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Tunisia: Strong central policies for gender equity

Marlaine E. Lockheed and Cem Mete

Although economic returns to basic and secondary schooling are high universally (Psacharopoulos 1985, 1994), different countries have adopted significantly different strategies for expanding schooling, with distinct implications for equity, social mobility, and economic growth. Goldin and Katz (2001) attribute part of the economic dominance of the United States to the fact that it led Europe in establishing mass secondary and higher education by at least several decades for much of the twentieth century. One difference the authors note between the United States and Europe is Europe's focus on "a small cadre of youth whose families could afford the private expense or who had scored sufficiently well on an examination taken around age 11" (p. 18). European policymakers viewed relatively egalitarian education in the United States as a waste of resources; their counterparts in the United States rejected the German system of apprenticeship training (Goldin 2001).

European countries were not the only ones that limited (and in some cases continue to limit) access to general secondary education. Many developing countries, especially those in Africa and Latin America, implement primary school-leaving examinations to determine which students will be allowed to remain in the general secondary education path (Bray and Steward 1998; Kellaghan 1992). Knight and Sabot (1990) compare the education systems of Kenya and Tanzania, arguing that Kenya's "failure" to curb secondary school expansion appears to have contributed to

higher labor productivity, lower inequality of pay, and a more equal distribution of secondary schooling.

The gender implications of selective education systems have received little attention. Studies show that girls are more likely than boys to drop out of school in Kenya (Lloyd, Mensch, and Clark 2000) and Tanzania (Al-Samarrai and Peasgood 1998), but these studies do not make explicit linkages between dropping out and performance in school, performance on the primary school-leaving examinations, and parental demand for girls' schooling. A priori it is not clear whether the selective education systems would exacerbate the gender gap in schooling (even if such systems reinforce socioeconomic inequalities in society or turn out to be inefficient due to high repetition rates at the end of each schooling cycle). In particular, if girls do not face major disadvantages in the household resource allocation process and basic education schools are not female unfriendly (that is, include such essential requirements as clean, functioning restrooms and female teachers as role models for girls), then a selective education system may not necessarily increase the gender gap in schooling outcomes.

This chapter aims to contribute to this literature by using data from Tunisia, a country that until 2000 implemented examinations to regulate passage from the sixth to seventh grade in basic education. A focus on Tunisia in the second half of the 1990s is a useful complement to the empirical literature, which focuses on Kenya and Tanzania, because developing countries that continue to implement highly selective secondary education strategies will face circumstances similar to Tunisia's pre-reform environment (with less pressure on available secondary education "seats" due to fertility transition) at some point in time. Tunisia differs from Kenya and Tanzania in another important way: its population is highly homogeneous. Tunisia's examination system, therefore, cannot reinforce discrimination based on ethnic or linguistic differences among population subgroups. Rural students are at a disadvantage, but, with a few exceptions, this disadvantage is based more on economic factors than ethnic ones.

This homogeneity may also explain the dramatic rise in education participation in Tunisia (table 8.1). Over the past half century, education participation in Tunisia has grown from a privilege of the few to the entitlement of the majority, due largely to the country's aggressive education reform policies and sustained economic growth. At independence in 1956, less than 5 percent of children were enrolled in primary school; by 2003 this share had increased to 98 percent, with essentially no gender differences in participation. Literacy for adults over the age of 15 rose from 16 percent in 1960 to 74 percent in 2004, while literacy among all 15- to 24-year-olds[1] rose from 27 percent in 1956 to 96 percent for males and 92 percent for females in 2004, equal to the net enrollment rates for primary school a decade earlier (Olfa n.d.; UIS 2005)

At the primary level, girls' participation equals that of boys, and their academic achievement is superior in some cases. On primary school-leaving examinations and international tests of achievement, girls outperform boys on language and reading

1 Data disaggregated by gender are not available for 1956.

Table 8.1. Literacy rates and net primary enrollment rates by gender in Tunisia, 1960–2004 various years (percent)

	Literacy adults 15 and older			Net primary enrollment		
Year	Total	Male	Female	Total	Male	Female
1960	16	—	—	—	—	—
1965–66	24	—	—	69	—	—
1970	27	41	15	76	—	—
1975	38	—	—	79	—	—
1980	45	58	31	83	—	—
1984–85	48	—	—	94	—	—
1990	59	72	46	—	—	—
1992	—	—	—	96	99	93
1995	65	76	53	—	—	—
1996	—	—	—	98	99	96
1999	—	—	—	94[a]	95[a]	92[a]
2000	71	81	61	94	95	94
2001	—	—	—	95	96	95
2002	—	—	—	97	97	96
2003	—	—	—	97	97	97
2004	74	83	65	98	97	98

a. Drop in rate may reflect differences in estimation methods.

Note: — indicates data not available.

Source: Lockheed and Verspoor 1990; Republic of Tunisia 1999; UIS 2006.

tests and generally perform as well as boys in math and science. Only on the primary school-leaving examination for mathematics in 1996 did girls underperform boys (table 8.2).

Moreover, unlike the pattern in many countries, the academic performance of rural girls in primary school is not below that of rural boys. However, the performance of rural children is well below that of urban children for both boys and girls (figure 8.1).

By lower secondary school, the situation changes, with emerging gender differences. First, boys who do not succeed on the sixth grade primary school-leaving examination are slightly more likely than girls to repeat the grade (Mete 2004). Second, boys and girls who do not repeat (and are therefore pushed out of the academic system) experience very different lives after primary school. At age 14, 57 percent of boys are working or looking for work, compared with 32 percent of girls; 46 percent of girls

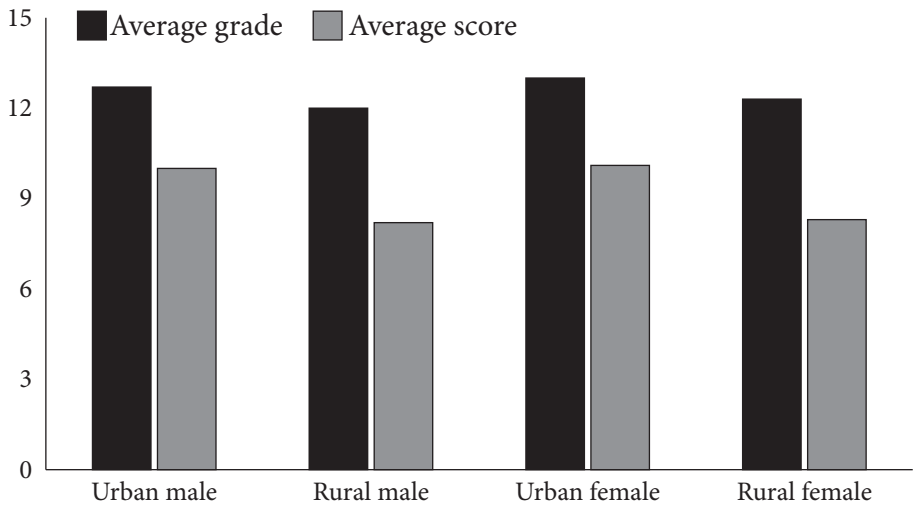
Table 8.2. Gender differences in primary school performance in Tunisia

Performance measure	Girls	Boys	Gender difference[a]
Grade average 1996	12.7	12.3	Girls outperform boys
Primary school-leaving examination 1996 (grade 6)			
Language score[b]	8.9	7.9	Girls outperform boys
Mathematics score	6.1	7.1	Boys outperform girls
Scientific awareness score	10.1	10.5	Girls and boys perform equally
TIMSS 2003 (Grade 4)			
Mathematics score	342	337	Girls and boys perform equally
Science score	316	312	Girls and boys perform equally

a. Difference between girls' scores and boys' scores significant at 5 percent level or better.
b. Average of scores on Arabic expression, study of Arabic texts, French expression, and study of French texts.

Source: Martin and others 2004; Mullis and others 2004; and authors' calculations using the 1995/96 Primary Leaving Examination Score Data Set.

Figure 8.1. Average school grades and primary-leaving examination scores, by gender and urban/rural residence, Tunisia 1996



Note: This figure shows the average of students' school grades and primary school-leaving examination scores, both measured on a 0–20 scale.
Source: Tunisia Ministry of Education, 1995/96.

Table 8.3. Gender differences in lower secondary school performance in Tunisia, 1999 and 2003

Performance measure	Girls	Boys	Gender difference[a]
TIMSS 1999 (Grade 8)			
Mathematics score	436	460	Boys outperform girls on three of five subtests
Science score	417	442	Boys outperform girls on two of six subtests
TIMSS 2003 (Grade 8)			
Mathematics score	399	423	Boys outperform girls
Science score	392	416	Boys outperform girls

a. Difference between girls' scores and boys' scores significant at 5 percent level or better.

Source: Martin and others 2000; Mullis and others 2000; Martin and others 2004; Mullis and others 2004.

are working in the home, compared with 4 percent of boys, despite compulsory school attendance laws. By age 15–16 nearly 40 percent of both girls and boys are working outside the home. Another 30 percent of boys are looking for work outside the home, while a similar share of girls are working at home. About a third of both boys and girls are attending private or technical schools.

Gender differences in performance also appear among those who are able to proceed to lower secondary school. On international tests of achievement in mathematics and science, eighth-grade boys outperformed eighth-grade girls in both 1999 and 2003, and more boys than girls completed the nine-year basic education cycle as recently as 2003 (Martin and others 2000; Mullis and others 2000; Martin and others 2004; Mullis and others 2004; IFC 2004) (table 8.3).

What accounts for the gender equity in school outcomes through grade 6 and the emergence of gender inequalities afterward? Are some girls more vulnerable during transition to lower secondary school than others? What are the implications of these findings for countries that, like Tunisia, have achieved universal enrollment at the basic education level?

Education in Tunisia

Tunisia is a medium-size country (population 10 million) on the southern coast of the Mediterranean. It was colonized by the Phoenicians (twelfth to sixth century BC) and became a major economic power as Carthage (sixth to second century BC). It was conquered by the Romans (second century BC to fifth century AD), converted to Islam by the Arabs (seventh to ninth century), ruled by the Berbers (ninth to tenth

and thirteenth to sixteenth centuries), incorporated into the Byzantine and Ottoman Empires (sixth to seventh and eighteenth and nineteenth centuries), and designated a French protectorate (late nineteenth century) before finally becoming an independent republic in 1956.

Although the Phoenicians invented the alphabet, Tunisia is not yet fully "alphabetized" (literate). Female literacy lags behind that of males, although the gap has narrowed considerably in recent years, particularly for youth (see table 8.1).

The road to literacy began with a major education reform in 1958 that was designed to ensure universal primary education. After 30 years it was clear that girls were lagging behind boys in education participation. In 1991 a second education reform made basic education compulsory for both boys and girls 6–16, with parental penalties for noncompliance. At the same time, sexual stereotypes were eliminated from school textbooks (Republic of Tunisia 1999). A monitoring and evaluation system was established in the 1994/95 school year to realize the national literacy strategy (UNESCO/IBE 2001).

The education system in the 1990s included five phases: an optional, fee-paying preschool for children 3–6; a free and compulsory six-year primary stage for children age 6 and above; a free three-year preparatory stage for those who qualified; a four-year secondary stage for those holding a basic schooling certificate; and postsecondary higher education. "Basic" education comprised the primary and preparatory stages (UNESCO/IBE 2001). A first step in achieving the goal of universal primary participation was reached in 1997/98, when 99 percent of six-year-olds were enrolled in school (IFC 2004).

Progression to the preparatory stage was not automatic in the 1990s. In order to enroll in the preparatory stage, students had to take a primary school-leaving examination at the end of grade 6. The score on this exam, combined with grades, determined which students advanced to a general junior secondary school, which could enroll in a technical school, and which had to exit the public school system. Both school grades and primary school-leaving examination scores were measured on a 0–20 scale, the correlation coefficient being 0.74. A score of 10 or more was required for a student to progress to a general public junior secondary school. About 60 percent of students did so in the second half of 1990s (up from about 30 percent in 1985). The examination-based selection after grade 6 was discontinued in 2000/01, when the preparatory stage became compulsory.

The data

This chapter uses three data sets. The 1997/98 Tunisia Grade 6 Students Survey collected detailed information on the characteristics of students enrolled in the final grade of primary school, their families, and the schools they attend. The survey was conducted

in two stages. In the first stage, carried out during the 1997/98 school year, 1,178 students were interviewed from 56 public primary schools, located in four gouvernorates (administrative regions): Ariana, Kasserine, Kebili, and Mahdia. In the second stage, carried out the following school year, the principals of the survey schools submitted information on the status of each student surveyed in the first stage, indicating whether the student had passed, failed, dropped out, or repeated.

The second data set is the 1995/96 Tunisia Dropouts Survey, which collected detailed information on the characteristics of some 100 public primary schools, including data on the experience and educational attainment of the teachers and principals. These schools were located in seven *gouvernorates*: Ariana, Bizerte, Jendouba, Sidi Bouzid, Gafsa, Medenine, and Mahdia.

To document the correlates of the primary school-leaving examination score and school grades, we used administrative records on the primary school-leaving examination score and school grade averages of all students enrolled in grade 6 in 1995/96. Of these 244,244 students, 99.4 percent took the primary school-leaving examination. Examination scores were separated by 10 subject areas (figures in parentheses represent the weights given to each subject area): mathematics (0.208), study of Arabic texts (0.166), study of French texts (0.166), Arabic expression (0.125), French expression (0.083), scientific awareness (0.083), Islamic education (0.042), history (0.042), civics (0.042), and geography (0.042). The overall primary school-leaving examination score is a weighted sum of these subject area scores. Identifiers of the student's gender; school grade average; and school, *gouvernorate,* and urban/rural location accompany this information.

The large sample size is the most attractive feature of the administrative records data set. Unfortunately, it includes no information on the characteristics of the school or the students' family. To partially remedy this situation, we turn to the information collected by the 1995/96 Tunisia Dropouts Survey. These two data sets are matched by school, and the resulting subsample of the 1995/96 Tunisia Ministry of Education data set is used for the analysis. The final data set included 6,384 observations, representing students enrolled in 95 schools.[2] Characteristics of samples used in the various analyses are presented in annex tables 8A.1 and 8A.2.

What accounts for gender equity at the early stages of basic education?

What explains the observed gender equity in schooling outcomes during the early stages of basic education in Tunisia? To be sure, some of the positive outcomes (such as universal enrollment rates) have to do with the enforcement of compulsory school attendance

2 The school code for one of the schools that appeared in the 1995/96 Tunisia Dropouts Survey did not have a counterpart in the Tunisian Ministry of Education data set. For four additional schools, some of the data required for the empirical analysis were missing.

laws at the basic education level. But parents also make supplementary contributions to their children's education; after taking into account (expected) returns to their children's schooling, they could end up investing disproportionately in boys' schooling.[3]

The data sets do not fully support this hypothesis, perhaps because the benefits to basic and secondary education are not adequately captured by labor market outcomes alone. Indeed, Tunisian girls enjoy relatively equal access to preschool, relatively equal access to private tutoring, comparable time-use patterns outside the school, and equal home inputs. In contrast, rural-urban differences in the provision of supplementary inputs, which we discuss in some detail below, are sizable. These findings are consistent with the standardized test results, which do not show a significant female disadvantage but do document poor learning outcomes for children residing in rural areas.

Preschool

Although little is known about the causal influence of preprimary school attendance on further schooling, there is some evidence suggesting that it is important for further educational attainment. Studies of the Perry Preschool experiment in the United States find that children who participated in the program exhibit higher intelligence, higher school enrollment, lower repetition and dropout rates, higher employment rates, higher income, and less involvement in crime than children who did not participate (Schweinhart and Weikart 1980; Berrueta-Clement and others 1984; Schweinhart, Barnes, and Weikart 1993). Studies using data from developing countries also find that preprimary school attendance is positively associated with increased school performance (see, for example, Myers 1995; World Bank 1995).

Preschool is not compulsory in Tunisia, but it is widely provided by public, private, and Koranic schools. Preschool (*jardins d'enfants*) covers children three to six and is the responsibility of the Ministry of Women, Family and Children. Koranic schools are the responsibility of the Ministry of Religious Affairs. Kindergarten, or the "preprimary preparatory year," covers children five to six and is the responsibility of the Ministry of Education.

The 1997/98 Tunisia Grade 6 Students Survey has a section on preprimary schooling. About 28.5 percent of children in the sample attended kindergartens and 30.3 percent attended Koranic schools. Among (first time) grade 6 students who had attended kindergartens, 70 percent received a passing score at the end of the year; only 50 percent of students who had not attended kindergarten passed. Attendance at Koranic schools is not associated with higher pass rates: about 55 percent of all first time

3 Kaboski (2004) estimates the returns to one additional year of schooling in Tunisia at about 8 percent, which compares favorably with the only other North African country included in the same study, Egypt, where returns to schooling are 5.2 percent. We are not aware of research that estimates returns to schooling separately for females in Tunisia. There is a sizable gap between the labor force participation rates of males (at 82 percent in 2000) and females (at 40 percent in 2000). Still, when it comes to female labor force participation rates, Tunisia performed better then other North African countries, with the exception of Morocco, where the female labor force participation rate was 43 percent in 2000 (World Bank 2005).

grade 6 students passed at the end of the school year, with no difference between those that attended Koranic schools and those that did not.

Grade 6 boys and girls were equally likely to have attended kindergarten and Koranic schools. In the bivariate probit regressions, the dependent variable takes the value 1 if the student participated in kindergarten or a Koranic school (table 8.4). The explanatory variables are gender, maternal schooling, paternal schooling, possessions in the household, and residence. Although the signs of the coefficients for the male dummy variable suggest that boys are more likely to attend Koranic preschools and girls more likely to attend kindergartens, the effects are not statistically significant.

Statistically significant predictors of kindergarten attendance include higher parental educational attainment, family household wealth, and urban residence.[4] For Koranic schools the only statistically significant predictor was residence: children from rural households were less likely than urban children to attend a Koranic preschool, while children from suburban households were more likely than urban children to do so.

Both maternal and paternal education levels are significant predictors of kindergarten attendance but not of Koranic school attendance.[5] Children from better-off households are also more likely to attend kindergarten. Children from rural households are less likely to attend any form of preschool.[6]

The negative correlation of the error terms of the equations indicates that, controlling for the explanatory variables, as the probability of kindergarten enrollment increases, the probability of enrollment in Koranic school decreases and vice versa. When the same model is estimated for boys and girls separately, the overall trends remain the same. A key difference is that while the parental schooling coefficients are statistically significant at the 5 percent level or better for girls, for boys the only parental schooling dummy that is statistically significant at the 5 percent level is having a mother who completed at least primary school (results available from the authors upon request). Similarly, the wealth effect on kindergarten attendance is almost twice as great for girls as it is for boys (statistically significant at the 1 percent level).

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4 Two issues regarding the estimation deserve consideration. First, because the Tunisian survey collected data on grade 6 students, the analysis of kindergarten and Koranic school attendance is subject to selection bias, in that data on students who dropped out before reaching grade 6 are not included. This possibility is ignored here. The effect is likely to be negligible, since the dropout rates in early grades of primary school are low (about 4 percent of students drop out before reaching the final grade of primary school). Second, the analysis of kindergarten and Koranic school attendance is subject to omitted variable bias, because there are no data on the availability and characteristics of preprimary schools. The residence dummies may roughly control for availability. The lack of data on the characteristics of preprimary schools is more problematic. This issue is partially taken into account by distinguishing between kindergartens and Koranic schools.

5 A chi-squared test with eight degrees of freedom strongly rejects the hypothesis that the coefficients for the kindergarten and Koranic school attendance equations are the same (t-statistic is 69.3).

6 Since dropout and repetition rates are high at the end of grade 6, in an attempt to avoid a likely selection bias, the empirical analyses reported here use a subsample of the students, those who were first time grade 6 students at the time of the 1997/98 Tunisia Grade 6 Students Survey.

Table 8.4. Bivariate probit estimates of preprimary school attendance at kindergarten and Koranic schools in Tunisia, 1998

Independent variable	Kindergarten	Koranic school
Gender		
Male	–0.16 (–1.3)	0.08 (0.73)
Mother's schooling		
Primary school attendance (vs. no schooling)	0.04 (0.26)	–0.21 (–1.58)
Primary school complete or more (vs. no schooling)	0.59*** (3.21)	–0.09 (–0.48)
Father's schooling		
Primary school attendance (vs. no schooling)	0.34* (1.87)	–0.11 (–0.75)
Primary school complete or more (vs. no schooling)	0.76*** (3.89)	–0.23 (–1.36)
Household possessions index	0.28*** (6.1)	0.04 (1.02)
Residence		
Rural (vs. urban)	–0.44*** (–2.59)	–0.34** (–2.06)
Suburban (vs. urban)	–0.24 (–1.4)	0.33** (1.98)
Constant	–2.50*** (–7.04)	–0.51* (–1.71)
ρ	–0.45	0.32
Number of observations	599	590
Log-likelihood	605.76	580.76

* Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Note: Figures in parentheses are *t*-statistics.

Source: Tunisia Grade 6 Student Survey, 1997/98.

Private and supplemental lessons

In many countries families hire tutors for their children to enhance their likelihood of advancing in school (Bray 2003; Wolf 2002). In some cases boys benefit more from these family expenditures, although a review of the literature by Bray (1999) reveals varied

findings, with no sign of female disadvantage in private tutoring in Egypt, Malaysia, Malta, Sri Lanka, and Taiwan (China) (conditional on school enrollment). The 1997/98 Tunisia Grade 6 Student Survey collected information on two types of additional tutoring: private courses offered by individual teachers and "supplemental" courses offered by schools. The main difference between these courses was their cost: private courses in Tunisia cost about three times as much as supplemental courses. About one-third of the students who took private courses took them from their own teacher at school. Almost all the remaining students took private courses from teachers other than their own. A similar trend exists for supplemental courses: 93 percent of students who took supplemental courses did so from their own teacher at school. Both private and supplemental courses focused on calculus, Arabic, French, and science. Supplemental courses are not free: about 85 percent of students who took such courses reported paying for them.

Boys appear more likely to take private courses than girls, but there is no gender difference in access to supplemental courses. Furthermore, the gender coefficient in the private-courses model is small and not statistically significant at the 10 percent level (table 8.5). The dependent variable takes the value 1 if the student receives private or supplemental lessons. In these models the explanatory variables are the same family background variables discussed above plus two school quality variables: teacher qualifications and class size.

Children from wealthier households are significantly more likely to take private or supplemental lessons, while children from rural households are significantly less likely to do so. Children from suburban households are more likely to have private (but not supplemental) lessons. Neither gender nor parental education is a statistically significant predictor of taking private or supplemental lessons. When the same model is estimated for boys and girls separately, the overall trends remain the same, but the wealth effect in the private-course regression is statistically significant only for girls, although for both genders the sign of the estimated parameter is as expected (results available from the authors upon request). We interpret this to mean that wealthier families are willing to pay for girls' tutoring but less wealthy families are not, whereas wealth has little impact on a family's willingness to pay for boys' tutoring.

We hypothesized that children in better-quality schools would be less likely to need, and therefore take, private or supplemental lessons. The regressions do not fully support this hypothesis. While the signs of coefficients for teacher qualifications were in the expected direction, with students in schools with more qualified teachers less likely to take private or supplemental lessons, the effects were not statistically significant. Contrary to our hypothesis, students in larger classes were less likely to take private or supplemental lessons, and these effects were statistically significant. One possibility is that larger classes represent greater demand for education, associated with better schools, rather than lower-quality education. This explanation is not supported by data, however: Mete (2004) shows that larger class sizes are negatively associated with the probability of receiving a passing score at the end of grade 6. It is

Table 8.5. Bivariate probit regressions on use of private and supplemental courses during primary school in Tunisia, 1998

Independent variable	Private tutoring	Supplemental courses
Gender		
Male	0.18 (1.37)	0.01 (0.09)
Mother's schooling		
Primary school attendance (vs. no schooling)	0.01 (0.07)	–0.03 (–0.23)
Primary school complete or more (vs. no schooling)	0.16 (0.76)	0.27 (1.51)
Father's schooling		
Primary school attendance (vs. no schooling)	0.22 (1.12)	0.02 (0.16)
Primary school complete or more (vs. no schooling)	0.08 (0.38)	0.00 (0.00)
Household possessions index	0.15*** (2.74)	0.18*** (4.64)
Residence		
Rural (vs. urban)	–0.69*** (–3.56)	–0.44*** (–2.57)
Suburban (vs. urban)	0.42* (1.95)	–0.12 (–0.63)
Percentage of teachers holding a post-bachelor diploma	–0.30 (–0.74)	–0.47 (–1.37)
Average number of primary students per class		
33–36 (vs. 24–32)	–0.25 (–1.50)	–0.33** (–2.52)
37–43 (vs. 24–32)	–0.72*** (–3.53)	–0.45*** (–2.86)
Constant	–1.71*** (–4.46)	–0.22 (–0.74)
ρ	–0.45	0.32
Number of observations	599	590
Log-likelihood	–605.76	–580.76

* Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Note: Figures in parentheses are *t*-statistics.

Source: Tunisia Grade 6 Student Survey, 1997/98.

also possible that as the number of students per teacher increases, teachers' time available for private courses becomes a constraint. This explanation is a poor one, however, because in such cases students should be able to switch to private instructors who are not teachers (such as high school students who have previously taken the primary school-leaving examination).

Time use out of school

In many countries girls have less time for homework due to high demands for their household labor, including housework, fetching wood and water, and caring for younger siblings (Ilahi 2001; Groothaert and Kanbur 1995). This does not seem to be the case in Tunisia for grade 6 girls. We examined the determinants of five types of out-of-school time use by boys and girls (table 8.6).[7] The first three columns in table 8.6 present ordinary least squares, probit, and tobit regression estimates for academic time use: time allocated to school homework, whether the child reads books other than school textbooks, and the amount of help received from parents. These are uses of time that support academics and can be considered inputs into schooling. Boys are less likely than girls to read books other than textbooks, but they spend no more time doing homework and are no more likely to receive help from parents than girls, everything else equal. That is, girls do not appear to be disadvantaged with respect to academic time use.

Girls do not appear disadvantaged with respect to work time either. The last two columns in table 8.6 present tobit regression estimates for housework and work outside the home. Girls spend more time working at home than do boys, while boys spend more time working outside the home. The "number of hours spent helping with housework in a week in grade 6" variable is obtained by summing four categories of housework time: time spent helping with housework, time spent caring for siblings, time spent fetching water and wood, and time spent on other household tasks. Girls are much more likely than boys to help with housework. Children of mothers who completed primary education spend less time doing housework, while children of fathers with only primary schooling spend more time doing housework. The household possessions index coefficient has a negative sign and is significant at the 1 percent level. Children enrolled in schools with crowded classes are likely to spend more time helping with housework.

7 The time allocation questions in the 1997/98 Tunisia Grade 6 Students Survey inquired about time allocated to a number of activities (such as homework and taking care of siblings) in a typical week. Measurement error is a concern in this context (see Juster and Stafford 1991); these models should therefore not be interpreted as definitive evidence on time use patterns of children. More detailed surveys with diary style time-use modules (such as that used in the Multinational Time Use Study (Centre for Time Use Research 2006) would improve the understanding of time-use patterns significantly. In the absence of such survey data, it is useful to recognize that if standard assumptions hold for the measurement error and the error term of the regression, the measurement error can be ignored in models that use time-allocation data as dependent variables (see Stapleton and Young 1984).

Table 8.6. Regression estimates of out-of-school time use by grade 6 students in Tunisia, 1998

Independent variable	Hours spent doing homework (ordinary least squares)	Reads books other than textbooks (probit)	Hours of parental help received (tobit)	Hours spent on housework (tobit)	Hours spent working outside the home (tobit)
Gender					
Male	–0.42 (–1.03)	–0.30*** (–2.71)	0.01 (0.02)	–5.79*** (–8.82)	11.25*** (3.78)
Mother's schooling					
Primary school attendance (vs. no schooling)	0.33 (0.67)	0.24* (1.79)	1.25 (1.61)	–0.53 (–0.68)	1.34 (0.40)
Primary school complete or more (vs. no schooling)	–0.15 (–0.23)	0.46** (2.44)	1.30 (1.30)	–3.43*** (–3.17)	2.79 (0.59)
Father's schooling					
Primary school attendance (vs. no schooling)	0.36 (0.68)	–0.13 (–.88)	0.64 (0.73)	1.90** (2.23)	4.76 (1.32)
Primary school complete or more (vs. no schooling)	0.63 (1.04)	–0.35** (–2.17)	2.13** (2.21)	1.17 (1.20)	–3.81 (–0.86)
Household possessions index	0.39*** (2.76)	0.16*** (4.15)	0.41* (1.85)	–0.78*** (–3.51)	–1.22 (–1.36)
Residence					
Rural (vs. urban)	0.03 (0.05)	–0.36** (–2.08)	–2.07** (–2.15)	1.68 (1.64)	8.78 (1.53)
Suburban (vs. urban)	1.00 (1.36)	0.05 (0.22)	–0.11 (–0.1)	0.31 (0.26)	–0.48 (–0.08)
Percentage of teachers holding a post-bachelor diploma	1.13 (0.87)	–0.04 (–0.11)	–0.38 (–0.19)	0.07 (0.03)	–33.66*** (–2.98)
Average number of students per primary class					
33–36 (vs. 24–32)	–0.06 (–0.13)	–0.18 (–1.32)	–1.94** (–2.50)	0.96 (1.23)	4.91 (1.41)
37–43 (vs. 24–32)	–1.68*** (–2.77)	–0.06 (–0.35)	–1.41 (–1.45)	1.67* (1.76)	7.75** (1.98)
Constant	8.45*** (7.57)	0.00 (–0.01)	–3.21* (–1.81)	9.20*** (5.20)	–22.82*** (–2.64)

(continued)

Independent variable	Hours spent doing homework (ordinary least squares)	Reads books other than textbooks (probit)	Hours of parental help received (tobit)	Hours spent on housework (tobit)	Hours spent working outside the home (tobit)
R^2	0.06	—	—	—	—
Number of observations	570	597	579	604	604
Log-likelihood		–346.04	–978.80	–1,627.76	–547.75

* Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Note: Figures in parentheses are *t*-statistics; — indicates variable not included in model.

Source: Tunisia Grade 6 Student Survey, 1997/98.

Most children in Tunisia do not report working outside the home. The dependent variable is obtained by adding the number of hours a child spent helping his or her family's work or business, doing seasonal work, and doing other work. The estimation results should be viewed as illustrative, since about 85 percent of the observations are censored at zero hours of work. Some trends are clear, however: girls are less likely than boys to work outside the home, and parental educational attainment does not affect working outside the home. Children attending schools with better educated teachers and smaller class sizes—possibly associated with better schools or schools in wealthier communities—are also less likely to work outside the home.

A trend that indirectly reinforces gender inequalities starts to emerge at the end of grade 6: girls work at home more than boys, and children of less educated parents (those who did not complete primary school) work at home more. Conversely, children from households with more possessions are working at home less, as are children attending schools with higher teacher qualifications and smaller classes. Since girls work at home more than boys do, these factors are more likely to affect girls.

Rural-urban differences

In many countries school participation and achievement vary in an orderly manner, with highest participation and achievement by urban males, followed by urban females, rural males, and rural females. This pattern is not observed in Tunisia at the primary level. Nevertheless, rural students are systematically disadvantaged in four ways. Rural students are less likely to attend preschool, receive private or supplemental lessons, read books other than textbooks, or receive academic help from their parents. In addition, some children in very remote rural areas may speak a Berber language as a mother tongue and may encounter difficulties with the language of instruction. (Our data do not include information on the language spoken at home.) While the rural disadvantage is visible for both boys and girls (we experimented with models

that include an interaction term between gender and rural residence, but this exercise did not reveal a robust trend), the cost of "failure" is much more severe for girls who live in rural areas, as shown below. Thus lack of a supportive household environment in rural areas is particularly detrimental for girls' schooling.

When and how do gender inequalities start to emerge?

Although girls and boys in Tunisia are as likely to attend preschool or to receive private or supplemental lessons and spend about the same amount of time working, girls have lower achievement at the lower secondary stage of schooling and fewer opportunities if they fail to advance to lower secondary school. Rural children are more disadvantaged with respect to family inputs to education. This section examines the determinants of education achievement at the end of sixth grade and the consequences of failure for girls, particularly rural girls.

Predictors of school grades and primary school-leaving examination scores

Primary school-leaving examination scores tend to be lower than grades in school, with only minor gender differences (see figure 8.1). Students residing in rural areas have lower school grades and much lower primary school-leaving examination scores than other students. What school and community factors account for these differences?

In this analysis the average primary school-leaving examination score of students and the average grade average of students in a school are considered to be functions of school and community characteristics. Characteristics of the students' families that are not captured by the grades and examination-scores data set would also influence these dependent variables. Moreover, teacher and school characteristics that are considered explanatory variables may themselves be influenced by parental characteristics (for example, influential parents may determine to some extent the amount of resources that schools enjoy). Thus the results of the Seemingly Unrelated Regression (SUR) estimation (table 8.7) should be interpreted with caution, as these correlations need to be explored in more detail by future research.

For both boys and girls, four school characteristics are related to their primary school-leaving examination scores: the principal's experience in the school, the teachers' experience in the school, the percentage of female teachers in the school, and the average number of grade 6 students per teacher. For girls the percentage of teachers with a higher education diploma is also important, while for boys the teachers' experience overall matters. The signs of the coefficients are the same for both boys and girls, indicating that school quality is important for both boys and girls. Teacher quality, however, has a stronger effect on girls' achievement than on boys', as indicated by the size of the coefficient. Certain subject area scores (mathematics and scientific

Table 8.7. Seemingly Unrelated Regression (SUR) estimates of predictors of primary school-leaving examination score and grade average and variable means

	Means		Boys		Girls	
Independent variable	**Boys**	**Girls**	**Primary school-leaving score**	**Grade average**	**Primary school-leaving score**	**Grade average**
School characteristics						
Principal's experience (in this school)	5.30 (6.03)	5.30 (5.92)	0.03*** (3.08)	0.00 (0.16)	0.02** (2.39)	0.00 (0.39)
Principal's experience (overall)	26.50 (8.40)	27.30 (7.74)	0.01 (0.76)	0.01 (1.19)	–0.01 (1.41)	0.00 (0.05)
Teachers' experience (average, in this school)	5.29 (2.59)	5.51 (2.60)	0.07** (2.32)	0.03 (1.17)	0.14*** (4.35)	0.07*** (2.74)
Teachers' experience (average, overall)	12.10 (5.50)	12.80 (5.34)	0.08*** (2.87)	0.03 (1.08)	0.02 (0.69)	–0.01 (0.41)
Percentage of female teachers	0.45 (0.23)	0.48 (0.21)	0.77*** (3.10)	–0.13 (0.59)	1.51*** (5.32)	0.72*** (3.04)
Percentage of teachers with high education diploma	0.38 (0.27)	0.41 (0.27)	0.55 (1.17)	–0.48 (1.13)	1.37*** (2.68)	0–.05 (0.11)
Number of grade 6 students/number of teachers in the school	5.00 (1.35)	5.03 (1.18)	–0.17*** (4.36)	–0.13*** (3.99)	–0.21*** (4.33)	–0.24*** (5.98)
Town characteristics						
Agricultural sector only (no service or industry sector)	0.65 (0.48)	0.61 (0.49)	–0.22* (1.84)	–0.31*** (2.90)	–0.19 (1.46)	–0.31*** (2.87)
Urban	0.53 (0.49)	0.59 (0.49)	0.05 (0.32)	0.14 (0.96)	0.01 (0.06)	0.26* (1.85)
Constant			8.01*** (22.60)	12.00*** (38.20)	8.33*** (19.20)	12.40*** (34.20)
R^2			0.12	0.03	0.11	0.06
Correlation of residuals			0.77		0.77	
Number of observations	3,353	3,031	3,353	3,353	3,031	3,031

* Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

Note: Figures in parentheses are standard deviations in columns 1–2 and *t*-statistics in columns 3–6. Coefficients for *gouvernorate* dummies are not shown.

Source: Tunisia Dropouts Survey, 1995/96; Tunisia Ministry of Education, 1995/96.

awareness) are much more sensitive to school characteristics than others (Islamic education, history, and geography) (results available from the authors upon request).

School characteristics have little effect on boys' grade averages. Only one school characteristic—the number of grade 6 students per teacher—is significantly related to the grade average of boys. In contrast, three school characteristics are related to girls' grades: teachers' experience in the school, the percentage of female teachers in the school, and class size, although the overall explanatory power of the regression is low.[8] A key trend to highlight here is that girls benefit much more than boys from more experienced teachers (in the same school), from a higher percentage of female teachers, and from lower student/teacher ratios.

Community characteristics are also related to achievement. For both boys and girls, residence in a town having only an agricultural sector is associated with lower primary school-leaving scores and lower grades. For girls residence in an urban town is associated with higher grades.

Implications of failure at the end of grade 6 for girls in rural areas

What happens to children whose primary school-leaving scores and grades mean that they do not transition immediately to lower secondary school? To find out, Mete (2004) uses a multinomial logit model that considers the following mutually exclusive states: enrolled in private junior secondary school, enrolled in technical junior secondary school, working, looking for work, and helping with housework. We illustrate the female disadvantage after dropping out of the general education path by reporting simulated probabilities based on her specification.

The most common pushed-out student is a 14-year-old whose mother did not attend school, whose father is a daily worker, who lives in an urban setting, and has two older and two younger siblings. The postprimary activities of girls and boys with this profile differ significantly (table 8.8). The probability of a boy being in a private or technical school (39.2) percent is nearly twice that of a girl (21.6 percent). The probability of a girl helping with housework (46.1 percent) is more than 10 times that of a boy (3.9 percent). The probability of a boy working or looking for work (56.9 percent) is nearly twice that of a girl (32.4 percent). These probabilities change with different family configurations and residence.

Against this baseline, table 8.8 presents the effects of changing one characteristic on the probability of observing each outcome. This exercise enables evaluation of absolute changes in probabilities in response to changes in explanatory variables. It is also useful for making comparisons between the models for boys and girls.

Age affects boys and girls differently. Older boys (15–16) have lower probabilities of attending private or technical schools, while older girls have higher probabilities of doing so, although the differences are not great. If a boy has no older siblings (as

8 The R^2 statistics are 0.03 for boys and 0.06 for girls (compared with 0.12 and 0.11 for the primary school-leaving examination score regressions).

Table 8.8. What happens six months after dropping out? Estimated probabilities of attending school or working in Tunisia by gender, 1996 (percent)

Child characteristics	Private school		Technical school		Work		Looking for work		Housework	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Baseline[a]	13.4	2.7	25.8	18.9	31.6	20.4	25.3	12.0	3.9	46.1
Age										
15	10.4	5.8	22.1	21.3	37.3	33.8	27.5	9.3	2.7	29.8
16	7.8	10.4	18.4	20.1	42.9	47.2	29.1	6.1	1.9	16.2
Number of older siblings										
0	10.4	2.8	38.9	19.5	31.3	23.4	17.4	10.0	1.9	44.4
4	15.6	2.5	15.4	18.1	28.9	17.6	33.1	14.3	7.0	47.4
Number of younger siblings										
0	11.0	5.3	39.3	19.2	26.8	16.8	20.8	10.4	2.2	48.4
4	15.1	1.3	15.6	18.1	34.6	24.2	28.5	13.5	6.3	42.9
Father's profession										
Unemployed	7.5	4.9	30.9	23.2	29.7	9.4	31.1	25.8	0.8	36.8
Independent	24.1	10.1	17.8	16.6	34.4	6.8	22.3	16.7	1.5	49.8
Employee (salary earner)	20.0	4.6	32.3	27.9	23.0	8.6	21.2	13.3	3.6	45.5
Mother's education										
Primary school attendance	13.1	1.7	39.6	26.8	24.6	26.9	20.5	19.6	2.2	25
Primary school completion or more	19.9	3.2	15.5	33.8	18.5	21.5	46.1	15.0	0	26.6
Residence										
Rural	9.7	1.6	12.2	4.4	16.1	3.5	55.5	16.7	6.6	73.9

a. Baseline individual is 14 years old, lives in an urban area, and has a mother who did not attend school, a father who is a daily worker, and two older and two younger siblings.

Source: Based on multinomial logit coefficients estimated separately for boys and girls reported by Mete 2004.

opposed to having two older siblings), the probability of technical junior secondary school attendance increases from 25.8 percent to 38.9 percent (the probability of attending private junior secondary school decreases slightly). The number of younger siblings has an influence of similar magnitude for boys. For girls, too, as the number of siblings increases, the probability of attending a technical junior secondary school decreases, although the magnitude of the effect is modest. If the father has an independent occupation, the probability of attending a junior secondary school increases, from 39.2 percent (in the base scenario) to 41.9 percent for boys and from 21.6 percent to 26.7 percent for girls. If the father is a salary earner, the corresponding probabilities are 52.3 percent for boys and 32.5 percent for girls. Mother's education has a strong positive influence on the probability of technical junior secondary school attendance for girls (26.8 percent if the mother attended primary school and 33.8 percent if the mother completed primary school or more compared with 18.9 percent in the base scenario). If the mother has some education, the probability of helping with housework declines from 46.1 percent in the base scenario to about 25.0 percent.

Perhaps most important are the strong urban/rural effects, particularly for girls. For girls residing in rural areas, the estimated probability of helping with housework is 73.9 percent, compared with 46.1 percent in the base case, while the probability of attending either private or technical school drops from 21.6 percent in the base case to 6.0 percent. Rural residence matters for boys as well. The probability of "looking for work" increases from 25.3 in the base scenario to 55.5 if the residence changes from urban to rural, while the probability of attending either private or technical junior secondary school declines from 39.2 percent to 21.9 percent. But rural boys are still nearly four times as likely as rural girls to attend some form of postprimary school.

Conclusions

Gender inequalities in educational outcomes in Tunisia do not emerge because girls experience a less supportive household environment or school environment. Girls perform as well as boys in the primary school-leaving examinations, so testing itself also does not directly put girls at a disadvantage. The selection aspect of testing places girls at a disadvantage indirectly, however, because parents are much less likely to enroll girls who fail to receive an overall passing score (and thus are ineligible to remain on the general public secondary education path) in private or technical schools. Girls' disadvantage in enrollment is much greater for poor, rural girls with uneducated mothers.

What policy interventions are appropriate in educational settings similar to Tunisia's at the end of 1990s? One set of interventions could target girls who do not receive a passing score (especially those from low socioeconomic background families in rural areas) for special treatment.

An alternative policy would be to try to help girls while they are still in primary school, recognizing that the cost of failure for them is more severe. In a large majority of the empirical models that we considered, school-related outcomes by girls (kindergarten attendance, taking private courses, primary school-leaving-examination scores) are much more sensitive to the household and school/teacher characteristics than they are for boys. While it may be difficult or impossible to improve the household environment girls face (especially in rural areas), it may be possible to improve the school and teacher characteristics that are strongly correlated with girls' school performance. Such a positive discrimination policy may be justified economically, since there is a strong case for advocating public policy interventions that explicitly focus on improving girls' schooling outcomes. Schultz (2001) argues for a disproportionate amount of expenditure on women's education on the grounds that the health and schooling of children are more closely related to their mother's education than their father's and because more educated women work more hours in the market labor force, broadening the tax base.

A third alternative would be to abolish examination-based selection in the early stages of education, as Tunisia did in 2000/01. Such selection may be inefficient and have significant inequality implications, including but not limited to gender inequalities.

Annex to Chapter 8

Table 8A.1. Characteristics of samples used for analyses of preprimary school attendance and private/supplemental courses during primary school

	Preprimary school attendance		Private/supplemental courses	
Characteristic	**Frequency**	**Percent**	**Frequency**	**Percent**
Gender				
Male	305	51	304	52
Female	294	49	286	48
Mother's schooling				
No schooling	323	54	316	53
Primary school attendance	180	30	178	30
Primary school complete or more	96	16	96	16
Father's schooling				
No schooling	141	23	138	23
Primary school attendance	264	44	259	44
Primary school complete or more	194	32	193	33
Household possessions index				
0–1	16	3	15	3
2–3	56	9	54	9
4–5	124	21	119	20
6–7	366	61	367	62
8–11	37	6	35	6
Residence				
Urban	116	19	115	19
Rural	311	52	304	51
Suburban	172	29	171	29
Percentage of teachers holding a postbachelor diploma (mean)	—	—	36	—
Average number of students per class (primary cycle)				
24–32	—	—	242	41
33–36	—	—	199	34
37–43	—	—	149	25
Total	599	100	590	100

Note: — indicates data not available.

Source: Tunisia Grade 6 Student Survey, 1997/98.

Table 8A.2. Characteristics of samples used for homework, reading books other than textbooks, help from parents, housework, and work models

Characteristic	Home-work	Other books	Help received	House-work	Work
Gender					
Male	50.88	51.09	51.30	51.32	51.16
Female	49.12	48.91	48.70	48.68	48.84
Mother's schooling					
No schooling	53.68	53.77	53.71	53.64	53.64
Primary school attendance	30.00	29.98	30.05	30.13	30.13
Primary school complete or more	16.32	16.25	16.23	16.23	16.23
Father's schooling					
No schooling	23.51	23.79	23.32	23.51	23.34
Primary school attendance	43.86	43.72	44.39	43.87	44.04
Primary school complete or more	32.63	32.50	32.30	32.62	32.62
Household possessions index					
0–1	2.46	2.68	2.59	2.65	2.65
2–3	9.12	9.05	8.98	9.27	9.11
4–5	20.70	20.27	21.07	20.36	20.53
6–7	61.93	61.81	61.31	61.59	61.59
8–11	5.79	6.20	6.04	6.13	6.13
Residence					
Urban	19.65	19.77	18.83	19.54	19.54
Rural	50.70	51.59	52.33	51.66	51.66
Suburban	29.65	28.81	28.84	28.81	28.81
Percentage of teachers holding a postbachelor diploma (mean)	36.31	35.97	36.12	35.94	35.95
Average number of students per class (primary cycle)					
24–32	41.40	40.87	41.45	41.39	41.39
33–36	34.21	33.67	33.51	33.61	33.44
37–43	24.39	25.46	25.04	25.00	25.17
Number of observations	570	597	579	604	604

Source: Tunisia Grade 6 Student Survey, 1997/98.

Table 8A.3. Primary school-leaving examination (PSLE) scores and grades in school, 1995/96

Performance measure	Mean for complete sample			Mean for students from schools included in the 1995/96 Tunisia Dropouts Survey		
	Male	Female	Total	Male	Female	Total
Grade average	12.3	12.7	12.5	12.1	12.4	12.2
Overall PSLE score	9.3	9.5	9.4	8.9	9.0	9.0
Subject area scores						
Arabic expression	8.8	9.8	9.3	8.8	9.6	9.1
Study of Arabic texts	9.1	9.9	9.5	8.6	9.2	8.8
French expression	6.2	7.1	6.6	6.1	6.7	6.4
Study of French texts	7.8	8.7	8.2	7.2	8.0	7.6
Islamic education	18.0	18.3	18.1	17.9	18.3	18.1
History	15.0	14.7	14.9	14.8	14.5	14.7
Scientific awareness	10.5	10.1	10.3	10.1	9.9	10.0
Mathematics	7.1	6.1	6.6	6.6	5.4	6.0
Civics	13.3	13.2	13.2	13.1	13.1	13.1
Geography	14.7	13.7	14.2	14.3	13.5	14.0
Sample size	127,625	116,619	244,244	3,353	3,031	6,384

Source: Tunisia Dropouts Survey, 1995/96; Tunisia Ministry of Education, 1995/96.

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