

PN. ACA-324  
93452

**INSTITUTE  
FOR  
POLICY  
REFORM**

**IPR Working Paper Series:**

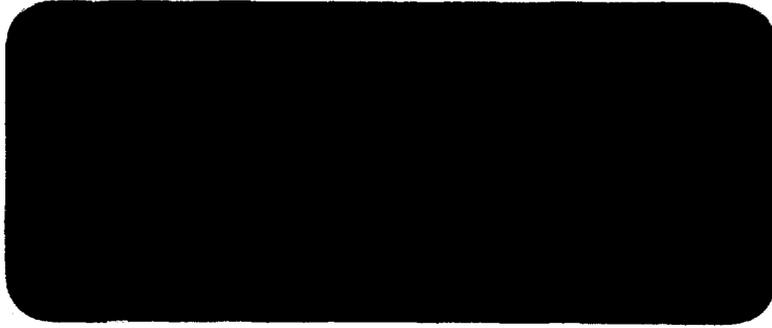
**Determinants of Educational  
Achievement and Attainment In Africa**



**February 1997**

**Institute for Policy Reform  
1400 16th Street, N.W., Suite  
Washington, D.C. 20036  
Tel: 202-939-3450; Fax: 202-939-3458**

)



The papers in this series were prepared under a cooperative agreement between the Institute for Policy Reform and the Agency for International Development, Cooperative Agreement No. AEP-5463-A-00-4015-00, except for the Mason and Khandker and Deolalilar papers. Supplementary funds were provided by Save the Children Federation, the Aga Khan Foundation and the International Institute for Educational Planning. Views expressed in these papers are those of the authors, not necessarily those of these organizations.

**INSTITUTE  
FOR  
POLICY  
REFORM**

**IPR Working Paper Series:**

**Determinants of Educational  
Achievement and Attainment in Africa**

**Enrollment in Primary Education and  
Cognitive Achievement in Egypt,  
Change and Determinants**

**Nader Fergany, Ilham Farmaz and Christiane Wissa**  
Almishkat Centre for Research and Training  
Cairo, Egypt

February 1997

Abstract

This paper reports on research that added variables from the Ministry of Education's school data base to a 1994 survey which included information on students, households, schools and cognitive achievement, and used these materials to investigate the determinants of achievement and enrollment and to explain the deterioration in these factors that occurred over the last decade. The paper finds, among other things, that socio-economic factors are more important than school characteristics in explaining results.

## **Acknowledgements**

Comments on earlier drafts were made by Ronald Ridker, Anne Case and Angus Deaton, and the participants in a one-day workshop held on December 2, 1996, especially Paul Glewwe. These comments helped improve the content and presentation of the study, and are gratefully acknowledged.

## CONTENTS

INTRODUCTION	1
A. Background	1
B. Main findings of the AQS	2
C. Objectives	2
D. Methodological caveats	3
LITERATURE REVIEW	5
DATA SOURCES	11
ANALYSIS AND CONCLUSIONS	13
A. The Micro-Level	13
<i>Determinants of initial enrollment in primary education</i>	17
<i>Determinants of completion of primary education in MOE-supervised schools</i>	20
<i>Determinants of cognitive achievement of individuals who ever attended MOE-supervised schools</i>	25
B. The Macro-Micro Link	30
CONCLUSIONS, POLICY RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH	36
A. Conclusions and policy recommendations	36
B. Suggestions for further research	40
REFERENCES	
ANNEX (1): INITIAL ENROLLMENT IN PRIMARY EDUCATION	
ANNEX (2): COMPLETION OF PRIMARY EDUCATION	
ANNEX (3): AVERAGE TEST SCORES	
ANNEX (4): SOCIO-ECONOMIC INDICATORS	
ANNEX (5): SUMMARY OF RESULTS OF REGRESSION ANALYSIS	

## INTRODUCTION

### A. Background

The survey of "Access to primary education and its quality" (AQS), was carried out in the spring of 1994 (Fergany, 1994b)<sup>1</sup>.

The survey covered a sample of approximately 4800 households in 16 rural and urban locations in three governorates: Cairo, Kafr Elsheikh (in the Delta) and Elminya (in the South). The sample was designed to approximate the rural/urban distribution and variation in educational attainment within the three governorates and in the country at large.

The survey instruments included:

- an *household* questionnaire (administered to the head of household)
- an *individual* questionnaire (administered to a member of the household in the age group 6-17 years)
- a *school* questionnaire (filled out for primary schools attended by household members in the sample locations)
- *Criterion-Referenced Tests* (CRTs) designed to measure cognitive achievement through assessment of progressive competency in reading & writing and mathematics on the level of skill expected from attending primary education (administered to members of the households in the age group 10-17 years who ever attended school).

A general report on the results of the AQS was prepared in the October 1994. A number of analytic papers devoted to specific issues was later produced. The accumulation of reviews and comments on the results of the AQS establishes the need for a more comprehensive and in-depth analysis of the data set, particularly with respect to the treatment of school variables.

### B. Main findings of the AQS

The results of the survey indicate stagnation in the level of enrollment in primary education, deteriorating efficiency and worsening quality of real output in terms of cognitive achievement.

---

<sup>1</sup> The AQS was funded by the Education Program, UNICEF, Cairo and implemented in collaboration with the Ministry of Education (MOE), National Center for Educational Research and Development, National Center for Examinations and Educational Evaluation, Central Agency for Public Mobilization and Statistics- Headquarters as well as the regional offices of Tanta and Elminya, University of Elminya - Faculty of Education, University of Tanta - Faculty of Education, and coordinated by Almishkat Center for Research and training.

On the quantitative dimension, the preliminary results point out that:

1. Since the mid 1980s, the long-term rising trend in *initial enrollment* in primary education has been frustrated. Level of initial enrollment appears to have not been able to break through the 90% barrier.
2. Since the late 1980s, the slowly rising historical trend in *internal efficiency*<sup>2</sup> seems to have been reversed.
3. As a result, *external efficiency*<sup>3</sup> is estimated to have entered a phase of decline in the last few years.

With respect to quality, cognitive achievement is shown to be quite low, particularly in mathematics. More importantly, cognitive achievement appears to have declined since the late 1980s with the reduction of the number of grades of the primary education cycle<sup>4</sup> having a significant downward effect on the level of competency.

### C. Objectives

The purpose of the present analysis is to deepen the findings of the October 1994 report on the AQS in two directions:

1. Attaining a fuller explanation of the *levels* of initial enrollment in primary education, completion of the primary education cycle, and cognitive achievement. In as much as possible, change over time in the three phenomena is to be investigated.

This objective is approached through constructing a set of explanatory variables that holds superior explanatory potential through better utilization of the AQS data set as well as the MOE schools data base. The set of explanatory variables is organized in two basic categories:

- socio-economic context variables on the individual, the household and community levels.
  - school variables.
2. Investigating the link between change over time in the three main parameters of primary education: initial enrollment, completion and cognitive achievement, and macroeconomic variables that are *presumed* to have exerted influence on household behavior in the area of primary education.

This objective is approached through constructing time series of indicators of economic growth, inflation and poverty and relating these series to estimated changes in enrollment, completion and cognitive achievement.

---

<sup>2</sup> Measured by the proportion of *entrants* who complete the primary cycle and average duration of completing the cycle.

<sup>3</sup> Measured by the proportion of primary education completers among the *population* in an appropriate age group.

<sup>4</sup> Primary education was reduced from six to five grades in 1988 in MOE-supervised schools.

#### D. Methodological caveats

The present study aims to establish *association* between social phenomena. In particular, the terms “determine” and “explain”, as well as their derivatives, are used in the sense of *statistically significant association* between a well-defined *response* variable and a *set of regressors*. The sets of regressors used are complex, reflecting the complexity of socio-economic reality but within the confines of the data set used.

It is to be noted in this respect that observations of empirical regularities, of statistical association, especially from cross-sectional data sets, can only be used as *evidence* for causal statements but cannot not be, *in themselves*, causal statements. While a lack of association may provide evidence *against* causality, causal statements can only be found at the level of theoretical generalizations and not through testable research hypotheses (Hage and Meeker, 1988, 42-43).

Even association is not easy to establish neatly, especially in the case of cognitive achievement, which is measured by scores in tests administered *at the time of the survey*. The attempt to link such scores to *past* personal or educational experience is subject to many influences that are difficult to disentangle.

On the side of explanatory variables, it is to be noted that measurement of socio-economic context variables, and MOE school variables, also relate to the time of the survey<sup>5</sup>.

Assessing change over time is unattainable without *comparable longitudinal* measurement. In the AQS data set, change over time in initial enrollment was *approximated* by taking *age* as a (reverse) proxy for time *prior to* the reference period of the survey. For completion of primary education and cognitive achievement, a better *proxy* for time is the calendar *year of entry* into primary education.

Establishing association between time series is considerably more difficult than following-up time trends, particularly if the units of analysis of the presumed “cause” and “effect” are different, as is the case when *macroeconomic* changes are presumed to have *caused* certain changes in the behavior of *micro units* (individuals and households). The maximum that one could hope for in this case is to argue for *plausible* association.

---

<sup>5</sup> The school variables derived from the AQS individual questionnaire, on the other hand, relate to the timing of the school experience. Though this type of data has its own measurement problems, it has an advantage over school variables pertaining to a *different* time reference than the education outcome variables.

## LITERATURE REVIEW

Joseph Farrell distinguishes two stages in the development of educational research on schooling.

In the mid 1960s, based on research carried out in industrialized countries, the conclusion was that "out-of-school factors had a much greater influence on student academic achievement than did school-related variables".

With the availability of studies from developing countries in the 1970s, the conventional wisdom acquired a new dimension: school-related variables are relatively more important than out-of-school factors, and their importance increases as the country gets poorer (1993, 29).

The underlying explanation seems to hinge on the assumption that variability in school quality tends to be relatively lower than variability in the socio-economic context of schooling in developed countries. In developing countries the opposite relationship is presumed to hold.

To hold this characterization as universal is inadequate. The situation can differ from one country to the other. Even the same country could experience different articulation of the two sets of variables in different time periods.

More generally, one can advance that *in a certain country, at some point in time, based on a specific set of measurements on school and socio-economic context variables, the relative importance of either the socio-economic context or school variables in determining educational output depends on the relative difference in the extent of variability of the two sets of variables.*

If, for example, school variables generally show a lower level of variability than socio-economic context variables, the former are expected to explain a smaller amount of variability in schooling output variables, and *vice versa*.

In addition, a distinction should be drawn between the *schools effect*<sup>6</sup> and the *school variables effect*. In a certain data set, the difference between the two effects, measured by contribution to the multiple correlation coefficient, expresses the extent of *sufficiency of measurement of the set of school variables used to approximate the schools effect in that data set.*

---

<sup>6</sup> In a regression analysis carried out to investigate the *schools effect*, each school would be assigned an indicator variable defined with respect to a school chosen as the *reference*, in which case the number of degrees of freedom for the *schools effect* would be equal to the number of schools in the data set minus one. The *school variables effect*, on the other hands, is measured by regressing the response variable on a set of variables measuring school *characteristics*.

In Egypt, precise measurement of the level of enrollment in education has been elusive<sup>7</sup>. Assessment of cognitive achievement has been even less tractable. Nevertheless, two large studies, both carried out around 1980, involved an assessment of the acquisition of basic skills in primary education.

The first study was carried out by the World Bank in collaboration with the National Center for Educational Research (NCER)<sup>8</sup> to investigate the retention of basic literacy skills (Swanson, 1987). The study covered about 10,000 children, in-school during the 1978/79 and 1979/80 school years and dropouts who last attended school between 1974/75 and 1978/79, and utilized a battery of nine tests for cognitive achievement levels. An important feature of the study was a longitudinal design that enabled comparing the achievement of dropouts with continuing pupils. Data collected also included characteristics of children and their households, teachers' qualification and experience, and measures of school quality. The study resulted in a mammoth database on which rather sophisticated econometric techniques were applied (sometimes to correct for methodological and implementation problems).

The second study was conducted by NCER (1981) to evaluate the "one-classroom school" in Egypt five years after it was started in 1975. Pupils of a sample of one classroom schools, as well as of their "mother" schools, were tested for basic skills.

Both studies utilized lengthy *Norm-Referenced Tests* (NRTs) and tested subjects *in the school environment*. NRTs result in assessments *relative to the "norm"* prevailing in the communities studied and testing in the school environment invites many biases particularly if dropouts are to be tested as in the case of the first study<sup>9</sup>. In many respects, field procedures in both studies were rather defective.

The major conclusion of the World Bank study was, contrary to the conventional wisdom in the literature at the time, that "the large disparities between the skill levels of continuing students and dropouts in any grade occur *prior to dropping out* and not afterwards" and that "these differentials arise early in their school career" (Swanson, 1987, 399 & 408). In addition, contrary to the then established conventional wisdom on the effect of schooling in developing countries, "individual and family characteristics were found to have a *greater* effect on skill levels than did schooling variables". This suggests that "**the policy instruments most immediately available to school officials can have only a limited effect on educational outputs**" (Swanson, 1987, 401 & 404).

---

<sup>7</sup> For a discussion and recent estimates, see: Fergany (1996).

<sup>8</sup> Currently the National Center for Educational Research and Development (NCERD).

<sup>9</sup> Dropouts are generally difficult to attract back to schools, let alone to take tests! Classroom testing invites cheating by pupils and collective help of pupils by teachers especially if they believe that the testing exercise will be used to evaluate their schools as well as their own performance.

The World Bank study reports average skill levels at completion of fifth grade of 51.9 in reading, 45.9 in writing and 28.1 in problem solving, to be compared to *a priori* standards set by a panel of NCER experts of 40.0, 41.7 and 71.4 respectively (Swanson, 1987, 203). It is difficult to attach an objective value to the *a priori* standards. In particular, the *a priori* standards given for reading and writing seem decidedly low, particularly with respect to NRTs<sup>10</sup>. Nevertheless, relative to *a priori* standards, the results reported would seem to indicate a "satisfactory" level of achievement in language skills but a low level in problem solving (39% of the *a priori* standard).

The one-classroom school study concluded that student achievement was higher in mother schools except with respect to religious education. The reported level of achievement in the sample of 40 one-classroom schools, and their mother schools, at the end of six years of primary education, in language and mathematics, is given in Table (1).

Table (1)  
Average achievement (%) in one-classroom  
and mother schools, 1981

Subject	One-Classroom School	Mother School
Reading	26	51
Writing	24	65
Arithmetic and Geometry	40	63

The rather dismal achievement of the pupils finishing one-classroom schools, relative to those of mother schools, is amply evident. Indeed, in both types of schools achievement is low. It is surprising, however, that *relative* achievement is found, contrary to the expected differentials<sup>11</sup>, to have been *lower* in reading than writing, in the mother schools, and in language skills than mathematics, in the one-classroom schools. This casts doubt on the validity of the tests used.

However, in view of our purpose here, it is important to realize that a sample of one-classroom schools, and their mother schools, is *not* a representative sample of Egyptian schools at large since one-classroom schools were generally established in rather poor areas. Better comparability with the World Bank study should accrue if we consider

---

<sup>10</sup> The author of the work cited points out that "the NCER panel has somewhat underestimated the reading and writing skills of the average student" (Swanson, 1987, 204).

<sup>11</sup> Normally, achievement is lower in mathematics than reading & writing and in writing than reading.

W

mother schools only from the one-classroom study and, even then, one would expect lower achievement in the mother schools than the World Bank study schools.

Nevertheless, great discrepancies obtain between the two sets of results. Achievement is better in writing, and mathematics, in the mother schools sample, i.e. the opposite of the expected differences.

One element of the discrepancy is the rather lenient *a priori* standard for language in the World Bank study alluded to earlier. On the other hand, testing for mathematics skills in the one-classroom study could have been relatively lenient.

In terms of overall rigor, extent of sophistication of analysis and consistency of the results with expectations, the results of the first study deserve a higher level of confidence.

However, it is important to stress that the two studies reviewed so far are *not comparable* to each other, basically due to differences in tests and *a priori* standards. Nor are they comparable to the AQS, for the same, as well as other methodological, reasons.

Recently, another large study examined "teaching practices and pupil achievement" (MOE, 1993). The study emphasized the impact of teacher characteristics, teaching practices and the school environment.

The study covered 18,000 pupils in the final grade of both the primary and preparatory stages of education. Field work was carried out during the school year 1990/91. *Primary school fifth-grade pupils* were tested, *in school*, in Arabic, mathematics and science using tests "developed and corrected by experts from the National Center for Educational Evaluation and Examinations" (MOE, 1993, 1/13). The implementation of the field survey is judged to have suffered major lapses that are likely to have undermined the quality of the resulting data set.

It is not clear from the study report what type of tests was utilized. Since evaluation of pupil competency was *not* the primary objective of the study, a *relative* measurement approach would have been sufficient. However, it is important to note that the results of this study are also *not* comparable to those of the AQS.

The study reports "national averages of *student* achievement" near the end of the primary education cycle of "60% in Arabic and 45% in mathematics" with great variability among educational directorates (MOE, 1993, 2/2). *Though the standard of comparison is not known*, the achievement of pupils about to complete the primary education cycle seems relatively low, particularly in mathematics.

Multivariate analysis of the level of achievement showed that *more than half* the variability in scores (60% in mathematics and 53% in Arabic) was attributable to class-, or school-level effects, the rest being due to differences among individual pupils (MOE, 1993, 5/4 & 10).

It is important to note that, of the three studies reviewed, this one had the most extensive collection of *school and teaching practices variables* and it is hence expected that school

variables explain a relatively higher proportion of variability in achievement in the analysis.

Nevertheless, the results of this study are starkly inconsistent with those of the earlier World Bank study which had a significant component on schooling and teaching practices. Socio-economic conditions have deteriorated considerably, on both the macro and micro levels, and the distribution of income and wealth worsened significantly, in the 1980s, while the vast majority of schools, which are supervised by the MOE, were kept subject to generally uniform conditions. Under this constellation of change, one would expect that the importance of school variables would *decline, rather than rise*, between the reference periods of the two studies.

Variables that were found to have *no* significant effect on pupil achievement included *gender, private tutoring and in-school tutoring groups* (MOE, 1993, 10/1-5). These conclusions are consistent with the preliminary findings of the AQS.

Factors that were found to be positively correlated with pupil achievement include interactive teaching activities, the frequent assignment of homework, longer teaching experience and better educational qualification of teachers, non-repetition and better school facilities (such as the presence of a library). As for pupil background, those from small families, families with higher parental education and higher economic status (measured by household facilities) had a higher level of achievement.

The study reports some counter-intuitive findings: work in small groups in the classroom or the teacher having in-service teacher training, produces *no* impact on pupil achievement. The first conclusion is a bit strange but the second might reflect the inadequacy of in-service training.

Even less intuitive are the conclusions that frequent use of short quizzes, special attention to particular pupils, non-lecture teaching formats and smaller classrooms have a *depressive* effect on achievement!

Using the World Bank study data set, Hanushek and Lavy (1994) argued for a close link between school quality and grade completion: "a student is much less likely to remain in school if attending a low quality school rather than a higher quality school". On the other hand, "bad" schools are also attended by pupils from poor social backgrounds. Thus, it can be argued that causality between the socio-economic context and quality of schooling is circular.

## DATA SOURCES

The *household* questionnaire of the AQS provides important information on the socio-economic context of primary education, as well as assessment of some aspects of education and schooling.

Data on educational history, as well as evaluation of school characteristics and school experience, were also collected in the *individual* questionnaire.

However, not all data elements on schooling that can be derived from the household and individual questionnaires were utilized in the analyses of the AQS data set conducted so far.

The school questionnaire data have *not* been used before. The judgment at the time of preparation of the AQS 1994 report was that the school questionnaire data were problematic, and require special treatment.

To ensure high quality data, "name of primary school attended", as well as many questionnaire items on the primary school attended, were asked only of respondents 10 years of age and older in the individual questionnaire. This condition restricts the possibility of linking school data, collected through school questionnaires, to individual-level data of those attending primary school at the time of the survey, to the later grades of the primary education cycle. Cognitive achievement tests were also administered for the same age bracket.

For practical field considerations, school questionnaires were completed only for schools within the administrative borders of the survey locations that were attended by a significant proportion of the primary education pupils in the households sample at the time of survey. This resulted in about two thirds of primary education pupils covered by the school questionnaire data, with the coverage rate, naturally, higher in rural locations where mobility to schools outside the village is limited. In addition, it was not possible to complete school questionnaires in one of the 16 locations of the survey.

Nevertheless, incorporating school data was considered a priority for the in-depth phase of analysis of AQS data.

It is possible to achieve a *higher rate of coverage* of pupils enumerated in the household survey, and *enrich* the schools data, through tapping the MOE schools data base<sup>12</sup>, but at a price. The price to be paid is limiting the scope of analysis to schools supervised by

---

<sup>12</sup> The MOE data base contains a wealth of information on enrollment, by age and sex, staff, examination results, and facilities, on the level of schools. The data base is generally updated annually (Data on facilities are, however, collected every five years).

The school questionnaire of the AQS was designed to essentially be a subset of the extensive data collected annually from schools by MOE.

MOE, i.e. *excluding schools supervised by Al-Azhar*<sup>13</sup>, comprising less than 10% of primary education pupils.

Unfortunately, the extent of loss of information by excluding Al-Azhar schools is *not* uniform over gender and rural/urban residence. Al-Azhar schools are more predominant in rural areas and their pupils are mostly boys. In other words, the extent of information loss resulting from getting the school variables from the MOE data base interacts with both gender and rural/urban residence in the country.

The MOE data base is not error free. Indeed, the data base is in need of *careful evaluation* before it can be put to meaningful *analytic uses*. For example, there seems to be an *unknown* level of exaggeration in enrollment derived from school records, the so-called "paper pupils" phenomenon<sup>14</sup>. Further, reporting of pupils ages seems to suffer some bias (Fergany, 1996).

Nevertheless, the benefits to accrue from using the MOE schools data base were judged to outweigh the shortcomings.

A school variables data set *around the time of field work of the AQS*, for pupils who reported the name of the primary school they attended, was constructed from the MOE data base. This additional data set significantly improves the school variables component of the analysis, in terms of both coverage and content.

As might be expected, not all schools reported in the AQS individual questionnaires could be identified within the MOE data base. However, the matching rate was remarkably good: 273 schools mentioned in the individual questionnaires of the AQS were traced to the MOE data base. This number of schools corresponds to 92% of MOE-supervised schools reported in the survey, representing 99% of all *individuals who ever joined primary education and were ten years of age or older at the time of the survey*.

Finally, it is important to note that the educational system in Egypt is *extremely centralized* which results in great uniformity in policies, procedures and resources available to schools. Important areas of uniformity are enrollment, staff regulations and teaching materials. Textbooks, for example, are standard, printed by the MOE and made available to *all* pupils at the beginning of the school year.

---

<sup>13</sup> Al-Azhar runs a public schooling system, parallel to the main one supervised by MOE, that spans the range of primary education to the university level. In Al-Azhar system the MOE curriculum is augmented by additional religious instruction.

<sup>14</sup> For various reasons, students are seemingly kept on school records when they have actually dropped out.

## ANALYSIS AND CONCLUSIONS

### A. The Micro-Level

This section investigates the relative importance of sets of explanatory variables, i.e. *regressors*, in explaining, in the sense of accounting for variability in, three parameters of primary education: *initial enrollment in primary education*, *completion of the primary education cycle among primary school entrants*, and level of *cognitive achievement among primary school entrants* (at the time of the survey). Also investigated are the direction and strength of relationships between the and the responses.

Determinants of initial enrollment are investigated using the AQS data. For the analysis of determinants of completion of primary education and level of cognitive achievement, the data set constructed by merging AQS results with the MOE schools data base is used.

The analysis of determinants presented here utilizes multiple regression<sup>15</sup>.

The *multiple correlation coefficient* between the response and the *set* of regressors ( $R^2$ ) which is equal, in the case of interval response variables, to the proportion of variability in the response that can be explained by the *set* of regressors *taken together*, expresses the strength of association between the response variable and *all* the regressors *combined*<sup>16</sup>.

In the case of the interval response variables, for example test scores, the sign of the regression coefficient indicates the direction of the relationship between the response variable and the explanatory variable, and its value expresses the absolute change in the estimated average value of the response for a unit increase in the explanatory variable, in the presence of the rest of explanatory variables, when all other explanatory variables are kept constant<sup>17</sup>.

---

<sup>15</sup> Logistic regression if the response is an indicator variable.

In multiple regression analysis, a response variable, in our case one of the three parameters of primary education considered, is related to a *set* of explanatory variables, considered likely to account *together* for a considerable portion of variability in the response, i.e. represents a solid *statistical* explanation of the response.

<sup>16</sup> The "pseudo"  $R^2$  is used. The pseudo  $R^2$  is defined as:

1-  $[L_1 / L_0]$  where  $L_1$  is the value of the log-likelihood function with *all* the included regressors and  $L_0$  is the value of the log-likelihood function with just the constant. For the pseudo  $R^2$ , the value 0 corresponds to the "constant-only" model and the value 1 corresponds to perfect prediction. In other words, a high value of the "pseudo"  $R^2$  expresses strong statistical association or explanatory (predictive) power.

<sup>17</sup> For this reason, in *multiple* regression analysis one *cannot* speak of a relationship between the response and a certain regressor, *and that regressor alone*, even if consideration is restricted to the corresponding estimated parameter of that variable only. For in multiple regression, the parameter estimate of *any* regressor is dependent on the *set* of other regressors included in the analysis.

In the case of discrete response variables, such as initial enrollment or completion, the regression coefficient can be used to define the *relative change* in the "*odds ratio*". The odds

Full “explanation” using regression analysis thus hinges on two, closely related, categories of information: *relative contribution of a number of regressors to variability in the response variable and values of the estimated parameters (coefficients) that are judged statistically significant* (again, on the basis of the relative contribution of the corresponding regressors to variability in the response variable). The two dimensions are inextricably intertwined that attempting to separate them is counterproductive.

Both the explanatory power of the regression as well as the parameter estimates depend on the *set* of regressors included.

Since in this type of analysis regressors are normally correlated, the results of multiple regression analysis differ from studying the link between a response and a limited number of explanatory variables, especially in tabular form. Indeed, this type of analysis could be misleading. The ‘apparent’ relationship between a response and a certain regressor *alone*<sup>18</sup> could change when other *correlated* regressors are introduced in the relationship.

Interactions can be introduced to investigate the nature of the *joint* relationship between correlated variables whose inclusion in the set of regressors is considered essential for modeling the response variable. If a higher order interaction is statistically significant, limiting the analysis to the main effects could lead to the wrong conclusions. Examination of interactions should *supersede* investigation of main effects.

All these considerations render regression analysis akin to an art form with a *subjective* element to it.

The set of regressors used in the present analysis falls in two basic categories:

1. socio-economic context variables, i.e. characteristics of the *individual*, the *household* and *community*. Characteristics of the individual include, in the case of completion and test scores, elements of the *primary education experience* covered in the AQS individual questionnaire. It is to be born in mind that all socio-economic context variables were assessed *at the time of the survey*, while some decisions, and events, relating to education could have taken place at an earlier time,
2. school variables, i.e. characteristics of the *school* attended (most of the time) during primary education and evaluation of the school experience.

The first category is *wholly* derived from the AQS while the second is *mostly* based on the MOE schools data base. The latter, being derived from a data base routinely collected by MOE from all schools, does not provide for a full assessment of schooling quality.

---

ratio refers to the probability of “success” divided by the probability of “failure”. Relative change in the odds ratio, for the *j*th regressor, is equal to  $\exp(b_j)$  where  $b_j$  is the estimated parameter, per *unit* of the regressor *in the presence of the rest of explanatory variables, when all other explanatory variables are kept constant*.

<sup>18</sup> That is to say, *not* including *any* other variables as regressors.

17

A small number of the school variables is taken from the individual questionnaire of the AQS. These variables relate to either the individual's evaluation of the school experience or characteristics of the school that were *not* included in the MOE data available for this analysis.

One advantage of these variables is that they relate to the actual school experience of the respondent. However, these variables represent *subjective* evaluations by the individual, conditioned not only by his personality and experience, including school outcomes, at the time of the survey, but also tainted by memory lapse if the primary school was attended earlier than the survey time.

Rarely, a similar data item was available from both the MOE data base and AQS results, such as quantitative measures of pupils per teacher or classroom size. Considered more accurate, preference was given to the former. This choice has, however, a disadvantage in the case of individuals who were not in primary school at the time of the survey, since the time reference of the MOE data might entail changes in school characteristics from those experienced by the individual.

It is to be noted that the set of school variables included in this analysis does not cover all aspects of schooling. In particular, *no* variables describe teaching practices.

In as much as the set of regressors used in the present analysis differs from that included in the analysis of determinants given in the 1994 AQS report, **the results are expected, in general, to be different.**

In the first place, the set of socio-economic context variables included in the present analysis is more extensive, and rather refined, than that used in the earlier analysis.

In addition, a major aspect of the discrepancy between the two data sets is the inclusion of a much more extensive set of *school variables, derived from both the AQS and the MOE data base*. As a result, for example, the level of statistical significance, and the estimated parameter value, of a socio-economic context variable included in the earlier analysis could change in the present one as a result of the fact that the children of richer families go to better schools.

Another aspect of the use of schools variables is the restriction of the sample to *MOE-supervised schools in the two cases of completion of primary education and combined test scores*. Exclusion of Al-Azhar schools is expected, among other things, to render the sample more uniform on school characteristics. Thus, with respect to completion of primary education and combined test scores, the use of schools data restricts the sample to *individuals who were (10-17) years of age at the time of the survey and ever attended MOE-supervised schools*.

The regressors used<sup>19</sup>, their summary statistics, and results of the regression analysis<sup>20</sup> are presented in the annexes<sup>21</sup>.

---

<sup>19</sup> Interval variables were taken to the second degree in order to investigate non-linear relationships. For the sake of simplicity, second degree terms that turned out to be *not* statistically significant were excluded from the final regression run.

<sup>20</sup> The results of the regression analysis contain:

a- the explanatory variables included in the regression.

b- the regression *coefficient*.

c- the value of the *test statistic* utilized.

d- the standard measure of *statistical significance*, **p**, where significance increases with decreasing value of **p**. Normally, values less than 0.05 are considered significant and values less than 0.01 are considered highly significant.

<sup>21</sup> All statistical procedures and graphs were produced using the package *Stata*.

*Determinants of initial enrollment in primary education*

A multiple regression analysis<sup>22</sup> of whether a person in the age group (6-17) at the time of the survey ever attended primary school or not<sup>23</sup> was carried out to ascertain the nature of contribution of a set of regressors to explaining variability in initial enrollment.

The regressors included in the analysis are *all* socio-economic context variables taken from the AQS data set. Excluding the physical constraint of not having a school within reasonable distance<sup>24</sup>, the household decision on initial enrollment of children in primary education is expected to be essentially, if not entirely, determined by the socio-economic context of the households and of primary education. However, a household survey such as the AQS cannot fully describe the latter aspect.

On the *individual* level, three variables are considered: age, taken as a *reverse* proxy for time<sup>25</sup>, gender, and a variable measuring the duration of economic activity of the child *relative to age* (with non-economically active children assigned the value zero).

On the *household* level, average monthly income *per member* of the household was taken as a general indicator of poverty or standard of living.

The gender of the head of household as well as his/her response to an attitude question on the desired level of educational attainment for girls were also included.

The level of educational attainment of the mother of the child was included among the regressors as the more sensitive indicator of the level of education of the parents.

On the *community* level, for each of the 16 primary sampling locations of the survey, average years of education per household member in the location was taken as an indicator of the general level of social development in the location. This variable summarizes the accumulation of educational attainment in the community over generations and is *not* directly related to present schooling facilities.

In addition, 4 indicator variables were included to account for differences among the 5 regions of the country<sup>26</sup> in which the survey was carried out that are not entirely captured by the explicit regressors defined.

The matrix of correlations was considered satisfactory. The largest correlation coefficient with the response (about -0.4) was with the regressor representing length of involvement in child labor.

---

<sup>22</sup> A logistic regression to accommodate the dichotomous nature of the indicator dependent variable (enrollment = 1, non-enrollment = 0).

<sup>23</sup> *Regardless* of whether the school attended was an MOE-supervised school or not.

<sup>24</sup> Data on schools in the AQS were restricted to individuals who *ever attended* schools.

<sup>25</sup> With older ages indicating earlier time points.

<sup>26</sup> While Cairo is entirely urban, both Kafr Elsheikh and Elminya are mostly rural.

Interactions among age, gender, and household income per member were tested in a preliminary run, found statistically insignificant, and excluded from the final regression. See Annex (1).

The “pseudo”  $R^2$  comes to about 0.40. Almost all regressors came out statistically significant.

Taking age as a reverse proxy for time, a downward trend in the odds for initial enrollment is discerned over the few years preceding the survey date<sup>27</sup>.

Girls are shown to suffer considerably lower odds for initial enrollment than boys.

Participation in economic activity is associated with significantly lower odds for initial enrollment in primary education. Further, the odds for initial enrollment decline fast with increasing duration of work (relative to age)<sup>28</sup>.

The odds for initial enrollment are estimated to rise with income of the household.

The only household characteristic that did not turn out statistically significant is the gender of the head, being a man or woman head does not significantly influence the chances of initial enrollment of the children of the household.

However, the head of household’s *attitude* towards girls education shows a positive impact on initial enrollment: the higher the stage to which the head thinks a girl should be educated, the higher the odds for initial enrollment in the household.

A higher standard of educational attainment of the mother is associated with rising odds for initial enrollment.

As well, higher educational attainment in the community, is associated with rising odds for initial enrollment up to the level of about 8 grades per member of the household in the community. Beyond that level, the odds for initial enrollment decline<sup>29</sup>.

---

<sup>27</sup> A recent assessment of net enrollment in primary education on the national level reveals a decline over the period 1990-1995 (Fergany, 1996).

<sup>28</sup> Excluding this regressor from the regression reduces the “pseudo”  $R^2$  by about 0.12, which means that it holds considerable explanatory power in its own right. It has to be kept in mind though that both initial enrollment and participation in economic activity are assessed retrospectively at the time of the survey. No direct cause-effect link is stipulated here.

<sup>29</sup> In the original data, the highest level of initial enrollment was attained in locations other than the most “developed” of survey locations.

21

*Determinants of completion of primary education of individuals who ever attended MOE-supervised schools*

The analysis is now restricted to *individuals who were (10-17) years of age at the time of the survey and had enrolled in MOE-supervised schools before 1989*<sup>30</sup>.

In addition to the socio-economic context variables considered in the case of initial enrollment, the set of regressors used in the analysis of determinants of completion includes a group of variables characterizing the *primary education experience* of the *individual* derived from the AQS data set. These comprise: age of entry in schooling (not just primary education); primary school cohort (calendar year of entry in primary education); failure rate in primary education, defined as  $\{(years\ spent / grades\ completed) - 1\}$ <sup>31</sup>; period of help at home while in primary education in hours, with no help assigned the value zero; whether the individual received private tutoring while in primary education; whether the individual joined in-school tutoring groups while in primary education; and whether the individual went regularly to the primary school.

To this augmented set of socio-economic context variables is also added the set of *school variables* derived from both AQS and the MOE data base.

The AQS group comprises three *School characteristics*: distance to school attended in km, whether the school had running water and whether the school organized extra-curricular activities. Three other variables summarize the individual's *Evaluation of the school experience*: whether teachers explained well; whether teachers treated the pupil well; and whether the individual liked school.

Variables derived from the *MOE Schools data base* cover many school characteristics.

Four categorical variables characterize the *type of school*: taking government schools as the reference category, the variables define government language<sup>32</sup>, private-government supported, private, and private language, schools.

Three categorical variables describe the *pattern of school shift*: taking full day schools as the reference category, the variables define 1st shift, 2nd shift, and 3rd shift, schools<sup>33</sup>.

Two categorical variables describe whether *School operates in own building*: taking schools operating in their own buildings *alone* as the reference category, the variables define schools operating in own building with other schools and those operating in a building that is not its own.

Six interval variables describe important aspects of the *pupils, teachers and classrooms* in the school: percentage of girls among pupils, pupils per classroom, pupils per teacher,

---

<sup>30</sup> Since the AQS was taken in the spring of 1994, pupils who enrolled in the autumn of 1989, would still be in the final grade of the primary education cycle at the time of the survey

<sup>31</sup> The term *repetition* rate is used for the *school* characteristic derived from the MOE schools data base.

<sup>32</sup> The adjective "language" refers to elite schools that emphasize teaching of foreign languages.

<sup>33</sup> If more than one "school" use the same building in shifts, they are considered by MOE as different schools with distinct pupil and staff bodies.

percentage of women teachers, percentage of teachers with university education, and percentage of teachers with educational qualifications.

The last group of MOE schools data base variables relate to official *examination results*. In principle, the results of examinations are given in terms of dividing enrolled pupils (applicants for examinations) into two mutually exclusive categories: those who *succeeded* and those who did *not succeed*. Those who succeeded are further classified into three mutually exclusive categories: succeeded in *first round*, succeeded in *second round*, and *automatically promoted*<sup>34</sup>. Those who did not succeed, are further classified into three mutually exclusive categories: *repeaters*, *dropouts*, and those *transferred to preparatory vocational training*. The third category represents a facility for children who are not regular preparatory school material to continue with education. This examination result is possible only in the last grade of the cycle, fifth, in which automatic promotion is not allowed<sup>35</sup>.

Six interval variables were defined to summarize *examination results*: percentage of pupils who did not attend examinations, which is an estimate of "paper" enrollment, percentage of pupils who passed the first round, percentage of pupils who were automatically promoted, percentage of pupils who repeated, percentage of pupils who dropped out, percentage of pupils who were transferred to vocational education<sup>36</sup>.

The matrix of correlations was considered satisfactory. The largest correlation coefficient with the response (about -0.5) was with the regressor representing the relative frequency of failing grades in primary education.

---

<sup>34</sup> This category is a peculiarity of the Egyptian primary education system: pupils who fail two consecutive years are automatically promoted to the next grade.

<sup>35</sup> Perusal of the examinations results reveals that transferal to preparatory vocational training at the end of the cycle is only slightly higher than the level of automatic promotion at the end of the fourth grade, which suggests that the two categories cater to essentially the same quality of pupils.

<sup>36</sup> These six variables do not add up to all enrolled pupils because they do not include all possible examination results enumerated above.

Two sets of interactions were considered: All possible interactions between gender, year of entry in primary education, and income per household member; and the two-way interactions between each of the last two variables and ten of the school variables normally considered important.

Only one, two-way, interaction was found to be *weakly* significant: year of entry with the percentage of teachers with educational qualifications. Further, no ready explanation could be found for this weak interaction effect. Hence, *all* interactions were eliminated in the final run.

See Annex (2).

The “pseudo”  $R^2$  comes to about 0.56. A contributing factor to this high level of explanatory power attained is that, as long as the household conditions allow, the system of education more or less guarantees continuation through procedures such as automatic promotion<sup>37</sup>. It is not surprising then that the attained high level of explanatory power is, to a great extent, due to the set of socio-economic context variables. See Table (2).

Table (2)  
The “pseudo”  $R^2$  of completion of primary education  
with different groups of regressors

Groups of regressors	$R^2$
school variables	0.170
AQS variables only	0.105
MOE variables only	0.044
socio-economic context variables	0.461
school and socio-economic context variables	0.563

The explanatory power of the socio-economic context variables *alone* account comes to 46%, compared to 17% only for all the *school variables*<sup>38</sup>. While the school variables add about 10 percentage points to the explanatory power that *already* explained by socio-

---

<sup>37</sup> Contrary to the cases of the initial enrollment and cognitive achievement, *no* statistically significant differences in completion of primary education were observed among the five survey regions.

<sup>38</sup> Measured by regressing completion on a set of regressors consisting of *school variables* derived from both the AQS and the MOE data base.

The procedure for regressing an indicator response variable on school dummy variables (to estimate the *schools effect*) breaks down for the observations for which all children in the same school have the same outcome. This happens naturally for schools with only one child in the sample. Since the AQS was based on a sample of households, this situation affected a large proportion of the observations (though accounting for only 5% of the cases, about 77% of the schools had one child each in the sample of households).

economic context variables, socio-economic context variables add almost 40 percentage points over the explanatory power of school variables.

in addition, it should be noted, the explanatory power of the rather modest, soft and subjective, AQS school variables is more than *twice* that of the, hard and “objective”, MOE school variables.

Girls are estimated to complete primary education at a significantly lower rate than boys.

The odds for completion are significantly influenced by the extent of participation in economic activity according to a U-shaped pattern. Up to a point, increasing participation in economic activity is associated with fast declining odds for completion, then the trend reverses. The second segment of the relationship probably expresses higher participation in economic activity *after* completion of primary education.

The proxy of time included in the analysis: primary school cohort, came out statistically significant. The odds for completion of primary education are estimated to have risen up to the 1984 entry cohort then started to decline.

Expectedly, a higher failure rate in primary education is associated with dramatic decline in the odds for completion of primary education<sup>39</sup>.

Having received private tutoring, is significantly associated with a higher chance of completing primary education.

Having joined in-school tutoring groups has a similar, but weaker, effect.

Going regularly to school considerably raises the odds for completion of primary education.

Higher income of the household is associated with rising odds for completion but with a much lower odds ratio than in the case of initial enrollment. Thus, poverty seems to act as a barrier to education both at entry to schooling and in terms of continuation in school, but much more so at entry.

The head of household's *attitude* towards girls education shows a positive impact on the chances of completion of primary education in the household.

The *only* AQS school variable that turned out statistically significant is having liked school. Individuals who liked school are estimated to have an odds ratio for completion higher than 9.

---

<sup>39</sup> Excluding this regressor from the regression reduces the “pseudo”  $R^2$  by about 0.18, which means that it holds considerable explanatory power in its own right.

28

It is worth noting that some regressors of the socio-economic context variables that are normally considered important did *not* turn out to have a statistically significant relationship with completion of primary education.

Of the *education experience* variables, age of starting schooling and duration of help at home while in primary education, did not come out statistically significant.

Among the *household characteristics*, these variables include the gender of the head, educational attainment of the mother, and the level of educational attainment in the community.

Of the *school characteristics* variable derived from the AQS, distance to school, whether the school had running water, whether the school organized extra-curricular activities, whether teachers explained well; and whether teachers treated the pupil well; did not show a statistically significant association with completion. All these were subsumed, it seems, in the umbrella variable: having liked school.

The truly remarkable finding, however, is that *none* of the school variables of the MOE group came out as statistically significant determinants of completion of primary education<sup>40</sup>.

***Thus, completion of primary education is shown to be primarily explained by socio-economic context variables.***

---

<sup>40</sup> Two type of school categorical variables: government language and private language, were dropped from the logistic regression run for predicting “success” perfectly. This means that *all* individuals in these two categories of schools completed primary education which precludes estimating the corresponding regression coefficients. Each of the two categories represents a tiny number of individuals in the data set (0.5% and 0.7% respectively).

*Determinants of cognitive achievement of individuals who ever attended MOE-supervised schools*

The analysis is now restricted to *individuals who were (10-17) years of age at the time of the survey and ever attended MOE-supervised schools*. It is important to remember that the response variable is measured *at the time of the survey*.

The *starting* set of regressors used in the analysis of determinants of cognitive achievement is, except for two additions, identical to that used for completion of primary education.

Two variables were added to the education experience group of the set of socio-economic context variables: number of grades completed in education (not just the primary cycle) and number of years since the individual left education (with those still attending school assigned the value zero).

Also the interactions of these two variables with each other, and with the year of entry in primary education, were added to the set of interactions in the preliminary regression run.

The matrix of correlations was considered satisfactory. The largest correlation coefficient with the response (about -0.5) was with the number of grades completed in primary education.

Four two-way interactions, and one three-way interaction, were found significant in the preliminary run, and retained for the final run reported on here: grades completed in education with years since left education, and year of entry in primary education with each of the following: percentage of teachers with university education, percentage of pupils who did not attend examinations, percentage of pupils who repeated the school year, and grades completed in education with years since left education. See Annex (3).

The explanatory power of all the variables included in the regression analysis amounts to 45% of variability in combined test scores.

As can be seen from Table (3), the socio-economic context is a considerably more important determinant of combined test scores than school differences.

The socio-economic context variables alone account for 45% of variability in combined test scores, compared to 16% for the *schools effect* (school differences). While the school variables add less than one percentage point of the variability in combined test scores to that already accounted for by socio-economic context variables, socio-economic context variables add more than 30 percentage points of the variability in combined test scores (i.e., about two thirds of total explanatory power and twice the size of the schools effect) above the explanatory power of the schools effect.

Table (3)  
Multiple correlation coefficient of combined test scores on  
different groups of regressors<sup>41</sup>

Groups of regressors	R <sup>2</sup>
schools effect (dummy variables)	0.155
school variables	0.147
AQS variables	0.065
MOE variables	0.092
socio-economic context variables	0.445
school and socio-economic context variables	0.450

The school variables used here, however, explain *almost* all (95%) of the *schools effect* on the combined test scores. This means that the set of AQS *and* MOE used here absorbs virtually *all* school differences. In other words, “omitted” school variables have very little explanatory power to add.

Contrary to the situation with respect to completion, the explanatory power of the AQS school variables comes to *only* 71% of that of the MOE school variables.

Reflecting on the level of explanatory power of school variables *relative* to the socio-economic context variables, based on the evidence presented in tables (2) and (3), it is clear that the *relative* explanatory power of school variables *alone*, compared to the *total* explanatory power achieved, is essentially equal for completion and cognitive achievement, at about one third (30% and 32%, respectively).

Given the level of explanatory power attained by socio-economic context variables, however, the *additional* relative contribution of school variables goes down to 22% in the case of completion and, at 1%, virtually vanishes in the case of cognitive achievement. In the case of cognitive achievement, socio-economic context variables leave virtually no variability to be explained by school variables!

In other words, ***school variables are generally much less influential than socio-economic context variables in determining both completion of primary education and test scores, but especially so in the case of cognitive achievement.***

In addition, soft and subjective school variables of the type included in the AQS, involving assessment of schools by pupils are quite important in explaining school differences, indeed *more* important than the hard and objective ones derived from the MOE data base in the case of completion of primary education.

---

<sup>41</sup> Not including interactions.

With respect to single regressors, participation in economic activity is estimated to be negatively associated with cognitive achievement.

Younger age at entry in education (not just primary education) is significantly associated with higher cognitive achievement.

Test scores are estimated to have risen over the years until about 1988 then started to decline.

It is not sufficient, however, to simply conclude that cognitive achievement has been declining recently. Recent entry cohorts are more likely to be still in school, which enhances their cognitive achievement (see below), but with relatively few grades completed in education (which is naturally expected to depress their test scores). This is confirmed by the highly significant three-way interaction between year of entry, grades completed in education, and years since left education.

A learning curve effect in cognitive achievement is generally expected in response to increasing number of grades completed. Further, retention of cognitive skills is likely to weaken after discontinuing education especially if the individual drops out early in the educational ladder. The passing of time without effective reinforcement of cognitive skills acquired in school is a possible explanation for weakening retention. However, as the World Bank study summarized in the literature review showed, a better explanation lies in the fact that poor performing pupils have a higher probability of leaving education to start with.

Considering the *joint* effect of primary education cohort, grades completed in education, and duration since the individual left education on test scores, reveals that a learning curve effect generally holds but the *slope* of the learning curve declines with increasing period of separation from education. Further, the decline in the slope of the learning curve seems to have been increasing over time. For individuals still in school (at the time of the survey), some improvement in test scores is discerned up to the mid 1980s. The end result of this complex pattern of change is that cognitive achievement is estimated to have been declining over time on account of the performance of school leavers.

Cognitive achievement is, as expected, *inversely* associated with the failure rate of the *individual* in primary education.

Longer period of help at home while in primary education is associated with increasing test scores, at a declining rate, up to about three hours per day. Beyond that level, the return on duration of help at home becomes negative, fast. Clearly, very long duration of help at home can be counterproductive. This level of help at home also probably corresponds to cases of poorly endowed children.

Higher educational attainment of the mother is significantly associated with a steady rise in combined test scores at the rate of about half a percentage point per additional grade completed by the mother.

The head of household's degree of keenness on girls education is positively associated with higher cognitive achievement. This is expected since emphasis on girls education is not only a sign of high regard for education in general but also an indication of a socially progressive character.

The majority of primary education pupils go to schools with *none* of the teachers having university education. Nevertheless, cognitive achievement is estimated to rise slightly with a higher proportion of teachers having university education but only in *recent* primary education cohorts.

Three examination results variables, derived from the MOE data base, came out statistically significant: proportion of pupils who did not attend the examination or "paper" enrollment, proportion of pupils who passed the first round, and proportion of pupils who repeated grade. "Paper" enrollment and level of repetition, however, interact with year of entry in primary education.

The extent of "paper" enrollment is negatively associated with test scores, again essentially among *recent* primary education cohorts.

A higher proportion of pupils passing the *first* round of examinations in the school is associated with increasing test scores, at a declining rate, up to about 90%. Beyond that level, a slow decline sets in. A very high proportion of pupils passing in the first round might reflect leniency in grading.

Lowest levels of cognitive achievement are associated with "average" values of grade repetition in the school. However, beyond that level of grade repetition, test scores rise steadily, at a faster rate in *recent* primary education cohorts. This finding could be better understood in view of the apparently weak retention of cognitive skills among school leavers. Repetition could act as positive reinforcement of skill acquisition.

All the remarks documenting particular patterns of influence of school variables on cognitive achievement in *recent* primary education cohorts point to the emergence of a *new educational regime, characterized by low quality, in the past few years.*

As interesting as the explanatory variables that turned out to have a significant influence on cognitive achievement, is the group of regressors that did *not* show a statistically significant association with test scores.

Of the *education experience* variables, receiving private tutoring or joining in-school tutoring groups, and going regularly to school, did *not* show a significant association with cognitive achievement.

Among the *household characteristics*, the non-significant variables include the gender of the head, level of income, and the level of educational attainment in the community.

*All the school characteristics* variable derived from the AQS, including the all-important completion determinant: having liked school, did not come out significant.

Among the *school variables* of the MOE group, quite a number of variables did *not* come out as statistically significant determinants of cognitive achievement. These include: type of school<sup>42</sup>, school shift pattern, school operating in own building, proportion of girls among pupils, pupils per classroom, pupils per teacher, proportion of women teachers, proportion of teachers with educational qualifications, proportion of pupils automatically promoted and the proportion of pupils transferred to vocational education (which are essentially general characteristics of the educational system), proportion of pupils who dropped out (which is in fact more a characteristic of the socio-economic context).

*None of all those school variables is estimated to have a significant impact on the level of cognitive achievement!*

This finding should *not*, however, be construed as indicating that improving school quality could not lead to higher cognitive achievement. The more appropriate conclusion to draw is that cognitive achievement is generally low *because* school, and teaching, quality are uniformly bad.

---

<sup>42</sup> The tiny category of government-sponsored private schools (accounting for about 2% of individuals in the data set) is estimated to have a, weakly significant, lower level of cognitive achievement than regular government schools.

## B. The Macro-Micro Link

The previous section established the importance of socio-economic context variables over school variables in explaining the output of primary education in Egypt in the last ten years or so, on the micro level.

In this section a *heuristic* approach to establishing *association* between change over time in the three basic educational parameters considered in this analysis: initial enrollment in primary education, completion of primary education, and cognitive achievement, and some of the basic socio-economic indicators for the country at large.

The evidence related to the macro socio-economic conditions is given in tabular form in Annex (4), and represented graphically in Figure (1).

Socio-economic indicators are given, depending on availability, for a much longer time horizon than the educational parameters derived from the AQS and discussed in the previous section<sup>43</sup>. In addition to the relatively wider availability of economic information, sometimes it is the *cumulative* impact of change in economic phenomena, or even change in a *previous* time period, that influences the behavior of individuals and households in a certain field of human activity, in our case interest, and investment, in education.

The recent time trend in the educational parameters can be briefly described as *stagnant or declining enrollment, declining completion rates and probably decreasing cognitive achievement*<sup>44</sup>.

On the economic front, we have a *mixture of macro- and micro-level* information.

General economic performance in Egypt, measured by the two basic indicators of growth of output and unemployment, has suffered serious deterioration over the last 20 years.

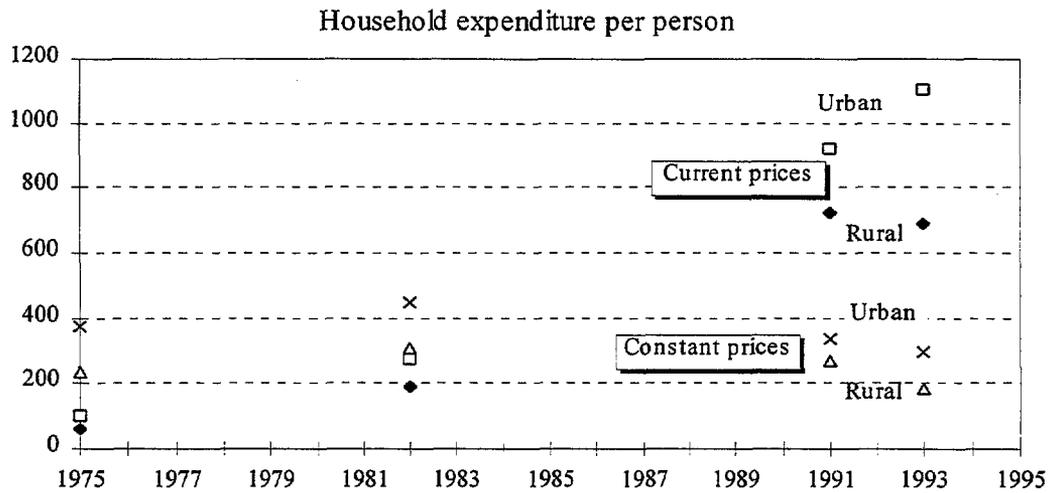
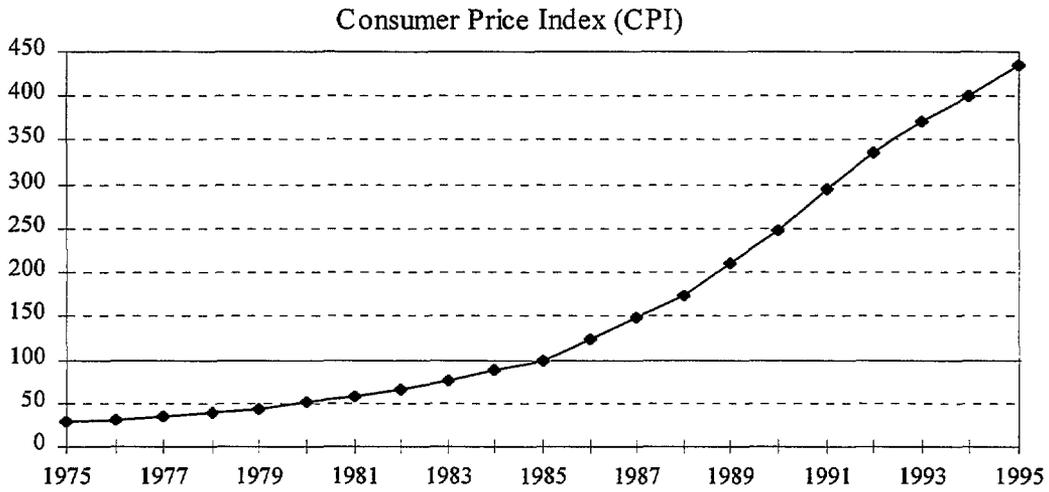
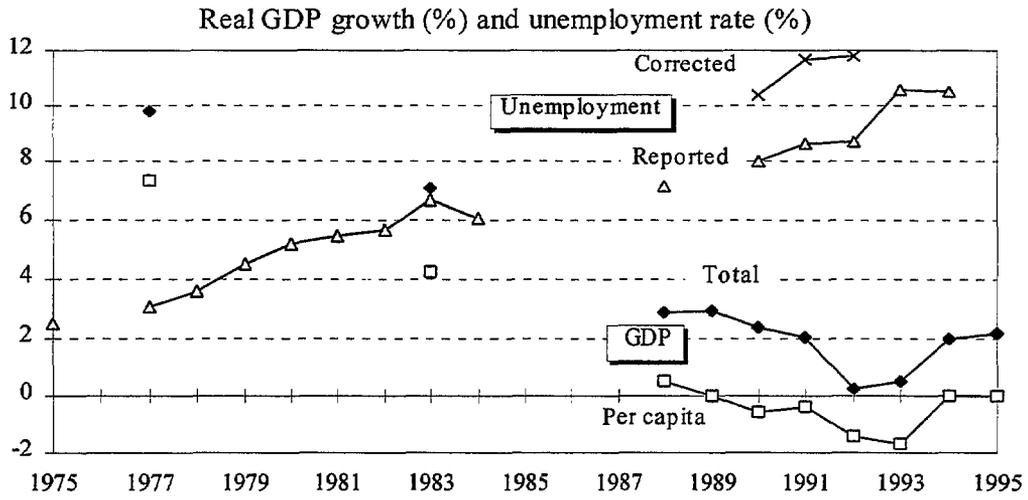
Growth of *real* output suffered sharp decline since the mid 1970s. As a result, the growth rate in *real per capita* GDP is estimated by the World Bank to have been zero or negative during the period 1989-1995.

---

<sup>43</sup> Economic indicators are given in the Annex for longer time horizons than represented in the graphs.

<sup>44</sup> More accurate characterization of the time pattern in initial enrollment, completion of primary education and cognitive achievement is provided in the micro-level analysis given earlier.

Figure (1)  
Socio-economic indicators, Egypt, selected years (1959-1995)



33

Unemployment rose consistently and, according to results of the Labor Force Sample Survey (LFSS) exceeded 10% since 1993. However, the LFSS under-estimates both participation in economic activity and unemployment. It is estimated that allowing for this under-estimation corrects the level of unemployment upward by 3-4 percentage points in the early 1990s (Fergany, 1995).

In addition, inflation, measured by the Consumer Price Index (CPI), has been steadily eroding the real value of household income. The CPI leaped to more than 400% over the period (1985-1995).

On the level of household economics, household surveys of income and expenditure furnish useful indicators of the standard of living. A series of five such surveys exist in Egypt covering a relatively long time period (1958 -1991)<sup>45</sup>, sufficient to trace developments in standard of living over the last three decades. In addition, a survey of social change sponsored by the Social Fund for Development (SFD) to monitor the social impact of structural adjustment that was taken in 1993 included a household income and expenditure component.

The six surveys are not perfectly comparable, especially in terms of quality of the resulting data. However, discrepancies between these surveys would not significantly mar the conclusions arrived at here because of the rather global analysis performed. In addition, the analysis is based on the expenditure variable, generally considered more reliable than income. In order to control for differences in household size, the analysis utilizes *per capita* household expenditure.

The Annex and Figure (1) present average per capita expenditure at current prices, as well as corrected for inflation, utilizing the CPI reported by the International Monetary Fund, as an indicator of the real standard of living. These indicators are given specific for rural/urban residence.<sup>46</sup>

Real standard of living exhibits essentially the same time trend in both rural and urban areas: a rise around 1960, followed by moderate decline, then a rise in the period of fast economic growth that succeeded the inception of economic restructuring in the mid 1970s to be followed again by a drop, particularly in urban areas.

This pattern mirrors the basic character of socio-economic development in the country over the time period considered. In urban areas, which are expected to be more vulnerable to shocks in the monetary economy, the real standard of living at the beginning of the

---

<sup>45</sup> Taken in 1958/59, 1964/65, 1974/75, 1981/82 and 1990/91.

<sup>46</sup> The CPI used does not differentiate between rural and urban residence. Since the rate of inflation is generally higher in urban areas, the *correction* for prices is under-estimated (real standard of living would be lower than indicated) in urban areas and over-estimated in the countryside.

1990s is shown to be *lower than the 1958 level*: more than thirty years of “progress” left people in the cities poorer.

The SFD sponsored survey of social change points out shocking deterioration in the standard of living: compared to the 1990/91 household budget survey, average household expenditure declined from LE 5200 to LE 4100, more than 20% decline in *current* prices, in about *two* years!

As seen in Figure (1), per capita household expenditure in *current* prices seems to have actually declined over that period. In *constant* prices, per capita household expenditure continued, between 1991 and 1993, the decline recorded in the interval (1982-1991), only at a faster pace. The rate of decline in (1991-1993) was higher in the countryside.

The upshot of tracing economic indicators over the last two decades can be summarized as *declining growth in output, increasing unemployment, spiraling cost of living and deepening poverty*. These trends have generally *intensified* in the last ten years, the period for which our educational parameters are available.

Contrasting trends in both educational parameters and economic indicators, it seems reasonable to conclude that *worsening economic conditions have exerted a downward pressure on household resources devoted to primary education, thus contributing to deterioration in initial enrollment, continuation in school, and quality of educational output*.

To be sure this is *not* a full explanation. Full explanation lies in the *articulation* of economic conditions with the education system.

In addition to shrinking household resources, rising cost of education contributes to the observed problems in primary education parameters. Cost of education to the household, be it *direct* in the form of tuition and fees, or *indirect* reflecting the increasingly-felt need for private tutoring as well as the basic cost of clothing, personal expenses allowances and other requirements, is considerable.

As an application of the “cost recovery” component of structural adjustment, the MOE reintroduced, in the mid 1980s, “modest” fees for the supposedly free basic education. The annual fees amount to about LE 15 per pupil for pre-school education, LE 11 for the first three grades of primary education, LE 16 for the fourth and fifth grades of primary education and LE 23 for the preparatory cycle.

AQS results show that the average annual expenditure per pupil in primary education is about LE 250, i.e. more than LE 20 per child in primary education a month, or more than LE 30 per month during the school year.

This amount is considerably larger than the official fees and is definitely not a small sum for a poor head of household with more than one child in primary school age.

35

On average, the most important expenditure item was "clothing" followed closely by "personal expenses allowances", each claiming about LE 60 annually. Next came "tuition and fees" followed successively by "books and equipment" and "private tutoring", at about LE 40 each.

By comparison, expenditure on "in-school tutoring groups" and "transport" were relatively minor items.

The amount spent on the "tuition and fees" item is considerably larger than the MOE fees which indicates the phenomenon of "disguised" fees, by which schools require pupils to pay additional amounts under different guises (construction of new buildings and facilities, maintenance of premises, extra-curricular activities,...).

Expenditure items can be classified into two main categories: personal and educational. The first comprises clothing, personal expenses allowances and transport; and the second consists of the remaining items which are more closely related to the educational process. Each of the two main categories makes a roughly equal claim on the on the household budget, of the order of LE 10 a month per pupil.

It might be argued that the most of the "personal" expenditure category will be incurred by the household whether the child goes to school or not. However, going to school definitely formalizes, and increases, these expenditure items. This is supported by the observation that the relative shares of "clothing" and "personal expenses allowances" are higher in poor households.

Poor, and probably declining, quality of educational inputs (teaching staff and school facilities) and of the educational process represents another important factor operating on all three educational parameters considered in this analysis. Indeed, this factor could be instrumental in reducing internal efficiency and lowering real output, including cognitive achievement. The concomitant, low and probably declining, returns to education could, in turn, depress willingness of households to invest in education.<sup>47</sup>

Further, the impact of economic pressures is likely to have a differential impact on the three parameters of the educational system considered.

As born out by the micro-level analysis, maximum impact of economic difficulty is likely to be in the case of initial enrollment, with poverty crowding children of the poor out of the educational system, and into a labor market, especially in the large cities. In large urban centers the labor market welcomes the flexible labor power of uneducated children and rewards them with earnings higher than university graduates in government employment.<sup>48</sup> in other words, the opportunity cost of basic education is high and rising, especially in urban areas.

---

<sup>47</sup> Research results point out weak and even negative returns to education, particularly among the poor. In other words, the labor market seems to punish education as well as poverty. There are also indications of decline, over time, in returns to education (Fergany, 1994a and Bartsch, 1995).

<sup>48</sup> Recent research shows that the net enrollment ratio has *declined* for both boys and girls, in urban Egypt over the last five years (Fergany, 1996).

## CONCLUSIONS, POLICY RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

### A. Conclusions and policy recommendations

The present analysis points out the emergence of a new regime of primary education in Egypt in the last few years characterized by stagnant or declining initial enrollment, declining completion rates and low, and seemingly decreasing, cognitive achievement. This is so in spite of the facilitate that a major nationwide drive to reform basic education was started about five years ago. The socio-economic context of education seems to be impeding the reform.

More than a decade ago, a major conclusion of the study that we singled out for value and relevance in the literature review, was that socio-economic context variables have a *greater* effect on skill levels than did school variables. This prompted the author of the work cited to conclude that "educational reform" limited to schools can only have a limited impact on schools output. Our findings on both the micro and macro levels of analysis, bear out the same conclusion, but in more striking terms.

The micro level analysis presented in this paper shows that socio-economic context variables play a much more important role in explaining primary education parameters than do school variables.

The finding that school variables explain relatively little of the variability in completion of primary education or cognitive achievement should *not*, however, be interpreted that schools do not make a difference. An even more ill-advised conclusion would be that resources should not be devoted to improving schools, and schooling.

Generally low cognitive achievement, for example, is better explained by *uniformly* poor quality of schools and schooling. In other words, better schools *would* make a difference in education outcomes.

In addition, the primacy of socio-economic context variables in determining enrollment, completion of primary education and cognitive achievement, since the mid 1980s, should not come as a surprise. The country has been undergoing an accelerating process of massive economic restructuring since the mid 1970s. The most immediate socio-economic impact of economic restructuring to date can be summed up in stagnant growth, increasing unemployment, deepening poverty and widening disparity in income and wealth. At the same time, virtually all schools in the country are run by a central authority, MOE, that manages to enforce a high level of uniformity on schools and schooling in the country.

Thus, with increasing socio-economic differentiation in the country, homogeneity in schooling has been preserved and probably reinforced by a major reform effort. Consistent with the conceptual premise advance by the author in the literature review,

socio-economic context variables should be expected to play a more important, and increasing, role in determining education outcomes than school variables.

As a result, solution to the brewing crisis in education in Egypt cannot be found solely within the confines of the educational system.

In this light, important results of *the micro-level* analysis are worth highlighting. See Annex (5).

Using proxies for time, all three parameters of primary education considered in this analysis show signs of *deterioration over time*. This has grave implications for human capital formation in the country.

While *girls* suffer lower levels of initial enrollment and completion of primary education, they do *not* under-perform boys in cognitive achievement<sup>49</sup>. A comprehensive policy package for eradicating the gender gap in enrollment should be developed and effectively implemented. Such a package should provide access to *girl-friendly* schools *all over the country*, but especially in remote hamlets in the poor countryside.

*Child labor* is one variable that came out as a significant determinant of all three educational parameters considered. Extensive involvement in child labor undercuts initial enrollment, completion of primary education and cognitive achievement. While, the articulation of child labor and schooling is a complex societal phenomenon, universalizing high quality primary education cannot be attained if child labor remains a possible, and in many ways, more economically rewarding, *alternative* to basic education.

*Poverty* of the household is a barrier to initial enrollment and a detractor of the chances of completion of primary education, but exerts *no* significant effect on cognitive achievement. Like girls, children of the poor, are excluded from primary education though they represent no worse educational investment than children from more privileged social backgrounds. Since acquiring human capital is the most effective means of combating poverty in a poor country, exclusion of the poor from basic education exacerbates inequality in a country suffering from wide, and widening, disparity. The appropriate policy line is in availing adequate, effective, and non-stigmatizing social support mechanisms for the education of children of the poor.

A *better educated mother* reinforces the odds for initial enrollment and cognitive achievement, but not necessarily completion of primary education. Education of the parents begets education among the children. It is important to note here that significant improvement in initial enrollment and cognitive achievement requires more than bare literacy for the mother. This is clearly another reason to stamp out the exclusion of girls

---

<sup>49</sup> Analysis of examination results of the MOE on the national level shows that girls do better than boys in primary education on every criterion (Fergany, 1996).

from education. But at the same time, the implied policy direction is clearly a long term one of major socio-cultural dimensions.

*A favorable attitude towards girls education* on the part of the household is another explanatory variable that came out positively associated with better initial enrollment, completion of primary education and cognitive achievement. However, the simple-minded recommendation of publicity campaigns to raise the "awareness" of parents and household heads of the value of girls education ignores the scientific understanding of awareness as a complex socio-cultural phenomenon that is also objectively determined by socio-economic reality. While girls education ranks extremely high in a human development strategy on the macro level, it does not necessarily represent a priority on the household level, especially if the household cannot afford to enroll *all* its children in primary education.

*Private tutoring*, and to a lesser extent, *in-school tutoring groups*, are shown to increase the odds for completion of primary education but to have *no* significant impact on cognitive achievement. There is clearly no justification for these practices that have developed into an extensive parallel system of instruction with no appreciable pay-off in the quality of educational output.

Starting schooling earlier has a positive impact on cognitive achievement. This finding recommends *pre-school* education. Alas, pre-school education currently is, and is likely to remain, a privilege for the children of the few.

Two school-related variables exert a significant influence on completion of primary education: *going regularly* to school and *liking school*. The two variables are closely linked and hinge on making school attractive to children; a reason to enjoy education.

Findings relating to the usual *school variables* pale by comparison to those given above (compare the two pages of Annex (5)) and are sometimes outright controversial.

A higher percentage of *teachers with university education*, or a lower level of "*paper*" enrollment, in the school helps cognitive achievement but, it seems, in *recent* primary education cohorts only.

A higher proportion of *pupils passing the first round of examinations* in the school improves cognitive achievement but up to a point.

Very high repetition rates in schools seem to be associated with *better* cognitive achievement!

On *the macro level*, worsening macro-economic conditions, coupled with deterioration in the inputs and functioning of the education system, have brought about a crisis in initial enrollment, continuation in school, and quality of educational output, in country whose educational system goes back to the 1830s.

39

In particular, the sweeping socio-economic changes brought about by economic restructuring in the last two decades seem to have inflicted a heavy toll on enrollment in, and quality of, primary education. While major reform of the educational system is called for, reversing the dire consequences mentioned can only be attempted at the plane of *societal* change, and not as a matter of purely educational concern.

In spite of a declared major drive, universalizing access to basic education, and eradication of the gender differential therein, has so far eluded the Egyptian government. In particular, it is clear that building traditional schools is, on cost grounds, out of the question in the case of the *many* small pockets of children out of basic education, especially in scattered population agglomerations deep in the Egyptian countryside. In addition, the high, and rising cost of education to the household, including the opportunity cost, represent formidable barriers to universal basic education.

The low quality of basic education is an even more intractable a problem. Among other factors, due to inadequate teachers' remuneration and a lax civil service, private tutoring has become rampant as means of teachers supplementing their salaries. Schools have essentially developed into marketplaces, built by the government for teachers to meet their prospective clients. To land private lessons, teachers would be irrational to teach well in classrooms. But even private tutoring does not result in significant improvement in acquisition of basic literacy skills. Hence the quality of education suffers across the board.

Clearly, such a cobweb of problems cannot be unraveled without, among other things, a significantly better remuneration scale for educators as well as a more efficient civil service system. But these are issues that go beyond the *sectoral* concerns of education to much wider issues of economic, and social, reform.

## B. Suggestions for further research

The analysis given in this paper raises many issues of crucial importance for the functioning, and outcomes, of the educational system in Egypt. The data base utilized, and the analysis rendered, are in some ways inadequate.

Investigation of the interplay of socio-economic context and school variables in charting, and explaining, changes in educational parameters is both a crucially important and fertile area for future research. A more conclusive assessment than presented here requires more elaborate research designs, and mechanisms able to produce richer and more accurate data sets that would enable more sophisticated analysis. In short, an integrated research program is called for.

At a minimum, a *series of comparable* surveys of *enrollment* in, *continuation* in, and *quality* of the output of, basic education, as well as the socio-economic context of education, on the household level, is required.

These surveys need to be complemented by data on schools and schooling far better than was included in the present analysis.

Fortunately, the MOE has managed to build a remarkable, annually updated, schools data base.

However, the data base does not cover schools run by Al-Azhar, and provides no information on the *schooling* process in general, or teaching practices in particular. In addition, some of the important elements of the present data base seem to suffer from inaccurate reporting, for example, the age structure of enrollment. Others pose analytic difficulties: e.g., "paper" enrollment. Maximum utilization of the data base requires an assessment of the precision and analytic relevance of these aspects. This can only be achieved through field surveys designed to accurately measure the enrollment parameters in question and compare the results to the MOE data base<sup>50</sup>.

Nevertheless, the MOE data base remains a major source of basic data on schools unparalleled in most LDCs and should play an important role in future analysis of education, particularly with respect to following-up enrollment on the national level and the influence of some school variables.

However, elements of the schooling experience, especially teaching practices, can never be accurately collected in a complete-coverage administrative operation, the way the present MOE data base is currently compiled. They belong to the domain of specialized surveys based on carefully selected samples.

In addition, as the present analysis shows, assessments of school variables derived from household surveys are quite useful and can be superior in explanatory power to those collected in administrative data bases.

---

<sup>50</sup> For an evaluation of the MOE data base and an attempt to correct for the basic shortcomings with respect to the calculation of net enrollment ratios, see: Fergany (1996).

Thus, the ideal research design for the future research creatively *integrates a households and matched-schools survey with pertinent elements of the MOE data base.*

Finally, questions of causation, crucial for effective policy formulation, can only be satisfactorily attempted from carefully designed panel data sets.

In view of the critical importance of basic education for the future development of the country, it is astounding that the necessary resources, minor in comparison to the extremely high expected information payoff, are not made available.

## REFERENCES

Bartsch, Ulrich (1995)

Rates of return to investment in education and migration in Egypt, *Almishkat Research Notes No. 09*, Cairo, September 1995.

Farrell J. P. (1993)

International Lessons for School Effectiveness: The View from the Developing World, in: J. P. Farrel and Joao B. Oliveira (Eds.): *Teachers in Developing Countries, Improving Effectiveness and Managing Costs*, Economic Development Institute of the World Bank.

Fergany, Nader (1994a)

Labour market returns to education and poverty in Egypt: rewards or punishments? *Almishkat Research Notes No. 07*, Cairo, March 1994.

----- (1994b)

Survey of access to primary education and acquisition of basic literacy skills in three governorates of Egypt, *Almishkat*, Cairo, October 1994.

----- (1995)

Recent trends in participation in economic activity and open unemployment in Egypt, *Almishkat*, Cairo, September 1995.

----- (1996)

Baseline information to plan for universal access to primary education in Egypt; I. Trends in the extent of access to primary education by gender; governorates by rural/urban residence, *Almishkat*, Cairo, May 1996.

Hage, J. and Meeker, B. F. (1988)

Social causality, Unwin Hyman, Boston

Hanushek, E. A. and Lavy, V. (1994)

School quality, achievement Bias, and dropout behaviour in Egypt, *Living Standards measurement Study, Working Paper No. 107*, the World Bank

Ministry of Education, Education Planning and Information Directorate, Research and Analysis Division (1993)

*General Report on National Survey of Teaching Practices, Student Achievement and School Effectiveness*, June 1993.

NCER (1981)

*The one classroom school in Egypt, an evaluation study, final report*. National Centre for educational Research in collaboration with IDRC.

Swanson, E. (1987)

*Achievement and wastage, an econometric analysis of the retention of basic skills in a developing country*. Unpublished Ph.D. dissertation, University of New York at Buffalo, August 1987.

## ANNEX (1): INITIAL ENROLLMENT IN PRIMARY EDUCATION

### I List of regressors

#### *Individual*

age

girl (boy)<sup>1</sup>

duration of economic activity in years / age [child not economically active = 0]<sup>2</sup>

#### *Household*

monthly income per member in LE

*Head of household*

man (woman)

desired stage for girls education<sup>3</sup> [no education = 0]

*Mother*

completed years of education

#### *Community*

*Survey locations*

average years of education per household member in location

*Regions*

Kafr Elsheikh, Urban (Cairo)

Kafr Elsheikh, Rural (Cairo)

Elminya, Urban (Cairo)

Elminya, Rural (Cairo)

---

<sup>1</sup> The reference category for categorical variables is given in parentheses.

<sup>2</sup> Definitional information are given in brackets.

<sup>3</sup> Primary =1, preparatory =2,..., post graduate =7.

## II Summary statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
<b>Response</b>					
Initial enrollment in primary education	7308	0.88	0.33	0.00	1.00
<b>Regressors</b>					
<i>Individual</i>					
age	7308	11.25	3.31	5.00	17.00
girl	7308	0.47	0.50	0.00	1.00
duration of economic activity / age	7260	0.03	0.11	0.00	0.77
<i>Household</i>					
monthly income per member	7186	51.17	49.51	1.82	1875
<i>Head of household</i>					
man	7297	0.92	0.27	0.00	1.00
desired stage for girl education	6821	4.70	2.15	0.00	7.00
<i>Mother</i>					
completed years of education	7072	2.81	4.52	0.00	18.00
<i>Community</i>					
<i>Survey locations</i>					
average years of education per household member	7308	5.32	1.93	2.70	10.45
<i>Regions</i>					
Kafr Elsheikh, Urban	7308	0.09	0.28	0.00	1.00
Kafr Elsheikh, Rural	7308	0.33	0.47	0.00	1.00
Elminya, Urban	7308	0.12	0.32	0.00	1.00
Elminya, Rural	7308	0.26	0.44	0.00	1.00

45

### III Results of regression analysis

Number of observations	6494		
chi2(16)	1796.6		
Prob > chi2	0.0000		
Pseudo R <sup>2</sup>	0.3953		
Log likelihood	-1374.2		
<b>Regressors</b>			
	<b>Coef.</b>	<b>Z</b>	<b>P&gt; z </b>
<i>Individual</i>			
age	0.386	3.384	0.001
age (squared)	-0.012	-2.404	0.016
girl	-1.785	-15.715	0.000
duration of economic activity / age	-13.378	-12.877	0.000
duration of economic activity / age (squared)	12.586	6.140	0.000
<i>Household</i>			
monthly income per member	0.013	4.217	0.000
monthly income per member (squared)	0.000	-2.060	0.039
<i>Head of household</i>			
man	-0.197	-0.964	0.335
desired stage for girl education	0.210	9.959	0.000
<i>Mother</i>			
completed years of education	0.194	6.631	0.000
<i>Community</i>			
<i>Survey locations</i>			
average years of education per household member	1.054	5.070	0.000
average years of education per household member (squared)	-0.065	-3.221	0.001
<i>Regions</i>			
Kafr Elsheikh, Urban	0.113	0.210	0.834
Kafr Elsheikh, Rural	0.748	2.405	0.016
Elminya, Urban	-0.734	-2.524	0.012
Elminya, Rural	-0.732	-2.362	0.018
Constant	-3.520	-3.862	0.000

**ANNEX(2): COMPLETION OF PRIMARY EDUCATION**

(among primary school entrants who were ten years of age or older at the time of the survey and enrolled in MOE-supervised schools before 1989)

**I List of regressors**

***Individual***

girl (boy)<sup>1</sup>

duration of economic activity in years / age [child not economically active = 0]<sup>2</sup>

*Education experience*

age of entry in schooling

primary school cohort (year of entry in primary education)

failure rate in primary education [(years spent/ grades completed) - 1]

period of help at home while in primary education in hours [no help = 0]

private tutoring in primary education

in-school tutoring groups in primary education

went regularly to primary school

***Household***

monthly income per member in LE

*Head of household*

man (woman)

desired stage for girls education<sup>3</sup> [no education = 0]

*Mother*

completed years of education

***Community***

*Survey locations*

average years of education per household member in location

*Regions*

Kafr Elsheikh, Urban (Cairo)

Kafr Elsheikh, Rural (Cairo)

Elminya, Urban (Cairo)

Elminya, Rural (Cairo)

---

<sup>1</sup> The reference category for categorical variables is given in parentheses.

<sup>2</sup> Definitional information are given in brackets.

<sup>3</sup> Primary =1, preparatory =2,..., post graduate =7.

**School**

*AQS Individual questionnaire*

*School characteristics*

distance to school in km

running water

extra-curricular activities

*Evaluation of school*

teachers explained well

teachers treated pupil well

liked school

*MOE Schools data*

*Type of school*

government language (government school)

private-government supported (government school)

private (government school)

private language (government school)

*School shift*

1st shift (full day)

2nd shift (full day)

3rd shift (full day)

*School operates in own building?*

own building with other schools (in own building alone)

in another building (in own building alone)

% girls among pupils

pupils / classroom

pupils / teacher

% women teachers

% teachers with university education

% teachers with educational qualifications

*Examination results*

% pupils did not attend examination

% pupils passed, 1st round

% pupils automatically promoted

% pupils repeated

% pupils dropped out

% pupils transferred to vocational education

## II Summary statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
<b>Response</b>					
Completion of primary education	2918	0.86	0.35	0.00	1.00
<b>Regressors</b>					
<i>Individual</i>					
girl	2918	0.46	0.50	0.00	1.00
duration of economic activity / age	2907	0.03	0.10	0.00	0.77
age of entry in schooling	2917	5.89	0.57	3.00	8.00
year of entry in primary education	2918	85.32	1.88	79.00	88.00
failure rate in primary education	2907	0.05	0.13	0.00	1.00
period of help at home while in primary education	2917	0.51	0.90	0.00	7.00
private tutoring in primary education	2918	0.50	0.50	0.00	1.00
in-school tutoring groups in primary education	2918	0.22	0.41	0.00	1.00
went regularly to primary school	2914	0.92	0.28	0.00	1.00
<i>Household</i>					
monthly income per member	2876	56.04	58.78	2.50	1875
<i>Head of household</i>					
man	2914	0.91	0.29	0.00	1.00
desired stage for girl education	2752	4.98	1.93	0.00	7.00
<i>Mother</i>					
completed years of education	2811	2.96	4.47	0.00	18.00
<b>Community</b>					
<i>Survey locations</i>					
average years of education per household member	2918	5.59	1.97	2.70	10.45
<i>Regions</i>					
Kafr Elsheikh, Urban	2918	0.11	0.31	0.00	1.00
Kafr Elsheikh, Rural	2918	0.31	0.46	0.00	1.00
Elminya, Urban	2918	0.12	0.33	0.00	1.00
Elminya, Rural	2918	0.22	0.42	0.00	1.00

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
<b>School</b>					
<i>AQS individual questionnaire</i>					
<i>School characteristics</i>					
distance to school	2811	0.57	1.02	0.00	25.00
running water	2918	0.84	0.37	0.00	1.00
extra-curricular activities	2917	0.93	0.26	0.00	1.00
<i>Evaluation of school</i>					
teachers explained well	2915	0.91	0.28	0.00	1.00
teachers treated pupil well	2914	0.91	0.29	0.00	1.00
liked school	2915	0.93	0.26	0.00	1.00
<i>MOE Schools data</i>					
<i>Type of school</i>					
government language	2918	0.01	0.07	0.00	1.00
private-government supported	2918	0.02	0.12	0.00	1.00
private	2918	0.03	0.18	0.00	1.00
private language	2918	0.01	0.08	0.00	1.00
<i>Number of shifts</i>					
1st shift	2918	0.41	0.49	0.00	1.00
2nd shift	2918	0.48	0.50	0.00	1.00
3rd shift	2918	0.00	0.03	0.00	1.00
<i>School operates in own building</i>					
own building with other schools	2918	0.36	0.48	0.00	1.00
in another building	2918	0.27	0.44	0.00	1.00
<i>% girls among pupils</i>					
	2918	46.73	9.48	0.00	100.00
<i>pupils / classroom</i>					
	2918	46.01	6.38	18.17	67.10
<i>pupils / teacher</i>					
	2917	22.93	6.05	9.61	55.60
<i>% women teachers</i>					
	2917	48.07	22.91	7.69	100.00
<i>% teachers with university education</i>					
	2917	4.95	13.54	0.00	100.00
<i>% teachers with educational qualifications</i>					
	2917	91.40	16.63	0.00	100.00
<i>Examination results</i>					
% pupils did not attend examination	2917	2.13	2.32	0.00	16.64
% pupils passed, 1st round	2917	81.55	12.98	51.09	100.00
% pupils automatically promoted	2917	1.73	2.26	0.00	15.07
% pupils repeated	2917	4.62	5.21	0.00	23.02
% pupils dropped out	2917	0.50	1.12	0.00	16.64
% pupils transferred to vocational education	2917	0.95	1.76	0.00	12.95

### III Results of regression analysis

Number of observations	2477		
chi2(44)	1093.8		
Prob > chi2	0.0000		
Pseudo R <sup>2</sup>	0.5626		
Log likelihood	-425.2		
<b>Regressors</b>			
	<b>Coef.</b>	<b>Z</b>	<b>P&gt; z </b>
<i>Individual</i>			
girl	-1.103	-5.563	0.000
duration of economic activity / age	-18.387	-8.534	0.000
duration of economic activity / age (squared)	26.652	5.604	0.000
age of entry in schooling	-0.128	-0.576	0.565
year of entry in primary education	26.214	5.911	0.000
year of entry in primary education (squared)	-0.155	-5.967	0.000
failure rate in primary education	-11.303	-14.961	0.000
period of help at home while in primary education	-0.014	-0.095	0.924
private tutoring in primary education	1.172	5.255	0.000
in-school tutoring groups in primary education	0.535	1.989	0.047
went regularly to primary school	1.307	4.351	0.000
<i>Household</i>			
monthly income per member	0.008	2.030	0.042
<i>Head of household</i>			
man	0.451	1.499	0.134
desired stage for girl education	0.148	3.257	0.001
<i>Mother</i>			
completed years of education	0.071	1.842	0.066
<i>Community</i>			
<i>Survey locations</i>			
average years of education per household member	0.127	0.694	0.488
<i>Regions</i>			
Kafr Elsheikh, Urban	-0.903	-0.953	0.341
Kafr Elsheikh, Rural	-0.132	-0.142	0.887
Elminya, Urban	0.653	0.684	0.494
Elminya, Rural	0.455	0.406	0.685

Regressors	Coef.	Z	P> z
<b>School</b>			
<i>AQS individual questionnaire</i>			
<i>School characteristics</i>			
distance to school	-0.013	-0.146	0.884
running water	-0.583	-1.884	0.060
extra-curricular activities	0.289	0.812	0.417
<i>Evaluation of school</i>			
teachers explained well	-0.009	-0.024	0.981
teachers treated pupil well	0.245	0.697	0.486
liked school	2.230	6.746	0.000
<i>MOE Schools data</i>			
<i>Type of school</i>			
government language	dropped		
private-government supported	-0.259	-0.202	0.840
private	2.149	0.688	0.491
private language	dropped		
<i>Number of shifts</i>			
1st shift	-0.471	-0.814	0.416
2nd shift	0.058	0.082	0.935
3rd shift	dropped		
<i>School operates in own building</i>			
own building with other schools	0.339	0.559	0.576
in another building	-0.656	-0.730	0.465
<i>% girls among pupils</i>			
% girls among pupils	-0.016	-0.723	0.470
<i>pupils / classroom</i>			
pupils / classroom	-0.004	-0.103	0.918
<i>pupils / teacher</i>			
pupils / teacher	-0.042	-0.691	0.489
<i>% women teachers</i>			
% women teachers	0.010	0.765	0.444
<i>% teachers with university education</i>			
% teachers with university education	0.025	0.593	0.553
<i>% teachers with educational qualifications</i>			
% teachers with educational qualifications	0.039	1.252	0.210
<i>Examination results</i>			
% pupils did not attend examination	0.108	0.958	0.338
% pupils passed, 1st round	0.058	1.321	0.186
% pupils automatically promoted	0.030	0.237	0.813
% pupils repeated	0.153	1.934	0.053
% pupils dropped out	0.190	0.790	0.430
% pupils transferred to vocational education	0.190	1.097	0.273
Constant	-1113.92	-5.898	0.000

52

### ANNEX (3): AVERAGE TEST SCORES

(among MOE-supervised primary school entrants who were ten years of age or older at the time of the survey)

#### I List of regressors

##### *Individual*

girl (boy)<sup>1</sup>

duration of economic activity in years / age [child not economically active = 0]<sup>2</sup>

##### *Education experience*

age of entry in schooling

primary school cohort (year of entry in primary education)

failure rate in primary education [(years spent/ grades completed) - 1]

years since left education [presently in school = 0]

grades completed in education

period of help at home while in primary education in hours [no help = 0]

private tutoring in primary education

in-school tutoring groups in primary education

went regularly to primary school

##### *Household*

monthly income per member in LE

##### *Head of household*

man (woman)

desired stage for girls education<sup>3</sup> [no education = 0]

##### *Mother*

completed years of education

##### *Community*

##### *Survey locations*

average years of education per household member in location

##### *Regions*

Kafr Elsheikh, Urban (Cairo)

Kafr Elsheikh, Rural (Cairo)

Elminya, Urban (Cairo)

Elminya, Rural (Cairo)

---

<sup>1</sup> The reference category for categorical variables is given in parentheses.

<sup>2</sup> Definitional information are given in brackets.

<sup>3</sup> Primary =1, preparatory =2,..., post graduate =7.



**School**

*AQS Individual questionnaire*

*School characteristics*

distance to school in km

running water

extra-curricular activities

*Evaluation of school*

teachers explained well

teachers treated pupil well

liked school

*MOE Schools data*

*Type of school*

government language (government school)

private-government supported (government school)

private (government school)

private language (government school)

*School shift*

1st shift (full day)

2nd shift (full day)

3rd shift (full day)

*School operates in own building?*

own building with other schools (in own building alone)

in another building (in own building alone)

% girls among pupils

pupils / classroom

pupils / teacher

% women teachers

% teachers with university education

% teachers with educational qualifications

*Examination results*

% pupils did not attend examination

% pupils passed, 1st round

% pupils automatically promoted

% pupils repeated

% pupils dropped out

% pupils transferred to vocational education

***Socio-economic context (education experience) interactions***

grades completed in education and years since left education

primary school cohort, grades completed in education and years since left education

***School - Socio-economic Context Interactions***

primary school cohort and:

% teachers with university education

% pupils did not attend examination

% pupils repeated

55

## II Summary statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
<b>Response</b>					
Average test scores	3681	39.29	22.07	0.00	97.50
<b>Regressors</b>					
<i>Individual</i>					
girl	3732	0.45	0.50	0.00	1.00
duration of economic activity / age	3720	0.03	0.09	0.00	0.77
age of entry in schooling	3730	5.90	0.58	3.00	10.00
year of entry into primary education	3730	86.22	2.40	79.00	92.00
years since left education	3726	0.50	1.51	0.00	12.00
grades completed in education	3732	6.03	2.39	0.00	12.00
failure rate in primary education	3721	0.05	0.13	0.00	1.00
period of help at home while in primary education	3729	0.53	0.89	0.00	7.00
private tutoring in primary education	3732	0.51	0.50	0.00	1.00
in-school tutoring groups in primary education	3732	0.21	0.41	0.00	1.00
went regularly to primary school	3725	0.92	0.27	0.00	1.00
<i>Household</i>					
monthly income per member	3677	55.58	55.77	2.50	1875
<i>Head of household</i>					
man	3726	0.91	0.28	0.00	1.00
desired stage for girl education	3512	4.95	1.95	0.00	7.00
<i>Mother</i>					
completed years of education	3604	2.95	4.49	0.00	18.00
<i>Community</i>					
<i>Survey locations</i>					
average years of education per household member	3732	5.57	1.97	2.70	10.45
<i>Regions</i>					
Kafr Elsheikh, Urban	3732	0.10	0.30	0.00	1.00
Kafr Elsheikh, Rural	3732	0.31	0.46	0.00	1.00
Elminya, Urban	3732	0.12	0.32	0.00	1.00
Elminya, Rural	3732	0.23	0.42	0.00	1.00

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
<b>School</b>					
<i>AQS individual questionnaire</i>					
<i>School characteristics</i>					
distance to school	3577	0.58	0.97	0.00	25.00
running water	3732	0.85	0.35	0.00	1.00
extra-curricular activities	3730	0.93	0.26	0.00	1.00
<i>Evaluation of school</i>					
teachers explained well	3728	0.92	0.27	0.00	1.00
teachers treated pupil well	3727	0.91	0.28	0.00	1.00
liked school	3728	0.93	0.25	0.00	1.00
<i>MOE Schools data</i>					
<i>Type of school</i>					
government language	3732	0.01	0.08	0.00	1.00
private-government supported	3732	0.02	0.13	0.00	1.00
private	3732	0.04	0.18	0.00	1.00
private language	3732	0.01	0.08	0.00	1.00
<i>Number of shifts</i>					
1st shift	3732	0.41	0.49	0.00	1.00
2nd shift	3732	0.49	0.50	0.00	1.00
3rd shift	3732	0.00	0.04	0.00	1.00
<i>School operates in own building</i>					
own building with other schools	3732	0.36	0.48	0.00	1.00
in another building	3732	0.26	0.44	0.00	1.00
<i>% girls among pupils</i>					
% girls among pupils	3732	46.60	9.26	0.00	100.00
<i>pupils / classroom</i>					
pupils / classroom	3732	46.03	6.33	14.80	67.10
<i>pupils / teacher</i>					
pupils / teacher	3731	22.97	5.98	5.29	55.60
<i>% women teachers</i>					
% women teachers	3731	48.05	22.98	7.69	100.00
<i>% teachers with university education</i>					
% teachers with university education	3731	5.07	13.90	0.00	100.00
<i>% teachers with educational qualifications</i>					
% teachers with educational qualifications	3731	91.35	16.95	0.00	100.00
<i>Examination results</i>					
% pupils did not attend examination	3730	2.15	2.33	0.00	19.35
% pupils passed, 1st round	3730	81.38	13.05	45.62	100.00
% pupils automatically promoted	3730	1.74	2.26	0.00	15.07
% pupils repeated	3730	4.67	5.25	0.00	23.02
% pupils dropped out	3730	0.51	1.11	0.00	16.64
% pupils transferred to vocational education	3730	0.95	1.79	0.00	12.95

51

### III Results of regression analysis

Number of observations	3152		
F(57,3094)	46.72		
Prob > F	0.0000		
R-squared	0.4626		
Root MSE	16.26		
<b>Regressors</b>			
	<b>Coef.</b>	<b>t</b>	<b>P&gt; t </b>
<i>Individual</i>			
girl	-0.525	-0.880	0.379
duration of economic activity / age	-13.411	-3.698	0.000
age of entry in schooling	-1.393	-2.537	0.011
year of entry in primary education	42.567	4.597	0.000
year of entry in primary education (squared)	-0.240	-4.494	0.000
years since left education	0.592	0.790	0.430
grades completed in primary education	5.059	10.128	0.000
failure rate in primary education	-57.739	-2.647	0.008
failure rate in primary education (squared)	17.256	2.074	0.038
period of help at home while in primary education	2.355	3.134	0.002
period of help at home while in primary education (squared)	-0.440	-2.012	0.044
private tutoring in primary education	0.183	0.276	0.783
in-school tutoring groups in primary education	-0.193	-0.242	0.809
went regularly to primary school	1.812	1.307	0.191
<i>Household</i>			
monthly income per member	0.008	1.354	0.176
<i>Head of household</i>			
man	1.923	1.861	0.063
desired stage for girl education	0.595	3.677	0.000
<i>Mother</i>			
completed years of education	0.531	6.043	0.000
<i>Community</i>			
<i>Survey locations</i>			
average years of education per household member	-0.822	-1.780	0.075
<i>Regions</i>			
Kafr Elsheikh, Urban	-0.436	-0.195	0.845
Kafr Elsheikh, Rural	-8.677	-3.376	0.001
Elminya, Urban	-5.946	-2.281	0.023
Elminya, Rural	-9.548	-3.048	0.002

<b>Regressors</b>	<b>Coef.</b>	<b>t</b>	<b>P&gt; t </b>
<b>School</b>			
<i>AQS individual questionnaire</i>			
<i>School characteristics</i>			
distance to school	0.028	0.089	0.929
running water	-0.815	-0.874	0.382
extra-curricular activities	0.385	0.324	0.746
<i>Evaluation of school</i>			
teachers explained well	-0.181	-0.142	0.887
teachers treated pupil well	2.141	1.706	0.088
liked school	2.135	1.410	0.159
<i>MOE Schools data</i>			
<i>Type of school</i>			
government language	-2.096	-0.450	0.653
private-government supported	-5.533	-2.033	0.042
private	0.980	0.240	0.810
private language	1.405	0.255	0.799
<i>Number of shifts</i>			
1st shift	1.792	1.150	0.250
2nd shift	3.237	1.873	0.061
3rd shift	6.592	0.866	0.386
<i>School operates in own building</i>			
own building with other schools	0.822	0.569	0.569
in another building	-0.226	-0.101	0.920
<i>% girls among pupils</i>			
% girls among pupils	-0.059	-1.074	0.283
<i>pupils / classroom</i>			
pupils / classroom	-0.070	-0.667	0.505
<i>pupils / teacher</i>			
pupils / teacher	0.189	1.221	0.222
<i>% women teachers</i>			
% women teachers	0.035	0.842	0.400
<i>% teachers with university education</i>			
% teachers with university education	-3.184	-4.133	0.000
<i>% teachers with educational qualifications</i>			
% teachers with educational qualifications	0.011	0.234	0.815
<i>Examination results</i>			
% pupils did not attend examination	13.640	2.262	0.024
% pupils passed, 1st round	1.678	2.173	0.030
% pupils passed, 1st round (squared)	-0.010	-2.022	0.043
% pupils automatically promoted	0.181	0.505	0.614
% pupils repeated	-11.297	-4.222	0.000
% pupils repeated (squared)	0.085	2.922	0.004
% pupils dropped out	-1.063	-1.702	0.089
% pupils transferred to vocational education	0.862	1.430	0.153
<b>Interactions</b>			
years since left education and grades completed education	18.867	6.103	0.000
<i>year of entry in primary education and:</i>			
years since left education and grades completed education	-0.232	-6.223	0.000
% teachers with university education	0.036	4.102	0.000
% pupils did not attend examination	-0.161	-2.306	0.021
% pupils repeated	0.119	3.870	0.000
Constant	-1955.36	-4.856	0.000

59

**ANNEX (4): SOCIO-ECONOMIC INDICATORS, EGYPT,  
selected years (1959-1995)**

Year	Real GDP growth %		Unemployment %		CPI		Average Household expenditure per person			
	Total	Per Capita	Reported	Corrected	1975=100	1985=100	Current prices		Constant prices (1985=100)	
							Rural	Urban	Rural	Urban
1959							27	49	207	371
1960			5.4							
1961			4.7							
1962			1.6							
1963			3.2		54	15				
1964			1.9		56	16				
1965					65	18	40	68	236	396
1966					70	20				
1967					71	20				
1968			3.1		70	20				
1969	4.2	2.0	2.7		72	20				
1970			2.4		75	21				
1971			1.8		77	22				
1972			1.5		79	22				
1973			1.9		83	23				
1974			2.3		91	26				
1975			3		100	28	63	102	233	378
1976					110	31				
1977	9.8	7.3	3.1		124	35				
1978			3.6		138	39				
1979			4.6		152	43				
1980			5.2		183	52				
1981			5.4		202	57				
1982			5.7		232	66	188	275	306	448
1983	7.0	4.3	6.6		269	76				
1984			6.0		315	89				
1985					353	100				
1986					438	124				
1987					524	148				
1988	2.9	0.5	7.1		616	174				
1989	3.0	0.0			747	212				
1990	2.4	-0.6	8.0	10.4	873	247				
1991	2.1	-0.4	8.6	11.7	1046	296	724	918	267	338
1992	0.3	-1.4	8.7	11.8	1188	336				
1993	0.5	-1.7	10.6		1311	371	689	1102	186	297
1994	2.0	0.0	10.5		1419	401				
1995	2.2	0			1539	436				
<b>Sources and Notes</b>	WB Data Base 1994 estimate 1995 projection  1969 represents 65-73 1977 represents 74-80 1983 represents 81-85 1988 represents 86-90				IMF Last three years WB Data Base 1994 estimate 1995 projection		Time reference of household expenditure surveys: 1958/59 1964/65 1974/75 1981/82 1990/91 1993 Social developments survey			

**ANNEX (5): SUMMARY OF RESULTS OF REGRESSION ANALYSIS  
excluding interactions (level of significance of regressors)**

<b>Regressors</b>	<b>Enrollment</b>	<b>Completion</b>	<b>Scores</b>
<i>Individual</i>			
Proxy for time (age / year of entry)	0.001	0.000	0.000
girl	0.000	0.000	0.379
duration of economic activity / age	0.000	0.000	0.000
age of entry in schooling	x	0.565	0.011
years since left education	x	x	0.430
grades completed in primary education	x	x	0.000
failure rate in primary education	x	0.000	0.008
period of help at home while in primary education	x	0.924	0.002
private tutoring in primary education	x	0.000	0.783
in-school tutoring groups in primary education	x	0.047	0.809
went regularly to primary school	x	0.000	0.191
<i>Household</i>			
monthly income per member	0.000	0.042	0.176
<i>Head of household</i>			
man	0.335	0.134	0.063
desired stage for girl education	0.000	0.001	0.000
<i>Mother</i>			
completed years of education	0.000	0.066	0.000
<i>Community</i>			
<i>Survey locations</i>			
average years of education per household member	0.000	0.488	0.075
<i>Regions</i>			
Kafr Elsheikh, Urban	0.834	0.341	0.845
Kafr Elsheikh, Rural	0.016	0.887	0.001
Elminya, Urban	0.012	0.494	0.023
Elminya, Rural	0.018	0.685	0.002

x not included

61

Regressors	Enrollment	Completion	Scores
<b>School</b>			
<i>AQS individual questionnaire</i>			
<i>School characteristics</i>			
distance to school	x	0.884	0.929
running water	x	0.060	0.382
extra-curricular activities	x	0.417	0.746
<i>Evaluation of school</i>			
teachers explained well	x	0.981	0.887
teachers treated pupil well	x	0.486	0.088
liked school	x	0.000	0.159
<i>MOE Schools data</i>			
<i>Type of school</i>			
government language	x	dropped	0.653
private-government supported	x	0.840	0.042
private	x	0.491	0.810
private language	x	dropped	0.799
<i>Number of shifts</i>			
1st shift	x	0.416	0.250
2nd shift	x	0.935	0.061
3rd shift	x	dropped	0.386
<i>School operates in own building</i>			
own building with other schools	x	0.576	0.569
in another building	x	0.465	0.920
<i>% girls among pupils</i>			
% girls among pupils	x	0.470	0.283
<i>pupils / classroom</i>			
pupils / classroom	x	0.918	0.505
<i>pupils / teacher</i>			
pupils / teacher	x	0.489	0.222
<i>% women teachers</i>			
% women teachers	x	0.444	0.400
<i>% teachers with university education</i>			
% teachers with university education	x	0.553	0.000
<i>% teachers with educational qualifications</i>			
% teachers with educational qualifications	x	0.210	0.815
<i>Examination results</i>			
% pupils did not attend examination	x	0.338	0.024
% pupils passed, 1st round	x	0.186	0.030
% pupils automatically promoted	x	0.813	0.614
% pupils repeated	x	0.053	0.000
% pupils dropped out	x	0.430	0.089
% pupils transferred to vocational education	x	0.273	0.153

x not included

62

# **INSTITUTE FOR POLICY REFORM**

## **Working Paper Series:**

### **Determinants of Educational Achievement and Attainment in Africa**

#### Findings from Nine Case Studies

Ronald G. Ridker, Institute for Policy Reform

#### Enrollment in Primary Education and Cognitive Achievement in Egypt, Change and Determination

Nader Fergany, Ilham Farmaz and Christiane Wissa, Almiskat Institute, Egypt

#### School Quality and Educational Outcomes in South Africa

Anne Case and Angus Deaton, Princeton University

#### Household Schooling Decisions in Tanzania

Andrew D. Mason and Shahidur R. Khandker, World Bank

#### Determinants of School Enrollment and School Expenditures in Kenya: Do They Vary by Household Income?

Anil Deolalikar, University of Washington

#### Textbooks, Class Size, and Test Scores: Evidence from a Prospective Evaluation in Kenya

Michael Kremer and David Myatt, Massachusetts Institute of Technology;  
Sylvie Moulin and Robert Namunyu, Internationale Christelijke Stichting.

#### Village Based Schools in Mangochi, Malawi, an Evaluation.

Karin A. L. Hyde<sup>1</sup>, Esme C. Kadzamira<sup>2</sup>, Juliet C. Sichinga<sup>3</sup>, Mike P. Chibwana<sup>2</sup>,  
Ronald G. Ridker<sup>4</sup> (<sup>1</sup>Consultant, Kenya; <sup>2</sup>Centre for Educational Research & Training,  
Malawi; <sup>3</sup>Ministry of Education, Malawi; <sup>4</sup>Institute for Policy Reform, Washington, D. C.

D.C.)

#### An Evaluation of Save the Children's Community Schools Project in Kolondieba, Mali

Joshua Muskin, Florida State University

#### An Evaluation of the Aga Khan Foundation's School Improvement Program in Kisumu, Kenya

Joanne Capper, Consultant, Institute for Policy Reform, Washington, D. C.

#### An Assessment of the Community Education Fund (CEF), Pretest Phase

Suleman Sumra, University of Dar es Salaam