

IV. The Analysis of the MS 5 Students' Scholastic Achievement

The Data

Two sets of data were utilized for the analysis of the academic achievement of MS 5 students.

The first set of data collected from our questionnaires distributed to the 1977 first year students in various institutions of higher education, both public and private. The public institutions are various universities - Chulalongkorn, Kasetsart, Thammasat, Mahidol, Silpakorn, King Mongkut's Institute of Technology, Chiangmai, Khon Kaen, Songkla and Ramkamhaeng. The private institutions are Bangkok College, Business College (Thurakij Bundit), Chamber of Commerce College and Phayub Technical College (in Chiangmai). The questionnaire was designed to get information on the students' academic performances in Mathayom Suksa 3 and Mathayom Suksa 5 as well as their general school environment. Information on students' characteristics and home environments were also collected. Total number of MS 5 students in the year 1976 were 68,325. Of these, 54,852 students were in public schools and 13,469 were in private schools. Our survey covered approximately 5 per cent of total MS 5 pupils.

The academic year of 1976 was the first year that the final exam has changed from the system administered by the Ministry of Education to the one administered by individual school. It could be criticized about the comparability of the results among schools. However, for a small project like this one, it is impossible to carry out a nationwide standardized test. We have carefully checked with many officials in the Educational Techniques Department, Ministry of Education, about variation in standard among schools. We were informed that since it was the first year, there was not much variation in curriculum and textbooks among schools. Besides, schools having upper secondary education have been supervised by the Department to cluster among themselves in order to promote educational standards and improve methods of instruction, evaluation and guidance. Therefore, at least within each cluster, examination instruments

are likely to be similar.¹ In addition, for the group of the 1976 MS 5 graduates, their MS 3 final examination was standardized and administered by the Ministry of Education. We select only students who completed MS 5 level in academic stream and find the correlation of their MS 5 and MS 3 grades. The correlation coefficient is 0.3296. For a sample size of 1204, it is significant at the .01 level.² This indicates that there is a close relationship between the performances in both level. We may, therefore, conclude that there are certain degree of standardization inherent in the MS 5 grading although it was independently administered by individual school.

The dependent variable in our model of the MS 5 scholastic achievement will be the MS 5 GPA (grade point average) of students in our sample.

The second set of data provides information on school pertaining to each student in our sample. They were obtained from the annual report of schools all over the country collected by the Ministry of Education. The report contains the following information :

- a. Information on students such as total number of students in school classified by class, number of repeaters, drop-outs, etc.
- b. Information on school financing such as tuition fee, value of things and money received from donation, revenue from tuition and other fees, expenditures by categories, etc.
- c. Information on teachers such as number of teachers classified by sex, age, marital status, number of years of teaching, highest education completed, teaching load, salary, etc.

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1. for those who are interested in the examination system in Thailand, see Kamol Sudaprasert, "Examination System Reform : A Case Study of Thailand" Bureau for Testing Services, Department of Educational Techniques, Ministry of Education, January, 1977 (mimeograph)
 2. $t_{1202} = 12.103$

Some Distribution of the MS 5 Sample

Types of MS 5 School

As mentioned previously, we collect information on MS 5 grades by distributing questionnaires to first year college students. It is therefore possible that these students might have not completed MS 5 level in the same year. Moreover, some of them might have attended vocational schools or not gone through any formal school systems. In order to make the students in our sample in as much comparable condition as possible, we confine our analysis to those who finished MS 5 in the academic year 1976 from schools in the formal school system. In so doing our sample size is reduced from 2,670 students to 1,561 students (see tables 10 and 11). Strikingly, the percentage of students from private schools is reduced from 20.6 to 1.34.

Fathers' Occupation and Institute of Higher Education

Table 12 presents the distribution of students in different institutions by their fathers' occupations. The students whose fathers are sales workers form the largest group, about 38 per cent of total students in our sample. Next are children of the professional, 13.7 per cent, the administrative 12.4 per cent, the farmers 10.3 per cent. Approximately 46 per cent of students in our sample were enrolled outside the "closed" university system. Of which about 40 per cent were in Ramkamhaeng University. Of all 161 farmers' children enrolled in higher institutions, 103 or 64 per cent were in Ramkamhaeng University which constitute 16.6 per cent of total Ramkamhaeng's students in our sample.

Age Sex and Race

About 90 per cent of students in our sample are in the age group of 17-19 years old. The largest group, 46 per cent, is the group in the 18 years of age. The proportion of male-female is 1.4 : 1 . Students of Chinese race constitute 18.2 per cent of total students in our sample. (see Table 13)

The MS 5 Grades and Higher Institutions

In order to see the relationship between the MS 5 grade and the chance of passing the university entrance examination, we crosstabulate students by their grade point average (GPA) and higher institutions attended. See Table 14. The last two columns show the percentage of students with GPA 2.49 or below, and 2.50 or above in each institution. The percentage of students with GPA 2.50 or above in the "closed" universities ranges from 65.2 (for Songkla) to 92.7 (for Mahidol). In Ramkamhaeng, about 60 per cent of students obtained GPA 2.49 or below. The proportion of students in the three private colleges with GPA 2.49 or below, ranging from 61 per cent for Bangkok College to 90 per cent for Chamber of Commerce. The composition of students in Phayub College is an exception. However, the sample size of this institution is too small to be statistically meaningful.

The Students' MS 5 Grades and Fathers' Occupation

The socioeconomic status of fathers is another factor that influences the students' academic achievement. Table 15 presents the distribution of students' MS 5 grades by fathers' occupations. In order to see more clearly the relationship between these two variables we calculate the percentages of students with GPA below 2.50 and those with GPA above 2.99 for each fathers' occupation category, see columns 8 and 9 in table 15. The data indicate that the percentage of the farmers' children with GPA below 2.50 is the biggest, 53.7 per cent of total farmers' children. Next are the children of the laborers, 48.9 per cent. If we exclude the group of service workers due to very small sample size (8 persons), the percentage of the sales workers' children who obtained GPA higher than 2.99 is the biggest, 23.9 per cent. Next are children of the professionals, 19.8 per cent. The percentage distribution of the remaining group are very similar to each other.

The Students' MS 5 Grades and Mothers' Education

Human capital theorists believe that education of mothers is one important factor that influences their children's learning motivation. Columns (4) and (9)

in table 16 show the percentage distribution across mothers' education of two groups of students, those with GPA less than 2.00 and those with GPA 3.00 or above. For the low achievers, see column (4), we can see that the proportion tends to decline as the level of educational attainment of mothers increases. For the high achievers the opposite trend is found, see column (9). However, it is not possible to state conclusively about the influence of mothers' education on scholastic achievement without more detailed observation and analysis.

Regional Variation in the MS 5 Grades

Since the 1976 final examinations for MS 5 students were carried out directly by individual schools, it would be of interest to how grade distribution varies among students in different regions. As is shown in Table 17, the largest group of students in every region are those who obtained GPA between 2.50-2.99. Since the largest number of students in our sample completed MS 5 level in Bangkok, the grade distribution of students in the Bangkok region resembles the national distribution. The percentage of students who obtained GPA less than 1.49 is highest in the Northeast, 4.4 per cent. However, the percentage of students obtaining GPA 3.50 and above is also the highest in the Northeast, 6.7 per cent. The South is the region that has the lowest percentage of students with GPA 3.00 or above. Not much can be said about the pattern of variation among students in different regions until other factors such as schools and teachers are taken into account.

Results of Statistical Analysis

In estimating the regression equations for the MS 5 grade we encounter a problem of severe multicollinearity. After eliminating variables that are highly correlated, our final equation contains the following variables :

The School Variables

Class sizes This variable is derived from dividing total number of MS 5 students in each school by number of MS 5 classrooms. The data are obtained from

the school annual reports.

Average teacher salaries : Normally, students at this level have to take various courses with different teachers. The school annual reports do not identify the teachers who taught at the MS 5 level. From the correlation coefficient matrix, we found that the teachers' characteristic variables are highly correlated with each others. However, the correlation between the average teacher salary and the MS 5 grade is the highest. We, therefore, use the average teacher salary as a proxy for teachers' characteristics. The average teacher salary is obtained from dividing total teachers' salaries by number of teachers in school. In order to check whether the average teacher salary is a good proxy for teachers' characteristics, we run a regression equation of the determinants of average teacher salary. The explanatory variables are average teacher ages, average number of teaching years in this school, average hours of teaching per week and proportion of teachers with bachelor degrees or above. The result of the estimation supports the use of average teacher salary as a proxy for teachers' characteristics. See table 18.

Teachers' disattentiveness: This variable intends to measure the teacher input based on students' attitude. Information for this variable is obtained from our questionnaires. It was coded as follows :

1. very good
2. good
3. not too bad
4. bad

From the way it was coded, this variable is expected to associate negatively with the MS 5 GPA.

The Home Environment and Students' Characteristics

Number of siblings in school This variable should measure the learning atmosphere at home. It should be positively associated with the MS 5 GPA. It is a continuous variable obtaining from the questionnaires.

Mothers' education This variable is also obtained from the questionnaires.

It is coded as follows :

1. Illiterate
2. Able to read and write
3. Complete primary education
4. Complete lower secondary education
5. Complete upper secondary education
6. Certificate
7. Not complete B.A.
8. B.A.
9. M.A.
10. Ph.D

Grade repetition This is a dummy variable coded one if the student has ever repeated any grade, or zero otherwise. Since this measures the students' cognitive ability, it should be positively associated with their GPA.

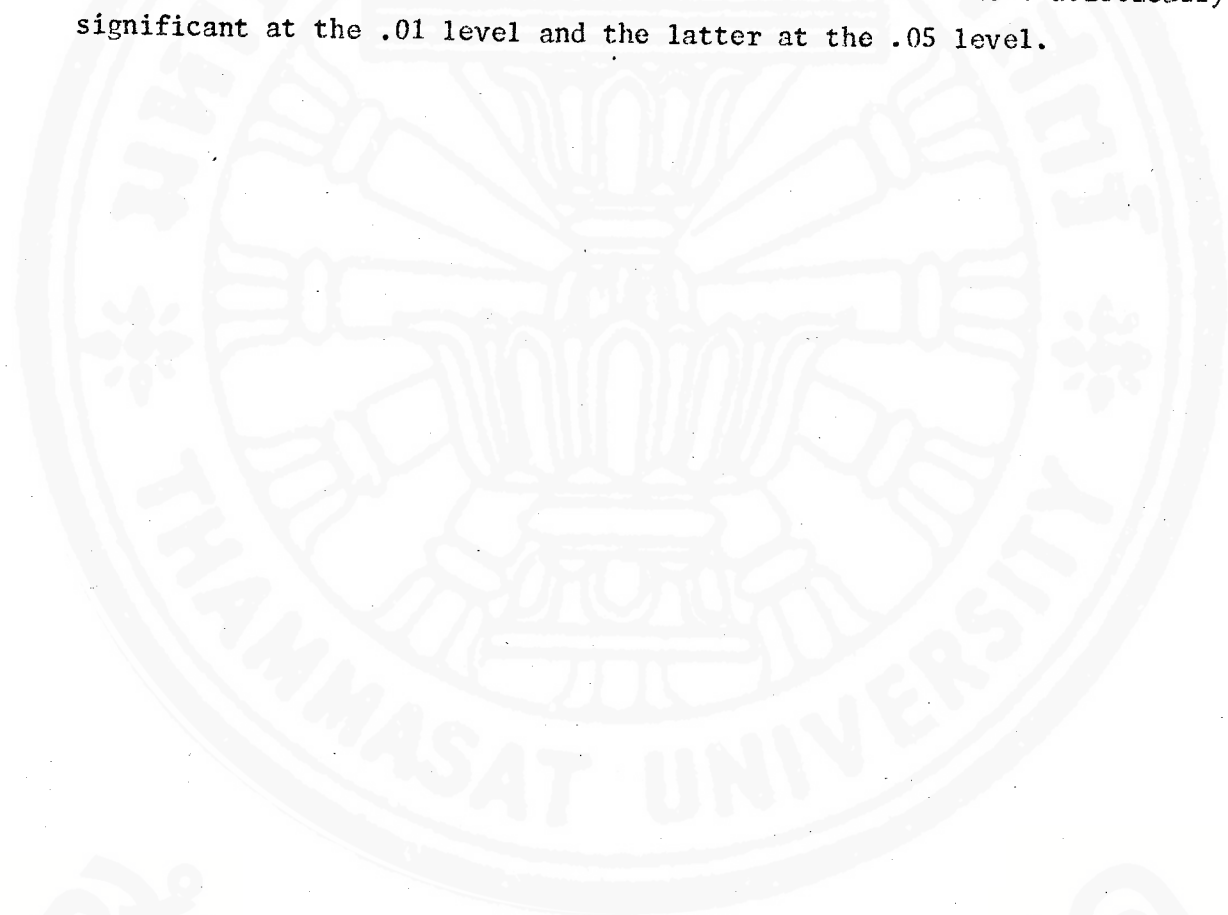
Health condition This is an ordinal variable coded as follows :

1. poor
2. not too bad
3. good

Poor health condition should retard students' learning capability.

The results of statistical estimation are shown in table 19 and table 20. Table 19 presents the regression equations with home inputs entering first and school inputs follow; and table 20 presents the regression equations with the reversed order of entering of variables. The sign of the coefficients of all variables turn out be as expected. The education of mothers is found to be statistically insignificant at the conventional level. The variable that exerts the strongest negative effect on the students' GPA is the grade repetition. This is consistent with that of the grade 3 level. The students' health condition is also very important. The class size and the average teacher salary are found to be statistically significant, but the magnitude of the effects are negligible.

The value of R^{-2} in the final step is rather low, 0.038. However, the F statistics in the final step is shown to be statistically significant, implying that the explanatory variables jointly contribute to the explanation of variation in the students' GPA. The calculated F statistics for testing the additional contribution of the home environment and students' characteristics in table 19 is 8.82, and the F-statistics for testing the additional contribution of the school variables in table 20 is 3.36. The former is statistically significant at the .01 level and the latter at the .05 level.



Concluding Comments

The empirical results may seem unsatisfactory in the sense that only few variables appear to be statistically significant and the overall value of R^2 is relatively low. Besides the problem of severe multicollinearity among variables, there are problems of not enough variations in the sample. At least three following possible sources that lower the variation in the sample could be identified :

First, at the higher level of education students tend to be more homogeneous in cognitive ability as well as in family background. According to statistics on education in Thailand in 1976, about 64.3 per cent of all students were enrolled in the lower primary level, 20 per cent in the upper primary, and less than 2 per cent in the upper secondary education.¹ This indicates clearly that a large number of students are forced to leave the formal school system at each major level of education due to parents' inadequate financial support. Those who realize their inability to attend the university level will turn to vocational training. The upper general secondary education is mainly for those who intend to go on to higher education. Since our sample is composed only of students who have completed the upper general secondary education, there are less variation in their cognitive ability and their family socioeconomic status.

Second, schools that provide education at this level are mostly big schools and located mainly in large urban areas. Variation in quality among schools at this level is expected to be less than schools at the primary level. Furthermore, about 60 per cent of students in our sample came from schools in Bangkok. This could further reduce variation in schooling factors among students.

Third, the final examination for the MS 5 students in the year of our study was independently administered by individual schools. It is very likely that variation in the students' GPA among schools under this system is much less than the previous examination system administered by the Ministry of Education.

1. Office of the Prime Minister, National Statistical Office, 1976 Statistics on Academic Stream of Education by Province, Bangkok 1976, p. 19.

Consequently, the variation in the dependent variable in our model is smaller than it should be.

The multiple regression technique is designed to explain variation in the dependent variable by variation in the explanatory variables. If the variation in the dependent variable is small, a low value of R^2 will turn up. When the variation in the explanatory variables are small, the standard error of estimates of the coefficients will be high. As a consequence, many coefficients could turn to be insignificant.

Despite the nature of the data and the problem of multicollinearity, our findings are still considered useful. It confirms that to be able to highly achieve in study at this level, students' cognitive ability and health condition are very important. Students who have ever repeated any grades and have poor health will be in much disadvantageous position at the higher level of education. Classrooms of larger sizes also exerts adverse effect on students' learning condition. The effect of teachers' salaries should not be interpreted straightforwardly, but should be related to teachers' characteristics variables. Teachers' salaries should be increased in concomitant with teachers' experience, qualification and appropriate teaching loads.