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DEPARTMENT OF EDUCATION

GOLD
Gothenburg Educational Longitudinal Database

**AN ATTRACTIVENESS INDEX TO DETERMINE
THE HIERARCHICAL DIFFERENTIATION WITHIN
HIGHER EDUCATION**

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An attractiveness index to determine the hierarchical differentiation within higher education

Description of the attractiveness index

The attractiveness index is based on the grade point average (GPA) from compulsory school, normally obtained at the age of 16. In order to make the variable stable against changes in mean GPA over time it is based on percentile transformed GPA (see the description of percentile rankings) during the period 1988 – 2002. Information is gathered on total cohorts born in 1972-1984, using register data from Statistics Sweden. Thus, the base for the attractiveness index is available for almost the total population (missing about 4%) and it is well defined.

However, the index itself is based on the population that has been admitted to programs in higher education of the cohorts 1972-1984, or about 35 percent of the complete GOLD-population. Persons that are not included in the GOLD-population but have been admitted to higher education are not included in the index. From 1998 there was a change in the grading system as a consequence of a new curriculum that was introduced in 1994. The new grading system is based on goal-related grades instead of the former norm-referenced grading system. Making grades from the two systems comparable was also a reason for using the percentile transformation of the grades.

The attractiveness index is constructed as the mean GPA for those admitted in each study program in higher education. The attractiveness index was computed from the first matriculation into a program. The index actually consists of several indexes: one index on semester level, where a minimum of nine students is required; and one for all semesters between autumn 1993 and spring 2002. The latter index is a program level index and a minimum of 31 students is required. The programs are rather stable over time and generally the variation between autumn semesters and spring semesters is higher than the variation between years.

The reason for using GPA from compulsory school instead of upper secondary school is that almost all students have got a GPA from compulsory school. Grades from upper secondary school could be considered as more appropriate as these are assigned closer to the application for higher education. However, about 15-25 percent of students born in the 1970s have not completed upper secondary education, with an increasing frequency of dropouts. The dropout is also not random; it is highly dependent on class (SES). In the latest cohorts in the 1970s, about 30 percent of the individuals from working class (SES 3) do not have any upper secondary school leaving certificate compared to those from upper middle class (SES 1) where the corresponding share is about 10 percent. In addition the grades from upper secondary school are affected by choice of program.

The percentile transformed grades have been adjusted for gender; that is, the percentile ranking has been done within gender; thereafter the ranking order is merged. There are several reasons for this. First, the mean GPA, or the overall grade, is higher for girls than for boys (Skolverket 2004). Second, many programs in higher education are perceived as either male or female; that is, women are competing with each other in order to get a place of study in female dominated programs, and men are competing with other men in other type of programs. The reason for the gender-differentiated choices of programs is the gender segregated labour market (SCB 2004, SOU 2004). Third, the meaning of a certain grade level differs. At equal achievement level, men are more likely than women to transfer to higher education (Andres 1998, Härnqvist 1998).

Higher education study programs defined as attractive according to the attractiveness index

Study programs that are defined as attractive according to the constructed attractiveness index are: agriculture, pharmacy, architecture, fire protection engineering, engineering, horticulture, law, medicine, landscape architecture, speech pathology and therapy, fine arts in church music, psychology, dental surgery and veterinary medicine. The list also includes journalism, business, computer science and mathematics, among others.

Relating the attractiveness index to other forms of status measurements

In previous research, several other ways of defining prestige or status have been used. In the following section a survey of some frequently used measures will be presented together with a short discussion about their applicability to Swedish conditions.

Other measures most in agreement with the attractiveness index are scores on matriculation diploma (Ayalon & Shavit 2004) or average SAT scores (Davies & Guppy 1997, Persell Hodges et al. 1992). Economic returns on the labour market (Ayalon & Shavit 2004, Davies & Guppy 1997, Erikson & Jonsson 1996) is a frequently used measure, although Erikson and Jonsson (1993) argue that it is somewhat arbitrary. Other measures are background variables, such as the educational level of the student's parents, or most commonly the father's educational level (Kivinen et al. 2001), and/or socioeconomic status (Kivinen & Rinne 1996). Moreover, the institutional difference is yet another; for example, whether it is an elite university, or a college (Ayalon & Shavit 2004, Jacobs 1999), or if characterised as a research versus service university (Kivinen & Ahola 1999). This division does to some extent overlap the differentiation into regions, and primarily if the institution is located in a capital area or outside (Kivinen et al. 2001). The amount of men attending different fields (Jacobs 1986, 1995), or type of institution (Jacobs 1999) is also used as a high status indicator with the understanding that male dominated institutions attract more money.

Turning our attention to Swedish conditions, relying on academic ability as measured by GPA from upper secondary school or SweSAT scores is difficult, since there are several admission quota groups which leads to different cut off points to the same program depending on which quota group the student has been admitted to. A certain number of places of study are in advance allocated for admission on the bases of GPA, while others are allocated for the SweSAT (SFS 1993, Ch. 7). Moreover, information on SweSAT scores is only available for a limited part of the population. Few students within working class, and particularly the men within this group, take the test.

Concerning returns on the labour market, they are different for men and women (Ljunglöf 2004, SCB 2004). The highest positions in society are almost not accessible for women, which might influence their expectations and thereby their educational choice (Andersson et al. 1997, Mickelson 2003, SOU 2004). Some programs are very attractive in the sense that high points for admission are required. Examples are speech pathology and therapy, dietetics, and physiotherapy which also attract primarily women (SCB 2003). However, these programs afford comparatively low economic returns on the labour market.

For Swedish conditions the measure of socioeconomic status is slowly becoming less precise since the latest survey of the total Swedish population was made in 1990.

In Sweden there are not very clear divisions between different universities, compared to other countries (Davies & Hammack 2005). The universities offer many different kinds of programs, both prestigious and not so prestigious. On the other hand, there is a difference between the universities and the recently established university colleges, the latter only offering bachelors degree. Higher education, universities and university colleges, are state

financed even though a few are privately held or foundations. There are no tuition fees. The admittance system is centralised, and the same regulations hold for the whole country.

In summary, there are several ways of sorting study programs according to attractiveness or status. Different principles can be used, such as programs with the highest amount of students who have: 1) highest GPA from upper secondary school; 2) taken the highest numbers of SweSATs; 3) parents with post secondary school education; and 4) parents from highest socioeconomic group. When using the available data and sorting study programs according to the above mentioned principles, the general conclusion is that study programs located at traditional universities are ranked as most attractive. Some recently established universities might enter the competition if they for example offer library science or journalism. However, it must also be taken into consideration that the competition for study places is dependent on the number of study places available.

Comparison with other measurements

Other measurements of attractiveness that are accessible for the entire population in the GOLD-database are also available. One is the relation between the number of admitted and applicants to each program in higher education and another is the mean of grades from upper secondary school.

The admitted/applicant ratio was found to be very variable, especially between autumn and spring semesters. The correlation with the mean compulsory school GPA was only 0.2. This can be the result of self-selection to educations like Physician and Master of Engineering. Moreover educations with lower status can have a large number of applicants but be avoided by persons with higher grades. The GPA from upper secondary school correlates 0.80 with the goal-related grades and 0.75 with the norm-referenced grades in relation to the GPA of the compulsory school.

Validation of the attractiveness index

In order to validate the attractiveness index, it has been compared with two other frequently used measures: parents' socioeconomic status and parents' education. Students born during the years 1972-1984 who entered any program with at least 20 participants offered at higher education institutions the academic year 2000/2001 were included in the comparison. The variables included in the analysis were: shares of students from SES 1 (*ses1*), shares of students whose parents have obtained post-secondary education (*educ1*), and the attractiveness index (*attr*). These three variables correlate as follows:

Table 1. Correlations and communalities between SES, Education level of parents and Attractiveness index.

Correlations

		ses1	educ1	attr index
ses1	Pearson Correlation	1	.782**	.658**
	Sig. (2-tailed)		.000	.000
	N	350	350	344
educ1	Pearson Correlation Sig. (2-tailed)	.782**	1	.660**
	Sig. (2-tailed)	.000		.000
	N	350	350	344
attr index	Pearson Correlation Sig. (2-tailed)	.658**	.660**	1
	Sig. (2-tailed)	.000	.000	
	N	344	344	344

** . Correlations is significant at the 0.01 level (2-tailed).

Communalities

	Initial	Extraction
ses1	1.000	.831
educ1	1.000	.832
attr index	1.000	.737

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Square Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.399	79.976	79.976	2.399	79.976	79.976
2	.380	12.667	92.643			
3	.221	7.357	100			

Extraction Method: Principal Component Analysis.

Component Matrix

	Component
	1
ses 1	.911
educ 1	.912
attr index	.858

Extraction Method: Principal Component Analysis.

The three variables were quite highly intercorrelated. In order to investigate the correlations more closely factor analysis (SPSS) was used.

As can be seen from the results, all three variables had high loadings on the first component. The first eigenvalue was 2.40 and explained 80% of the variance. This shows that there is only one component.

Conclusion

There are several ways to define attractiveness of educational programs. In this data material there are some benefits of using GPA as a base for the index. GPA is a stable measure over time. It is a simple measure to use and it is rather uniform. It is also the measure that has the least missing data in the GOLD-material. Furthermore, it is the most stable measurement between years and semesters.

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