

Disrupting Education's Old Guard: The Labor Market Effects of Replacing Class Exams for Group Projects*

Alonso Alfaro[†]

Marco A. Badilla Maroto[‡]

September 24, 2024

*We are thankful for the funding provided by The Center for Latin American and Caribbean Studies (CLACS) at UC Berkeley. The views expressed herein are those of the authors and do not necessarily represent the views of the Central Bank of Costa Rica. All results have been reviewed to ensure that no confidential information is disclosed. All remaining errors are our own.

[†]Central Bank and University of Costa Rica. Email: alfaroua@bccr.fi.cr

[‡]UC Berkeley. Email: mbadilla@berkeley.edu

1. Introduction

Education systems universally employ exams as one of the main evaluation tools. The predictive capacity of these assessments regarding future academic and labor achievements, and their impact on equity issues, has long been a topic of discussion. An example of the latter is the admission exam to selective higher education institutions, which on the one hand is predictive of students' college and post-college performance (UC-Academic-Council (2020), Chetty et al. (2023)) and on the other hand, highlights disparities between high and low-income backgrounds and other groups ((Friedman et al., 2024)). Whether to keep or drop those exams is the question that has challenged many colleges in recent years.¹

Within the role of exams discussion, this paper switches the focus of attention from the admission exams example to examining the consequences of eliminating exams as the standard evaluation tool throughout a whole educational stage. We delve into the different mechanisms that materialize an effect on labor market outcomes and the differential impact by gender, family income, and the student's academic rank in the standard exam environment. More specifically, we investigate the effects of fully eliminating and substituting exams and quizzes with group projects throughout all classes and programs at ULACIT, a highly-ranked university in Costa Rica; ULACIT's 2008 exam-to-projects reform continues to be active nowadays. Our analysis focuses on several outcomes: college GPA, program duration, likelihood of formal sector employment (extensive margin), and wages.

We contribute to three strands of literature. First, to the formative assessment literature, which focuses on the usefulness of more frequent, lower-stakes evaluations, which allow more feedback. Eren and Henderson (2008), Eren and Henderson (2011), Grodner and Rupp (2013) and Kalenkoskia and Pabilonia (2016) present evidence of the positive impact of the presence of homework on test scores and college attendance, while Kokotsaki et al. (2016), Kingston (2018), Saavedra et al. (2022) and Krajcik et al. (2023) do so in favor of project-based learning; Berry et al. (2020) studies the impact of higher frequency of evaluations within classes. The main contribution of this paper to this literature lies in studying the effects of such formative assessment policies on labor market outcomes.

Second, to the role of exams literature, which we have discussed already to some extent with the college admission exams case. However, it also covers the signaling value of exams (Clark and Martorell (2014), Schwerdt and Woessmann (2017), Diamond and Persson (2017)) and some disadvantages they have like encouraging memorization and exacerbating anxiety in students, which in turn harms their performance (Ebenstein et al. (2016), Jackson (2018), Heissel et al. (2021) and Lincove et al. (2022)). Third, we also contribute to the literature on the growing importance of social skills, like teamwork, communication, and social connections, on labor market outcomes (Deming (2017), Deming and Kahn (2018) and Deming and Weidmann (2021)), as in this setting, group projects play a role in strengthening those skills in college graduates.

¹While the University of California officially eliminated in 2020 the standardized testing requirement for admission decisions, other universities like Stanford, Harvard, MIT, and Yale have reinstated them after COVID; see Borghesan (2023) for effects of reducing emphasis on standardized exam scores in admissions. Instead of dropping admission exams, many universities and countries opt for complementing them with preferential admission policies that target diversity, such as Carlana et al. (2024).

2. Data

Employer-Employee Administrative Dataset

This panel, collected by the Social Security Administration, covers all formal workers in the labor market in Costa Rica from January 2006 to December 2017. For each worker, this dataset records demographic characteristics such as date of birth, nationality, gender, as well as monthly labor earnings (wages), and three-digit occupation, among other worker and firm-employer characteristics. Labor earnings are not censored and we deflate them to 2013 real 'colones' via the consumer price index, CPI. Only workers between 18 and 65 years of age are kept. As usual in employer-employee datasets, this panel does not track informal employment.²

Graduation Records from Top Universities

This dataset contains the historical records of graduates from the top 4 universities in the country: the University of Costa Rica (UCR), the Institute of Technology of Costa Rica (TEC), the National University of Costa Rica (UNA), and the Latin American University of Science and Technology (ULACIT). For each individual, it includes the person's ID, all degrees, dates of graduation, program level (technician, bachelor, licentiate, master, doctorate), program name, and area; admission year for UCR-TEC-UNA is estimated based on the earliest graduation year, and the respective historical and official program duration. For ULACIT and UNA, the list also contains information on graduation distinctions (honors). ULACIT provides additional information regarding final graduation GPA, the exact date the individual started each separate program, and the student's high school exit-GPA³ (average across all school core subjects in final two years; does not include standardized exit-exams scores).

National High School Exit Exams

The Ministry of Education of Costa Rica provided an anonymized student-level database of high school exit exams for the entire country, covering the years 2000 to 2019. For each student who graduated from high school, the dataset includes the score of the standardized mathematics exit-exam, mathematics high school exit-GPA (not including exit-exam score), the individual's gender, the type of high school (private or public), the region of the high school, and the university from which they will graduate in the future (broken down by each of the top 4 universities, and a residual category of "other", which groups any other university or no college education). Given the anonymization, we are only able to link back to the other datasets the respective averages at the university and admission cohort levels.

²Informal workers represent 39.1% of total employment in Costa Rica; this share is smaller than the average for Latin America (ILO, 2018).

³This specific variable is only recorded for applicants who applied for any kind of scholarship at this university (51% of all of ULACIT's historical graduates). Given the nature of some of these scholarships, this particular sub-sample may or may not be representative of all ULACIT students. Nevertheless, it will be useful for several robustness checks and heterogeneity analyses.

3. References

- Berry, J., Kannan, H., Mukherji, S., & Shotland, M. (2020). "Failure of frequent assessment: An evaluation of India's continuous and comprehensive evaluation program". *Journal of Development Economics*, 143(102406). <https://doi.org/https://doi.org/10.1016/j.jdeveco.2019.102406> (cit. on p. 2).
- Borghesan, E. (2023). "The Heterogeneous Effects of Changing SAT Requirements in Admissions: An Equilibrium Evaluation". *R R at Journal of Political Economy* (cit. on p. 2).
- Carlana, M., Miglino, E., & Tincani, M. (2024). "How far can inclusion go? The long-term impacts of preferential college admissions". *NBER Working Paper 32525*. <http://www.nber.org/papers/w32525> (cit. on p. 2).
- Chetty, R., Deming, D., & Friedman, J. (2023). "Diversifying Society's Leaders? The Determinants and Causal Effects of Admission to Highly Selective Private Colleges". *NBER WORKING PAPER 31492*. <https://doi.org/10.3386/w31492> (cit. on p. 2).
- Clark, D., & Martorell, P. (2014). "The Signaling Value of a High School Diploma". *Journal of Political Economy*, 122(2), 282–318. <https://doi.org/https://doi.org/10.1086/675238> (cit. on p. 2).
- Deming, D. (2017). "The Growing Importance of Social Skills in the Labor Market". *The Quarterly Journal of Economics*, 132(4), 1593–1640. <https://doi.org/https://doi.org/10.1093/qje/qjx022> (cit. on p. 2).
- Deming, D., & Kahn, L. (2018). "Skill Requirements across Firms and Labor Markets: Evidence from Job Postings for Professionals". *Journal of Labor Economics*, 36(S1). <https://doi.org/https://doi.org/10.1086/694106> (cit. on p. 2).
- Deming, D., & Weidmann, B. (2021). "Team Players: How Social Skills Improve Team Performance". *Econometrica*, 89(6), 2637–2657. <https://doi.org/https://doi.org/10.3982/ECTA18461> (cit. on p. 2).
- Diamond, R., & Persson, P. (2017). "The Long-term Consequences of Teacher Discretion in Grading of High-stakes Tests". *Working Paper*. <https://web.stanford.edu/~diamondr/DiamondPersson.pdf> (cit. on p. 2).
- Ebenstein, A., Lavy, V., & Roth, S. (2016). "The Long-Run Economic Consequences of High-Stakes Examinations: Evidence from Transitory Variation in Pollution". *American Economic Journal: Applied Economics*, 8(4), 36–65. <https://doi.org/http://dx.doi.org/10.1257/app.20150213> (cit. on p. 2).
- Eren, O., & Henderson, D. (2008). "The impact of homework on student achievement". *Econometrics Journal*, 11(2), 326–348. <https://doi.org/10.1111/j.1368-423x.2008.00244.x> (cit. on p. 2).
- Eren, O., & Henderson, D. (2011). "Are we wasting our children's time by giving them more homework?" *Economics of Education Review*, 30(5), 950–961. <https://doi.org/10.1016/j.econedurev.2011.03.011> (cit. on p. 2).
- Friedman, J., Sacerdote, B., & Tine, M. (2024). "Standardized Test Scores and Academic Performance at Ivy-Plus Colleges". Opportunity Insights. https://opportunityinsights.org/wp-content/uploads/2024/01/SAT_ACT_on_Grades.pdf (cit. on p. 2).

- Grodner, A., & Rupp, N. (2013). "The Role of Homework in Student Learning Outcomes: Evidence from a Field Experiment". *The Journal of Economic Education*, 44(2), 93–109. <https://doi.org/10.1080/00220485.2013.770334> (cit. on p. 2).
- Heissel, J., Adam, E., Doleac, J., Figlio, D., & Meer, J. (2021). "Testing, Stress, and Performance: How Students Respond Physiologically to High-Stakes Testing". *Education Finance and Policy*, 16(2), 183–208. https://doi.org/https://doi.org/10.1162/edfp_a_00306 (cit. on p. 2).
- ILO. (2018). "Women and Men in the Informal Economy: A Statistical Picture (Third Edition)". International Labour Office. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_626831.pdf (cit. on p. 3).
- Jackson, K. (2018). "What Do Test Scores Miss? The Importance of Teacher Effects on Non-Test Score Outcomes". *Journal of Political Economy*, 126(5). <https://doi.org/https://doi.org/10.1086/699018> (cit. on p. 2).
- Kalenkoskia, C., & Pabilonia, S. (2016). "Does high school homework increase academic achievement?" *Education Economics*, 25(1), 45–59. <https://doi.org/http://dx.doi.org/10.1080/09645292.2016.1178213> (cit. on p. 2).
- Kingston, S. (2018). "Project Based Learning Student Achievement: What Does the Research Tell Us?" *PBL Evidence Matters*, 1(1), 1–11. <https://doi.org/http://bie.org/x9JN> (cit. on p. 2).
- Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). "Project-based learning: A review of the literature". *Improving Schools*, 19(3), 267–277. <https://doi.org/https://doi.org/10.1177/1365480216659733> (cit. on p. 2).
- Krajcik, J., Schneider, B., Miller, E., Chen, I., Bradford, L., Baker, Q., Bartz, K., Miller, C., Li, T., Codere, S., & Peek-Brown, D. (2023). "Assessing the Effect of Project-Based Learning on Science Learning in Elementary Schools". *American Educational Research Journal*, 60(1), 70–102. <https://doi.org/https://doi.org/10.3102/00028312221129247> (cit. on p. 2).
- Lincove, J., Mata, C., & Cortes, K. (2022). "A Bridge to Graduation: Post-Secondary Effects of an Alternative Pathway for Students Who Fail High School Exit Exams". *Bureau of Economic Research*, No. w29742 (cit. on p. 2).
- Saavedra, A., Morgan, K. L., Liu, Y., Garland, M., Rapaport, A., Hu, A., Hoepfner, D., & Haderlein, S. (2022). "The Impact of Project-Based Learning on AP Exam Performance". *Educational Evaluation and Policy Analysis*, 44(4), 638–666. <https://doi.org/https://doi.org/10.3102/01623737221084355> (cit. on p. 2).
- Schwerdt, G., & Woessmann, L. (2017). "The information value of central school exams". *Economics of Education Review*, 56, 65–79. <https://doi.org/http://dx.doi.org/10.1016/j.econedurev.2016.11.005> (cit. on p. 2).
- UC-Academic-Council. (2020). "Report of the UC Academic Council Standardized Testing Task Force (STTF)". University of California System. (Cit. on p. 2).