

# **Determinants of Educational Attainment Among Adolescents in Egypt: Does School Quality Make a Difference?**

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## **Abstract**

The paper explores empirically the relationship between school quality in Egyptian preparatory (middle) schools and the likelihood of school dropout either during preparatory school or before the completion of secondary school. Despite strong empirical evidence for the many positive social and economic returns associated with more years of schooling, there has been little research exploring how the quality of particular schools might influence grade levels attained. The authors address this research gap using detailed data on Egyptian preparatory schools (grades 6–8, the last three years of the eight years of basic schooling) that are linked with a national survey of Egyptian adolescents. The results confirm that school quality is associated with grade levels attained. For both boys and girls, the elements of school quality that matter include traditional elements such as time available for learning and material resources, including teacher quality, as well as some aspects of school and classroom dynamics, in particular treatment by teachers and teacher attitudes. A comparison of these results with a similarly designed study in Kenya by some of the same authors suggests that the specific features of school quality that matter for educational outcomes are context specific and differ between boys and girls. Gender roles in society, as well as school quality and teacher attitudes about the academic capabilities of adolescent boys and girls, shape the ways in which schools influence boys and girls in a particular setting. At the same time as schools empower young people with knowledge and skills, they also reflect and reinforce societal norms, including norms about gender roles.

Education is known to produce many positive social and economic outcomes including improved cognitive competencies, higher wages, better health, improved marriage prospects, and lower fertility. Despite the documented empirical correlations between the grades of schooling attained and these various outcomes, there has been very little research exploring how the quality of particular schools might influence those outcomes, with the notable exception of cognitive competencies. Furthermore, the relationship between school quality and grades attained has itself rarely been addressed in the literature despite the documented importance of certain levels of schooling to many of the outcomes identified above. The gap in the empirical literature is linked to a gap in the theoretical literature. Current theory suggests that the benefits of schooling are mainly attributable to improved cognitive competencies as typically measured by standardized test scores. Yet common sense and experience suggest that schools produce many other individual attributes, in addition to cognitive competencies, that can influence subsequent schooling outcomes, later success in the labor market, and other nonmarket outcomes such as marriage and childbearing.

In this paper, we propose to take advantage of detailed data on Egyptian preparatory schools (grades 6–8, the last three years of the eight-year basic schooling sequence) that are linked with a national survey of Egyptian adolescents. Using a subsample of the national sample of adolescents who attended our sample schools, we explore statistically the relationship between various dimensions of school quality at the preparatory level and the likelihood of school exit (a) before the end of preparatory school and (b) before the completion of secondary school. We begin with a review of the literature on school quality and returns to schooling and then present some background information on the specific situation of schooling in Egypt before introducing our data and providing some descriptive background on various dimensions of school quality. Throughout we will analyze outcomes separately for boys and girls, allowing for the possibility that effects of school quality may differ by sex.

## **RETURNS TO SCHOOLING AND SCHOOL QUALITY**

### **Returns to Schooling**

The field of education has concentrated primarily on the more immediate benefits of schooling to the individual in the form of improved cognitive competencies (see

Lockheed and Verspoor 1991; Velez et al. 1993; Harbison and Hanushek 1992; Fuller and Clarke 1994; Glewwe 1999 for reviews). There is a long and continuing tradition in the field of education of estimating education production functions that link specific school inputs such as measures of school quality to test scores. Economists have focused mainly on the longer-term benefits from additional years or levels of schooling, these being summarized in wage differences or rates of return to schooling in the labor market (e.g., Mincer 1974). Both economists and demographers have examined the link between grades attained and improved child outcomes (e.g., Leibowitz 1974). Only recently have economic studies linked aggregate measures of school quality (usually proxied by expenditures per student or teacher/student ratios across schools within a state or district) to either adult wage rates or more immediate educational outcomes such as grade attainment and/or test scores. As both grades attained (Mincer 1974; Psacharopoulos 1989) and test scores (Grogger and Eide 1995; Murnane et al. 1995) have been empirically linked with earnings, firmly establishing the links between school quality and these two educational outcomes can be an important step in understanding the longer-term relationship by which school quality enhances later earnings.

Behrman and Birdsall (1983) first called attention to the potential biases in existing estimates of labor market rates of return to years of schooling due to the omission of information on school quality. At that time, few economists had incorporated any measures of school quality in their earnings equations. Betts's (1996) recent review of the literature on school inputs identifies 23 studies that have examined the relationship between school inputs and students' later job-market success in the United States, but only six of these contained data that linked the individual student to the actual school attended, and no study could examine more than a few simple indicators, such as teacher/student ratios, teacher education, teacher salary, length of school year, and books per student. Moreover, none of these six studies found significant effects of school inputs. Seeking to explain this, Betts argues that, over time, the conventional set of variables has exhibited less and less variation across US schools. In concluding his review, Betts suggests that it is time for the school-quality literature to search for a richer paradigm than the education production function common in the

education field. He notes that “education is much more than an assembly line. Given the web of principal-agent issues in public education, perhaps the literature could progress by examining more closely the human interactions within schools. From a sociological and psychological perspective, such work would involve attempting to identify the teaching methods, attitudes, and styles that characterize the best teachers” (p. 183). He decries the complete absence of studies on the effects of classroom environments on later labor market success.

If the literature linking school quality to economic rates of return is thin, that concerned with the effect of school inputs on grades attained is even skimpier. Card and Krueger’s (1996) review of that literature, which included their own historical research based on state data (Card and Krueger 1992), suggests that this is a promising avenue for future research. They say that it is “unclear whether this relationship [between school quality and educational attainment] results because students respond to the economic incentives created by a rise in the return to school or because they find it more enjoyable to attend schools with smaller classes or better-paid teachers” (p. 123). Thus, they hint at the possibility that attitudes toward school and schooling may be another pathway of influence between school quality and grades attained besides cognitive competencies. In less-developed countries where enrollment is far from universal, the potential implications of school quality for educational attainment are profound (Lloyd and Mensch 1999). Indeed, a major vehicle through which school quality may affect earnings is through its impact on retention and educational attainment.

We are aware of only two studies in developing countries that have examined the effect of school quality on educational attainment: Glewwe and Jacoby (1994) in Ghana and Lloyd et al. (2000) in Kenya. However, to our knowledge, the Kenyan study is the only one that has gone beyond viewing schools as entirely dedicated to the production of cognitive competencies. In the Kenyan study, schools are viewed as institutions with the potential to shape students not just intellectually but also socially, either by reinforcing existing social norms or by encouraging more progressive and tolerant attitudes. Indeed, the study gives particular attention to factors that encourage or discourage students, such as teacher attitudes and the quality of student–teacher

interaction, and examines the implications of these factors for school dropout. The empirical results suggest, controlling for individual and family variables, that girls' retention is discouraged by schools in which boys have a more supportive environment than girls in terms of advice, in which teachers take the importance of math less seriously for girls, in which boys are left free to harass girls, and in which girls' experience of unequal treatment is not recognized by boys. By contrast, none of these factors was statistically important for boys. Few of the other conventional dimensions of school quality were statistically significant predictors of dropout; the few that were only became significant once controls were introduced for the gender dimensions of schooling.

### **Conceptualizing School Quality**

In conceptualizing and measuring school quality, it is important to distinguish school inputs from school outcomes. While good-quality schools are sometimes defined by their results (e.g., cognitive tests or examination scores, see Harbison and Hanushek 1992; Hanushek and Lavy 1994) or by their material correlates (e.g., resources per student, see Schultz 1987), our definition of quality encompasses elements of the educational process that are recognized in the educational literature as being good practices that improve cognitive competencies, encourage attendance, reduce attrition, and/or equalize opportunities by gender. We define three major dimensions of school quality and adapt them to the specific circumstances of the Egyptian schooling system: (1) time available for learning during the school day ("time to learn"); (2) material inputs, such as books, desks, quality and quantity of teaching staff, science labs, and equipment for the school health clinic;<sup>1</sup> and (3) attributes of the school and classroom environment, such as orderliness, the learning environment, teacher and student attitudes, school policies, teacher treatment of students, gender messages, and student behavior (see Table 1). In mixed-sex schools, boys and girls may experience the same school differently either because the same factors affect boys and girls differently or because certain school resources are differentially available to boys and girls (e.g., less time for girls than for boys to use playing fields). Furthermore, there may be systematic differences between the quality of all-boys schools and the quality

**Table 1** Dimensions of school quality, Egypt, 1998

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**Time to learn**

Total time school in session over school year

Number of shifts

**Material inputs**

Facilities (availability and use)

Infrastructure: buildings, classrooms (ventilation, visibility), sports facilities, science labs, library, space for nonacademic activities, school health clinic, school yard

Equipment: desks, blackboards, telephone, duplicating equipment, computers, supplies for school health clinic

Amenities: toilet, electricity, water

Instructional materials (availability and use): textbooks, maps and charts, lab equipment, sports equipment, library books

Teaching staff

Quantity: student–teacher ratio.

Quality: temporary/permanent teaching staff, experience, workload, training, supervision, satisfaction

Curriculum beyond core (availability and participation): home economics, agricultural studies, sports, art, music

Other staff: school head, group tutoring, school deputies, social workers, doctor/nurse

**School and classroom environment**

Learning environment: size of school, number of students per section, physical condition of classrooms

Orderliness: teacher attendance, whether or not scheduled classes are held, percent of class time used for teaching

Teacher treatment of students: encouragement/discouragement, use of punishment (physical vs. verbal), inclusive/exclusive

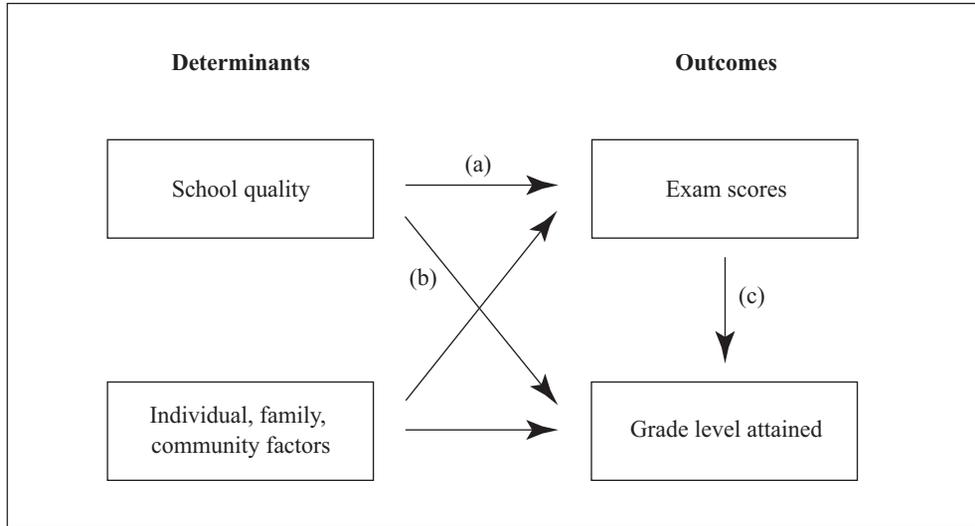
School head and teachers' views on gender issues: learning in mixed vs. single-sex classrooms, teaching boys vs. girls, girls' and boys' academic abilities generally and for specific subjects, importance of teaching about puberty, importance of girls' and boys' participation in sports, ministry policy of home economics for girls only, ministry policy of agricultural/industrial studies for boys only, appropriate gender roles

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of all-girls schools or, more specifically, between all-boys and all-girls schools within a specific community or school catchment area.

Figure 1 focuses on the impact of school quality on education outcomes, highlighting the direct and indirect pathways through which school quality may influence grade attainment. All other potential determinants of educational outcomes, whether

**Figure 1** School quality and educational outcomes



they be at the individual, family, or community level, are subsumed for illustrative purposes in one box. The pathway emphasized in the educational literature (a) links school quality to grade attainment via exam performance. Because eligibility to progress to the next level of schooling will depend on good exam performance, better exam scores are expected to lead to more grades attained (c).

Surprisingly, the direct pathway (b) between school quality and grade attainment has received much less attention in the literature (see Card and Krueger 1996 for discussion). Aspects of school quality that might directly enhance retention rates would include amenities that make the school experience less stressful and more pleasurable, teacher behaviors and attitudes that are supportive and encouraging, school policies that are inclusive, and pedagogical practices that encourage participation. It is our presumption that these elements of quality would reduce the probability of dropout, even controlling for exam scores. Lloyd et al. (2000) provides some empirical support for this pathway in the context of Kenya.

In the present analysis, we explore the potential importance of a similar set of variables for the case of Egypt. In particular, we test the hypothesis that students who attend preparatory schools that provide more time to learn, more and better material

inputs (including facilities, instructional materials, and teaching staff), and a more supportive and encouraging environment for learning will be less likely to drop out of school, all other factors being equal, during preparatory school and before completing high school.

## **THE EGYPTIAN SCHOOLING CONTEXT**

### **The School System**

Basic schooling in Egypt is divided into two phases: primary (grades 1–5) and preparatory (grades 6–8). In 1984, both phases of basic schooling were made compulsory; previously only primary had been compulsory. The Egyptian constitution provides for free education at all levels of study, and, despite growing financial difficulties, this principle has been largely respected (World Bank 1989). Egypt’s governmental education system has two parallel structures administered by different ministries: the secular or public structure and the Muslim Al Azhar structure. For ordinary subjects, the curriculum is the same, and compulsory schooling requirements can be fulfilled in either. Of those students currently enrolled in preparatory schools, 88 percent attend nonreligious public schools, 7 percent attend Azhar schools, 4 percent attend private schools, and less than 1 percent attend experimental schools.

Boys and girls attend mixed classes at the primary level, but at the preparatory level the stated ideal is single-sex education. Nonetheless, some schools remain *de facto* mixed. This is particularly the case in rural areas, where enrollments may not always be sufficient to justify the creation of separate schools for boys and girls. Mixed schools can be of two types: mixed at the school level with segregated classrooms or mixed within classrooms as well. All aspects of the preparatory school curriculum are the same for boys and girls save one: girls study home economics and boys take agricultural/industrial studies. The curriculum for each grade is uniform from school to school nationally and rigidly enforced; in our school visits across Egypt, we found the same lesson being taught in the same week in all parts of the country.

Because children are expected to attend the public school nearest to their home, most parents have only one option for influencing the quality of their children’s education within the public system: to invest in supplementary tutoring. There are no provi-

sions within Egyptian schools to accommodate students with different learning abilities, and the curriculum is inflexible from year to year. Most preparatory schools offer supplementary tutoring in required subjects on the premises after regular school hours as an option for an additional fee, but our data suggest that relatively few students attend. Private tutoring outside the school is often provided by school teachers in group or individual arrangements, often to the same students whom they teach during the school day. Although such private tutoring is illegal, it is widely practiced. Because only about a third of students going beyond preparatory school are able to enter the preferred general secondary track because of limited places, much is at stake.

An examination administered at the level of the governorate<sup>2</sup> is taken at the end of grade 8 and the score on that exam determines a student's eligibility to continue on to secondary school, a phase that typically lasts another three years (Mahrouse 1994). A minimum score of 50 percent is required to continue beyond preparatory; those who fail are entitled to take a re-exam a few months later and are allowed to repeat the last year of preparatory if they again fail. The student's score also determines whether he or she can attend general secondary (a more academic track with opportunities for university later on) or technical secondary (a less prestigious track but one that offers the immediate development of marketable skills). As a result of the relative availability of these two different types of secondary schools, currently about two-thirds of students continuing to secondary pursue the technical track.<sup>3</sup>

The rapid growth in technical secondary enrollment has been largely demand-driven, reflecting the steadily increasing desires of students and parents for higher levels of education as well as the rapid growth in the number of preparatory school graduates. More than a decade ago, a World Bank technical mission pointed to an alarming deterioration in the quality of technical secondary schools as a result of rising enrollments and limited government budgets (World Bank 1989). It further noted that there had been little attempt to adapt the curriculum of technical secondary to the needs of the private sector, a problem that is currently being addressed with several initiatives, including the building of more industrial technical schools (Assaad 1999).

Since 1964, the Egyptian government has, in principle, guaranteed employment to all graduates of technical secondary schools, technical institutes, and universities, but

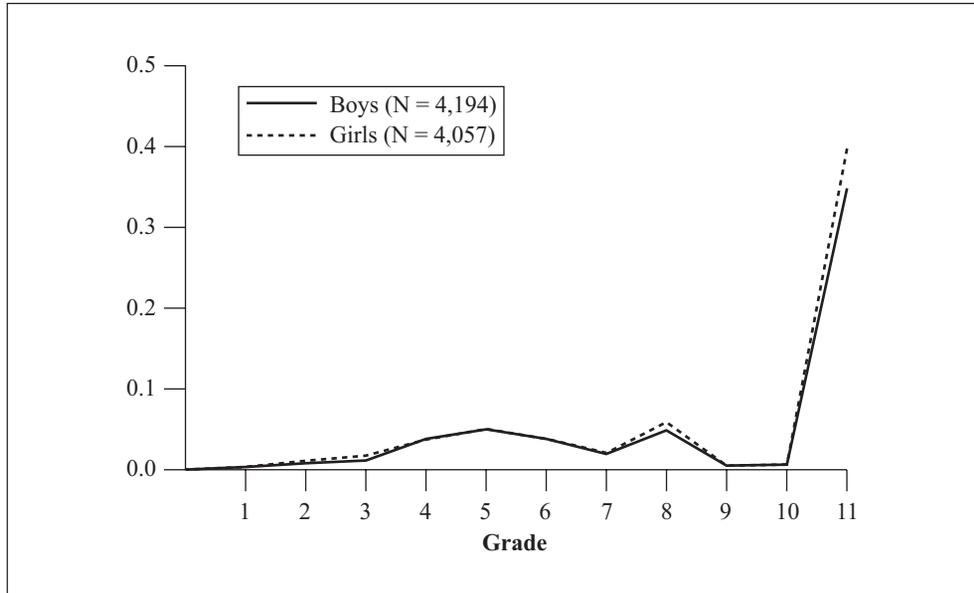
not to the graduates of general secondary who are expected to go on to university. During the last ten years, however, as the waiting time for jobs has lengthened, it appears that the job guarantee, which remains officially on the books, has effectively been suspended. As of 1995, the last cohorts of graduates who were offered government appointments were the 1983 university graduates and the 1982 technical secondary and technical institute graduates (Assaad 1997a). During the same time period, the wage gap between the public and private sector has substantially narrowed. Nonetheless, public-sector jobs remain attractive because of their many nonwage benefits such as guarantees of lifetime job security, disability and retirement benefits, medical insurance, paid vacations, and sick leave. As a result, officially recorded unemployment rates are extremely high by international standards because young workers who are holding less desirable jobs in the private sector without reporting them remain in the official queue for government jobs. Clearly, the best opportunities in the private sector are open to those with the most marketable skills. Because of discrimination in the private sector against women, the unemployment rate for young women graduates eligible for government jobs is particularly high and has risen sharply in recent years (Assaad 1997b, 1999).

### **Progress Through Egyptian Schools**

School enrollment for boys in Egypt is nearly universal (95 percent of 10–19-year-olds have ever been to school).<sup>4</sup> The percentage of girls aged 10–19 who have ever been to school is lower (84 percent), but because growth in girls' enrollment exceeds that of boys, the gender gap has been narrowing. Once in school, the probability of dropout is roughly the same at each grade for boys and girls, particularly among the youngest cohorts. The explanation for the persistence of a gender gap in enrollment is the difference in ever-enrollment. This fact has led to confusion in the public discourse about girls' schooling in Egypt. Lower overall enrollment rates for girls have left many with the impression that girls' dropout rates are higher than boys' when, in fact, this is not the case.

For both boys and girls, the hazard rate of school leaving varies by grade with slightly greater risks of school exit at the end of primary and then again at the end of grade 8 when the compulsory phase of schooling ends (see Figure 2). Across cohorts, our data indicate that the hazard of school exit at each grade has been falling, particu-

**Figure 2** Hazard rates of school exit among adolescents ever enrolled, by grade and sex



larly during the first eight grades (data not shown). As a result, there has been an increase in the number of students who enroll in secondary school. Indeed, most Egyptian boys and girls who ever enter school continue through three years of secondary and, as a result, the hazard rate of school exit is highest at the end of grade 11, which marks the end of secondary. As greater numbers of Egyptian adolescents progress to higher levels of schooling, the question of how the quality of preparatory school affects these educational pathways becomes increasingly salient.

## DATA

### Study Design and Sample

Our data are drawn from two complementary surveys, one of adolescents and one conducted in preparatory schools, that were developed with the participation of the authors (among others) and fielded in Egypt in 1997/98. The first survey—the Adolescence and Social Change in Egypt (ASCE) survey—is a nationally representative, multistage stratified probability sample of 9,128 adolescents aged 10–19 conducted in March–

August 1997, based on the recently updated census frame compiled by the Central Agency for Public Mobilization and Statistics.<sup>5</sup> The core individual questionnaire, administered to all adolescents, collected basic demographic data and full education histories. In addition to the adolescent interview, in households where parents or other adults were present, one parent or responsible adult was selected to be interviewed. Adults were queried about basic household composition and economic status, expenditures on school-related items (e.g., transportation to school and costs of tutoring), attitudes toward marriage and gender roles, and other topics.

The second survey was a survey of secondary schools. The budget allowed us to sample up to 75 nonreligious public preparatory schools. Our goal was to randomly select a subsample from the 101 primary sampling units (PSUs) represented in the original adolescent sample in order to create a linked sample of adolescents and schools. As a minimum requirement, we were committed to visiting enough preparatory schools in each PSU chosen so at least two-thirds of respondents who had been to preparatory school had attended a selected school. This ultimately led us to select a subsample of 37 PSUs.<sup>6</sup>

Building on Kenyan experience (Mensch and Lloyd 1998; Lloyd et al. 2000) and adapting it to the Egyptian schooling system, we developed nine survey instruments to be administered in these 75 preparatory schools. Through both interviews and observation, data were collected on physical facilities, staffing, school-based tutoring, gender-role attitudes of teachers and administrators, pedagogical methods, and student–teacher interactions. The school visits took place in the fall semester of the 1998/99 school year. Each school was visited for a full school week (6 days) by one interviewer, who started the week by choosing at random a section of students in their third year of preparatory (grade 8 of the basic schooling sequence) to follow during the observation week.<sup>7</sup> Table 2 provides a summary of the nine school-based instruments, their mode of administration, and the number administered in each school.

During the week, the head of the school was interviewed as well as teachers and a sample of the students from the selected section.<sup>8</sup> For that section, one class of each subject was observed, including home economics and/or agricultural/industrial studies depending on whether the school was mixed or single-sex.<sup>9</sup> In addition to monitoring specific behavior, the observer took extensive notes on classroom dynamics. In particu-

**Table 2** Characteristics of school instruments

Focus of instrument	Number of instruments administered <sup>a</sup>	Number of schools with instruments	Type of administration	Number administered per school		
				Single-sex	Mixed/single-sex	Mixed/mixed
Head of school	75	75	Interview	1	1	1
Social worker	85	73	Interview	1–2	1–2	1–2
Doctor/nurse	58	58	Interview	0–1	0–1	0–1
Teacher <sup>b</sup>	480	75	Interview	4–6	8–12	5–7
Student	2,495	75	Self-administered (with interviewer assistance)	17–38	36–69	32–56
School data	84	75	Observation, administrative records	1	2	1
Classroom	479	75	Observation	4–6	11–12	4–7
Break	227	75	Observation	2–3	3–6	3
Student enrolling and staffing	75	75	Administrative records	1	1	1

<sup>a</sup> In the nine schools that were mixed at the school level but had exclusively sex-segregated classrooms, both a boys' and a girls' class were visited, the teachers of these two classes were interviewed, and so forth. As a result, a greater number of some instruments were administered than would be expected given that the total number of schools visited was 75. For example, 84 school-data instruments were administered because some of the data gathered on this questionnaire were class-specific. Similarly, 480 teacher instruments were administered rather than the expected maximum of 450, and so forth.

<sup>b</sup> Subjects include Arabic, English, math, science, social studies, home economics, and agricultural/industrial studies.

lar, various aspects of teacher–student interactions were noted, including the extent of student participation, the level of teacher encouragement or discouragement, and punishment. The break period—a short interval during the school day when extracurricular activities occur, including sports, art, music, and drama—was also observed three times during the observation week. In addition, because the recently implemented national student insurance program mandates that all Egyptian preparatory schools have a doctor or nurse on the premises, an interview with the doctor or nurse was included.<sup>10</sup> And as

all preparatory schools have at least one social worker (and often more than one) who deals with various administrative matters related to the payment of school-related charges, as well as students' problems at home and at school, a social worker assigned to the third year of preparatory was also interviewed.<sup>11</sup> Finally, each interviewer wrote summary comments about each school at the end of the visit. This qualitative material, complemented by the notes collected by the classroom observer, has yet to be analyzed systematically; it will be useful in its own right, and it will give us a better sense of how well our instruments succeed in gathering the information we sought.

Our linked data are based on the 1,614 adolescents (726 boys and 888 girls)<sup>12</sup> who in 1997 currently attended or had attended one of our visited preparatory schools. Of these, 1,562 actually lived in the 37 PSUs in which the schools were located (the remaining 52 presumably lived in adjacent PSUs). These 1,562 adolescents constitute 83 percent of the 1,872 adolescents resident in the 37 PSUs who had attended or were currently attending a public, nonreligious preparatory school. Fifteen of the PSUs were urban and 22 were rural. Our overall coverage rate of 83 percent is considerably higher than the two-thirds initially specified.

About 77 percent of all Egyptian adolescents ever attend preparatory school (El Tawila et al. 1999). Our linked data, while a selective sample of all Egyptian adolescents, is fully representative of Egyptian adolescents ever attending preparatory school, the population group to which our research is addressed.

### **Measuring School Quality**

The nine instruments of the school-based portion of the study provided a vast array of school quality measures in Egyptian preparatory schools. As a first step, we identified 53 variables that seemed to be well-measured and to have some direct relevance to the question of how school quality affects educational attainment (see the Appendix Table for a complete list of the variables). From this list, data reduction proceeded in several steps. First we eliminated variables that were missing for some of our schools (e.g., percent of teachers with at least a BA degree), were found to be difficult to interpret clearly, seemed to have a more tenuous connection with school quality, exhibited very low variability across schools, were highly correlated with other variables,

and/or were conceptually similar to other variables (in which case we chose a variable with explicit policy significance)<sup>13</sup> or not hypothesized to be related to the outcomes of interest for this paper.

The remaining 19 variables are indicated, along with their means and standard deviations, in Table 3. These variables represent the major elements and subelements of school quality as indicated in Table 1. Each of the indicators of school quality in Table 3 is presented separately for boys and girls. Not only are some schools segregated by sex, but, in mixed schools, girls and boys may experience the same school differently. Thus, in the first column of Table 3 we provide the means for each variable only for the 47 schools that boys attend. For the subset of schools that are mixed, we represent boys' experience in the school by drawing exclusively on boys' responses to the student questionnaire and, in mixed schools where classes are segregated, we draw only on responses from the teachers who actually taught boys. In the third column, we take a similar approach to deriving means for girls who attended 51 of the schools in our sample.

We can see from these summary statistics that, while most dimensions are the same, certain aspects of schooling are experienced quite differently for boys and girls. Under material inputs, we can see that an average of 81 percent of girls reported that their most recently scheduled girls-only home economics class had met whereas only 47 percent of boys reported that their most recently scheduled boys-only agricultural/industrial studies class had met. This suggests that schools are much more invested in training girls in traditional domestic roles than in training boys in vocational trades. With the steady growth in the proportion of students attending secondary school, two-thirds of whom are enrolled in technical secondary schools, there may seem to be less need to expose boys to these trades in preparatory school than there might have been in the past. Under school and classroom dynamics, boys are much more likely than girls to have been hit as punishment by a teacher on the previous school day (22 percent vs. 5 percent) or to have ever been told by a teacher that they are a failure (29 percent vs. 11 percent). On the other hand, boys are more likely than girls to report that there is an adult in the school with whom they can comfortably talk (43 percent vs. 32 percent).

**Table 3** Gender-specific school quality variables

	<b>Boys (N = 47)</b>		<b>Girls (N = 51)</b>	
	<b>Mean</b>	<b>S.D.</b>	<b>Mean</b>	<b>S.D.</b>
<b>Time to learn</b>				
More than one shift (%)	32.0	47.0	32.0	47.0
<b>Material inputs</b>				
% of 12 possible amenities	46.4	20.7	48.9	21.7
Students who had all books in first week (%)	31.4	27.9	31.7	39.1
Ratio of borrowed/temporary to full-time regular teachers	0.28	0.25	0.27	0.25
Teacher work load (lessons/week)	17.3	3.6	16.7	3.4
Teaching experience (no. of years)	8.9	3.1	8.6	2.7
Teachers who had in-service training (%)	50.8	19.9	53.6	20.4
Teachers who gave feedback (%)	87.7	13.6	84.8	21.1
Student participation in extracurricular activity last week (%)	39.4	22.3	34.1	23.7
Students who say last home economics/vocational class met (%)	47.0	28.8	80.7	35.1
<b>School and classroom dynamics</b>				
Average % of class time used	83.8	8.5	80.3	10.1
Class size	43.3	8.4	43.7	7.8
Students hit as punishment in last school day (%)	22.4	17.9	4.6	8.2
Students told by teacher they were a failure (%)	28.7	19.1	11.0	9.5
Students who say students are treated equally (%)	40.0	20.9	40.7	19.6
Students who say there is an adult to talk to (%)	43.0	21.2	32.0	18.9
Average teacher preference for teaching boys (preference for boys = 1; preference for girls = -1)	-0.05	0.41	-0.39	0.35
Average teacher belief that subjects are harder for boys than girls (harder for boys = 1; harder for girls = -1)	0.23	0.37	0.22	0.35
Head teacher with more traditional attitudes toward gender roles (% of “traditional” responses to six attitudinal questions)	26.9	18.9	28.2	16.2

Note: For full definitions of each variable, see Appendix Table.

Finally, head teachers in schools that girls attend are slightly more traditional in their gender-role attitudes than head teachers in schools that boys attend.

Given the highly bureaucratized school system in Egypt, some Egyptian experts have questioned whether school quality is sufficiently variable across schools to

allow meaningful statistical analysis. A preliminary exploration of our school data shows substantial variation in student experience across schools in time to learn, in various dimensions of material inputs, and in school and classroom dynamics. First, with respect to time to learn, roughly a third of schools have more than one shift. Since the length of the school day in single-shift schools is 6.5 hours on average and the length of the school day in double-shift schools averages 5 hours, there is a substantial variation in time to learn. With respect to material inputs, we see substantial variation in the percentages of the 12 amenities available in the school (the average for boys' schools is 46 percent, range 67–25,<sup>14</sup> and the average for girls' schools is 49 percent, range 71–27). The ratio of borrowed/temporary to full-time regular teachers is 0.27, range 0.53–0.02. Class size, which averages 43–44, ranges from 52 to 35 students per section. With respect to school and classroom dynamics, the percentage of students who think students are treated equally in the school averages 40 percent and ranges from 61 percent to 19 percent. Additional examples of variability in school quality can be seen in Table 3.

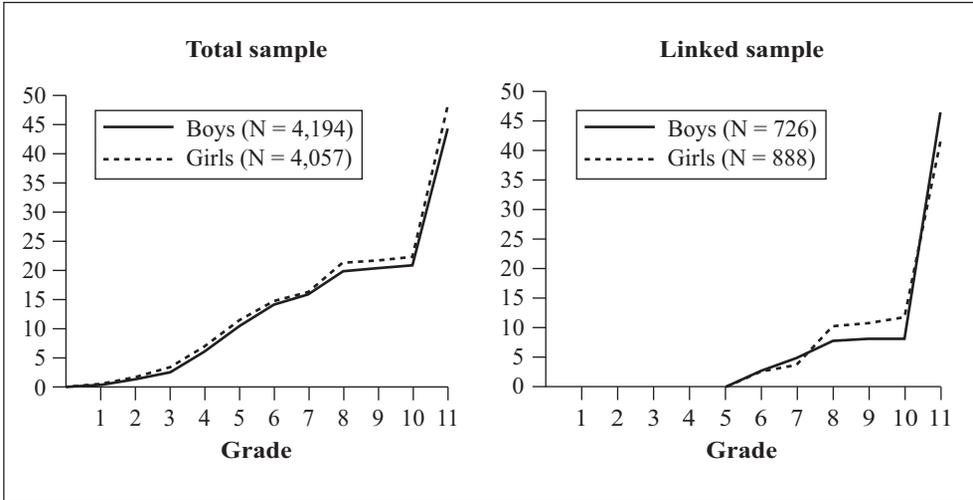
## **MULTIVARIATE ANALYSIS**

Using our linked sample, we explore the effects of individual, household, and school variables on school exit postprimary. We use a discrete time hazard model to estimate the probability of school exit.

Figure 3 shows the cumulative proportion of adolescents who have left school by grade for the total national sample starting in grade 1 and for the linked sample starting at grade 6. Because the linked sample is restricted to those who ever attended preparatory, school exit is therefore measured only from the time of preparatory school entry. It is clear from this figure that progression rates for boys and girls are nearly identical. Indeed, the minor differences observed are not statistically significant. However, this does not preclude the possibility that the factors explaining dropout rates for boys are different from the factors explaining dropout rates for girls.

A question that often arises in empirical research on the effects of school quality is the potential endogeneity of school quality (Glewwe and Jacoby 1994; Glewwe et al.

**Figure 3** Cumulative percentage of adolescents who have left school, by grade and sex



1995). We can identify three possible reasons that school quality might be endogenous: (1) some married couples might migrate in order to take advantage of higher-quality schools for their children; (2) adolescents might move away from home to attend better schools; and (3) parents might choose between schools within communities according to their quality. In the Egyptian context, however, schooling-related migration appears to be unlikely. Using tabulations from the 1995 Egyptian Demographic and Health Survey, we found that only 9 percent of married women under age 30 with children had changed communities following the birth of their first child. (Women more often change communities at the time of marriage.) Hence, it seems unlikely that married couples are selecting communities with an eye to school quality. The limited research on internal migration in Egypt suggests that, as elsewhere, migrants are attracted to areas with higher general levels of development (Hussein 1988). Neither do adolescents often move away from home to attend selected schools: Data from the 1997 ASCE survey show only 3 percent of adolescents living away from their parents. Finally, school choice in Egypt is very limited and students are all but required to attend the preparatory school nearest to their home.<sup>15</sup>

In Table 4 we present the odds ratios from a logistic regression of school exit from the beginning of the preparatory school sequence (grade 6) until the end of the secondary school sequence (grade 11). Here we allow for the possibility that some of the effects of school quality may manifest themselves during the secondary school years, not just during preparatory school. In Table 5, we estimate a similar model but only focus on exit probabilities from grade 6 through 8, assuming that the effects of preparatory school quality are primarily felt during the years in which they are experienced. In both tables the results for girls and boys are presented separately and each model is estimated in two steps, first with individual and family variables only and then with the addition of all 19 school quality variables.

The individual and household variables included in the analysis are age (as a time-varying variable), residence (urban vs. rural),<sup>16</sup> household wealth as proxied by an asset index (which is measured separately for urban and rural areas and discussed more fully below), mother's years of schooling, whether or not the father is present in the household (to assess levels of parental involvement and support), and the age of entry into primary school, because late entry sometimes puts students at a disadvantage later on (Bommier and Lambert 2000; Lloyd et al. 2000). In order not to lose observations where values on certain variables are missing, we also include two dummies, one for observations that were missing on the household asset index and one for observations that were missing on mother's schooling (the odds ratios for these variables are not shown).

One of the household variables—the asset index—requires some additional explanation. Following the lead of Filmer and Pritchett (1999), who argue that an index based on household assets works well as a proxy for long-run household wealth, we make use of data on 20 questions concerning household possessions and amenities<sup>17</sup> to create separate asset indexes, one for rural and one for urban areas, because assets are held in different forms in rural and urban Egypt (Assaad 2001). Thus, urban adolescents have a score of 0 on the rural asset index, and rural adolescents have a score of 0 on the urban asset index. To create these indexes, we divided our sample into rural and urban residents and then included all 20 items in a “principal components” analysis. The loadings thus obtained, which differed between urban and rural areas, were then used to construct each index.

We start with Table 4, which presents the results for dropout from grade 6 to grade 11. Looking first at the results for the individual and family variables, we see that both boys and girls appear much less likely to drop out in urban areas in model 1. Once school variables are introduced, however, this effect disappears, suggesting that the differences in dropout between rural and urban areas can largely be explained by school factors whose prevalence differs between urban and rural areas. Furthermore, the odds of school exit for boys are significantly affected by the family's socioeconomic situation both in terms of household wealth (in rural areas) and mother's educational attainment, and these results hold true whether or not school factors are controlled for in the model. Greater household wealth and more years of schooling for mothers significantly reduce the likelihood of school exit for boys. While this is the expected result, we do not find the same effects for girls. Indeed, schooling exit for girls does not appear to be influenced by the family's socioeconomic status, despite the fact that our data show that girls in preparatory school are considerably more likely than boys to have been tutored in the week before the survey—75 percent of girls and 59 percent of boys (El Tawila et al. 2001). Finally, boys are less likely to drop out the older they are in a given grade; age is not a factor in the likelihood of dropout for girls.

Parents value investments in school for girls primarily for the returns that higher levels of schooling yield in the marriage market in terms of attracting better-educated and financially successful husbands for their daughters (Mensch et al. 2000). As of 1995, no more than 11 percent of rural women and 21 percent of urban women worked for cash in Egypt (Amin and Lloyd 1998). In the case of boys, the returns come mainly in the form of improved earnings and job stability. Our results suggest that poor and relatively uneducated parents who allow their children to start school are willing to make greater financial sacrifices to educate their daughters than their sons, possibly because sons have better opportunities in the job market than daughters have in the marriage market at lower levels of education. Alternatively it is possible that parents place greater consumption value on the education of their daughters than the education of their sons, given idealized gender roles in Egyptian society.

As for the school-quality variables, we find six statistically significant in the case of girls and two in the case of boys in explaining the probability of dropout. All but one

**Table 4** Odds ratios from logistic regression model of school exit before high school completion (linked sample)

	Boys (N = 707)		Girls (N = 865)	
	1	2	1	2
<b>Individual and family</b>				
Age (time-varying)	0.86 <sup>+</sup>	0.86 <sup>+</sup>	1.10	1.13
Residence (omitted = rural)	0.25*	0.00 <sup>+</sup>	0.31**	1.32
Urban asset index	0.87	0.98	0.79	0.88
Rural asset index	0.74*	0.74 <sup>+</sup>	1.00	0.98
Mother's years of schooling	0.83*	0.83*	0.96	0.96
Father co-resident (omitted = living away)	0.93	0.87	0.70	0.64
Age at school entry	0.85	1.00	1.03	0.89
<b>School</b>				
Time to learn				
Number of shifts (omitted = 1)		1.27		5.73*
Material inputs				
Facilities index		1.09		0.71*
Students who had all books in first week (%)		1.29		0.82
Ratio of borrowed/temporary to full-time regular teachers		1.47 <sup>+</sup>		1.23*
Teacher work load (lessons/week)		1.03		1.03
Teaching experience (no. of years)		1.56		0.80
Teachers who had in-service training (omitted = no)		1.50		0.69*
Teachers who gave feedback (omitted = no)		0.70		0.97
Students who say last home economics/vocational class met (%)		1.26		0.88 <sup>+</sup>
Student participation in extracurricular activity last week (%)		0.91		0.71
School and classroom dynamics				
Average % of class time used		2.62		1.13
Class size		1.12		1.01
Students hit as punishment in last school day (%)		1.23		0.73
Students told by teacher they were a failure (%)		0.87		1.49
Students who say students are treated equally (%)		0.50*		0.99
Students who say there is an adult to talk to (%)		0.63		1.71**
Average teacher preference for teaching boys (preference for boys = 1; preference for girls = -1)		1.03		0.99
Average teacher belief that subjects are harder for boys than girls (harder for boys = 1; harder for girls = -1)		1.50		1.13
Head teacher with more traditional attitudes toward gender roles (% of "traditional" responses to six attitudinal questions)		0.82		0.98

Note: The regressions also included dummies for adolescents for whom information on household assets and mother's schooling was missing.

<sup>+</sup>P<0.10; \*P<0.05; \*\*P<0.01.

of these work in the hypothesized direction. The odds for girls to drop out appear 5–6 times greater in schools with multiple shifts than in schools with one shift; the same is not true for boys.<sup>18</sup> Girls are less likely to drop out when they attend schools with better physical facilities; the same is not true for boys. Both boys and girls suffer greater drop-out rates in schools that have a higher ratio of temporary to full-time regular teachers. Girls are less likely to drop out of school when a higher percentage of teachers have received in-service training in the last two years; the same is not true for boys. Girls are also less likely to drop out of schools where home economics classes meet regularly; boys are less affected by the regularity of agricultural/industrial studies. While similar percentages of boys and girls report that students are treated equally in school, boys in schools where a higher percentage of boys report equal treatment are less likely to drop out, but girls are not equally affected by this treatment factor. The one counterintuitive result concerns girls who have attended schools where higher percentages of female students report that there is an adult at the school with whom they can comfortably talk; they are more likely to drop out than girls who have attended schools where fewer girls report having these relationships. We can only speculate that girls who are having difficulties are most likely to seek the advice of an adult at the school, suggesting that the variable may not be strictly exogenous.

When we focus on multivariate results for dropouts that occur during preparatory school only (see Table 5), a few interesting differences emerge. The main findings remain the same: Boys' dropout rates are more often affected by the family's socioeconomic status, while girls' dropout rates are more often affected by the school environment. Indeed, two additional school-quality dimensions are now important for girls: participation in extracurricular activities, which reduces the chance of dropout, and being told by a teacher that she is a failure, which increases the chance of dropout.<sup>19</sup> The only other result worth noting in the preparatory-school-exit version of the model is the statistically significant effect of age for girls and (to a lesser degree) for boys when school-quality variables are included in the model. The older a girl is at any given grade, controlling for the age of entry, the greater the likelihood of school exit. This suggests that it is even more important for girls than for boys to progress steadily through school without grade repetition. Given similar progression rates for

**Table 5** Odds ratios from logistic regression model of school exit during preparatory school (linked sample)

	Boys (N = 707)		Girls (N = 865)	
	1	2	1	2
<b>Individual and family</b>				
Age (time-varying)	1.24	1.28 <sup>+</sup>	2.13**	2.08**
Residence (omitted = rural)	0.26*	0.00*	0.27**	0.78
Urban asset index	0.95	1.05	0.73 <sup>+</sup>	0.78
Rural asset index	0.79 <sup>+</sup>	0.77 <sup>+</sup>	1.02	1.04
Mother's years of schooling	0.85*	0.84*	0.98	0.98
Father co-resident (omitted = living away)	0.95	0.88	0.77	0.65
Age at school entry	0.81	0.97	0.77	0.84
<b>School</b>				
Time to learn				
Number of shifts (omitted = 1)		1.21		6.46*
Material inputs				
Facilities index		1.15		0.70 <sup>+</sup>
Students who had all books in first week (%)		1.29		0.87
Ratio borrowed/temporary to full-time regular teachers		1.46 <sup>+</sup>		1.20 <sup>+</sup>
Teacher work load (lessons/week)		1.02		1.04
Teaching experience (no. of years)		1.55		0.81
Teachers who had in-service training (omitted = no)		1.45		0.61**
Teachers who gave feedback (omitted = no)		0.69		0.86
Students who say last home economics/vocational class met (%)		1.25		0.86**
Student participation in extracurricular activity last week (%)		0.95		0.68*
School and classroom dynamics				
Average % of class time used		2.44		1.07
Class size		1.12		0.97
Students hit as punishment in last school day (%)		1.30		0.63
Students told by teacher they were a failure (%)		0.89		1.92*
Students who say students are treated equally (%)		0.51*		0.89
Students who say there is an adult to talk to (%)		0.60		1.84*
Average teacher preference for teaching boys (preference for boys = 1; preference for girls = -1)		1.04		1.00
Average teacher belief that subjects are harder for boys than girls (harder for boys = 1; harder for girls = -1)		1.50		1.12
Head teacher with more traditional attitudes toward gender roles (% of "traditional" responses to six attitudinal questions)		0.84		0.91

Note: The regressions also included dummies for adolescents for whom information on household assets and mother's schooling was missing.

<sup>+</sup>P<0.10; \*P<0.05; \*\*P<0.01.

boys and girls, it is not surprising then that the proportion of girls who ever repeat a grade in preparatory school is slightly lower than it is for boys (31 percent vs. 39 percent; data not shown).

It appears from these results that the remarkably similar rates of school progression for boys and girls are the result of different sets of determinants. Other things being equal, school quality seems to matter for girls, while the socioeconomic background of parents seems to matter for boys. Substantial improvements in socioeconomic conditions without improvements in school quality could lead to boys' enrollment rates once again surpassing those of girls. The opposite result would occur if there were improvements in school quality without any underlying improvements in economic conditions.

## CONCLUSIONS

Our results provide confirmation that school quality is associated with grade levels attained. Furthermore, the elements of school quality that matter differ for girls and boys. The elements of school quality that matter include traditional elements capturing variations in time to learn and variations in material resources, including teacher quality, but also encompass some aspects of school and classroom dynamics, in particular teacher treatment and teacher attitudes.

Furthermore, the schooling experience of boys and girls appears to differ in ways that are related to prevalent societal attitudes about boys and girls. Gender roles in the family and in society are sharply drawn in Egypt. However, from an Egyptian perspective this does not imply a devaluation of women or their activities (Naguib and Lloyd 1994). In a context where both men and women value social interdependence more highly than autonomy (Nawar, Lloyd, and Ibrahim 1995), it should not be surprising to find that schools continue to place considerable importance on home economics for girls, as schooling is seen as providing preparation for the sharply differentiated but complementary roles of men and women in marriage and motherhood. Indeed, parents place such a high value on the schooling of their girls, despite low female labor force participation rates, that the proportion of girls privately tutored in preparatory schools exceeds the proportion of boys tutored. Furthermore, girls' drop-

out rates appear to be unaffected by a parent's socioeconomic status while boys whose parents are poorer or less educated are more likely to drop out than those whose parents are richer or better educated.

It is instructive to compare our results in Egypt to the results of our study in Kenya, discussed earlier, on the effect of school quality on gender differences in dropout rates (Lloyd et al. 2000). The school experiences of Egyptian boys and girls differ markedly from those of their counterparts in Kenya. In Kenya most adolescents attend mixed schools and are relatively free to associate with the opposite sex. The opposite is true in Egypt. In Kenya, boys outperform girls in school, and girls are more likely to drop out than boys at any particular age. Indeed teachers view girls negatively, often saying that they are too lazy or stupid to learn. In Egypt, on the other hand, girls and boys progress and perform similarly in school, and teachers express a strong preference for teaching girls. Nonetheless, we find in both countries that dropout rates for girls are more responsive to various dimensions of school quality than rates for boys. In Kenya, where girls are viewed negatively and treated badly by teachers, various dimensions of teacher treatment seem to matter the most for girls' dropout rates. In Egypt, where girls are seen to be well-behaved and easier to teach, many of the factors affecting dropout are related to time to learn, material resources, and the quality of teachers in the school. However, we also find that teacher treatment matters as well for girls in Egyptian preparatory school. A major difference between the Kenyan results and the Egyptian results is that, in Egypt, boys are also responsive to teacher treatment in terms of dropout rates—a result that may be explained by the fact that they are more likely to be physically punished than girls and to be denigrated by their teachers, in contrast to the case of Kenya.

This comparison suggests that the specific features of school quality that matter for educational outcomes are context-specific and differ between boys and girls. Gender roles in society as well as school and teacher attitudes about the academic capabilities of adolescent boys and girls shape the ways in which schools have an impact on boys and girls in a particular setting. At the same time that schools empower young people with knowledge and skills, they also reflect and reinforce societal norms, including norms about gender roles.

## Appendix Table Initial list of school-quality variables

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### Time to learn

*School has more than one shift?*

Average length of school day (minutes)

Length of school week (minutes)

### Material inputs

Facilities (availability and use)

*% of 12 possible amenities/resources possessed by the school<sup>a</sup>*

Instructional materials (availability and use)

*% of students who had all books in first week*

% of interviewed students who went to the school library last week

% of interviewed students who have gone to the science lab this year

Is there a computer at school? (from student report)

% of interviewed students who have ever used a computer at school (assuming a computer is present)

Is there a library at school? (from student report)

Is there a science lab at school? (from student report)

Teaching staff (quantity and quality)

*Ratio of borrowed/temporary teachers to full-time regular teachers (preparatory level)*

*Average number of lessons taught per week by teachers of visited classes*

*Average years of teaching experience of teachers of visited classes*

*% of teachers of visited classes who received in-service training in the last two years*

*% of teachers of visited classes who had written or oral supervisory feedback from school administrators in the last academic term*

% of third-year-preparatory-level teachers with at least a BA degree

School has enough teachers for all subjects, according to school head

Average number of years at this school of teachers of visited classes

% of teachers of visited classes who had written or oral supervisory feedback from education directorate/ministry in the last academic term

% of teachers of visited classes observed by someone from the education ministry in the last academic term

% of teachers of visited classes observed by someone from the education directorate in the last academic term

% of teachers of visited classes observed by someone from the school in the last academic term

Student/teacher ratio

Curriculum beyond core (availability and participation)

*% of interviewed students who participated in an extracurricular activity last week*

School offers ordinary-level group tutoring?

School offers advanced-level group tutoring?

% of interviewed students who say a sports lesson actually occurred at last scheduled time

Other staff

School head received in-service training in last two years?

% of social workers who say they have a private space in the school in which to meet with students

### School and classroom dynamics

Learning environment

*Average total number of students in visited classes*

Enrollment of school, 1998–99 school year<sup>b</sup>

Average % of “good” classroom conditions reported by interviewed students<sup>c</sup>

*(continued)*

(continued from previous page)

Orderliness

*% of interviewed students who say a home economics or agricultural/industrial studies lesson actually occurred at last scheduled time*

*Average % of class time actually used in visited classes*

*Average attendance of teachers of visited classes during week*

School head and teacher's views

*Average preference among teachers of visited classes for teaching girls/boys (preference for boys = 1, preference for girls = -1)*

*Average belief among teachers of visited classes that their subject is harder for girls/boys (harder for boys = 1, harder for girls = -1)*

*% of school head's answers to gender-related questions that are more "traditional"<sup>d</sup>*

*% of teachers of visited classes who think preparatory-level students learn better in mixed classrooms*

*% of teachers of visited classes whose opinion about the preferability of mixed classrooms is at odds with the type of classroom in which they teach*

*School head approves of the current policy that offers home economics classes to girls only and agricultural/industrial studies classes to boys only?*

*% of teachers of visited classes who approve of the current policy that offers home economics classes to girls only and agricultural/industrial studies classes to boys only?*

*School head says that sports participation is unconditionally important for girls?*

Teacher treatment in classroom

*% of interviewed students who say a teacher at this school, during the preparatory level, insulted their ability or told them they were a failure and would not succeed at school*

*% of interviewed students who say there is an adult at school with whom they can comfortably talk*

*% of interviewed students who were physically punished in the last school day*

*% of interviewed students who say that all students are treated equally at the school*

*% of interviewed students harassed at school in the last week*

*% of interviewed students punished in the last school day*

*% of interviewed students punished with insults/humiliation in the last school day*

*% of interviewed students verbally harassed recently by a teacher or administrator*

*% of interviewed students physically harassed/punished recently by a teacher or administrator*

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Note: The variables in italics were included in final models.

<sup>a</sup> The 12 possible amenities/resources included: school has library, school has computer, school has typewriter, school has telephone, school has television, school has video, school has photocopier, school is connected to public water supply, school has sports yard/court, school has science lab, school has nurse/doctor, and school has at least one room for nonacademic activities for every 200 students.

<sup>b</sup> Three schools had missing values on the 1998–99 enrollment variables; for these three, 1997–98 enrollment figures were used.

<sup>c</sup> The three "good" conditions are: From his/her seat in the main classroom, the student is able to hear the teacher clearly, see the blackboard clearly, and write comfortably.

<sup>d</sup> The six questions that form the basis of this scale are: Should a girl finish school before thinking of marriage? Should a girl get an education and work before thinking of marriage? Should a girl get married when she finds an appropriate groom, even if she is still in school? Could a wife go to the health unit or doctor on her own? Could a wife visit a friend on her own? Could a wife go to the market on her own?

## NOTES

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- 1 Under Egypt's health insurance system, all schools are required to have a nurse or doctor in residence to provide both preventive and primary health care to students (El Tawila et al. 2001).
- 2 A governorate is a regional administrative unit. There are 26 governorates in Egypt.
- 3 Students placed into technical secondary are further tracked by exam performance: A small group of the best-performing students among those who did not qualify for general secondary enter advanced five-year technical schools and the rest enter the more typical three-year technical schools. The best among this latter group are placed into industrial schools, the next group into agricultural schools, and the weakest group into commercial schools (World Bank 1989).
- 4 All data for this paragraph are taken from the 1997 ASCE national survey of adolescents, which is fully described in the data section of the paper.
- 5 Further details on the survey can be found in El Tawila et al. (1999).
- 6 Fifty of the 101 primary sampling units from the original sample were randomly selected and then ranked from high to low according to the percentage of girls aged 10–14 enrolled in school. As a first step, alternate PSUs in the ranking were sampled to determine the range of districts according to enrollment. This initial set of 25 PSUs yielded 60 schools. Because the budget permitted a larger sample, an additional 12 PSUs were selected from those remaining after a similar ranking procedure to yield a final sample of 75 preparatory schools.

- 7 If the school was mixed but had segregated classrooms, one section each of girls and boys was selected and the visit was extended for a second week.
- 8 Separate questionnaires were developed for boys and girls. If the section of third-year preparatory contained fewer than 35 students, all students in the section were interviewed. If the section selected contained more than 35 students, half were interviewed. In mixed schools, boys and girls were interviewed separately.
- 9 Home economics is taught only to girls, and agricultural/industrial studies is taught only to boys. The number of classes observed sometimes fell below the ideal if the teacher was absent, if there were scheduling problems, or if the home economics or agricultural/industrial studies class was scheduled at the end of the school week when the student interview took place, thus forcing the cancellation of one or the other of these classes.
- 10 There was no doctor based at 14 of the schools. In two of the schools the doctors refused to speak to the interviewer. In one school the doctor divided his time between the school where he was based and a neighboring school that we also visited.
- 11 Only one school had no social worker, although in another the social worker was too new to answer questions meaningfully. In a few mixed schools boys and girls had separate social workers; in these cases, both social workers were interviewed.
- 12 The linked sample includes more girls than boys because we found a greater number of all-girls schools in the 12 additional PSUs selected (see note 6 for an explanation of how PSUs were selected).
- 13 For example, we retained a measure of whether or not a school had one shift or more than one shift and deleted other highly correlated measures of time to learn, such as the average length of the school day or school week. We also retained a measure of punishment by hitting rather than punishment in general because corporal punishment is illegal in Egypt.
- 14 “Range,” as used in this paragraph, refers to the range from one standard deviation above to one standard deviation below the mean.

- 15 Students scoring above 90 percent on the primary school–leaving exam appear to be able to choose the preparatory school they will attend. In the 1997 ASCE survey we asked adolescents whose last school-leaving exam was for primary what they had scored on the exam. Only 5 percent of students were able to provide an answer. Therefore, we have no way of knowing from our data which students might have been allowed some choice of preparatory schools. In rural areas, however, there is rarely more than one preparatory school available for each sex. In urban areas, the few students who score above 90 have some choice of schools.
- 16 It is typical in Egypt to include a more elaborate series of dummy variables for residence, including urban governorates (Cairo and Alexandria), urban upper Egypt, urban lower Egypt, rural upper Egypt, and rural lower Egypt. In this analysis, the regression could not run when we included these variables because there were no students who dropped out in the urban governorate category.
- 17 The 20 questions included: Does the household’s dwelling have more than one room per two residents? Does it have a kitchen, piped water, a toilet, a radio, a TV, a washing machine, a refrigerator, a water heater, a telephone, an air conditioner, a video machine, a motorcycle, a truck, a personal car? Does any member of the household own, in whole or in part, agricultural land, buildings, vacant land, a factory/workshop, or other similar assets?
- 18 While the size of the coefficient on the shifts variable changes depending on which group of school-quality variables are included in the model, even when we drop the two most highly correlated variables—total class size and teacher’s years of experience—the coefficient is large and significant (4.2 at the 1 percent significance level). Furthermore, if we distinguish statistically between morning and afternoon shifts, girls attending schools with morning shifts are more likely to drop out than those attending schools with afternoon shifts. Girls attending one-shift schools are the least likely to drop out. The reasons for this are not yet known.
- 19 The question to students was worded as follows: At this school during the preparatory stage, did any teacher ever insult your ability, telling you that you are a failure or won’t succeed in school?

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