

# Measurement of University External Effectiveness Based on the Use of the Acquired Skills

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**Summary.** In this paper, we analyse the skills used at work, 18 to 30 months from the completion of studies, by the students who graduated at the University of Florence in the year 2000. The aim is pursued by detecting the determinants of the phenomenon with particular attention to the possible differences between study programmes. We performed two analyses: in the first, we identified homogeneous groups of degree programmes and applied a proportional odds (logistic) model for each group and a partial proportional odds model for the whole university. The second analysis was an ordered logistic model with random intercept having two levels of aggregation with the degree types as second-level units.

**Keywords:** University effectiveness; Skills; Ordered logistic regression, Proportional odds models; Partial proportional odds models; Multilevel models; Cluster analysis.

## 1. The evaluation of external effectiveness

One of the ways of assessing the quality of the education offered by a university is to evaluate its performance in terms of internal and external efficiency and effectiveness. External effectiveness is the ‘capacity’ of a university programme to satisfy labour market needs as indicated by the first-employment rate (Chiandotto & Bacci, 2004), the length of time lapse between graduation and employment, the actual usefulness of the qualifications for the work undertaken, the degree to which graduates use at work the skills they have acquired at university, and so on.

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<sup>1</sup> The idea, the structure and the setting out of the contribution are due to both the authors; the data processing and the estimate of the models have been done by S. Bacci.

In this research, we focused on the use of skills that graduates achieved at university, with particular reference to the capacity of study programmes of creating the competences required by the labour market. For this purpose, after an appropriate aggregation of study programmes, we estimated a logistic regression model for every aggregation of graduates as well as for the entire contingent of the employed graduates. In this latter case, the groups of programmes were given the role of explicative variable. Thereafter, the results obtained were compared with those from the application of a multilevel logistic regression model on the same set of data; in this application, the programmes represented second-level units.

In Section 2, we discuss the phenomenon under study and its possible interactions with both the individual variables and different types of jobs. In Section 3, we analyse the resulting groups, while in Sections 4 and 5 we discuss the predictions and the results of the fitting of a regression model according to study programme and for the whole Florence University, for finding the net effect of the determinants of the achieved skill use. In Sections 6 and 7, we comment on the estimates obtained with a multilevel regression model. At the end, conclusions about the advantages and drawbacks of using a multilevel model for hierarchic models are drawn.

## 2. The skill use of the University of Florence graduates

In the year 2000, 5245 students graduated from Florence University. Out of these, 4846 had a Master and 399 a Bachelor degree. Of the 3856 graduates we interviewed, 2882 (approximately 75%) resulted to be working at the time of the interview: 1867 (64.8%) were using intensively the skills they had acquired at university, 730 (25.3%) were using it to a fair extent, while the other 285 (9.9%) did not use it at all.

The response distributions are far from being homogeneous with either the study programme<sup>2</sup> or the faculty (Table 1). For instance, the graduates in the Humanities who said their occupation entailed considerable use of the skills acquired at university went from 40.0% (Philosophy) to 65.0% (Modern foreign language and literature), while the graduates in Science ranged from 45.8% (Natural science) to 81.3% (Physics).

A comparison between the faculties revealed great differences. Taking into account the “considerable use of the skills”, there was an 86.7% of graduates from Medicine and an 81.5% of those from Pharmacy.

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<sup>2</sup> Because of the small numbers of graduates, Political economics has been merged with Economics, Tropical and subtropical agriculture and relative Sciences to Agronomy; moreover, the two courses in Foreign language and literature under Letters and Philosophy and Formation Science have been considered as a single study programme.