their highest educational level and a summary measure of household possessions.[6] Because we want to estimate the interactions between this measure of family background and the institutional characteristics of accountability, autonomy, and choice, we refrain from including additional family background controls that are either components of the ESCS index (such as parental education or the number of books in the household) or that are likely to correlate with it (such as the employment status of parents).

Because SES is a key variable in the equity analyses, we dropped all student observations with missing information on the ESCS index from our sample. We also excluded Mexico and Turkey from the sample of countries because the average ESCS level for students in these countries was a full standard deviation below the international mean on the ESCS index, the central variable in our equity analyses, suggesting that comparisons between these countries and the rest of the OECD in terms of equity may be unreliable. As a consequence, the dataset used in our analyses contains 181,469 students in 27 OECD countries. We impute missing

[4] An alternative to estimating clustering-robust linear regression models to deal with the nested data structure would be to estimate Hierarchical Linear Models (HLM). Under the assumption that the errors are independent of regressors, both approaches yield consistent parameter estimates of the regression coefficients. The HLM approach aims to gain efficiency by exploiting assumptions on the variances and covariances of the error terms, but it also rests on stronger distributional assumptions (Cameron and Trivedi 2005, p. 847). Cohen and Baldi (1998) show that under moderate violations of its assumptions of random and normally distributed effects, HLM can lead to invalid inference, whereas clustering-robust linear regressions provide consistent and robust parameter estimates.

[5] For details on the econometric modeling see Appendixes B1 and B2 of Woessmann et al. (2009, pp. 127–129).

[6] For detailed information on the construction of the ESCS index, see OECD (2005).

values for all remaining background variables in this sample, using a conditional mean imputation method (cf. Little and Rubin 1987).[7]

The main focus of our analyses is on the vector $F \times I$, which represents the interaction terms between family background and the measures of school accountability, autonomy, and choice. Assuming that after having controlled for the set of observed effects at the level of students, schools, and systems, there is no unobserved heterogeneity left across countries that might bias the estimates, the estimated coefficients η on the interaction terms between SES (measured at the student level) and the institutional features (measured at the country level) identify how the institutional features affect the size of the effect of SES on student achievement.

In order to make the individual coefficients α and η meaningful, we have centered both the family background variable and all institutional variables to have a mean of zero. As a result, the estimated α coefficient represents the effects of family background in the case of the international mean value of all institutional variables, while the estimated η coefficients represent the institutional effects in the case of the international mean value of family background. The sign of the coefficients on the interaction terms between the measures of accountability, autonomy, and choice and the family background variable indicates whether the influence of family background on student achievement becomes smaller or larger with increased accountability, autonomy, and choice in the schooling sector. A significant positive relationship means that inequality increases with increasing accountability, autonomy, or choice, while a significant negative relationship means that inequality is reduced.

For each model, we also estimate a second specification that relaxes the assumption that there is no unobserved cross-country heterogeneity in student achievement. This is achieved by including a whole set of country fixed effects in the model. Country-level variables such as GDP per capita, expenditure per student and the averaged institutional variables for accountability, autonomy, and choice cannot be included in this specification because they vary only at the country level. Instead, the model includes a vector of country dummies C that allows the education production function to have a unique intercept for each country:

$$T_{isc} = F_{isc}\alpha + B_{isc}\beta + R_{sc}\gamma + (F_{isc} \times I_c)\eta + C_c\mu + \varepsilon_{isc} \qquad (6.1b)$$

Despite the country fixed effects, the specification still identifies the measure of interest, namely how the institutional features influence the relationship between SES and student achievement, which is again captured by the coefficients η on the interaction terms at the student level. To identify this specification, the assumption that there is no unobserved cross-country heterogeneity can be replaced by the less restrictive assumption that any remaining unobserved cross-country heterogeneity

[7] For details on the imputation method see Appendix B3 of Woessmann et al. (2009, pp. 129–131).

is unrelated to the size of the effect of SES on student achievement. Under this assumption, equation (1b) can still identify how institutional features of the school system relate to the equality of educational opportunity. Since it requires the least restrictive assumptions on the cross-country distribution of test scores, the specification with country fixed effects is our preferred specification.[8]

The institutional features I_c are all measured as averages at the country level. The analyses thus use only between-country variation in accountability, autonomy, and choice to identify their effects on equity. The main reason for this aggregation is to evade problems of within-country selectivity bias. Within each country, students with different SES may self-select into specific schools with certain institutional features. For example, high-SES parents may be more likely to opt into schools with strong accountability systems, with autonomy over particular decisions, or under private management. This self-selection may affect how strongly student achievement depends on SES within countries and may also bias the estimated interaction coefficients when estimated at the individual level within countries. We circumvent these issues by measuring all features of accountability, autonomy, and choice at the country level. This way, selection processes within each school system cancel one another out, and the estimated coefficients show how strongly inequality of opportunity depends on the average share of schools with each institutional feature in a specific school system. The aggregate measurement also allows us to capture any systemic effects. The downside of using only country-level institutional measures is that the number of observations at the country level is again very limited.

6.3.2 Cross-Country Analyses and Potential Bias

Due to the cross-sectional nature of the PISA dataset, a caveat applies when interpreting our estimation results. First, the data do not allow for panel or value-added estimations (cf. e.g. Hanushek 2002; Todd and Wolpin 2003). Because of unobserved student abilities, cross-sectional analyses can give rise to omitted variable bias when the variables of interest are correlated with the unobserved characteristics. In this chapter, we hope to minimize such biases due to unobserved student heterogeneity by including a huge set of observed abilities, characteristics, and institutions which reduce potential biases. Estimates based on cross-sectional data will be unbiased if the explanatory variables of interest are unrelated to features that still remain unobserved, if they are exogenous to the dependent variable, and if they and their impact on the dependent variable do not vary over time.

[8] See also Schuetz et al. (2008) for additional methodological details of the econometric technique.

Many of the institutional features of an education system may be reasonably assumed to be exogenous to individual students' performance. The cross-country nature of the data allows the systematic utilization of country differences in the institutional settings of educational systems, which would be neglected in within-country specifications. At the country level, explanatory variables are included to control for country differences with respect to educational expenditure and the development stage of a country. However, a caveat applies here in that a country's institutions may be related to unobserved, e.g. cultural, factors which in turn may be related to student performance. To the extent that this may be an important issue, caution should prevail in drawing causal inferences and policy conclusions from the presented results.

In terms of time variability, changes in institutions generally occur only gradually and evolutionary rather than radically, particularly in democratic societies. Consequently, the institutional structures of education systems are highly time-invariant and thus most likely constant, or at least rather similar, during a student's time at secondary school. We therefore assume that the educational institutions observed at one point in time persist unchanged during the students' secondary-school life and thus contribute to students' achievement levels, and not only to the change from one grade to the next. A level-estimation approach thus seems well-suited for determining the total association between institutions and student achievements. Still, institutional structures may differ between primary and secondary schools, so that issues of omitted prior inputs in a students' life may still bias estimated institutional effects, generally in an attenuating way.

6.3.3 Results of the Basic Equity Model

Because our aim in this first section of the chapter is to provide an overview of the main results for accountability, autonomy, and choice, we use only one or two summary indicators for each of the three institutional features in our basic equity model. Even in the more detailed analyses of specific institutional dimensions presented in the subsequent sections, the summary measures of the other two institutions used in the basic equity model are again included as control variables. Moreover, because the practice of tracking has proven to be one of the most important factors in determining inequality, all our equity models include a tracking variable, and the interaction between this tracking variable and ESCS.[9]

Questions of equity are of course intertwined with questions of efficiency. For example, it may be the case that some institutional features increase inequality but are nonetheless beneficial for all students. This would be the case if the achievement of low-SES students is raised, but the achievement of high-SES

[9] See Schuetz et al. (2008), and Hanushek and Woessmann (2006) for the effects of tracking on inequality.

students is raised by an even larger amount. In such a case, everybody gains in absolute terms, and efficiency is increased in the Pareto sense (that no-one is worse off while at least some-one is better off). Assessments of the relative merit in such cases require value judgments concerning the relative importance on equity and efficiency.

While we abstain from such judgments in this chapter, our results can inform the discussion by illustrating the size of any potential tradeoffs. Detailed results on the efficiency analysis of the same institutional features (in particular accountability, autonomy, and choice) are provided in Woessmann et al. (2009). Here, we only briefly summarize these results, and we will refer to results on efficiency as well as equity whenever it is necessary for a comprehensive assessment. Table 6.1 reports results of the basic equity model for our estimation sample of 27 OECD countries (except for France, Mexico, and Turkey, for the reasons discussed above).[10] Note that all models control for a large number of student background and school resource variables.[11] The summary accountability variable included in the basic equity model measures whether a country has external exit exams at the end of secondary school. The positive sign of the estimated coefficient on this variable indicates that students in countries that have external exit exams in mathematics perform better on the PISA mathematics test than students in countries without external exit exams. In terms of equity, however, external exit exams reduce equality of educational opportunity insofar as they increase the influence of SES on student achievement. This is apparent from the statistically significant positive interaction term between external exit exams and SES reported in the second column of specification (1), which presents additional results from the same regression model presented in the first column. (Note that the qualitative results regarding the interaction of the different institutions with SES in the basic equity model are robust to the inclusion of country fixed effects as reported in specification (2) of Table 6.1).

While these results suggest that accountability systems may enhance achievement but reduce equity, it is important to keep in mind that there are many different ways to implement accountability. External exit exams mainly provide incentives for individual students, although they may also create indirect accountability pressures for teachers and schools. Other accountability devices, such as monitoring teachers' lessons and comparing the schools' performance to district and national averages, focus instead on teachers and schools. Section 6.4 examines in greater detail the effects of these different forms of accountability policies on equality of educational opportunity.

Two measures of autonomy are included in the basic equity model: the share of schools in a country having main responsibility for formulating the school budget and the share of schools exerting a direct influence on decision-making about

[10] Results for science are similar and are reported in Woessmann et al. (2009, p. 81).

[11] Detailed results for all background variables are reported in Woessmann et al. (2009, pp. 103–105).

Table 6.1 Students' achievement in mathematics: the basic model

	Main effect (1)	Interaction with ESCS	Interaction with ESCS (2)
External exit exams	16.840**	8.120***	8.750***
	(*8.008*)[a]	(*0.862*)	(*0.799*)
Autonomy in formulating budget	−29.740*	7.950***	9.329***
	(*14.594*)[a]	(*1.885*)	(*1.645*)
School influence on staffing decisions	31.153*	1.870	0.798
	(*15.990*)[a]	(*1.492*)	(*1.348*)
Private operation	61.385***	−5.295***	−7.900***
	(*12.042*)[a]	(*1.901*)	(*1.755*)
Government funding	60.752**	−18.065***	−13.137***
	(*28.731*)[a]	(*4.480*)	(*4.214*)
Years since first tracking	0.038	2.462***	2.119***
	(*1.892*)[a]	(*0.281*)	(*0.260*)
ESCS	29.475***	–	28.661***
	(*0.405*)		(*0.371*)[b]
Country fixed effects	No		Yes
Students	181,469		181,469
Schools (clustering units)	6,912		6,912
Countries	27		27
R^2	0.318		0.353

Notes

[a] Clustering of standard errors at the country level

[b] Main effect of ESCS

Dependent variable: PISA 2003 international mathematics test score. ESCS = PISA index of economic, social and cultural status. Sample: OECD countries (excluding France, Mexico, and Turkey). Least-squares regressions weighted by students' sampling probability. Controls include: 15 student characteristics, 9 measures of school location and resources, expenditure per student, GDP per capita, imputation dummies and interaction terms between imputation dummies and the variables. Robust standard errors adjusted for clustering at the school level in parentheses. Significance level (based on clustering-robust standard errors): *** 1 %, ** 5 %, * 10 %

staffing. The effects of these two types of autonomy on average student achievement point in opposite directions: while autonomy in formulating the budget is negatively associated with student achievement, influence on staffing decisions is positively associated with student achievement. With respect to the effects on equity, only the interaction between SES and autonomy in formulating the budget is statistically significantly estimated. The positive sign of the estimated coefficient indicates an equity-decreasing effect of autonomy in this area, while influence on staffing decisions does not appear to have a statistically significant effect on equality of educational opportunity in this specification. As we will see in Sect. 6.5, which probes the effects of different forms of autonomy in greater detail, however, these results do not prove robust to the analysis of additional measures of school autonomy.

The summary measure of choice included in the basic equity model is the share of privately operated schools in a country. As is evident from Table 6.1, private school operation is strongly and significantly associated with higher student achievement and with greater equality of educational opportunity. Contrary to the concerns of many critics of private involvement in education, a large sector of privately operated schools does not reduce equality of outcomes for children from different social backgrounds; in fact, the opposite is true.

While in the operation of schools, private involvement is associated with better performance and more equity, the association is reversed in the case of school finance: here, a larger average share of government (as opposed to private) funding of schools is associated with better student achievement and with greater equality. Larger government funding, in particular when it is available to privately operated schools, may create choice for a larger share of the population and thus increase competition and access to good schools for children with less favorable family backgrounds. Section 6.6 will examine the effects of choice on equity in greater detail.

6.4 Accountability and the Equality of Educational Opportunities: Empirical Results

Table 6.2 reports the results concerning the effects of different measures of accountability on equality of educational opportunity. Our models include all variables that were already introduced in the basic equity model in Table 6.1, plus additional country-level measures of accountability. Specifically, the four additional accountability measures are the use of assessments for decisions on student promotion and retention and for the grouping of students, the monitoring of teacher lessons by the principal or senior, staff and the use of teacher-subjective ratings to assess students.

As already shown in the basic equity specification in Table 6.1, external exit exams are strongly and positively related to student achievement. A student with a socio-economic background equal to the OECD average of ESCS scores 37.4 test points higher on the PISA 2003 mathematics scale if the country employs external exit exams in this subject. At the same time, the use of external exit exams seems to strengthen the influence of socio-economic background on student achievement. The magnitude of this association is, however, substantially reduced in this specification, which now accounts for the effects of several other accountability measures relative to the basic equity model.

The relationship between external exit exams and equality of educational opportunity is illustrated by Fig. 6.1. There, we distinguish between children with low SES, defined as children who are at the 10^{th} percentile of the OECD distribution of the ESCS index and children with high SES, defined as children who are at the 90th percentile of the OECD distribution of ESCS. Students at the 10th

Table 6.2 Students' achievement in mathematics: accountability

	Main effect (1)	Interaction with ESCS	Interaction with ESCS (2)
External exit exams	37.422***	3.500**	3.656**
	(*12.638*)[a]	(*1.692*)	(*1.506*)
Assessments used to make decisions about students' retention/promotion	38.274***	3.549*	−0.181
	(*12.323*)[a]	(*1.824*)	(*1.682*)
Assessments used to group students	−52.478***	−1.409	−0.743
	(*14.895*)[a]	(*2.361*)	(*2.210*)
Monitoring of teacher lessons by principal	31.563**	11.859***	11.006***
	(*13.148*)[a]	(*1.670*)	(*1.539*)
Teachers' subjective ratings used to assess students at least monthly	27.175	−12.242***	−5.385**
	(*18.715*)[a]	(*2.583*)	(*2.331*)
ESCS	29.582***	–	28.941***
	(*0.397*)		(*0.367*)[b]
Country fixed effects	No		Yes
Students	181,469		181,469
Schools (clustering units)	6,912		6,912
Countries	27		27
R^2	0.329		0.353

Notes

[a] Clustering of standard errors at the country level

[b] Main effect of ESCS

Dependent variable: PISA 2003 international mathematics test score. ESCS = PISA index of economic, social and cultural status. Sample: OECD countries (excluding France, Mexico, and Turkey). Least-squares regressions weighted by students' sampling probability. Controls include: autonomy in formulating budget, school influence on staffing decisions, private operation, government funding, years since first tracking, interaction terms between these institutional variables and ESCS, 15 student characteristics, 9 measures of school location and resources, expenditure per student, GDP per capita, imputation dummies and interaction terms between imputation dummies and the variables. Robust standard errors adjusted for clustering at the school level in parentheses. Significance level (based on clustering-robust standard errors): *** 1 %, ** 5 %, * 10 %

percentile of the ESCS distribution have lower SES than all but 10 % of the students in our sample, while students in the ninth decile have a higher SES than all but 10 % of students.[12] Figure 6.1 depicts the test scores of children with low and high SES that are associated with the presence or absence of external exit exams. While both low- and high-SES students gain from the presence of external exit exams, high SES students gain slightly more. The presence of external exit

[12] In all figures of this chapter, we will use the first and the ninth decile of the ESCS distribution to refer to students with low and high SES.

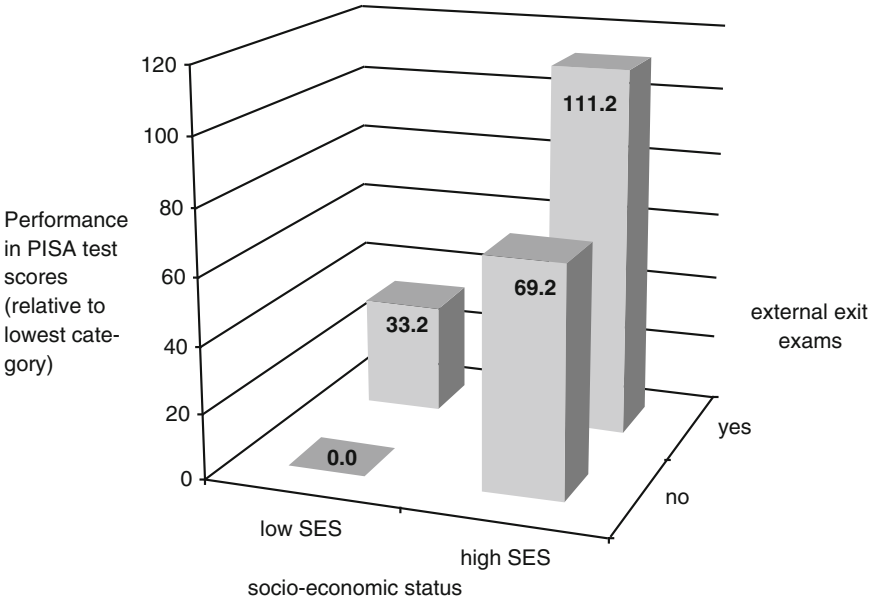

Fig. 6.1 External exit exams and SES. Performance in PISA test scores (relative to lowest category). *Note* low and high SES refer to the first and ninth decile on the PISA ESCS index, respectively. *Source* based on specification (1) of Table 6.2

exams is associated with a gain in test scores of 33.2 test score points (33.2–0.0) for low-SES students and with a gain of 42.0 points (111.2–69.2) for high-SES students.

Contrary to previous findings, these results suggest that there may be a tradeoff between efficiency and equity that is narrowly defined when it comes to external exit exams. The effect of SES on student achievement is slightly greater in systems with external exit exams. However, even students with the lowest SES gain from external exit exams: abolishing external exit exams would hurt even the most disadvantaged.

The first of the newly added measures of accountability is the percentage of schools using assessments to make decisions about students' retention or promotion, another accountability device aimed squarely at students. The results reveal that students perform significantly better in countries with larger shares of schools using this accountability measure. With respect to equality of educational opportunity, the results differ between our two specifications. While specification (1) seems to support the hypothesis that the use of assessments for promotion decisions reduces equity, specification (2) does not. The results of the latter specification, which includes country fixed effects and therefore places fewer restrictions on the model, are more credible. The use of assessments in making decisions about student retention and promotion thus appears to be unrelated to equality of educational opportunity.

The next additional measure of accountability is the extent to which the schools in each of the countries report using assessments to group students. The use of assessments for student grouping can be regarded as a proxy for the extent of tracking that takes place within schools. Students in countries with a larger share of schools using assessments to group students perform substantially worse than students in countries where fewer schools do so. This finding on the effects of tracking within schools is confirmed in the first column of specification (1) of Table 6.2. The coefficient of the interaction term between this variable and SES is negative but not statistically significant in both specifications; high-SES students seem to suffer as much from this practice as low-SES students. Equality of educational opportunity therefore does not seem to be affected by the presence or absence of the use of assessments for student grouping.

Our results show that students in countries with more monitoring of teacher lessons by principals perform better, but also that equity in these countries is reduced. The difference in test scores between low- and high-SES students becomes larger in countries where a large share of schools report using this type of teacher monitoring.

Figure 6.2 displays the effects of having a high incidence of teacher monitoring by principals (as in the United States, 99.7 % of students) as compared with a low incidence of such monitoring (as in Portugal, 4.9 % of students) for low- and high-SES students. Again, even low-SES students gain from the teacher-focused accountability, but now to a substantially smaller extent (16.3 test-score points) than high-SES students (44.8).

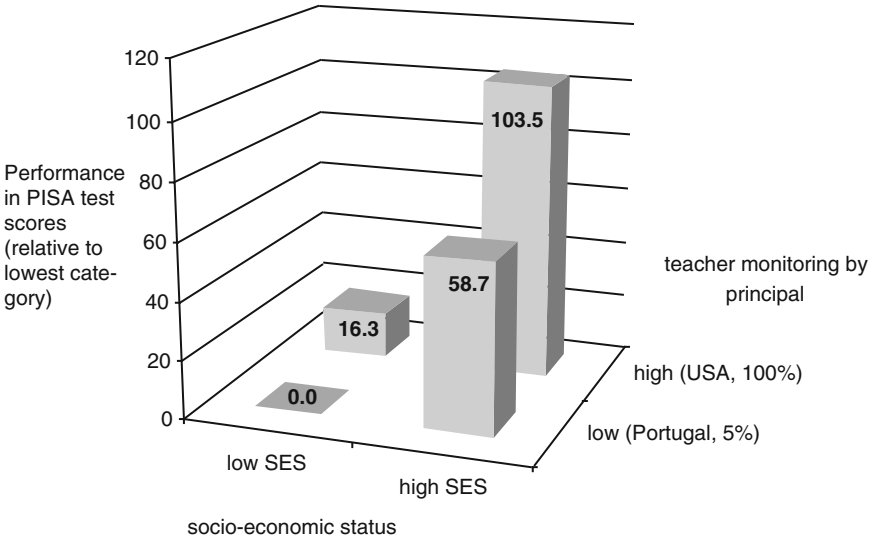

Fig. 6.2 Monitoring of teacher lessons by principal and SES. Performance in PISA test scores (relative to lowest category) *Note* low and high SES refer to the first and ninth decile on the PISA ESCS index, respectively. *Source* based on specification (1) of Table 6.2

An alternative measure of teacher monitoring available in the PISA 2003 database is whether inspectors or other persons external to the school observed classes during the previous year to monitor the practice of mathematics teachers. We used this measure as an alternative measure of teacher monitoring in the model reported above and entered it jointly with the measure of monitoring by principal. In neither specification did this measure of teacher monitoring show a statistically significant effect on equity.

The result that external teacher monitoring is neutral with respect to equity may suggest that the equity-reducing pattern found for internal teacher monitoring by principals is due to the fact that in many countries it is primarily schools catering to high-SES students that are using internal teacher monitoring. If this is the case, the equity-reducing effect of internal teacher monitoring may be more seeming than real.

The final measure of accountability included in the model reported in Table 6.2 is the share of schools that report using teachers' subjective ratings to assess students at least monthly. This form of student assessment does not have a significant effect on student performance on average, but it reduces the inequality in an education system. Figure 6.3 illustrates the effects of this form of assessments graphically. All else being equal, the gap between low- and high-SES students is very large (at 89.8 test-score points) in countries like Denmark that report very low frequencies of this form of assessment. But the gap becomes substantially smaller (at 61.4 test-score points) in countries like Portugal that report very high frequencies of this form of assessment. Thus, using teacher's subjective ratings to judge the performance of students seems to be a helpful tool in reducing

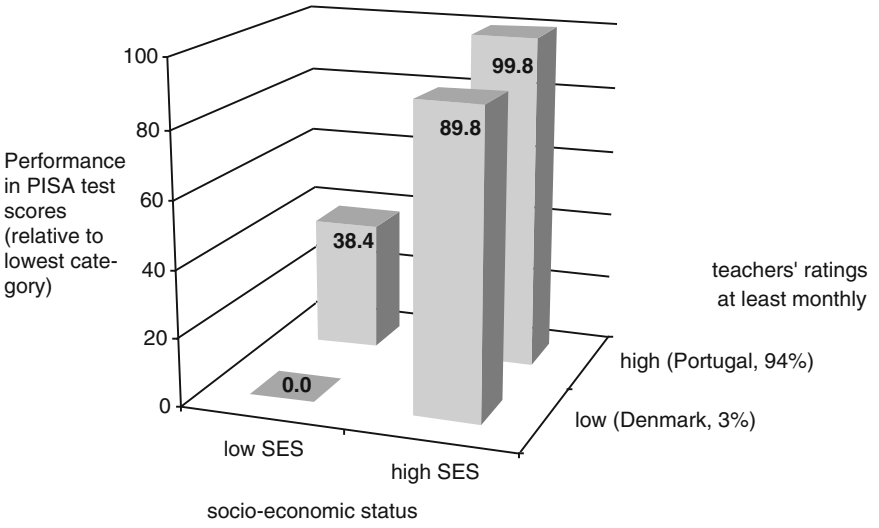

Fig. 6.3 Student assessment by teachers' subjective ratings and SES. Performance in PISA test scores (relative to lowest category). *Note* low and high SES refer to the first and ninth decile on the PISA ESCS index, respectively. *Source* based on specification (1) of Table 6.2

educational inequalities. This may be due to increased reflection by teachers on their students' performance and potential, something that might be less common in the simple grading of tests.

Similar equity-enhancing effects are found for the use of teacher-developed tests as an alternative form of student assessment. By contrast, the regular use of standardized tests is not significantly associated with the equality of educational opportunity.

Accountability measures can be targeted not only at teachers or students but also at schools as a whole. We therefore also examined within the same model the effects on equity in the use of student assessments to monitor the school's progress from year to year, to compare the school to district or national performance, and to compare the school to other schools. None of these accountability measures aimed at schools show a significant interaction with students' SES; they seem to be neutral with respect to equity.

In summary, accountability devices seem to be mostly tides that lift all boats. For most of them, there is no significant difference in how they affect low-SES versus high-SES students. External exit exams have a somewhat larger—and internal teacher monitoring has a substantially larger—positive effect for high-SES students, despite both accountability measures having a positive effect even on students with very low SES. The regular use of teachers' subjective ratings to assess students increases the equality of educational opportunity.

6.5 Autonomy and the Equality of Educational Opportunities: Empirical Results

Table 6.3 reports the main and interaction effects of five different forms of school autonomy on student achievement and on equality of educational opportunity in PISA 2003. Specification (1) displays the results for the model without country fixed effects, which therefore is also able to determine the main effects of the autonomy variables on average student achievement. Specification (2) presents the estimates for the model with country fixed effects, where main effects cannot be identified. Both regressions include the same institutional variables controlling for the effects of accountability and choice as the basic equity model presented in Sect. 6.3.

Autonomy in budget formulation is significantly negatively related to student achievement, while school influence on staffing decisions seems to be positively related to achievement (although the effect does not reach statistical significance in this specification). None of the other autonomy variables aggregated at the country level (autonomy in hiring teachers, autonomy in establishing starting salaries, and autonomy in determining course content) show a significant effect on average student achievement. However, all of the autonomy variables show a significant association with equity in specification (1) that does not include country fixed

Table 6.3 Students' achievement in mathematics: autonomy

	Main effect (1)	Interaction with ESCS	Interaction with ESCS (2)
Autonomy in formulating budget	−35.144*	−4.222**	0.202
	(*20.181*)[a]	(*2.104*)	(*1.884*)
School influence on staffing decisions	25.705	−2.810*	−3.980***
	(*16.911*)[a]	(*1.560*)	(*1.423*)
Autonomy in hiring teachers	17.164	17.231***	15.232***
	(*19.501*)[a]	(*1.814*)	(*1.672*)
Autonomy in establishing starting salaries	−6.418	4.122**	0.587
	(*18.037*)[a]	(*1.960*)	(*1.791*)
Autonomy in determining course content	−0.223	−7.958***	−3.306*
	(*23.814*)[a]	(*2.282*)	(*1.964*)
ESCS	29.559***	–	29.046***
	(*0.396*)		(*0.365*)[b]
Country fixed effects	No		Yes
Students	181,469		181,469
Schools (clustering units)	6,912		6,912
Countries	27		27
R^2	0.321		0.354

Notes

[a] Clustering of standard errors at the country level

[b] Main effect of ESCS

Dependent variable: PISA 2003 international mathematics test score. ESCS = PISA index of economic, social and cultural status. Sample: OECD countries (excluding France, Mexico, and Turkey). Least-squares regressions weighted by students' sampling probability. Controls include: external exit exams, private operation, government funding, years since first tracking, interaction terms between these institutional variables and ESCS, 15 student characteristics, 9 measures of school location and resources, expenditure per student, GDP per capita, imputation dummies and interaction terms between imputation dummies and the variables. Robust standard errors adjusted for clustering at the school level in parentheses. Significance level (based on clustering-robust standard errors): *** 1 %, ** 5 %, * 10 %

effects. Two of the significant interactions are not robust to the inclusion of country fixed effects in specification (2), though, which requires the least restrictive modeling assumptions.

The interaction effect between autonomy in formulating the budget and ESCS is not statistically significantly different from zero in specification (2) with country fixed effects. While this interaction proves very sensitive to the specific model specification as long as no country fixed effects are included (being positive in the basic equity model of Table 6.1 and negative once additional autonomy measures are included in specification (1) of Table 6.3), the preferred specification with country fixed effects suggests that autonomy in formulating the school budget is not significantly associated with equality of opportunity.

The coefficient on the interaction term between ESCS and the autonomy variable which indicates that schools have a direct influence on decision making about staffing is significantly negative in both the model with and without country fixed effects.[13] At the same time, the interaction between ESCS and autonomy in hiring teachers is significantly positive. This difference in results regarding the two measures of staffing autonomy may be due to the fact that they measure somewhat different aspects of staffing autonomy. The first measure asks about staff in general, while the second asks specifically about teachers. Perhaps more importantly, the measure of school influence on staffing decisions does not exclude the possibility that other bodies outside the school also influence staffing decisions, while the measure of autonomy in hiring teachers explicitly excludes the possibility that outside bodies have main responsibility.

Our findings suggest that equity is enhanced when schools have some influence on staffing decisions, but that it is reduced when schools have full autonomy in hiring teachers. That is, equality of educational opportunity seems to be improved by allowing schools to take part in personnel decisions, but it seems to be harmed when these decisions are completely left to the schools. However, as in the case of the internal teacher monitoring by principals discussed in the previous section, there is also the possibility that the positive interaction between SES and the share of schools with hiring autonomy says more about the type of student that schools with full autonomy in hiring teachers cater to than about any direct effect of autonomy on equity.

The fourth autonomy variable included in the model of Table 6.3 measures autonomy in establishing starting salaries. In the model with country fixed effects, the interaction term between salary autonomy and SES is not statistically significant, which suggests that autonomy in establishing starting salaries is not significantly related to equality of educational opportunity.

Autonomy in determining course content is positively associated with equality of educational opportunity. Its interaction with SES is negative in both the regression with and without country fixed effects. At the same time, it is unrelated to average student achievement in our specification (1) model. Therefore, at least in the presence of external exams (a circumstance that is controlled for in the model), giving more autonomy in the choice of content is equity-enhancing and does not have negative effects on efficiency.

In summary, some of the associations between school autonomy and equity prove sensitive to the specific model used. In our preferred model, however, equality of opportunity is lower in countries where more schools have full autonomy in hiring teachers. This negative effect of staffing autonomy on equity is

[13] The variable 'School influence on staffing decisions' suffers from the weakness that it surveys the influence of the 'school's governing board', which may lead to misreporting in countries that do not have the concept of school governing boards. Note that the results regarding the other institutional variables in the basic equity model do not change if the variable 'Autonomy in hiring teachers' is used instead of the variable 'School influence on staffing decisions' in the basic equity model.

attenuated (but not eliminated) by the fact that equality of opportunity is higher in countries where more schools have some influence on staffing decisions. Equality of opportunity is also higher in countries where more schools have autonomy in determining course content. Autonomy in formulating the budget and autonomy in establishing starting salaries do not show a significant association with the equity of student achievement. Keep in mind, though, that the limited degree of statistical freedom in our country-level analysis prevents us from analyzing the possibility that the effects of school autonomy depend on the extent of accountability, which proved to be an important aspect in a closely related analysis on the association of these institutional features with the level of student achievement (Woessmann et al. 2009).

6.6 Choice and the Equality of Educational Opportunities: Empirical Results

Our basic equity model in Table 6.1 reports the effects of private operation on average student achievement and equity while controlling for the share of funding that comes from government sources. The results show that a higher share of private operation increases both mean achievement and equity. At the same time, the average share of government funding also increases both mean achievement and equity. Figure 6.4 illustrates the equity-enhancing effect of private operation by contrasting the effects of high versus low levels of private operation for students with high versus low SES. Iceland is one example of countries with essentially no privately operated schools, while 77 % of the Dutch students tested in PISA 2003 attend schools that are privately operated. The figure reveals that private operation of schools reduces the achievement gap between low- and high-SES students. While the gap is 77.2 test-score points in countries without any private operation, it is lower–66.9 test-score points–in countries with high levels of private operation.

To further explore the effects of choice and private involvement on the school system, we add to the basic equity model another variable measuring the difference in the share of government funding that private and public schools received. While public schools tend to receive the largest part of their funding from government sources, the average share of funding of privately operated schools that comes from government sources varies substantially across countries. In countries such as Belgium, Ireland, and the Netherlands, public–private partnerships are quite common in schooling: Many schools are privately operated but mostly publicly funded. In Finland, Korea, the Netherlands, the Slovakia, and Sweden, the difference in the average share of government funding between publicly and privately operated schools is close to zero. By contrast, in Greece, the United Kingdom, and the United States, publicly operated schools receive nearly all their funding from government sources, while privately operated schools receive hardly any government funding. The variable of the difference in the share of government funding

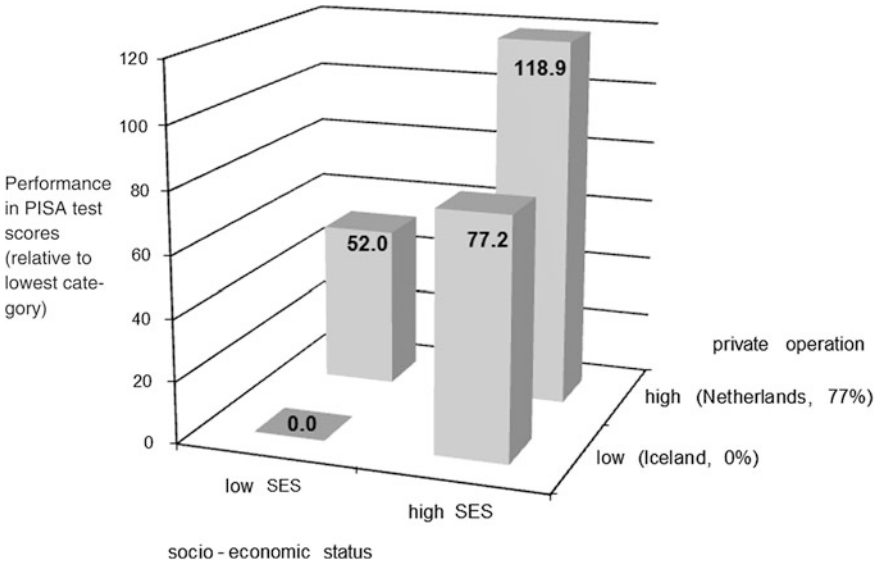

Fig. 6.4 Private school operation and SES. Performance in PISA test scores (relative to lowest category). *Note* low and high SES refer to the first and ninth decile on the PISA ESCS index, respectively. *Source* based on specification (1) of Table 6.2

between private and public schools captures essentially the extent to which the government encourages public–private partnerships by treating public and private schools equitably in terms of access to funding.

The models presented in Tables 6.1 and 6.4 differ only with respect to this new variable and its interaction term with ESCS. Comparing the results, we see that the main effect of private operation on average achievement becomes smaller and that its interaction effect with ESCS is no longer statistically significant in Table 6.4. The interaction effect of government funding with ESCS is also somewhat reduced. This suggests that the total equity-enhancing effect of private operation and part of the equity-enhancing effect of governmental funding can be ascribed to larger government funding of privately operated schools. In other words, it appears that the equity-enhancing effect of private operation stems from private schools' greater access to government funds in countries with large private sectors.

In terms of the effect of the difference in government funding between private and public schools, the results reveal that a greater difference between private and public schools in the received share of government funding is detrimental to average student achievement and equality of educational opportunity. Thus, average student performance is lower in countries where private schools receive only little funding from the government. At the same time, equality of educational opportunity is hindered by a large difference in government funding between private and public schools. It seems that government funding of private schools particularly benefits students with low SES.

Table 6.4 Students' achievement in mathematics: choice

	Main effect (1)	Interaction with ESCS	Interaction with ESCS (2)
Private operation	41.618***	−1.637	0.708
	(*13.520*)[a]	(*2.169*)	(*2.059*)
Government funding	79.487***	−16.346***	−8.104*
	(*28.011*)[a]	(*4.805*)	(*4.556*)
Difference in government funding between	−33.630**	10.595***	13.827***
Public and private schools	(*12.960*)[a]	(*1.658*)	(*1.551*)
Years since first tracking	−2.067	3.367***	2.726***
	(*2.847*)[a]	(*0.302*)	(*0.274*)
ESCS	29.612***	–	28.902***
	(*0.424*)		(*0.393*)[b]
Country fixed effects	No		Yes
Students	164,532		164,532
Schools (clustering units)	6,404		6,404
Countries	25		25
R^2	0.327		0.357

Notes

[a] Clustering of standard errors at the country level

[b] Main effect of ESCS

Dependent variable: PISA 2003 international mathematics test score. ESCS = PISA index of economic, social and cultural status. Sample: OECD countries (excluding France, Mexico and Turkey). Least-squares regressions weighted by students' sampling probability. Controls include: external exit exams, autonomy in formulating budget, school influence on staffing decisions, interaction terms between these institutional variables and ESCS, 15 student characteristics, 9 measures of school location and resources, expenditure per student, GDP per capita, imputation dummies, and interaction terms between imputation dummies and the variables. Robust standard errors adjusted for clustering at the school level in parentheses. Significance level (based on clustering-robust standard errors): *** 1 %, ** 5 %, * 10 %

This is depicted graphically in Fig. 6.5. The lowest difference, in Korea, is actually slightly negative in the PISA 2003 sample, i.e. privately operated schools report receiving a slightly larger share of government funding. The difference is virtually zero in several other countries such as Finland, the Netherlands, the Slovakia and Sweden. The highest difference is 91 % points in the United States, where private schools receive virtually no funding from government sources. Figure 6.5 shows that while both low- and high-SES students benefit from a smaller difference in government funding between private and public schools, low-SES students gain substantially more: low-SES students gain 45.8 test-score points whereas high-SES students gain only 19.3 test-score points. Thus, the difference in achievement between high- and low-SES students becomes significantly smaller as the difference in government funding between private and public schools is reduced.

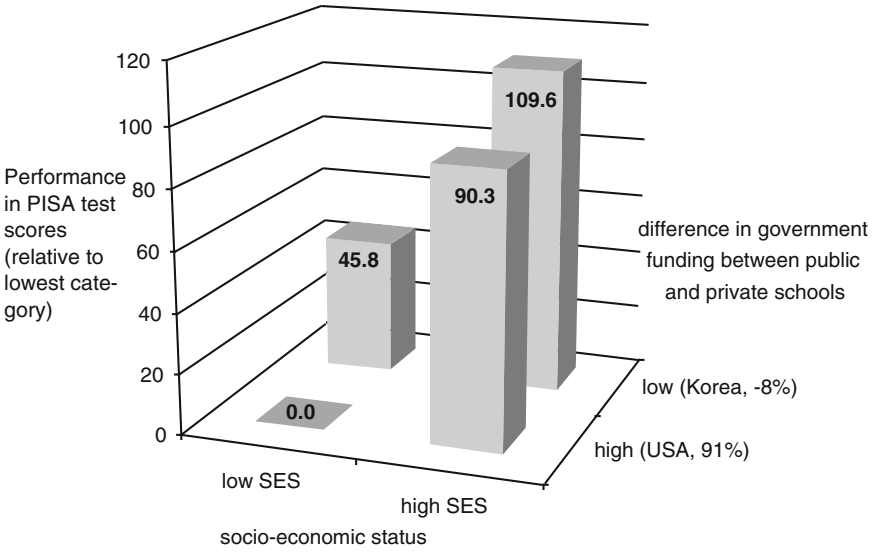

Fig. 6.5 Difference in government funding between private and public schools and SES. Performance in PISA test scores (relative to lowest category). *Note* low and high SES refer to the first and ninth decile on the PISA ESCS index, respectively. *Source* based on specification (1) of Table 6.4

We have also experimented with the two proxies for public school choice at our disposal. The first one is the share of students in a country who report attending their school because it is the local school for students who live in their area, which may serve as a proxy for the fact that students are required to attend the school in their local catchment area. The second one is the share of students in a country who report attending their school because it is known to be a better school than others in the area, which may serve as a proxy for exerted choice among schools. Both proxies have substantial limitations when used as a measure of public school choice, and they do not enter significantly when added to the basic equity model with country fixed effects. Neither the share of students attending their school because it is local, nor the share of students attending their school because it is better is statistically significantly related to equality of educational opportunity.

When adding the two proxies of public school choice to the model of Table 6.4, the coefficient on the interaction between SES and the share of students in a country who attend their school because it is known to be better than alternative schools actually turns weakly (but statistically significantly) negative, indicating that choice among public schools may also be beneficial for equity.

6.7 Choice-Based vs. Selection-Based Systems: Early Tracking

Table 6.4 also reports the effects of tracking on average achievement and on equity. We define tracking as the systematic selection of students into schools with different curricula, based on some measure of their (perceived) ability. The timing and extent of tracking varies widely across OECD countries. While many countries, like Sweden, do not track their students at all during the years for which schooling is compulsory, Germany and Austria begin tracking their students at age 10. Our measure of tracking is the number of years that have passed since the first stage of selection when students are 15 years old (the age at which they participated in the PISA 2003 study). Thus, the tracking variable will be zero if no selection has taken place by age 15 (in countries like Sweden), and it will be 15 minus the age of students at the time of first selection in countries that do employ tracking—for example, the variable takes on a value of 5 in Germany and Austria.

Supporters of tracking regimes typically argue that instruction is more efficient in tracked systems because classrooms are more homogenous, which would lead to higher average achievement in tracked systems. However, critics of tracking argue that it harms low-ability children by depriving them of the positive influence of more able peers. Moreover, because the achievement tests on which selection is based provide only a noisy signal of the students' true abilities, many students are likely to end up in the wrong track. Because high-SES parents tend to be particularly keen to place their children in high-track schools, this may mean that early tracking puts low-SES students at a disadvantage. In addition, when track decisions are made at an early age, children who did not have much exposure to education at home have little time to respond to the educational environments of schools before tracking decisions are taken, whereas they would have more time to prove their academic potential if tracking decisions came later. Children from low-SES backgrounds may therefore be at a particular disadvantage in systems with early tracking. Previous cross-country evidence corroborates such an equity-reducing effect of tracking (Schuetz et al. 2008; Hanushek and Woessmann 2006; Ammermüller 2005).

The results presented in Table 6.4 are inconsistent with the claims of supporters of tracking; however, they provide strong additional support for the concerns voiced by critics. Early tracking is not significantly related to average student achievement in OECD countries, but it does significantly reduce equality of educational opportunity. Figure 6.6 presents the results graphically. In countries where no selection takes place up to age 15, the difference in performance between low- and high-SES students is 65.0 test-score points (95.8–30.8). By contrast, in countries like Austria and Germany, where selection takes place five years prior to the PISA testing age of 15, the difference in achievement between high- and low-SES children is 107.7 test-score points. Thus our analysis confirms the finding of previous studies that tracking has harmful effects for low-SES students while providing no benefits in terms of average student achievement. While low-SES

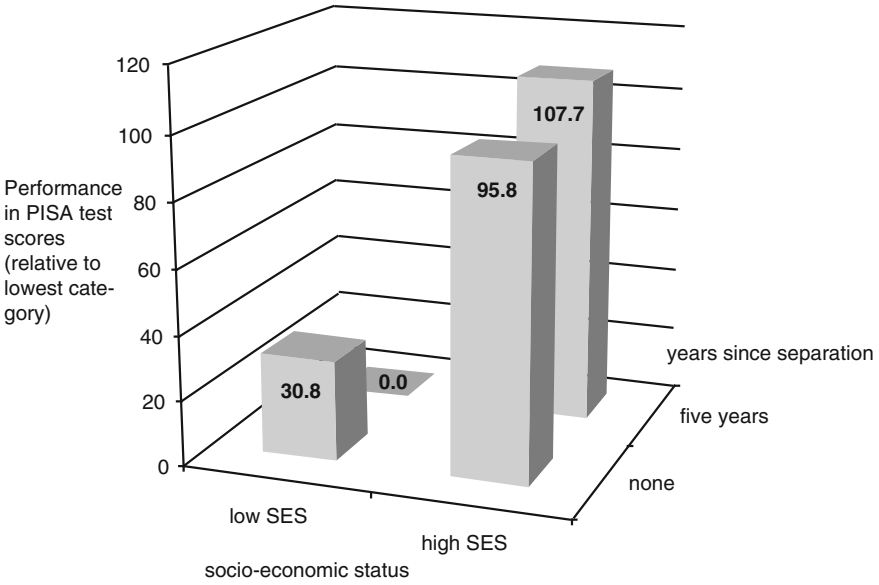

Fig. 6.6 Tracking and SES. Performance in PISA test scores (relative to lowest category). *Note* low and high SES refer to the first and ninth decile on the PISA ESCS index, respectively. *Source* based on specification (1) of Table 6.4

students lose substantially in early tracking, only the highest-SES students seem to gain a little.

These results highlight the importance of distinguishing school choice from ability-based selection as exercised by actors within the school system. Choice refers to the capacity of parents to choose from among different schools the one that is best for their children. In contrast, in tracked systems, students are selected into different types of schools. While various forms of school choice have been repeatedly shown to improve both the academic achievement of students and the equality of educational opportunity, the practice of selective tracking appears to be unrelated to average student achievement and strongly detrimental to equality in educational opportunity.[14]

In summary, larger shares of privately operated schools are beneficial for the equity of student achievement as long as they are treated in the same way as publicly operated schools in terms of government funding. Government (as opposed to private) funding has a general equity-enhancing effect, but this is particularly reinforced when government funding is distributed to private and public schools on equal terms. Choice among publicly funded but privately operated schools is particularly beneficial for low-SES students. The available

[14] In addition to the cross-country evidence, Woessmann (2010) provides evidence from across German states corroborating the equity-enhancing effects of private school operation and later tracking.

proxies of public school choice seem to be neutral with respect to equality of opportunity. In contrast to the beneficial equity effects of choice-based systems, early tracking is detrimental to equal opportunity.

6.8 Conclusions

In general, there is very little evidence that those aspects of accountability, autonomy, and choice that are associated with higher levels of student achievement across countries—as reported by Woessmann et al. (2009, Chaps. 1–6)—have adverse consequences for the equality of opportunities within school systems. On the contrary, the choice created by public funding for privately operated schools in particular is associated with a strong reduction in the dependence of student achievement on SES.

While the effects of most accountability devices do not differ significantly for students with different SES, the effects are slightly smaller for low-SES students with a few accountability measures and larger with others. External exit exams have a strong positive effect for all students that is slightly lesser for low-SES students. Monitoring of teacher lessons by the school principal is also associated with higher performance across the distribution, although the effect is substantially lesser for low-SES students. By contrast, the positive effect of regularly using subjective teacher ratings to assess students is substantially greater for low-SES students. The effect of many other accountability devices, such as the monitoring of teacher lessons by external inspectors, the regular use of standardized tests, and the use of assessments to make decisions on student retention or promotion, to group students, to monitor school progress, or to compare the school to district or national performance benchmarks or to other schools, does not differ significantly for students with different SES.

Results on the relationship between school autonomy and equity are somewhat mixed and partly sensitive to specification choices. Equality of opportunity is lower in countries where more schools have autonomy in hiring teachers, although there is a smaller opposing effect for school influence on staffing decisions across the board. School autonomy in determining course content is associated with slightly higher equality of opportunity. In our most elaborate specification, autonomy in budget formulation and salary determination are unrelated to the equity of student outcomes.

In terms of private school choice, the positive effects of both private school operation and government funding are substantially greater for low-SES students. The equity-enhancing effect of private school operation can be attributed to international variation in the difference in government funding between public and private schools: the more similar the treatment of privately operated schools relative to publicly operated schools in terms of government funding, the less student achievement depends on family background. Thus, the competition created by

government funding for privately operated schools seems to be particularly helpful for students with low SES.

These results on choice and competition contrast starkly with the results on effects of the selectivity of the school systems, as measured by the age at which children are first tracked into different types of schools. Inequality of opportunity is substantially higher in school systems that track students at early ages.

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