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Advanced Econometrics

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Signaling Effect of Honors Degree on Graduate Program Permission Rate

Motivation and Literature Review

An approach to estimate the effect of education on wages would be: $\log(w_i) = b_0 + b_1 s_i + b_2 A_i + \text{other variables}$, where s_i is years of schooling, and A_i is a measure of ability. The implicit assumption we have made so far is that returns to education are due to increases in productivity. Workers accumulate skills that firms are willing to pay for. In a competitive market, wages equals marginal product.

However, there is an alternative explanation about why firm might be willing to pay more for educated workers: signalling. In a separating equilibrium, high and low ability workers choose different levels of schooling, and as a result, employers can infer worker ability from education.

Clark and Martorell (2014): uses RD to study the effect of high school degree on wage in US. Mazrekaj and Cabus (2019): the same but in Netherlands. The signalling model works in studying the relationship between not only schooling and wages but also honors degree and wages. Khoo and Ost (2018): uses RD to study the effect of honors degree on wage in US. Similarly, this paper studies how honors degree affect graduate program permission rate, whether graduate admins focus too much on the title instead of more accurate statistics like gpa. Because graduation programs expect from the students high academic ability, which is directly signalled by an honors degree, then the research topic is safe compared with wages studies, where wage can relate to other abilities besides academic ability.

Model

H_0 : Honors degree has no signaling effect on graduate permission rate.

H_1 : Honors degree increases graduate permission rate by signaling effect.

$$Y_i = b_0 + b_1 \cdot D_i + b_2 \cdot gpa_i + b_3 \cdot cre_i + \varepsilon_i$$

$$Y_i = \frac{\text{offer}}{\text{application}}$$

b_1 : interested effect.

$D_i = 1$ if has honors title upon graduation. $D_i = 0$ if not. Honors degree in some universities, e.g. Delaware University only has pre-entry selection requirements. Honors degree in others, e.g. NYUSH additionally requires students to take honors program courses like Business and Economics Honors Seminar. Cannot study this by signaling model. Because only want to study the signalling effect, should control the same knowledge level, which is violated by taking especial classes. Thus only study graduation from where honors degree has pre-entry selection requirements.

gpa_i : gpa in 4.0 scale, running variable.

$gpa_0 = 2$, assumed cutoff.

cre_i : credits taken in courses with honors title, running variable. Assume there are 10 honors courses to choose from, 4 credits each.

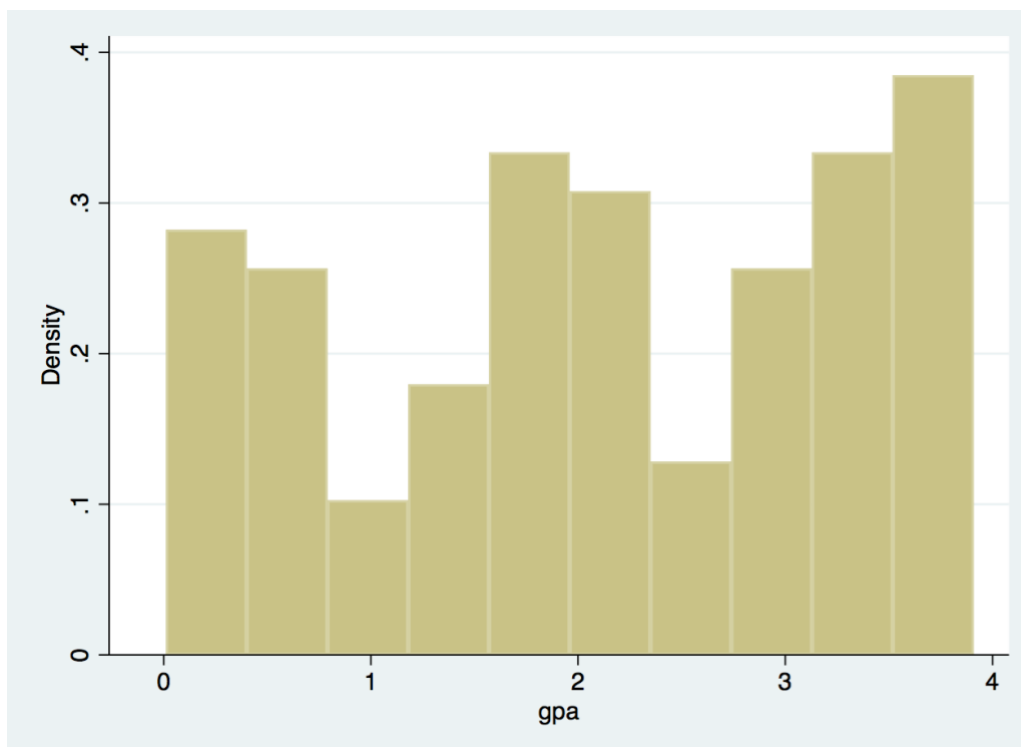
$cre_0 = 20$, assumed cutoff.

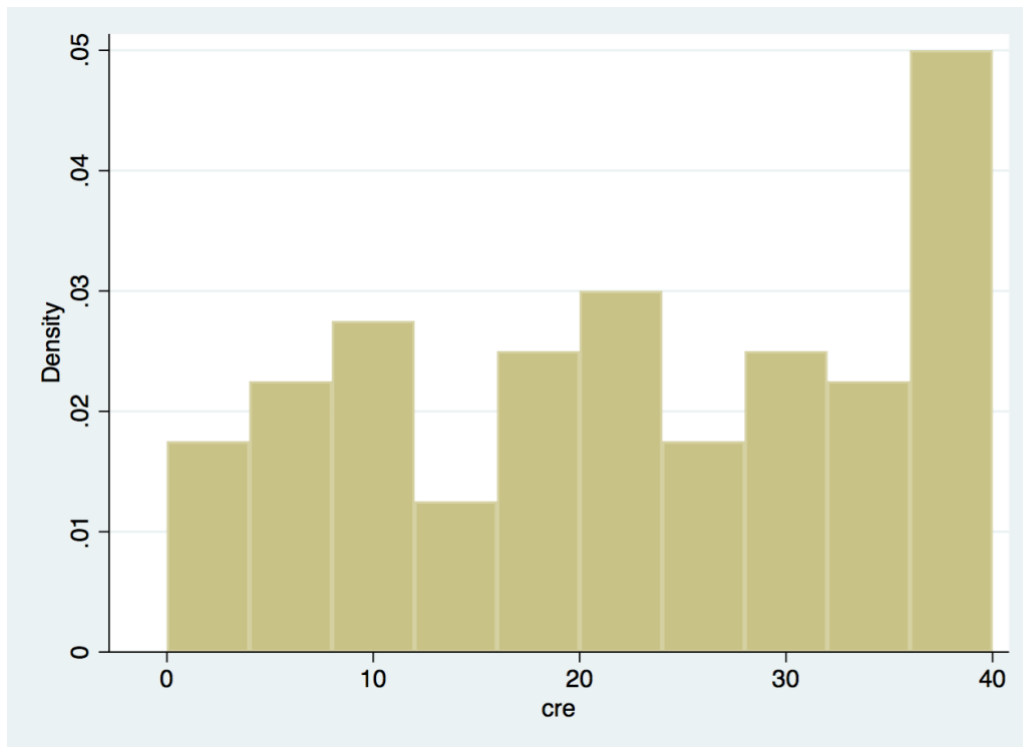
$\Pr(D_i = 0 | gpa_i < gpa_0 \vee cre_i < cre_0) = 1$, requirement met is a necessary condition.

$\Pr(D_i = 1 | gpa_i \geq gpa_0 \wedge cre_i \geq cre_0) = 1 - \Pr(\text{neverTaker} | gpa_i \geq gpa_0 \vee cre_i \geq cre_0)$, assuming there is no defier. Assume nevertaker takes up half of the population.

Assume SUTVA and monotonicity.

Check local continuity. Ideally because gpa is given by professors and cannot be cheated by academic integrity, local continuity should hold.



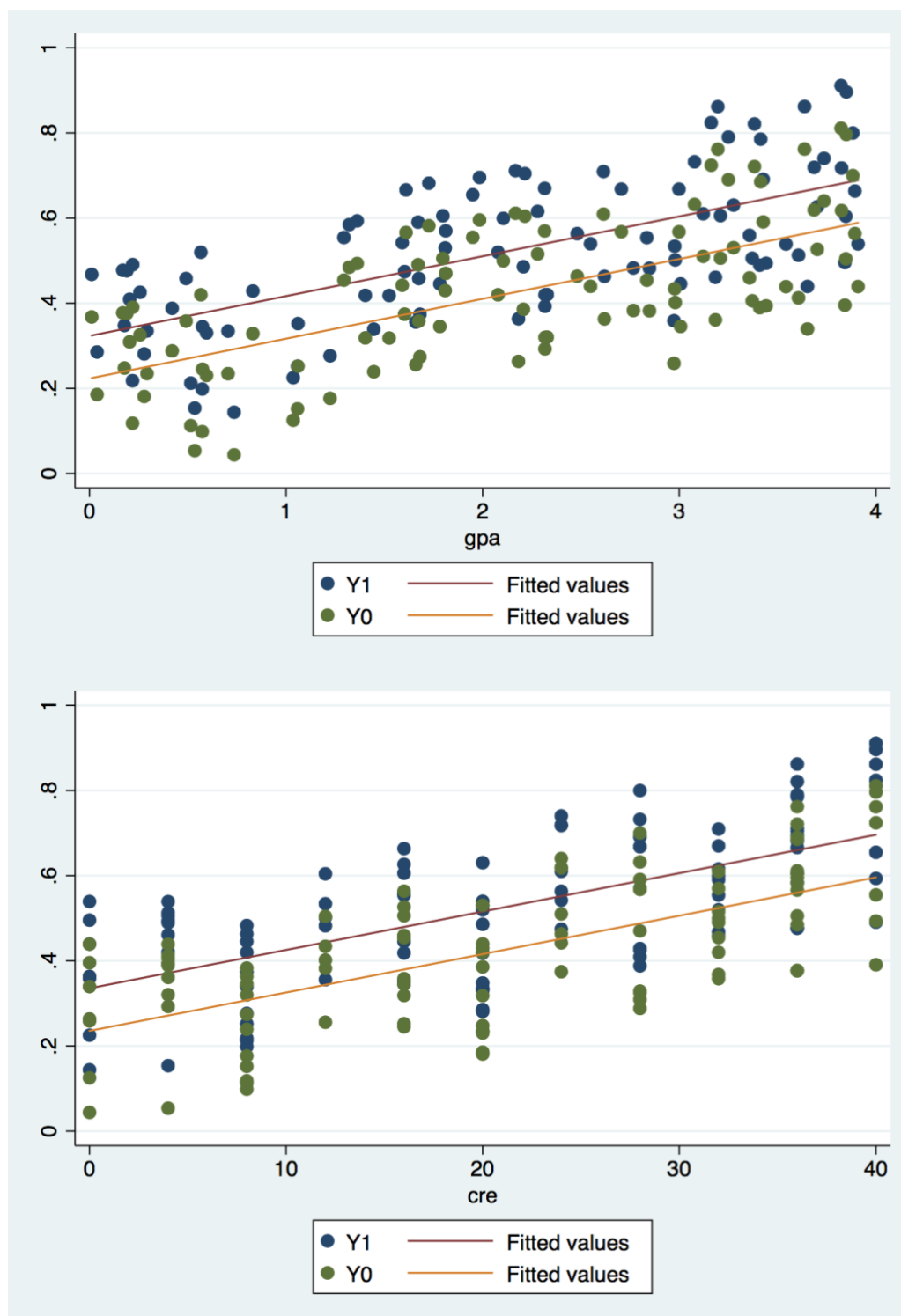


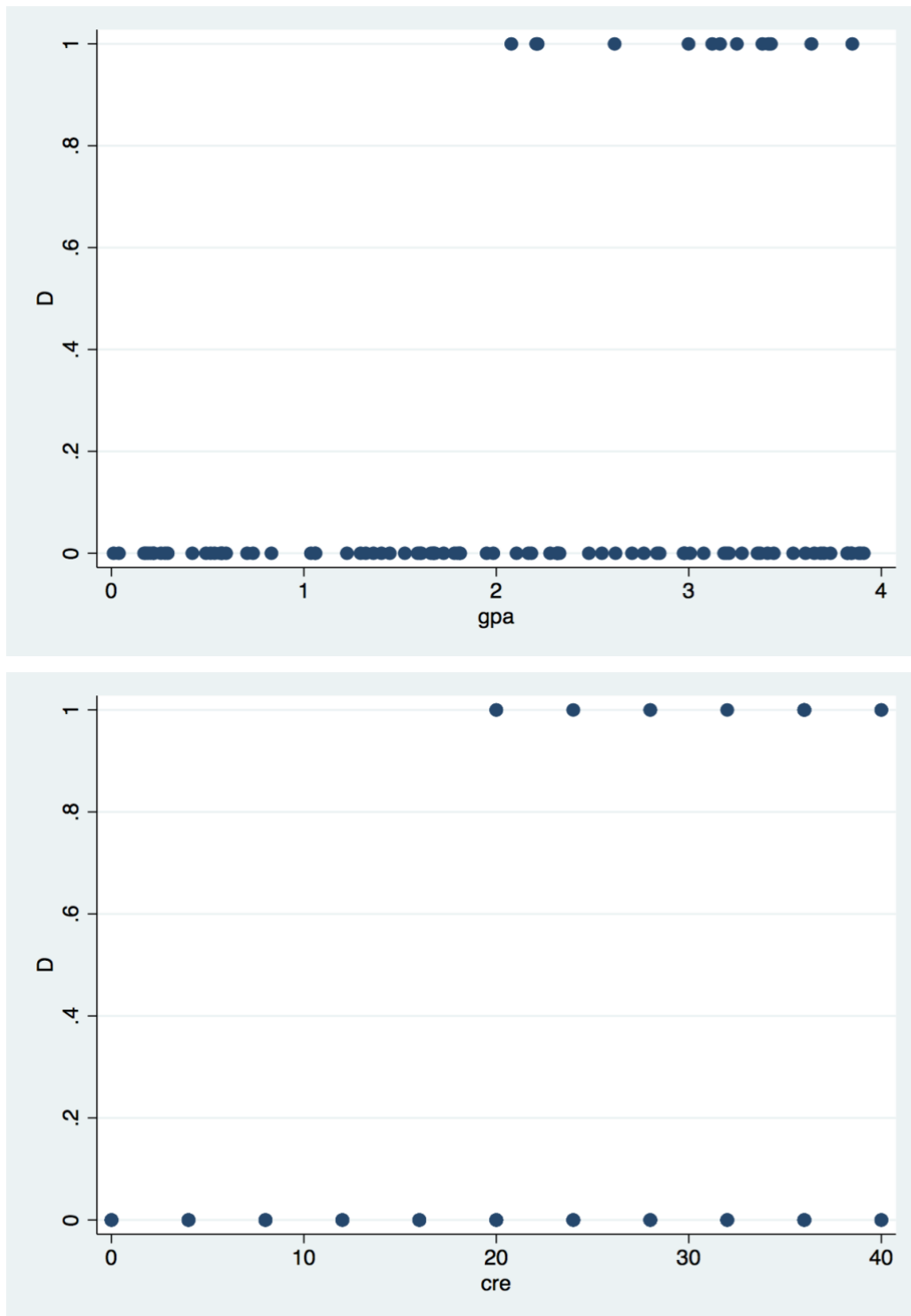
Result

VARIABLES	(1) Y
D	0.0884*** (0.00934)
gpa	0.106*** (0.00247)
cre	0.0102*** (0.000244)
Constant	-0.0135* (0.00807)
Observations	100
R-squared	0.979
Standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

b_1 is close to true value 0.1 which is inside 95% confidence interval. t-score 9.47 is far from 3 standard errors, which means b_1 has statistical significance. Reject H_0 . Then honors degree increases graduate permission rate by signaling effect.

b_2 similarly close to 0.1, b_3 close to 0.01.





Discussion

What causes a student to be a never taker may make endogenous. If a student has plenty of productive but time-consuming extra-curriculum activities like internship, it will go to the error term, it may make the student unable to pursue an honors degree, yet it will help the student get admitted in grad programs. May want control time spent on such activities, but hard to collect data.

Works Cited

- Cabus, Sofie, and Deni Mazrekaj. “Does a High School Diploma Matter? Evidence Using Regression Discontinuity Design.” APPAM International conference, 2019. Universitat Pompeu Fabra. APPAM, <https://appam.confex.com/appam/int19/webprogram/Paper29234.html>.
- Khoo, Pauline, and Ben Ost. “The Effect of Graduating with Honors On Earnings.” *Labour Economics*, vol. 55, 2018, pp. 149–162. Elsevier. IDEAS, <https://ideas.repec.org/a/eee/labeco/v55y2018icp149-162.html>.
- Martorell, Paco, and Damon Clark. “The Signaling Value of a High School Diploma.” *Journal of Political Economy*, vol. 122 no. 2, April 2014, pp. 282-318. The University of Chicago Press. Jstor, <https://www.jstor.org/stable/10.1086/675238>.