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## Teaching quality and academic research

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## ABSTRACT

This paper studies the relation between teaching quality and research productivity using a detailed database for students in higher education. In order to measure teaching quality, we employ a version of the value-added methodology which uses future performance of students to make inferences about the current teaching quality of their professors. We report a mild but positive and significant relation between publications on top journals and teaching quality. To all practical effects, this finding does not seem to be contaminated by the potential negotiating power of professors with high levels of top publications strategically choosing the best-performing groups. Additionally, we report evidence that the random assignment of students into class groups is reasonably satisfied. Finally, we argue that teaching effectiveness measures based on anonymous student evaluations are suspicious and debatable.

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## 1. Introduction

Universities around the world emphasize teaching and research as their main tasks. Consequently, the relation between academic research and teaching quality is one of the most fundamental issues of higher education.<sup>1</sup> This paper investigates this relation by employing not only student evaluations but also measures of teacher value-added effectiveness.

Although policy arguments assume that teaching is a key determinant of a student's academic formation and transition into the labour market, how to estimate teachers' contribution to student learning is much less clear. This fact is disturbing not only because empirical studies analyzing the relation between teaching quality and research may potentially be subject to well-founded causality critiques, but also because it makes the inclusion of teaching quality considerations into teachers' promotions and tenured positions extremely controversial.<sup>2</sup>

This paper applies value-added models of teaching effectiveness at the university level, with the final objective of analyzing the relation between teacher quality and academic research. As opposed to the value-added contemporaneous approach used in primary and secondary schools, this paper employs a version of the value-added methodology first proposed by Carrell and West (2010) which uses future performance of students to make inferences about the current teaching quality of their professors.

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E-mail address: [gonzalo.rubio@uch.ceu.es](mailto:gonzalo.rubio@uch.ceu.es) (G. Rubio).<sup>1</sup> See Mas-Colell (2011) for a discussion about the differences between universities in the United States and the European Union regarding the interaction between research and teaching as the two fundamental aspects to consider when thinking about the European space for higher education.<sup>2</sup> Carrell and West (2010) discuss how students appear to reward teachers with good evaluations depending upon the contemporaneous grades they expect to get from the instructors. This finding seems to question the value and accuracy of student evaluations through anonymous questionnaires.

The issue of clarifying the relation between teaching quality and academic research is particularly relevant for countries where hiring companies do not tend to offer new positions for undergraduates based on the reputation of a particular university. In this context, where there seems to be a lack of market discrimination about the reputation of universities, policy administrators should be especially concerned with the budget resources assigned to public universities. This is particularly true for Continental Europe, where there is a current debate on whether university funding should be more strongly related to academic research contributions and less so to a school's number of students. The core of this debate relies on the degree to which teaching quality and academic research are interconnected. As discussed by [Labini and Zinovyeva \(2014\)](#), many universities worldwide have a complementary view of research and teaching. Teachers at the frontier of knowledge can then teach up-to-date material more effectively and their courses can better reflect the relevant issues to be taught. On the other hand, teaching and research can also be considered substitutes, given the time and effort required for teaching excellence, and can even reflect different natural abilities. Ultimately, the relation between academic research and teaching quality is an empirical issue.

We study the relation between teacher quality and academic research for three degree programs, Business Administration, Economics, and Finance & Accounting, offered by the University Carlos III of Madrid, one of the best internationally known Spanish Universities, for two graduating classes from 2008 to 2013. We find a mild but positive and significant relation between academic research, as measured by the publications on top scientific journals, and teaching quality. It is important to point out that our findings do not seem to be explained by a non-random assignment of students to class groups, and to all practical effects they cannot seem to be attributed to the strategic actions of professors with top publications choosing the best-performing student groups for example taught in English, with high average entry scores or with a significant proportion of females. Additionally, we show that value-added-based measures of teaching quality seem to reflect different characteristics than the ones related to overall satisfaction, as captured by student questionnaires. In particular, and contrary to our previous finding, the degree of student satisfaction is negatively and significantly related to top publications, but it is strongly and positively related to teaching activities and to the grading methodology followed in the course. These results have serious implications for how student performance should be assessed and, of course, for how teacher quality should be measured.

We do recognize that we cannot generalize our results to the global higher education space. In this sense, our research has well-identified limitations. Although, our data are very rich and university officials have provided us with all the necessary details to pursue this research, the data cover only the School of Law, Business and Economics from a single Spanish university. The positive point is that the University Carlos III has a specific and well-defined system of incentives for both teaching and research that makes their data reasonable to use; however, it is very difficult to generalize our results to other areas of knowledge or and to other Spanish universities. Nonetheless, a more ambitious goal of our study is a public call for the creation of comparable data sets across Spanish universities to allow researchers, students, and public official to discriminate between programs, schools, departments, and universities. At the very least, the top Spanish universities should develop systematic data sets that allow for well-defined questions and answers about the relative importance of teaching and research. They should understand that an investment in this direction is a key strategic tool in discriminating themselves from other universities while alleviating adverse selection problems.

From a more general perspective, studies of this sort, with public data sets that allow for discrimination in teacher quality, academic research productivity, employment conditions, recent graduates' salary levels, and so on, should be a fundamental part of the obligations of Spanish universities to society. Any society should be able to ask about the responsibilities of universities when enormous amounts of resources are invested in higher education. An obvious prerequisite of such studies is sufficient data to make the necessary comparisons and then penalize those who are not creating enough value in either teaching or research.

The paper is organized as follows. Section 2 briefly reviews previous literature on faculty research productivity and its relation with teaching quality. Section 3 describes our data regarding institutional details and discusses students and teacher characteristics related to research and teaching activities. Section 4 discusses the econometric methodology to obtain measures of teaching effectiveness. Section 5 explores the relation between academic research and teaching quality, employing a value-added methodology. Section 6 analyzes teacher evaluations from student questionnaires. Section 7 concludes the paper with summary and final remarks.

## 2. Previous literature on research productivity and teaching quality

Most universities rely on summary statistics of student questionnaires to assess the contribution of teachers to student knowledge. Indeed, using the results from a 1999 United States (US) national survey for Economic departments, [Becker and Watts \(1999\)](#) show that student evaluations of teaching are, by far, the most widely way of assessing teaching quality. Not only that, but this procedure is often the only methodology employed to evaluate teaching effectiveness. [Becker et al. \(2011\)](#) show that, even using an updated national survey for 2011, the departmental evaluation practices have practically not changed except for the use of on-line questionnaires.

The idea of using student evaluation of teachers is, of course, to alleviate agency problems related to the fact that neither the quality of teachers nor their level of effort can be observed. [Wachtel \(1998\)](#) argues that faculty opinions about the reliability of teachers' evaluations are extremely dispersed. If anything, the consensus seems to be rather critical about the use of anonymous questionnaires as a way of determining which university teachers to hire or to promote. Indeed, [Carrell](#)

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