

On China's Model of Probability of Entering Higher Level School

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1. Student Probabilities Matrix in the School Year of 1997-1998

Education in China has been growing rapidly during the past few decades, especially from the middle of 1980s. We used the demographic input-output matrix technique, developed by Mr. Richard Stone a couple of decades ago, for forming students input-output matrix in the school year 1997-1998, in which the total students in regular schools are classified 6 levels. They are primary schools, junior secondary school, senior secondary school, specialized secondary school, regular institutes of higher education and graduate education. Then we extracted information from the student input-output matrix, which relate to the student probabilities matrix P.

$$P_{1997-1998} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0.900 & 1 & 0 & 0 & 0 & 0 \\ 0.303 & 0.337 & 1 & 0 & 0 & 0 \\ 0.081 & 0.089 & 0.021 & 1 & 0 & 0 \\ 0.089 & 0.098 & 0.291 & 0 & 1 & 0 \\ 0.010 & 0.010 & 0.030 & 0 & 0.106 & 1 \end{bmatrix}$$

The numbers below the diagonal element in the columns of P represent the probabilities of entering next higher-level schools for a new entrant. From the first column of $P_{1997-1998}$ we can see a new student entering primary schools has a 90 percent chance of entering a junior secondary school, a 30.3 per cent chance of entering a senior secondary school, a 8.1 per cent chance of entering a specialized secondary school, a 8.9 percent chance of entering a regular institute of higher education, and a 1.0 percent chance of entering graduate education.

Parallel statements can be made for the other columns.

As can be seen by comparing the numbers below the diagonal element of $P_{1997-1998}$ row by row, almost all of the numbers (except P_{43}) are getting larger and larger. E.g. a new entrant for primary schools in the 1997-1998 has an 8.9 per cent chance of eventually entering a regular institute of higher education; and this chance rises to 9.8 per cent for junior secondary schools and 29.1 per cent for senior secondary schools.

2. Estimation of Probability Models

The probabilities that we can derive from a student input-output matrix are measure of past changes from one period to the next. Thus the main problem encountered in building the model is to find out what has been happening to the probabilities in the past. So we calculates the probabilities matrix from the school year 1987-1988 to 1997-1998 and the estimates based on the data are presented in Table 1.

Table 1 Estimates of Probabilities of entering next higher level school

Variable	①	②	③	④	⑤	⑥
Constant	-71.317 * (2.336)	-19.520 * (3.414)	-10.527 ** (3.565)	4.665 ** (1.555)	-23.871 * (2.993)	-9.473 * (1.920)
t	0.0362 * (0.001)	0.0095 * (0.002)	0.00532 ** (0.002)	-0.0023 ** (0.001)	0.0121 * (0.002)	0.00479 * (0.001)
R ²	0.991	0.790	0.496	0.495	0.878	0.733
F-statistic	951.459	33.765	8.841	8.825	64.745	24.716
DW	1.646	1.407	2.986	0.444	1.705	1.329

Notes: * represent the estimates are significant at 0.1% levels. ** represent the estimates are significant at 2% levels. Standard errors are in parentheses.

① represent entering a junior secondary school for a new entrant to primary school; ② represent entering a senior secondary school for a new entrant to junior secondary school; ③ represent entering a specialized secondary school for a new entrant to junior secondary school; ④ represent entering a specialized secondary school for a new entrant to senior secondary school; ⑤ represent entering regular institute of higher education for a new entrant to senior secondary school; ⑥ represent entering a postgraduate education for a new entrant to regular institute of higher education.

It appears fairly typical that the numbers tend to increase from the 1986-1987 school year to the 1997-1998 school year, from which the probabilities of entering to junior secondary school for a new entrant to primary school increased rapidly, from 54.9% to 90%. Which is result of carrying out a policy of 12-year compulsory education and economic development. It might also be due to a greater willingness to have children going to school as a consequence of higher income and the one-child policy.

There is an exception to the changes. The column 4 changed in a converse direction, reducing from 6.6 per cent in the 1986-1987 to 0.21 per cent in the 1997-1998 school year. The levers of senior secondary school are both for entering specialized secondary schools and regular institute of higher education, but More and more school leaver from senior secondary school would like to enter colleges and universities to do further study instead of entering specialized secondary schools.