

## Case Study on Econometric Model Measuring Popularity of Lecturers

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### 1. Rationale and Motivation

The project was combined with a specific education system at Warsaw School of Economics. In each of the first three semesters (i.e. Basic Study) students are obliged to complete a given set of courses. Since there are a number of professors giving the same lecture, students are free to choose the one they wish to attend. At the end of each semester every student submits his/her “card of choices” assigning the highest rank (1) to the most preferred professor and subsequent ranks – in order of preference – to other professors. Students are then assigned to certain lecturers based upon their choices, as well as their entrance examination results.

Recently, both in the university press and among school officials, a discussion on the motives of students’ choices has arisen. It was suggested by some that students are driven by the perspective of easy assessment, and high grade as a consequence.

### 2. Objectives

The opinions described above brought to light the need for further research in this matter. The starting point became the verification of hypothesis that the main motive of students’ choices regarding the lecturers, is the final grade received at the given class (course). Nevertheless to verify the above hypothesis, it has proved to be essential to identify other potential motives. Consequently, the complex analysis of professors’ popularity has become the scope of the research. The main assumption was: the higher rank the professor received on the “cards of choices”, the more popular he/she could be considered. In other words, the purpose of the study was to identify the potential reasons that make students choose a particular professor more often than the

others, as well as to measure the impact of each of these identified motives on the professors' popularity.

### **3. Model**

The model explaining popularity of lecturers was based on linear regression. The regressand (explained variable) was the popularity of the lecturer, whereas the set of the regressors (explaining variables) consisted of potential motives. All variables had been processed before being incorporated to the model, as described below.

The source data for the variable "popularity" came from the "cards of choices" submitted in the academic year 2001/2002. Since the data were the rank orders of the professors within each subject, multidimensional scaling, and multidimensional unfolding in particular, seemed to be the most appropriate technique of analysis. The MDU procedure was performed for each of the subjects separately. Then the perception maps were constructed, where both students and professors were depicted as points in a two-dimensional space. One could observe, that the closer the student-points were located to the given professor-point, the more popular this professor could be considered. For each professor the average (Euclidean) distance to all student-points was computed. The received values were then treated as the realizations of the explained variable "popularity" in the regression model.

The set of variables explaining popularity of the lecturer consisted of two subgroups. The first group was related to the students' expectations regarding the final grade. The second group of variables considered professors' features other than expected grade. As regards the first group, the expected grade was defined as the relative deviation of the grade average – given by a particular professor – from the general grade average obtained by the students within one subject. As a source data the grade distributions from the academic years 1998/1999, 1999/2000 and 2000/2001 were applied. Consequently, three potential regressors (each for one academic year) were constructed.

The other subgroup contained variables describing the qualitative characteristics of the lecture – and lecturer in particular. At Warsaw School of Economics the quality of lecture is evaluated by students themselves on a regular basis. Every semester a standardised questionnaire is distributed, containing a number of questions on lecture attributes. Students respond using a predefined nominal scale.

The specificity of the source data implied the factor analysis as the most appropriate research technique. It enabled the construction of orthogonal variables, which could be assigned an explicit interpretation.

As a result of factor analysis, two factors (variables) describing lecturer features were extracted:

- rhetoric skills,
- initiative to encourage students to self-study.

Factor scores for each professor were computed. The obtained values served then as the realisations of respective explaining variables in the regression model.

As regards model construction, correlations between all considered variables were examined. The results of correlation analysis became a prerequisite for estimation of two models – for two separate groups of subjects.

The first model regarded subjects compulsory in the first semester, whereas the second – all remaining Basic Study courses. In each model, different sets of variables proved to be statistically significant.

The model allows for complex analysis of the professor's popularity backgrounds. Furthermore it enables the researcher to examine more potential motives of students' choices than originally proposed. However the weakness of the model is its high sensitivity to data quality. It is recommended, not to aggregate the source data (e.g. to average, to sum, etc.).

Due to the insufficient data set, this particular project can only serve as a one-off activity and the conclusions should not be taken as ultimate. However, the applied model will be re-estimated for a more complete data set and repeated in subsequent semesters. Therefore, it can become routine practice.

#### **4. Organization**

The model construction was carried out in three phases:

- multidimensional scaling (responsible – Magdalena Łagodzka)
- factor analysis (responsible – Magdalena Browarska)
- estimation of final regression model (responsible – Magdalena Browarska and Magdalena Łagodzka).

Data was delivered by Basic Study Director and IT Center.

The only costs incurred for the Project resulted from bibliographic query in Poland and in Germany.

## **5. Results and Implementation**

The result of the project was the detailed analysis of students' choices for one academic year. However, it brought a new strategy for professors' popularity evaluation. The strategy included all the above mentioned methods applied in a strictly defined sequence.

Consequently, the process of conducting the project was crucial for plausibility of both of the partial and final results.

During the research several unexpected results appeared. In each stage of analysis additional interesting conclusions could be drawn. Perception maps constructed for Multidimensional Scaling and Factor Analysis revealed some unanticipated tendencies regarding students' attitude towards particular subjects. Partial results disclosed also, that popularity of the professor may be influenced by the subject he/she lectures.

The above conclusions were neither positive nor negative, they were however helpful for better understanding of popularity mechanisms.

## **6. Implementation**

As already mentioned, the project was only a pilot. Nevertheless, it should be considered as a starting point for further, recurring research of popularity reasons and teaching quality. It requires however the set of potential motives to be extended. Hence the significance of the motives should be examined in subsequent semesters. Such approach would allow to monitor tendencies both among students and professors.

Only such a focused research could be implemented in a long term, and thus serve as a supporting tool for the university didactic staff management.