Supervising and Assessing Team Projects. Some Experiences in Econometrics

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Abstract

In the context of the Economics and Business degrees, Econometrics provide a wide variety of tools which appear to be narrowly related to several main competences such as information management, creativity, problem solving or decision-making. Furthermore, the need of analyzing and interpreting the functioning of the economy suggests the convenience of learning Econometrics by doing Econometrics.

Team projects play a main role in the teaching-learning process, since they allow students cooperating in the development of econometric models, taking benefit from econometric software and ICT facilities, and also improving their ability to work in team, as suggested by employers. Moreover, from the teachers´ perspective, the development of team projects represents a good opportunity to reexamine some methodological aspects, also opening new challenges in the management and assessment of the projects.

In this paper we summarize our experiences in supervising Econometrics team projects for more than a decade, describing the main pedagogical and organizational decisions. According to the available information (based both on objective statistics and online students´ surveys) we confirm some strengths of the experience (such as the use of Gretl, the virtual campus, the continuous assessment or the oral presentation) but also some weaknesses, mainly referred to organizational aspects and the improvement of critical and self-critical ability.

Keywords: team project, econometrics, Gretl, self-assessment, peer assessment, surveys

1. The Econometrics Teaching-Learning Process

The Economics degrees aim at training individuals capable of analyzing and interpreting the functioning of the economy, and Econometrics provides a wide variety of tools which appear to be narrowly related to main competences as information management, creativity, problem solving or decision-making.

In the framework of the University of Oviedo, Econometrics is a compulsory third-year subject, with about 100 students divided into two groups for theoretical sessions, three groups for classroom practices and five groups for lab sessions, and our blended learning experiences in Econometrics started sixteen years ago, when the virtual campus AulaNet was created. Since then, the teaching-learning methodology has been progressively adapted to new technological resources (virtual campus platforms, econometric software,…) and new university degrees in the context of the European Higher Education Area (EHEA), as described in López & Pérez [1].

The obtained results are quite satisfactory, according to both objective and subjective indicators. The rate of efficiency (computed as the ratio between passed and registered credits), exceeds the average of the Department of Applied Economics and the School of Economics and Business and similar conclusions are found with regard to the rate of expectancy (examined/registered), the rate of success (passed/examined) and the proportion of students achieving high marks.

Regarding the subjective indicators, students´ online surveys detect a high level of agreement with the achieved competences and skills, especially those referred to information management, computing and problem solving. Teamwork is also appreciated as a valuable although rather hard competence.

According to our experiences, three elements must be highlighted as determinants of this success: the software Gretl, the team Project and the assessment system.

Gretl (Gnu Regression, Econometrics and Time-series Library) has proved to be a suitable software for educational purposes, as shown in the works by Baiocchi & Distaso [2], Mixon & Smith [3], Yalta & Yalta [4], Rosembladt [5], Cottrell [6], Falat & Panciková [7], Cottrell & Luchetti [8] and Adkins [9], among others. In a previous work (López & Pérez [10]) we have implemented the “Four-F” test including the hypotheses of Freedom, Flexibility, Functionality and Friendliness, finding that –

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according to both objective evidence and students´ subjective perceptions- Gretl clearly fulfills the requirements of freedom, flexibility and friendliness, while some difficulties arise with regard to its functionality.

The team project has been identified as a key point in the Econometrics learning process, providing our students with many competences. Since the supervision and assessment of these projects are the main goal of this paper, they are analyzed in more detail in the next section.

Finally, the assessment system has been designed by combining the continuous evaluation and the final exam. More specifically, according to this procedure the team project has a weight of 25%, while the final exam weights 60% and the remaining 15% corresponds to monthly assessment questions, collected in theoretical, practical and lab sessions. With the aim of rewarding students who regularly attend class, the continuous assessment grade is computed as the average of each student´s four best scores, thus providing some extra "degrees of freedom".

2. Supervising and Assessing Team Projects

The inclusion of collaborative works into university courses has become more popular in the context of the European Higher Education Area. In the case of Econometrics, the team project plays an outstanding role in the teaching-learning process, since it provides our students with the opportunity to work with real information, thus becoming familiar with the main problems of econometric modelling and forecasting.

The supervision and assessment of these team projects are challenging from both teachers´ and students´ perspectives. Although Information and Communication Technologies can be a great help in managing these projects, teachers undoubtedly assume an extra-effort and the need to develop new assessment procedures.

Moreover, students undertaking such projects need advice and support and they often express concern about the way in which marks are allocated to different members of the group, with different contributions to the project.

As described in table 1, our methodology is based on an intensive use of the virtual campus resources from the very beginning of the process. Once the course is started, students are asked to submit online their proposals, allowing them to freely choose both teammates and topic.

Since then, all communications referred to team projects take place through the corresponding forum (with 3-4 team members and the professors) starting with the feedback to the first proposal and finishing by sending the final report (together with the corresponding Gretl workfiles). Of course, students have free access to the software Gretl and a wide variety of online materials, and they are also welcome to face-to-face tutorials, but the use of the team forum provides outstanding advantages throughout the entire process: students can easily organize themselves, ask and solve questions, … while teachers have access to extremely useful information in order to evaluate not only the final result, but also the learning process.

With the aim of sharing experiences, oral presentations of the team projects are scheduled along the semester and, since they take place at different development stages, further debate is emphasized, trying to develop critical and self-critical abilities.

Table 1. Team Project Monitoring and Assessment

Week	Activity and Monitoring	Assessment (weight)
2-3	Team and Project Proposal (online)	Grade assigned to project proposal (10%)
4	Team´ Forum Available, Feedback to first proposal, List of Projects Published	Forum Activity (10%)
4-14	Team Questionnaire and Oral Presentations	Grade assigned to presentation (30%)
Final exam	Final report (forum)	Grade assigned to final report (50%)
Final exam	Personal Questionaire (including self-assessment and peer-assessment)	Final grade assigned to team and members

Source: Own elaboration

Regarding the assessment, two main difficulties have been faced. The first of them refers to the aspects of the team project that should be assessed (the product and/or the process) while the second focuses on the procedure for assigning a mark to each member of the group.

With respect to the first aspect, we aim to evaluate not only the product (the final report weights 50%) but also the process, which is rather more difficult, (weights of 10% are assigned to the initial proposal and forum activity while oral presentation weights 30%).

Regarding the criteria of assigning marks to different members of a group, the simplest option (according to which all members of the group receive the same mark) seems to be quite unfair when, as it is often the case, they do not contribute equally to the project. The use of peer assessment is a suitable way to solve this problem, as shown by Holland & Feigenbaum [11], Sluijsman et al. [12], Kennedy [13], Scott et al. [14], Pond et al. [15], Willmot & Crawford [16], among others.

In this paper we propose a straightforward approach according to which each student evaluates each member of the team, and also the team as a whole, using the standard scale from 0 to 10. Since students are familiar with this grading system the accuracy of their answers is expected to increase and the obtained results are fully homogeneous and comparable.

More specifically, according to our proposal and denoting the marks provided by teachers and students by X and Y respectively, the final grade assigned to a student i of a team t can be computed as follows:

$$X_{i,t} = \left(X_t^{\text{Proposal}} 10\% + X_t^{Forum} 10\% + X_t^{\text{Presentation}} 30\% + X_t^{\text{Report}} 50\% \right) \frac{\overline{Y}_{i,t}}{\overline{Y}_t}$$

where $\overline{Y}_{i,t}$ and $\overline{Y}_t$ represent the average grades assigned to student i and team t by all the team members.

3. Empirical Findings

Our experience provides interesting empirical evidence referred to three different aspects: consistency of the peer assessment results, consistency between self and peer assessment and impact of the assessment system on students´ grades.

The available information comes from teachers´ records and individual questionnaires provided by a total of 88 students grouped in 24 teams, allowing a wide variety of statistical analyses.

With reference to the consistency, the obtained results confirm that, although the levels of dispersion are found to be moderate, students are able to discriminate between students' grades, instead of awarding equal marks.

As expected, the dispersion between team members negatively affects the results of the group and the average grade awarded to the team is usually (62.5% of the cases) higher than the one obtained from individual grades, thus suggesting the existence of a positive "team effect" which can be interpreted as the "team value added".

A more detailed analysis of the individual answers detects a high level of coherence between members of the same team, since the peer assessments to a given member of the team are found to be quite similar. In fact, the Pearson Variation Coefficient results to be low in the vast majority of the cases (97.7%) confirming the representativeness of the mean peer-assessment.

In order to examine the consistency between self and peer-assessment, we have computed both absolute and relative self-assessment biases, whose expressions are collected in table 2. The obtained results support in both cases the consistency hypothesis, since the differences between self and peer-assessment for a given student are found to be non-significant.

Table 2. Consistency between Self- and Peer-assessment

	Expression	Consistency Hypothesis	p-value
Absolute bias	$AB = Y^{Self} - Y^{Peer}$	$H_0 : m_{AB} = 0$	p=0.82
Relative bias (SAPA)	$RB = \frac{Y^{Self}}{Y^{Peer}}$	$H_0 : m_{RB} = 1$	p=0.69

Source: Own elaboration

Finally, we briefly examine the impact of the proposed assessment system on students´ grades. As expected, the team project final mark awarded to each student through expression (1) is usually lower

than both the self-assessment and the peer-assessment grades, as it can be observed though the Self-Assessment to Teacher-Assessment (SATA) and the Peer-Assessment to Teacher-Assessment (PATA) ratios. The obtained results –summarized in table 3- are in both cases clearly significant, leading to the rejection of the unbiasedness hypothesys.

Table 3. Self- and Peer-assessment unbiadness tests

	Expression	Consistency Hypothesis	p-value
SATA	$SATA = \frac{Y^{Self}}{Y^{Teacher}}$	$H_0 : \mu_{SATA} = 1$	p=0.00
PATA	$PATA = \frac{Y^{Peer}}{Y^{Teacher}}$	$H_0 : \mu_{PATA} = 1$	p=0.00

Source: Own elaboration

In spite of the existence of the previously detected biases, self- and peer-assessments result to be significant in explaining the team project final mark awarded to each student. In fact, the following least-squares model has been fitted, also confirming the negative impact of the group dispersion and providing a coefficient of determination of 47%.

$$\hat{X} = -0.671 + 0.643Y^{Peer} + 0.243Y^{Self} - 0.494STD_Y$$
$$(1.05) \quad (0.12) \qquad (0.11) \qquad (0.25)$$

This regression provides new interesting evidence about the relationships between teachers´ and students´ assessments, since the estimated parameters show the expected signs and fail to reject the hypothesis $H_0 : \beta_1 = 0, \beta_2 + \beta_3 = 1$, thus confirming the adequacy of the proposed assessment procedure.

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