Labour market response models for university evaluation

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Abstract

In this work we tried to measure the quality of the universities in terms of employment outcomes of their graduates. In addition to previous findings in the literature, we are interested in assessing whether the research activities of universities and/or departments have any bearing on the outcomes of the teaching activities. If universities are conceived as multi-product organizations, oriented to both teaching and research, the question naturally arises whether there is complementarity or substitutability between the twos.

Among the problems we face, there are the appropriate measure of employability of graduates, the appropriate measure of research activity, the correct unit of analysis (universities or school/departments) and the correct methods for assessing university quality.

1 Related works

It is generally difficult to measure the quality of education imparted, because on the one hand the benefits emerge over the entire lifecycle, and on the other hand the benefits often involve very different dimensions of life. Moreover, in Italy there are no longitudinal databases that are informative of all dimensions. For this reason, we shall restrict ourselves to a more limited perspective, considering the (first) transition from university to the labor market. As many other papers in the field, we use the most recent ISTAT survey on 2004 graduates, collected 3 years after graduation (in case of release of the new survey, conducted in 2010, we will try to update our analysis).

In the Italian case other papers have goals similar to ours, since they have explored the university contribution to employability ((4), (7), (5)). For the Cariplo

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Foundation project 2009 titled: '*The quality of the education system in Lombardy: Measurement, international comparisons and proposals*', we have correlated the employment outcomes of graduates out of Lombard universities with information concerning the characteristics of the universities attended. We used three alternative sources of data. The first was the research activity of schools collected by CENSIS-La Republica (individual productivity of professors, quality of research, quality of teaching, internationalization). The second source was the CIVR ranking. However, instead of using the aggregate ranking of universities (5), we preferred the positioning within each specific reserach field. From the same data source we have also extracted measures for excellence in research and fund attraction. Finally, from CNVSU we obtained measures of effectiveness of teaching, of regularity in academic careers (i.e. the proportion of graduates concluding their studies in due time) and availability of resources (proxied by the students/teachers ratio). In this analysis of Lombard universities we followed the two-step approach adopted by (4), even if our first-step clusters were more precisely identified (by university, reserach field and type of degree). We found that attended universities contribute more to wage differentials than to job finding probabilities. In addition, when we replaced university fixed effects with characteristics of the cluster university/research field area using previous mentioned variables from CENSIS, CIVR and CNVSU, we found limited statistical significance, probably due to the limited number of universitiesin Lombardy

2 Materials and Method

Standard literature on effectiveness of educational obtains value added (V.A.) estimates using a two-stage procedure (see Hanushek 1974) where the first stage estimates the V.A. of the institution using a fixed effects (FE) model and the second stage regresses the FE coefficients on some institution-level inputs (see (3) and (4) among others). V.A. can be also evaluated considering alternative models, e.g random-effects multilevel models (see (9) and (8) among others). Moreover, other approaches have been proposed and discussed ((6), (12), (2)). As pointed out by (11) the adjustment required for the assessment of effectiveness is not easy, as it involves many variables whose measurement is problematic. The amount of accidental variability should be carefully estimated and taken into account when comparing the institutions, in order to avoid results that do not reflect actual differences in effectiveness. A broad review of the methodological and statistical issues connected with performance indicators is (1).

We have extended our previous study on Lombard universities to the entire country, replicating alternative methods to obtain measures of universities V.A. (2-step fixed effects, multilevel models). After comparing the outcomes and of alternative methods, our preferred method is a random intercept multilevel model. Following related works, we include in level-1-variables student characteristics in terms of family of origin, previous educational career and possible work experience; we then add the type and the subject area of the degree obtained. As level-2-variable, we consider the private-public nature of the university. Finally we account for local labour market via regional dummies.

3 Summary of Results

In the two models for earnings and job-finding probability, the significant variables with positive coefficient are the degree marks, being male, the months of the previous work, having a high social status and having worked during the course of studies. Obtaining the degree beyond the due time is associated to a significant negative penalty. As for the other variables, all subjects have a significant negative coefficient compared to the reference case (Economics and Statistics) when accounting for earnings differences. Having attended a private university has a positive premium. Employment probabilities do reflect the dual nature of the Italian labour market, since the probability is highest in Trentino and lowest in the South. Finally those who obtained a degree under the pre-reform system perform better than 3-year BA holders.

Figure 1 shows that universities differ significantly, in particular the ones on first and the last position in the ranks. The confidence intervals are more overlapped in the wage prediction than in the employment prediction.
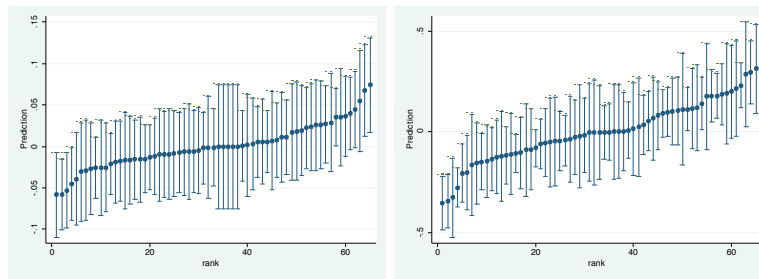
Fig. 1 Random-intercept predictions and approximate 95% confidence intervals versus ranking for wage and for employment

In the final version of the paper the two ranks will be explored in more detail.

We are currently exploring the correlation between different V.A. measures and a newly constructed measure of research activity based on the mean IF per university collected from Web of Science database. We are aware that this measure of 'research' does not go uncontested, especially when considering alternative strategy of normalization (by number of scholars per university, by number of total products per university, by area, etc.). In our micro-data set the number of units per university is proportional of its dimension and the subject area is considered. In a preliminary analysis we use the mean of IF per university[1] as a proxy of the 'research intensity/quality' of universities. The coefficient associated to the mean IF influence positively the probability of job-finding, in according with our previous analysis on universities in Lombardy and with the (5) results.

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[1] The IF value that we used for this purpose is the mean IF of all papers produced by the researchers of the universities in 2001-2004, the years of reference of the ISTAT Survey.

4 Conclusions

In the final version of the paper we will be able to discuss the alternative measures of research activity in relationship to the employability of graduates. In addition we will explore the complementarity/substitutability between teaching activities and research activity. Finally we would like to express our view about which V.A. model are more appropriate in the case of university evaluation.

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