

## **Remedial education in Italian University: long run effects**

Maria De Paola, Vincenzo Scoppa, Janna Smirnova

Department of Economics, Statistics and Finance

University of Calabria

[maria.depaola@unical.it](mailto:maria.depaola@unical.it) [vincenzo.scoppa@unical.it](mailto:vincenzo.scoppa@unical.it) [janna.smirnova@unical.it](mailto:janna.smirnova@unical.it)

### **Extended Abstract**

*This is an extended abstract of the paper that is in progress. We apologise for not having submitted a complete version. However, the results of data elaboration are very promising. We guarantee to provide the discussant with a full version of the paper in a due time.*

Tertiary education nowadays faces heterogeneous challenges across the globalised world. However, the problem regarding the quality of education has become relevant for any society. The supply of highly skilled labour in an expected frame of time is an important aim to be achieved in rapidly changing competitive conditions.

In this regard, remediation is considered as a solution to a frequent problem of tertiary education, such as scares freshmen or precollege students' preparation. This persistent problem, in turn, spills over into a wide range of other problems such as, for example, shortage of college enrolment and consequent scarcity of skilled labour force in the USA (Boylan et al., 2017), prolongation of time spent in completing degree and high college drop out rates in Europe (Duchini, 2017) or hamper introduction of English-speaking college culture in Asian universities (Chao and Tseng, 2013). The remediation, consisting in providing unprepared students with the skills necessary for a college education, could represent an effective tool to correct these and other severe shortcomings of modern education system.

To face the problem, many states in the USA have introduced the norms of legislation on remedial education starting from 2012 (Boylan et al., 2017). In turn, large-scale policies of remediation were also introduced in England since 2014 (Van Effenterre, 2017). In many European universities freshman students are now to be tested in relation

to the degree course requirements while the universities are called to elaborate their own strategies of remediation (European Commission, 2013).

Mushrooming literature offers contradictory evidence on wide range of topics regarding remedial education (a literature review is provided by Van Effenterre, 2017), which confirms the complexity of the issue. The matter on the modality of remedial courses supply, their assignment, the measure of effectiveness, the over time effect, the costs and the benefits are still open questions.

Our study provides some novelty elements into discussion on remedial education by considering an Italian public university. First of all, the case regards non-mandatory assignment to remedial courses, different from those mostly studied in the literature. Secondly, the research covers a long time spell passed after remedial courses were taken, which makes possible to consider a wide range of long-run effects. Finally, we add the evidence on the impact of remediation on the employment, which, at our knowledge, is investigated only by very few authors.

Literature on remedial education covers wide range of topics. The main issue regards the functionality of remedial courses and evaluates advantages and disadvantages of their introduction. Different are the measures of the effects of remediation. Most part of the literature concentrates on probability of college entrance (Cortes et al., 2014), time to obtain a degree (Bettinger and Long, 2008), drop out rates or scores accumulation during academic carrier (Garcua-Perez and Hidalgo-Hidalgo, 2017; 2017 Dai and Huang, 2014). The fact that, as discussed in Van Effenterre (2017), both positive and negative evidence is found, indicates on the importance of the analysis of particular remediation features.

For this reason, some of the contributions arise the question on what makes remedial courses functional. These papers investigate the organisation of remedial education, for example: introduction at school level (Lavy et al., 2018) or college level (Boatman and Long, 2018); types of introduction, such as double-dose (Cortes et al., 2014), additional hours (De Paola, Scoppa, 2014) or conditioned academic carrier pursuance (Duchini, 2017); the establishment of assignment rules (Scott-Clayton, Crosta, Belfield, 2014); the costs of introduction (Lavy, 2018) and other issues. Exciting interest are the papers that search for differences in impact of remedial courses based on social or

personal characteristics such as academic preparedness (Boatman and Long, 2018), gender (Angrist et al., 2009) or demography (Garcia-Perez and Hidalgo-Hidalgo, 2017).

As for the time span, the short-run effects of remediation are mostly studied, while few are the papers that analyse long-run effects by taking into consideration academic achievements (Zeidenberg, Jenkins and Calcagno, 2007; Boatman and Long, 2018; Cortes, Goodman, Takako, 2014), social aspects and outcomes of labour market (Lavy, Kott and Rachkovski, 2018),

The present study can be considered peculiar in some aspects and sheds light on different issues scarcely covered by existing literature. We analyse remedial courses offered in Italian medium size public university in 2009-2010 academic year. The aim of the remediation was intended in its conventional formulation, such as to help scarcely prepared freshman students to achieve necessary skills to face academic carrier. On the contrary of the cases mostly cited in the literature, the remediation was not mandatory. Assignment to courses was based on a placement test and students who were placed below a certain score were strongly advised to follow the courses. As a consequence, the students could choose if adhere to remediation. In the light of the evidence arose in recent literature, mandatory courses, nonetheless their most precise assignment, represent disadvantages in terms of self-esteem of students under remediation with respect their non-remediated peers (Bettinger and Long, 2008). As suspected, the psychological burden has a negative impact on student performance and may overrun the positive effects provided by remediation.

Moreover, the remediation is often designed as barrier to overcome before proceeding the academic carrier. In fact, the remediation may consist on increasing the hours of mostly difficult university courses, as in Cortes et al. (2014) or may create a formal obstacle to access ordinary examination sessions, as in Duchini (2017). The optionality of courses offered in our case study does not imply such impediment. We show that the system where the remediation is optional provides positive results in terms of academic performance.

Finally, we add to the literature a long run analysis of the impact of remediation on labour market. Only few papers have considered the links between employment and remedial courses. Lavy et al., 2018 have found positive effects on employment by considering courses offered at school level, while Martorell and Mc-Farlin (2011) have not

detected any positive labour market outcomes in analysing college remediation. Instead, our analysis demonstrates that the remediated college students are more likely to become employed within one year after degree, with respect to their non-remediated counterparts.

Our analysis takes origins from De Paola and Scoppa (2014) paper and is based on the same data set, extended by additional information on academic performance and employment outcomes observed within eight years from the remediation, taken from the AlmaLaurea database. The administrative data is provided by the University of Calabria and consists of the information on 4019 freshman students enrolled in in 2009-2010 academic year. We observe individual characteristics of individuals, family background, academic results and employment after one year from graduation. The observations cover the period till 2017.

Remedial courses consisted in 160 hours of lectures, promoted by Calabria Region and financed by European Social Fund. They covered both mathematics and language skills, lasted two month and ended before the regular college courses started. The remediation was strongly advised to scarcely prepared students identified on the basis of a placement test. However, the courses were open to all the cohort and the students who were placed above cut-off score could have taken part of them.

We take an advantage of having information on both remediated and non-remediated students, and, following De Paola and Scoppa (2013) apply a Fuzzy Regression Discontinuity Design to detect whether the adherence to this type of remediation has effects on both academic and work carriers. The cutoff rule that was applied in the placement test to select students to remediation is used as an assignment treatment to instrument the effective attendance. The students just above or just below the cutoff can be judged similar in their academic achievements. In this way, a jump in the relationship between academic and employment outcomes to placement test score, near the cutoff, can be considered as a treatment effect.

To assure the robustness of our results we provide a validity analysis of the diff-in-discontinuities design, applying McCrary test and a Balance Test on Control Variables.

Preliminary main results of the estimations demonstrate that the remediated students obtain higher score of their final grade and are more probably get employed within a year after graduation, with respect to those non non-remediated.

The results obtained permit to draw some policy implications that aim to improve the quality of tertiary education and to contribute to the decrease of unemployment in most economically disadvantaged areas.

## References

1. Angrist, Parag A. Pathak and Christopher R. Walters. 2013. Explaining Charter School Effectiveness. *American Economic Journal: Applied Economics*. Vol. 5, No. 4, pp. 1-27.
2. Bettinger E.P. and B.T. Long. 2008. Addressing the Needs of Under-Prepared Students in Higher Education: Does College Remediation Work? *Journal of Human Resources*. DOI: 10.1353/jhr.2009.0033 .
3. Boatman Angela, Bridget Terry Long. 2017. Does Remediation Work for All Students? How the Effects of Postsecondary Remedial and Developmental Courses Vary by Level of Academic Preparation. *Educational Evaluation and Policy Analysis*.
4. Cortes Kalena E., Joshua S Goodman, Takako Nomi. 2014. Intensive Math Instruction and Educational Attainment: Long-Run Impacts of Double-Dose Algebra. NBER Working Paper No. w20211.
5. Boylan Mark, Mike Coldwell, Bronwen Maxwell & Julie Jordan. 2016. Rethinking models of professional learning as tools: a conceptual analysis to inform research and practice. *Journal of Professional Development and Education*.
6. Chun-Ming Hung, Iwen Huang, Gwo-Jen Hwang, 2014. *Journal of Computers in Education*. Effects of digital game-based learning on students' self-efficacy, motivation, anxiety, and achievements in learning mathematics Volume 1, Issue 2–3.
7. De Paola Maria, Scoppa Vincenzo. 2013. The Effectiveness of Remedial Courses in Italy: a Fuzzy Regression Discontinuity Design. *Journal of Population Economics*. 10.1007/s00148-013-0466-8.
8. Duchini, E. 2017. Is college remedial education a worthy investment? New evidence from a sharp regression discontinuity design. *Economics of Education Review*, 60, 36-53.
9. J.I. García-Pérez, M. Hidalgo Hidalgo. 2017. No student left behind? Evidence from the Program for School Guidance in Spain". *Economics of Education Review* , 60: 97-111.

10. Lavy Victor, Assaf Kott, Genia Rachkovski. 2018. Does Remedial Education at Late Childhood Pay Off After All? Long-Run Consequences for University Schooling, Labor Market Outcomes and Inter-Generational Mobility. NBER Working Paper No. 25332.
11. Martorell Paco and Isaac McFarlin. 2011. Help or Hindrance? The Effects of College Remediation on Academic and Labor Market Outcomes. *The Review of Economics and Statistics*, vol. 93, issue 2, 436-454.
12. Scott-Clayton Judith, Peter M. Crosta, Clive R. Belfield. 2014. Improving the Targeting of Treatment: Evidence From College Remediation. *Educational Evaluation and Design*. <https://doi.org/10.3102/0162373713517935>.
13. Van Effenterre, Clementine. 2017. Post 16 remedial policies: a literature review. Post 16 remedial policies: a literature review. London, England: Centre for Vocational Education Research.
14. Zeidenberg, Matthew; Jenkins, Davis; Calcagno, Juan Carlos. 2007. Do Student Success Courses Actually Help Community College Students Succeed? CCRC Brief. Number 36.