



SAPIENZA
UNIVERSITÀ DI ROMA

2019

**17th INTERNATIONAL CONFERENCE ON
SCIENTOMETRICS & INFORMETRICS**

ISSI2019

with a Special STI Indicators Conference Track

2-5 September 2019

Sapienza University of Rome, Italy

PROCEEDINGS

VOLUME II

PROCEEDINGS OF THE 17TH CONFERENCE OF THE INTERNATIONAL SOCIETY FOR SCIENTOMETRICS AND INFORMETRICS

- © Authors. No part of this book may be reproduced in any form without the written permission of the authors.
- © International Society for Scientometrics and Informetrics
- © Edizioni Efesto - ISBN 978-88-3381-118-5 - August 2019
Printed in Italy

Editors: *Giuseppe Catalano, Cinzia Daraio, Martina Gregori,
Henk F. Moed and Giancarlo Ruocco*

Graphic cover design: *Francesco Manzo* | graframan.com

Cover photo: ©*Fayee* - stock.adobe.com

The Role of Research Collaborations for Academic Performance in Italy: An Empirical Analysis of Scopus Data

Luigi Aldieri¹, Gennaro Guida², Maxim Kotsemir³ and Concetto Paolo Vinci⁴

¹ laldieri@unisa.it

Department of Economic and Statistical Sciences, University of Fisciano, Salerno, Via Giovanni Paolo II, 132, 84084 Fisciano, Salerno (Italy)

² gennaro.guida@uniparthenope.it

Department of Economic and Legal Studies, Parthenope University of Naples, Via Generale Parisi, 13, 80132, Naples (Italy)

³ mkotsemir@hse.ru

Institute for Statistical Studies and Economics of Knowledge, National Research University Higher School of Economics, 20 Myasnikitskaya Street, 101000, Moscow (Russian Federation)

⁴ cpvinci@unisa.it

Department of Economic and Statistical Sciences, University of Fisciano, Salerno, Via Giovanni Paolo II, 132, 84084 Fisciano, Salerno (Italy)

Introduction

There are different streams in the literature to explore research collaboration (Acosta et al., 2010; Fantino et al., 2015; Bergé, 2017; Shashnov and Kotsemir, 2018; Kotsemir, 2019). The topic concerning the research collaboration assumes a key role to the development of an academic institution in Italy, where a higher share of fund-raising depends on scientific research output. As discussed in the literature (Aldieri et al., 2018), the knowledge flows arisen between researchers from different universities are relevant to enhancing the quality of research and at the same time Italian and Russian universities could improve their interactions with international institutional partners. Paying attention to the Italian case, we intend to investigate the distribution of collaboration activities for regions evidencing the explanatory variables able to produce such a result.

Following this approach, we explore the variables which are the most significant inside the research production function and which could be an important instrument to favour less opened institutions.

In order to achieve our objective, we consider the following set of variables: age, gender, academic institution, disciplinary field and position relative to authors; number of administrative staff employed; amount of study grants; foundation year; number of spin off, relative to universities. Thus, in order to evaluate the output of scientific research we use a mean of 5 bibliometric indexes as the IF5Y (the Impact Factor calculated on a period of the last 5 Years), the AIS (Article Influence Score), the IPP (Impact Per Publication) the SJR (SCImago Journal Rank), and the H Index for the period 2010-2014

(see detailed description of all these variables in Aldieri et al., 2019).

Methodological Approach

The aim of our investigation is to estimate the effect of single authorship (single), national external collaborations (nat_coll) and international collaborations (int_coll) on the quality indicator of Italian universities, measured by the new quality index (pc) that encompasses eight indicators (number of publications indicators of journal quality an citation indicators). PC variable is obtained from a principal component analysis (PCA) process (see more in Aldieri et al., 2019). In particular, we investigate the corpus 5002 publications of Italian researchers belonging to the statistical economic sector in Scopus for the period 2007 – 2016. Model that is estimated is the following (1):

$$PC_{i,k} = C(Coll, x_{i,k}, z_i, w_k) \quad (1)$$

The university-specific characteristics (vector $x_{i,k}$) include the number of students (stud) and Government transfers received (fund). The institution-specific characteristics that affect the quality of a unit's publications (z_i) consider the "age" of an academic institution (found), that is, the years elapsed from its establishment to 2017, the number of faculty staff (pstaff) and the number of spinoffs (SpOff).

The publications in scientific fields (w_k in the model) are grouped into four sectors: 1) economics; 2) business management; 3) economic history; 4) statistics. This classification of scientific fields is used by the National Agency for Assessing University and Scientific Research (also known as AN-VUR) for the assessment of scientific research in Italy. All variables used in our model are described in Table 1.

Table 1. Description of variables of the model

Variable	Description of Variable
PC	Dependent Variable of publication quality stemmed from the PCA process
Gend	Dummy variable assumes 1 if first author is male and 0 otherwise
Age	First author's age
Stud	Number of students enrolled in the University
Fund	Amount of funds received from University
pstaff	Number of administrative staff in the University
Found	Foundation year of University
SpOff	Dummy variable assumes the value of 1 if University has spin-off
Dist	Geographical distance in km between two Universities
Single	Dummy variable assumes the value of 1 if there is only 1 author in a specific publication
Int coll	Dummy variable assumes the value of 1 if there is at least 1 foreign author (not from Italy) in a specific publication
Nat coll	Dummy variable assumes the value of 1 if there is at least 1 author of other national (Italian) University in a specific publication

Results

In order to solve the potential endogeneity of collaborations, we use GMM (Generalized Method of Moments) techniques for instrumental variables, which allow endogenous variables to be instrumented by excluded instruments (See Table 2).

Table 2. GMM model results (dependent variable is PC)

Coeff. Est ^d .	GMM	
	Coeff.	s.e. ^a
Gend	-32.05***	(11.25)
Age	0.81	(0.772)
Stud	-0.04***	(0.001)
Fund	0.01***	(0.001)
pstaff	-0.15***	(0.030)
Found	-0.26***	(0.028)
SpOff	-10.3***	(0.475)
Dist	-0.06***	(0.024)
Single	3.53***	(0.732)
Int coll	13.47***	(0.406)
Nat coll	2.53***	(0.377)
R2		

Notes. a: ***, ***, * Coefficient significant at the 1%, 5%, 10%. b: Year, field and country dummies are included in the estimation procedure. c: Standard errors are corrected for heteroscedasticity. d: 5002 observations.

From the empirical findings, we can observe that both international and national external collaborations lead to a significant and positive effect on research evaluation process, but the magnitude of international collaborations is higher. Concerning the other control variables, our results show that male authorship and the amount of funds received

from university increase the academic research quality. On the other hand, variables like number of students, number of administrative staff, university foundation year, the presence of spin-off and the average distance from another university lead to academic quality deterioration.

Conclusions

The full-article version of this research (Aldieri et al., 2019, available at <https://rdcu.be/bqLxZ>) provides more comprehensive analysis of the impact of research collaborations on the scientific performance of Italian universities, including geographical aspects (analysis of the effects of collaboration on the level of regions and provinces of Italy). One the way of development of research is its replication for the case of several countries with different academic systems. The other way of development is the expansion of the sample (in terms of time span; number of universities, the corpus (and thematic coverage) of publications) to detect some effects due to trends and disciplinary aspects in the development of collaborations.

References

Acosta, M., Coronado, D., Ferrándiz, E., & León, M. D. (2010). Factors affecting inter-regional academic scientific collaboration within Europe: The role of economic distance. *Scientometrics*, 87(1), 63-74.

Aldieri, L., Kotsemir, M., & Vinci, C. P. (2018). The impact of research collaboration on academic performance: An empirical analysis for some European countries. *Socio-Economic Planning Sciences*. 62, 13–30.

Aldieri L., Gennaro G., Kotsemir M., & Vinci C. P. (2019). An investigation of impact of research collaboration on academic performance in Italy. *Quality and Quantity*. 1-38, article in press.

Bergé, L. R. (2017). Network proximity in the geography of research collaboration. *Papers in Regional Science*, 96(4), 785-815.

Fantino, D., Mori, A., & Scalise, D. (2015). Collaboration between firms and universities in Italy: The role of a firm's proximity to top-rated departments. *Italian Economic Journal*, 1(2), 219-251.

Kotsemir M. (2019). Unmanned aerial vehicles research in Scopus: an analysis and visualization of publication activity and research collaboration at the country level // *Quality and Quantity*, 1-31. <https://rdcu.be/btN2A>

Shashnov, S., and Kotsemir, M. (2018). Research landscape of the BRICS countries: current trends in research output, thematic structures of publications, and the relative influence of partners. *Scientometrics*, 117(2), 1115–1155. <https://rdcu.be/4rWv>