Education, inequality and use of digital collaborative platforms: The European case

Online Appendices

Jesús M. Artero
Cristina Borra
Rosario Gómez-Alvarez

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Table A. Main studies on the relationship between DCPs and education

Article	Data	Country/Year	Methodology	Variables	Results
Schor (2016)	43 Platform providers, 23 men and 20women.	USA. 2013-2015	Interviews and descriptive evaluation of the results		Access to platforms at high educational level.
Cansoy and Schor (2016)	125 thousand listings of Airbnb accommodations for 104 metropolitan areas	EEUU. 2015-2016	Mixed effects estimations		Positive relationship of education on listings of higher prices and ratings. Positive relationship of education on income generated platform.
Thebault-Spieker, Terveen and Hecht, 2015	40 Taskrabbit providers	Chicago, USA. 2014	Logistic fixed effects and qualitative analysis	Dependent variable: performing the service on the platform	Service providers less likely to accept tasks in neighbourhoods of low socioeconomic status
Ravenelle, 2016	78 interviews of providers in Airbnb, Task-Rabbit, Kitchen-surfing and Uber	New York, USA. 2015	Interviews and descriptive evaluation of the results		61% of the respondents have a higher degree.
Fraiberger and Sundararajan (2015)	P2P transactions in Getaround	San Francisco, USA. 2014-2016	Dynamic economy simulations with P2P for the rental of durable goods market (vehicles)	Availability per hour of vehicles, unit price transactions, location of vehicles, characteristics of the same, valuations of tenant and landlord, sociodemo-graphic profile of tenant.	Benefit for the income group below the median, via vehicle rental opportunity and lower travel cost
Quattrone et al., (2016)	14,639 providers in Airbnb, 17,825 listings and 220,075 reviews	London, UK. 2012-2015	OLS analysis	Dependent variable: Airbnb listings and reviews per square meter. Independent variable: Number of hotels, accessibility, demographic & urban variables	Rooms offered in areas of high educational profile. Rental of accommodation in areas with owners of high educational profile and income.
Smith (2016)	4787 participants from different platforms	USA. 2015	Qualitative analysis of interviews		Highly educated individuals are more likely to use platforms

Table B.1 Construction of the variables in the model

Variable	Variable definition	Derived from variable(s)
Panel A. Eurobarómetro		
Use of DCPs.	Dummy variable equal to 1 if the respondent reports having regularly or occasionally used DCPs, 0 otherwise.	Q1
Years of schooling	Years invested in education, equal to D4 minus the age of access to primary education.	D4
College graduate	Dummy variable equal to 1 if years of schooling correspond to an education level of respondent (ISCED) > 5.	D4
Year_16	Year in which the respondent turns 16 years old	D1
Region	Region of residence of the respondent at the time of the survey	D12
Female	Dummy variable equal to 1 if the respondent is a woman	D2
Rural	Dummy variable equal to 1 if the respondent lives in a rural community	Q2
Panel B. ETER		
Number of universities	Number of universities at the regional level	FOUNDATIONYEAR, REGIONOFESTABLISHMENTNUTS2
Region	Region the university is located	REGIONOFESTABLISHMENTNUTS2
Foundation Year	Founding date of the university (year)	FOUNDATIONYEAR
Public universities	Dummy variable equal to 1 if the University is public, 0 otherwise.	STATUS
Private universities	Dummy variable equal to 1 if the University is private, 0 otherwise.	STATUS

Source: Eurobarometer 438 (2016) and ETER (2018) datasets

Table B2. Descriptive statistics of the main dependent, independent variables and controls in the model

	Average	Stdev.	Min	Max
Use of DCPs	0,178	0,383	0	1
Years of schooling	13,86	5,42	0	79
College graduate	0,393	0,488	0	1
Female	0,519	0,500	0	1
Rural residence	0,313	0,464	0	1

Source: Eurobarometer 438 (2016) dataset.

Table B.3. Robustness checks by openings at age 25 and public/private university.

Panel A. Benchmarch	
University openings at age 16	0.0204***
	(0.004)
F-Test	20.22
Prob > F	0,000
Panel B. Openings after age 16	
University openings at age 16	0.0146**
	(0.007)
University openings at age 25	0.0067
	(0.005)
F-Test	10.55
Prob > F	0,000
Panel C. Public vs. private universities	
Public university openings at age 16	0.0242**
	(0.011)
Private university openings at age 16	0.0181***
	(0.006)
F-Test	11.96
Prob > F	0,000
Cohort FE	Yes
Region FE	Yes
Observations	13,007

Each panel corresponds to a different regression. The table shows the first stage results for the education variable Years of schooling on university openings at age 16 and 25 and public and private openings. Each column corresponds to a different regression. Additional controls are gender and rural community dummies. The sample in Panels A and C includes all individuals aged at least 16 years. The sample in Panel B includes individuals aged at least 25 years. Sample weights used.

** Significant at 10 %; ** significant at 5 %; *** significant at 1 %*

Table B.4. Main estimated impact of being a college graduate on use of DCPs.

VARIABLES	(1) OLS Specification	(2) IV Specification
Education variable	0.0895***	0.7512**
	(0.007)	(0.298)
Cohort FE	Yes	Yes
Region FE	Yes	Yes
Observations	13,007	13,007
First Stage Results		
Instrument (# universities at 16)		0.0014***
		(0.000)
F-Test		11.66
Prob > F		0.001
Mean of dep. var.	0.178 (0.383)	

Each column corresponds to a different regression. The table shows the OLS and IV regression results of an indicator of DCPs use on the education variable. Additional controls are gender and rural community dummies. The sample includes all individuals aged at least 16 years. Sample weights used.

** Significant at 10 %; ** significant at 5 %; *** significant at 1 %*

Appendix C. Instrument Validity

A key element of our approach in Equations (1) and (2) is that we include both cohort and region fixed effects, thus relying on the way the instrument changes within regions and cohorts to identify our effects. That is, common features shared by individuals born in the same year are captured by cohort fixed effects; similarly, common features shared by individuals living in the same region are captured by region fixed effects. This ensures that we do not use permanent differences across cohorts or regions as a source of identifying variation. However, two additional concerns are related to the validity of the instrument: first, the location of the opening of universities may not be random; second, the mobility of individuals may correspond to the supply of university centres.

With respect to the first point, it is possible that the opening of universities is governed by expected increases in demand for education, and thus, it is an effect and not a cause of the educational level of the population. If demand for education is correlated with unobserved factors that also foster access to collaborative platforms, then the change in these unobserved variables is what really explains the increase in educational level and participation in platforms, and thus, our model could overestimate the effect of educational level on the use of DCPs. Another possibility is the location of new universities for political motives to compensate territories with little university provision or low levels of university attendance. This suggests that the opening of universities in an area could be negatively rather than positively correlated to academic success in that region and our estimates would underestimate the effect of education on platform use (see similar comments in Currie and Moretti, 2003).

In relation to the second limitation, it is possible that individuals change their residence to attend universities in another region or move to regions with new universities for other reasons such as better work opportunities. However, first, the percentage of students that emigrate to another region of Europe to pursue their studies does not, on average, reach 6% (Sanchez and Flisi, 2017), and second, newly created institutions are not usually considered to be prestigious and, hence, do not usually attract many students from other regions (Hoxby, 2009). Nevertheless, it still might be possible that some of our results may proceed from the endogenous mobility of individuals.

We account for these potential threats to identification in several ways. First, we test for the validity of our instrument by estimating first-stage equations that include the availability of universities when the individual was aged 25, along with the measure of availability at 16. If our hypotheses are consistent, the impact of the number of universities at the age of 16 on the educational level should be greater than the impact at 25 when the decisions of investment in human capital have already been taken. On

the contrary, if the individuals aged 25 or older with university studies completed move to regions where new universities are located or if the new universities are founded in regions where educational demand is expected to increase, the effect of the openings at the age of 25 on educational level should be greater than that of the openings at 16 years of age.

The second test of the validity of the instrument consists in analysing the differences in the impact of the opening of public and private universities on educational level. If our hypothesis on the reduction of marginal costs with the opening of universities in the region where an individual lives is correct, the opening of public universities should cause a greater impact than the opening of private ones. It is possible that the individuals who decide to enrol at university because a new institution has opened in their region probably come from a low socio-economic background and are more likely to enrol at public universities. Meanwhile, probably most individuals who emigrate to other regions to enrol at private universities would have gone to university anyway, even without the availability of a university in his region of origin. If private universities have larger effects on education than public universities, we could be facing problems of validity with our instrument.

Table B.4 presents the results of the two alternative specifications of our first-stage equation (2) described in Section 3. The first-stage results of column 2 in Table 2 are repeated in Panel A of Table B.4 as a benchmark. In Panel B, along with the number of universities when the individual was aged 16, we add the availability of university centres in the region of residence when the individual was 25 as an instrument. If this instrument shows an additional positive impact on the years of study, our strategy would be called into question. The coefficient of the number of universities at 16 continues to significantly affect the educational decisions of the individuals, but the number of universities at 25 is not capable of significantly identifying the years invested in education. The results indicate that it is the availability of university centres at the age of completing compulsory education that determines the continuation of studies and enables us to rule out the possibility that the results obtained are biased by either the endogenous location of universities or the endogenous migration of individuals older than 24 to regions where the new university is located. Panel C in Table 4 uses the number of public and private universities in the region when the individual turned 16 years old as distinct instruments. If university openings affect education by increasing availability and reducing the costs of attendance, we should expect a greater effect for public rather than private universities, and finding the opposite would arouse suspicion about the validity of our instrument. The effect of a new public university is over 30% larger than the effect of a private university. This result helps to rule out that our results are driven by the

endogenous location of university centres in regions with greater expected growth in educational demand.

References

Currie J and Moretti E (2003) Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings*. Quarterly Journal of Economics* 118: 1553-1604.

Hoxby CM (2009) The Changing Selectivity of American Colleges. *Journal of Economic Perspectives* 23(4): 95-118.

Sanchez M and Flisi S (2017) *Student mobility in tertiary education: institutional factors and regional attractiveness*. Publications Office of the European Union, Luxembourg.