# The Unintended Effects of an Intensive Margin Reform to Student Loans on Educational Attainment

Online Appendix

Pinjas Albagli
London School of Economics

Andrés García-Echalar
Universidad de los Andes

February, 2023

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# A Replication of Main Results Excluding Year 2008

This appendix replicates our analysis in the main text excluding cohort 2008 for immediate enrollment and cohorts 2007–2008 for two-year enrollment and second-year dropout. Our main results remain virtually unchanged while the evidence supporting the parallel trends assumption is stronger. The numbering of tables and figures replicates that of the main text to facilitate comparisons.

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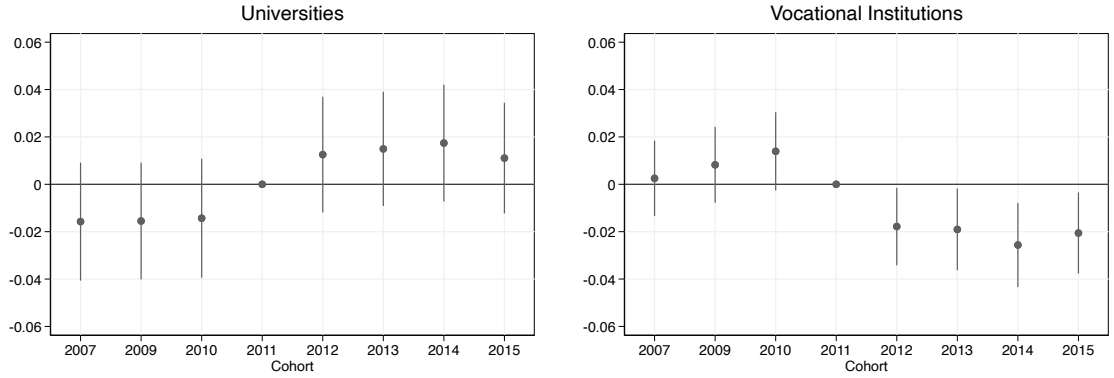
Table 3: Immediate Enrollment

| | HES | | | Universities | | | Vocational | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Eligible × exposed | -0.001 | -0.002 | -0.003 | 0.025*** | 0.025*** | 0.023*** | -0.026*** | -0.027*** | -0.027*** |
| | (0.004) | (0.004) | (0.004) | (0.005) | (0.005) | (0.005) | (0.003) | (0.003) | (0.003) |
| Exposed | 0.062*** | 0.071*** | 0.078*** | -0.012*** | -0.035*** | -0.031*** | 0.074*** | 0.105*** | 0.108*** |
| | (0.003) | (0.007) | (0.006) | (0.001) | (0.007) | (0.007) | (0.003) | (0.004) | (0.004) |
| Eligible | 0.261*** | 0.261*** | 0.243*** | 0.291*** | 0.291*** | 0.271*** | -0.029*** | -0.029*** | -0.028*** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.004) | (0.002) | (0.002) | (0.002) |
| Cohort effects | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Control variables | No | No | Yes | No | No | Yes | No | No | Yes |
| Observations | 1,353,980 | 1,353,980 | 1,353,980 | 1,353,980 | 1,353,980 | 1,353,980 | 1,353,980 | 1,353,980 | 1,353,980 |
| Control group size | 508,298 | 508,298 | 508,298 | 508,298 | 508,298 | 508,298 | 508,298 | 508,298 | 508,298 |
| Outcome mean | 0.536 | 0.536 | 0.536 | 0.355 | 0.355 | 0.355 | 0.182 | 0.182 | 0.182 |

*Notes:* Clustered standard errors at the class level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. School level control variables include indicators of school type, rural area and geographical region. Student level control variables include gender, attendance rate, district and number of family members at different levels in the education system. Control group size accounts for the number of ineligible individuals in the exposure period, while Outcome mean refers to the mean of the dependent variable of those individuals.

Figure 1: Dynamics of Immediate Enrollment



## Table 4: Two-Year Enrollment

| | HES | | | Universities | | | Vocational | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Eligible × exposed (2nd year) | 0.015*** | 0.014*** | 0.012*** | 0.023*** | 0.023*** | 0.021*** | -0.011*** | -0.012*** | -0.012*** |
| | (0.005) | (0.005) | (0.005) | (0.006) | (0.006) | (0.006) | (0.003) | (0.003) | (0.003) |
| Exposed (2nd year) | 0.035*** | 0.054*** | 0.057*** | -0.005*** | -0.009 | -0.007 | 0.039*** | 0.063*** | 0.065*** |
| | (0.004) | (0.006) | (0.006) | (0.001) | (0.006) | (0.006) | (0.003) | (0.004) | (0.004) |
| Eligible | 0.283*** | 0.283*** | 0.261*** | 0.270*** | 0.270*** | 0.250*** | 0.010*** | 0.010*** | 0.008*** |
| | (0.004) | (0.004) | (0.004) | (0.005) | (0.005) | (0.005) | (0.003) | (0.003) | (0.003) |
| Cohort effects | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Control variables | No | No | Yes | No | No | Yes | No | No | Yes |
| Observations | 1,035,551 | 1,035,551 | 1,035,551 | 1,035,568 | 1,035,568 | 1,035,568 | 1,037,137 | 1,037,137 | 1,037,137 |
| Control group size | 263,400 | 263,400 | 263,400 | 263,402 | 263,402 | 263,402 | 263,959 | 263,959 | 263,959 |
| Outcome mean | 0.474 | 0.474 | 0.474 | 0.310 | 0.310 | 0.310 | 0.151 | 0.151 | 0.151 |

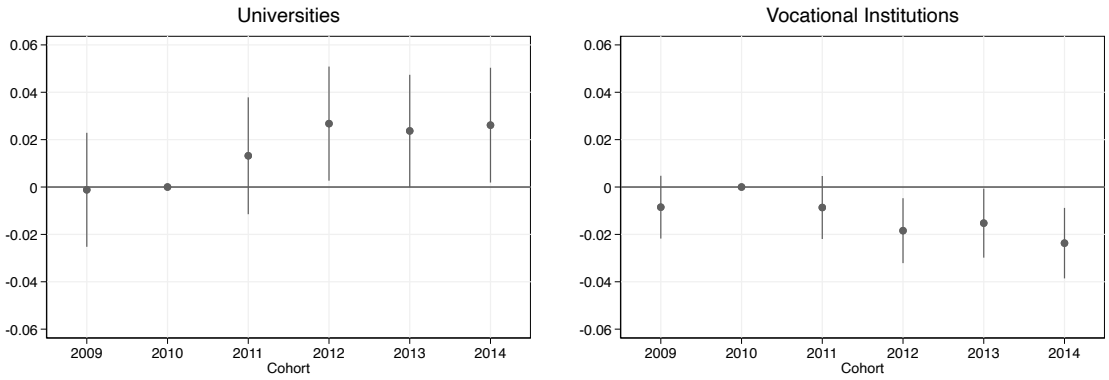
*Notes:* Clustered standard errors at the class level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. School level control variables include indicators of school type, rural area and geographical region. Student level control variables include gender, attendance rate, district and number of family members at different levels in the education system. Control group size accounts for the number of ineligible individuals in the exposure period, while Outcome mean refers to the mean of the dependent variable of those individuals.

## Table 5: Second-Year Dropout

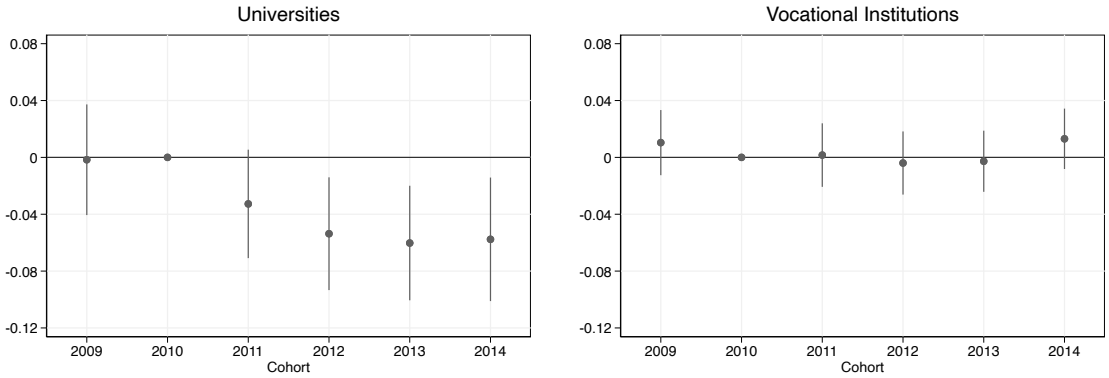
| | HES | | | Universities | | | Vocational | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Eligible × exposed (2nd year) | -0.014*** | -0.014*** | -0.014*** | -0.049*** | -0.049*** | -0.050*** | -0.003 | -0.003 | -0.008 |
| | (0.005) | (0.005) | (0.004) | (0.009) | (0.009) | (0.009) | (0.005) | (0.005) | (0.005) |
| Exposed (2nd year) | 0.018*** | 0.023*** | 0.034*** | 0.057*** | 0.056*** | 0.070*** | 0.006 | 0.007 | 0.037*** |
| | (0.005) | (0.005) | (0.005) | (0.010) | (0.010) | (0.010) | (0.005) | (0.006) | (0.006) |
| Eligible | -0.182*** | -0.182*** | -0.125*** | -0.221*** | -0.221*** | -0.156*** | -0.143*** | -0.143*** | -0.118*** |
| | (0.004) | (0.004) | (0.004) | (0.008) | (0.008) | (0.007) | (0.004) | (0.004) | (0.004) |
| Cohort effects | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Control variables | No | No | Yes | No | No | Yes | No | No | Yes |
| Observations | 526,147 | 526,147 | 521,391 | 301,826 | 301,826 | 297,440 | 224,857 | 224,857 | 224,480 |
| Control group size | 139,280 | 139,280 | 139,280 | 90,748 | 90,748 | 90,748 | 48,669 | 48,669 | 48,669 |
| Outcome mean | 0.103 | 0.103 | 0.103 | 0.102 | 0.102 | 0.102 | 0.180 | 0.180 | 0.180 |

*Notes:* Clustered standard errors at the class level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. School level control variables include indicators of school type, rural area and geographical region. Student level control variables include gender, attendance rate, district and number of family members at different levels in the education system. Program characteristics include duration, annual fee, and an indicator for accreditation. Control group size accounts for the number of ineligible individuals in the exposure period, while Outcome mean refers to the mean of the dependent variable of those individuals.

Figure 2: Dynamics of Persistence and Retention




(a) Two-Year Enrollment




(b) Second-Year Dropout

Table 6: Difference-in-Discontinuities Design: Immediate Enrollment

| | All students | | | GPA $< 5.3$ | | |
|---|---|---|---|---|---|---|
| | HES | Universities | Vocational | HES | Universities | Vocational |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Difference | 0.011* | 0.023*** | -0.006 | 0.003 | 0.025** | -0.024** |
| | (0.006) | (0.006) | (0.006) | (0.013) | (0.010) | (0.012) |
| Exposed | 0.074*** | 0.127*** | -0.048*** | 0.062*** | 0.084*** | -0.024*** |
| | (0.004) | (0.005) | (0.005) | (0.009) | (0.007) | (0.009) |
| Unexposed | 0.063*** | 0.104*** | -0.042*** | 0.059*** | 0.059*** | -0.001 |
| | (0.005) | (0.004) | (0.004) | (0.009) | (0.007) | (0.007) |
| Bandwidth | | | | | | |
| *Exposed* | 51.257 | 36.629 | 41.201 | 48.882 | 47.259 | 43.601 |
| *Unexposed* | 50.574 | 42.220 | 52.172 | 42.668 | 45.042 | 53.310 |
| Observations | | | | | | |
| *Exposed* | 117,087 | 84,280 | 94,582 | 27,136 | 26,254 | 24,260 |
| *Unexposed* | 113,523 | 95,218 | 116,986 | 27,528 | 29,019 | 34,149 |

*Notes:* Optimal bandwidths separately selected by exposure. Triangular kernel is used for local linear regressions. SUEST standard errors clustered at the class level in parentheses. *** p< 0.01, ** p< 0.05, * p< 0.1.

Table 7: Difference-in-Discontinuities Design: Two-Year Enrollment

| | All students | | | GPA $< 5.3$ | | |
|---|---|---|---|---|---|---|
| | HES | Universities | Vocational | HES | Universities | Vocational |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Difference | 0.019** | 0.015** | 0.004 | 0.041** | 0.028** | 0.006 |
| | (0.007) | (0.007) | (0.007) | (0.016) | (0.011) | (0.013) |
| Exposed | 0.076*** | 0.107*** | -0.038*** | 0.080*** | 0.072*** | 0.000 |
| | (0.004) | (0.004) | (0.005) | (0.008) | (0.006) | (0.008) |
| Unexposed | 0.057*** | 0.092*** | -0.042*** | 0.040*** | 0.044*** | -0.006 |
| | (0.006) | (0.005) | (0.005) | (0.014) | (0.010) | (0.010) |
| Bandwidth | | | | | | |
| *Exposed* | 58.077 | 37.934 | 38.461 | 64.812 | 51.634 | 48.703 |
| *Unexposed* | 53.155 | 50.305 | 48.858 | 35.814 | 44.375 | 45.506 |
| Observations | | | | | | |
| *Exposed* | 133,494 | 88,264 | 89,627 | 38,607 | 31,115 | 29,424 |
| *Unexposed* | 61,536 | 58,343 | 56,759 | 11,691 | 14,464 | 14,832 |

*Notes:* Optimal bandwidths separately selected by exposure. Triangular kernel is used for local linear regressions. SUEST standard errors clustered at the class level in parentheses. *** p< 0.01, ** p< 0.05, * p< 0.1.

Table 8: Difference-in-Discontinuities Design: Second-Year Dropout

| | All students | | | GPA $< 5.3$ | | |
|---|---|---|---|---|---|---|
| | HES | Universities | Vocational | HES | Universities | Vocational |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Difference | -0.009 | 0.000 | -0.025** | -0.025 | -0.019 | -0.051** |
| | (0.007) | (0.013) | (0.011) | (0.017) | (0.031) | (0.025) |
| Exposed | -0.008* | -0.017** | 0.002 | -0.029*** | -0.009 | -0.038** |
| | (0.004) | (0.008) | (0.006) | (0.010) | (0.018) | (0.016) |
| Unexposed | 0.001 | -0.018 | 0.026*** | -0.004 | 0.010 | 0.013 |
| | (0.006) | (0.011) | (0.009) | (0.014) | (0.025) | (0.019) |
| Bandwidth | | | | | | |
| *Exposed* | 54.348 | 51.297 | 46.782 | 50.644 | 54.499 | 31.156 |
| *Unexposed* | 50.402 | 49.227 | 50.556 | 41.813 | 38.712 | 50.574 |
| Observations | | | | | | |
| *Exposed* | 69,669 | 30,248 | 32,749 | 15,517 | 6,386 | 5,968 |
| *Unexposed* | 28,947 | 13,368 | 15,330 | 6,267 | 2,471 | 4,341 |

*Notes:* Optimal bandwidths separately selected by exposure. Triangular kernel is used for local linear regressions. SUEST standard errors clustered at the class level in parentheses. *** p< 0.01, ** p< 0.05, * p< 0.1.

Table 9: Heterogeneity of Main Results by Student Sex

| | HES | | | Universities | | | Vocational | | |
|---|---|---|---|---|---|---|---|---|---|
| | Female | Male | Difference | Female | Male | Difference | Female | Male | Difference |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Immediate Enrollment | -0.011** | 0.001 | -0.012** | 0.021*** | 0.022*** | -0.001 | -0.032*** | -0.021*** | -0.011** |
| | (0.004) | (0.005) | (0.006) | (0.005) | (0.007) | (0.007) | (0.004) | (0.004) | (0.005) |
| | [720,112] | [633,868] | [1,353,980] | [720,112] | [633,868] | [1,353,980] | [720,112] | [633,868] | [1,353,980] |
| | {0.51} | {0.51} | {0} | {0.30} | {0.29} | {.01} | {0.21} | {0.22} | {-.01} |
| Two-Year Enrollment | 0.005 | 0.018*** | -0.013* | 0.019*** | 0.022*** | -0.003 | -0.018*** | -0.007* | -0.011** |
| | (0.005) | (0.007) | (0.007) | (0.006) | (0.008) | (0.009) | (0.004) | (0.004) | (0.005) |
| | [550,288] | [485,263] | [1,035,551] | [550,302] | [485,266] | [1,035,568] | [551,073] | [486,064] | [1,037,137] |
| | {0.45} | {0.44} | {.01} | {0.26} | {0.25} | {.01} | {0.17} | {0.17} | {0} |
| Second-Year Dropout | -0.013** | -0.016*** | 0.003 | -0.041*** | -0.057*** | 0.016 | -0.005 | -0.011* | 0.007 |
| | (0.006) | (0.006) | (0.008) | (0.013) | (0.013) | (0.018) | (0.007) | (0.007) | (0.010) |
| | [276,309] | [245,082] | [521,391] | [158,711] | [138,729] | [297,440] | [117,898] | [106,582] | [224,480] |
| | {0.12} | {0.14} | {-.02} | {0.11} | {0.13} | {-.02} | {0.21} | {0.23} | {-.02} |
| Cohort effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

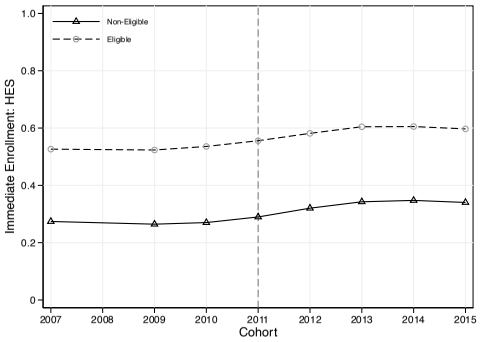
*Notes:* SUEST standard errors clustered at the class level in parentheses. Sample sizes in square brackets. Outcome sample means in curly braces. *** p<0.01, ** p<0.05, * p<0.1. School level control variables include indicators of school type, rural area and geographical region. Student level control variables include attendance rate, district and number of family members at different levels in the education system.

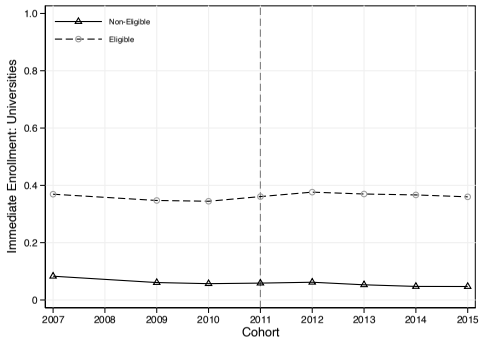
Table 10: Heterogeneity of Main Results by School Type

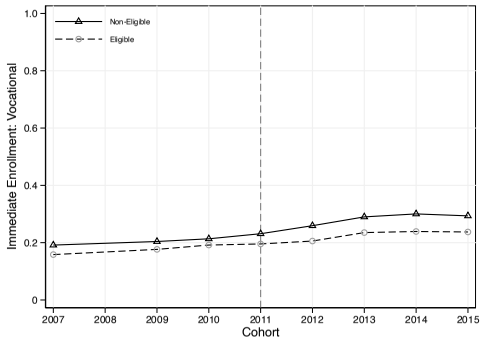
| | HES | | | Universities | | | Vocational | | |
|---|---|---|---|---|---|---|---|---|---|
| | Public | Voucher | Difference | Public | Voucher | Difference | Public | Voucher | Difference |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Immediate Enrollment | 0.002 | -0.005 | 0.007 | 0.010 | 0.028*** | -0.018* | -0.008 | -0.033*** | 0.025*** |
| | (0.006) | (0.004) | (0.007) | (0.008) | (0.005) | (0.010) | (0.005) | (0.004) | (0.007) |
| | [530,018] | [823,962] | [1,353,980] | [530,018] | [823,962] | [1,353,980] | [530,018] | [823,962] | [1,353,980] |
| | {0.46} | {0.54} | {-.08} | {0.24} | {0.33} | {-.09} | {0.23} | {0.21} | {.02} |
| Two-Year Enrollment | 0.007 | 0.016*** | -0.009 | 0.010 | 0.025*** | -0.015 | -0.004 | -0.013*** | 0.009 |
| | (0.008) | (0.005) | (0.009) | (0.010) | (0.006) | (0.012) | (0.005) | (0.004) | (0.006) |
| | [402,810] | [632,741] | [1,035,551] | [402,815] | [632,753] | [1,035,568] | [403,430] | [633,707] | [1,037,137] |
| | {0.40} | {0.48} | {-.08} | {0.21} | {0.29} | {-.08} | {0.18} | {0.17} | {.01} |
| Second-Year Dropout | -0.007 | -0.020*** | 0.013 | -0.055*** | -0.050*** | -0.005 | -0.001 | -0.012* | 0.011 |
| | (0.008) | (0.006) | (0.009) | (0.017) | (0.011) | (0.020) | (0.008) | (0.006) | (0.011) |
| | [185,603] | [335,788] | [521,391] | [94,366] | [203,074] | [297,440] | [91,470] | [133,010] | [224,480] |
| | {0.15} | {0.12} | {.03} | {0.13} | {0.11} | {.02} | {0.23} | {0.21} | {.02} |
| Cohort effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Notes:* SUEST standard errors clustered at the class level in parentheses. Sample sizes in square brackets. Outcome sample means in curly braces. *** p<0.01, ** p<0.05, * p<0.1. School level control variables include indicators of school type, rural area and geographical region. Student level control variables include attendance rate, district and number of family members at different levels in the education system.

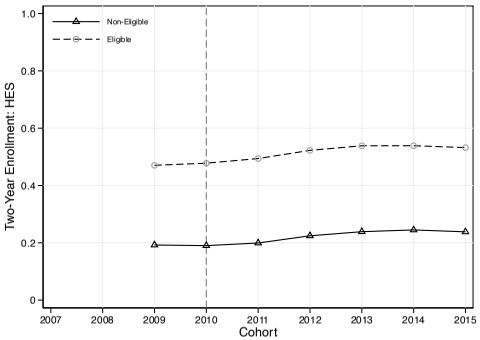
Figure A.1: Outcomes over Time by Eligibility

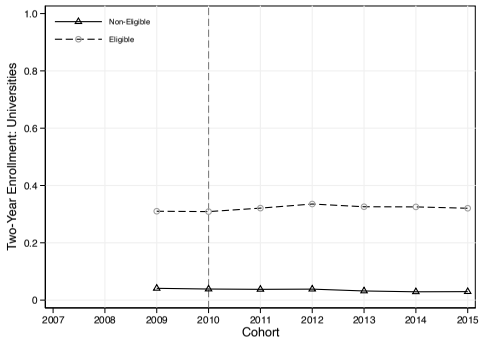


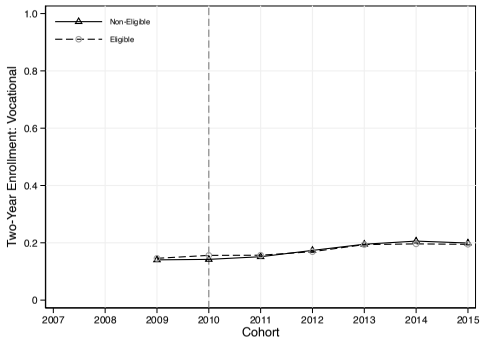



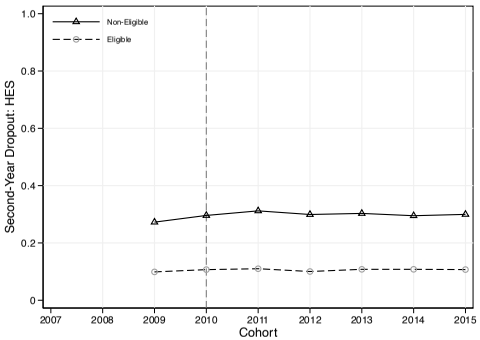

Panel A: Immediate Enrollment

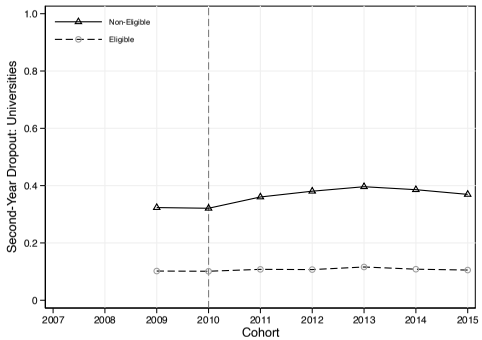


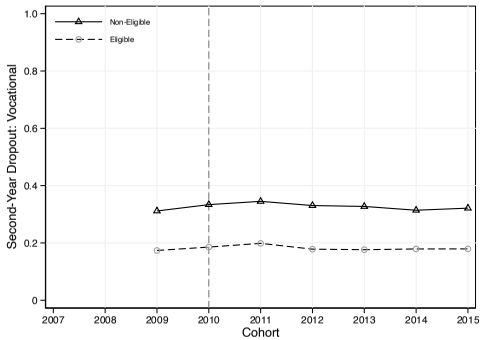




Panel B: Two-Year Enrollment




Panel C: Second-Year Dropout

# Table A.1: Dynamics Excluding Year 2008

| | **Immediate Enrollment** | | | | **Two-Year Enrollment** | | | | **Second-Year Dropout** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Universities | | Vocational | | Universities | | Vocational | | Universities | | Vocational | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Eligible × cohort 2007 | -0.016 | -0.017* | 0.003 | 0.004 | | | | | | | | |
| | (0.010) | (0.010) | (0.006) | (0.006) | | | | | | | | |
| Eligible × cohort 2009 | -0.015 | -0.015 | 0.008 | 0.008 | -0.001 | -0.001 | -0.009* | -0.009* | -0.002 | -0.003 | 0.010 | 0.010 |
| | (0.010) | (0.010) | (0.006) | (0.006) | (0.009) | (0.009) | (0.005) | (0.005) | (0.015) | (0.015) | (0.009) | (0.009) |
| Eligible × cohort 2010 | -0.014 | -0.015 | 0.014** | 0.015** | | | | | | | | |
| | (0.010) | (0.010) | (0.006) | (0.006) | | | | | | | | |
| Eligible × cohort 2011 | | | | | 0.013 | 0.014 | -0.009* | -0.009* | -0.033** | -0.049*** | 0.002 | -0.002 |
| | | | | | (0.010) | (0.010) | (0.005) | (0.005) | (0.015) | (0.015) | (0.009) | (0.008) |
| Eligible × cohort 2012 | 0.013 | 0.011 | -0.018*** | -0.016*** | 0.027*** | 0.026*** | -0.018*** | -0.018*** | -0.054*** | -0.057*** | -0.004 | -0.007 |
| | (0.009) | (0.009) | (0.006) | (0.006) | (0.009) | (0.009) | (0.005) | (0.005) | (0.015) | (0.015) | (0.009) | (0.008) |
| Eligible × cohort 2013 | 0.015 | 0.012 | -0.019*** | -0.018*** | 0.024*** | 0.021** | -0.015*** | -0.015*** | -0.060*** | -0.057*** | -0.003 | -0.010 |
| | (0.009) | (0.009) | (0.007) | (0.007) | (0.009) | (0.009) | (0.006) | (0.006) | (0.016) | (0.015) | (0.008) | (0.008) |
| Eligible × cohort 2014 | 0.017* | 0.016 | -0.026*** | -0.025*** | 0.026*** | 0.025*** | -0.024*** | -0.024*** | -0.058*** | -0.038** | 0.013 | 0.006 |
| | (0.010) | (0.010) | (0.007) | (0.007) | (0.009) | (0.010) | (0.006) | (0.006) | (0.017) | (0.017) | (0.008) | (0.008) |
| Eligible × cohort 2015 | 0.011 | 0.009 | -0.021*** | -0.020*** | | | | | | | | |
| | (0.009) | (0.009) | (0.007) | (0.007) | | | | | | | | |
| Eligible | 0.302*** | 0.283*** | -0.036*** | -0.035*** | 0.270*** | 0.250*** | 0.014*** | 0.012*** | -0.220*** | -0.155*** | -0.148*** | -0.122*** |
| | (0.007) | (0.007) | (0.004) | (0.004) | (0.007) | (0.007) | (0.004) | (0.004) | (0.011) | (0.011) | (0.006) | (0.006) |
| Cohort 2007 | 0.024*** | 0.023*** | -0.040*** | -0.043*** | | | | | | | | |
| | (0.003) | (0.004) | (0.006) | (0.005) | | | | | | | | |
| Cohort 2009 | 0.002 | 0.002 | -0.027*** | -0.028*** | 0.002 | 0.001 | -0.002 | -0.001 | 0.002 | 0.004 | -0.022** | -0.026*** |
| | (0.003) | (0.003) | (0.006) | (0.005) | (0.002) | (0.003) | (0.004) | (0.004) | (0.015) | (0.015) | (0.009) | (0.008) |
| Cohort 2010 | -0.002 | 0.000 | -0.018*** | -0.019*** | | | | | | | | |
| | (0.003) | (0.003) | (0.006) | (0.005) | | | | | | | | |
| Cohort 2011 | | | | | -0.001 | -0.003 | 0.009** | 0.010** | 0.039*** | 0.066*** | 0.011 | 0.022*** |
| | | | | | (0.002) | (0.003) | (0.004) | (0.004) | (0.015) | (0.015) | (0.009) | (0.008) |
| Cohort 2012 | 0.003 | 0.005 | 0.028*** | 0.031*** | -0.000 | 0.001 | 0.031*** | 0.036*** | 0.060*** | 0.066*** | -0.003 | 0.002 |
| | (0.003) | (0.003) | (0.005) | (0.005) | (0.002) | (0.003) | (0.004) | (0.004) | (0.016) | (0.015) | (0.009) | (0.009) |
| Cohort 2013 | -0.006** | -0.005 | 0.059*** | 0.059*** | -0.007*** | -0.008** | 0.053*** | 0.054*** | 0.075*** | 0.087*** | -0.006 | 0.019** |
| | (0.002) | (0.003) | (0.006) | (0.005) | (0.002) | (0.003) | (0.005) | (0.004) | (0.016) | (0.016) | (0.009) | (0.008) |
| Cohort 2014 | -0.012*** | -0.010*** | 0.069*** | 0.071*** | -0.010*** | -0.009*** | 0.064*** | 0.067*** | 0.065*** | 0.061*** | -0.020** | 0.008 |
| | (0.002) | (0.003) | (0.006) | (0.006) | (0.002) | (0.003) | (0.005) | (0.005) | (0.017) | (0.017) | (0.009) | (0.008) |
| Cohort 2015 | -0.012*** | -0.010*** | 0.062*** | 0.063*** | | | | | | | | |
| | (0.002) | (0.003) | (0.006) | (0.005) | | | | | | | | |
| Student district fixed effects | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes |
| Control variables | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1,353,980 | 1,353,980 | 1,353,980 | 1,353,980 | 1,035,568 | 1,035,568 | 1,037,137 | 1,037,137 | 301,826 | 297,440 | 224,857 | 224,480 |
| Pre-trends $p$-value | 0.295 | 0.260 | 0.126 | 0.113 | 0.900 | 0.955 | 0.098 | 0.072 | 0.913 | 0.858 | 0.243 | 0.241 |

*Notes:* Clustered standard errors at the class level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. School level control variables include indicators of school type, rural area and geographical region. Student level control variables include gender, attendance rate, district and number of family members at different levels in the education system. Control group size accounts for the number of ineligible individuals in the exposure period, while Outcome mean refers to the mean of the dependent variable of those individuals.

## Table B.1: IV-DiD Regressions for Two-Year Outcomes

| | HES | | | Universities | | | Vocational | | |
|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **Two-Year Enrollment** | | | | | | | | | |
| Eligible × exposed (2nd year) | 0.014*** | 0.013*** | 0.011** | 0.022*** | 0.022*** | 0.021*** | -0.011*** | -0.013*** | -0.012*** |
| | (0.005) | (0.005) | (0.005) | (0.006) | (0.006) | (0.006) | (0.003) | (0.003) | (0.003) |
| Cohort effects | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Control variables | No | No | Yes | No | No | Yes | No | No | Yes |
| Observations | 1,035,551 | 1,035,551 | 1,035,551 | 1,035,568 | 1,035,568 | 1,035,568 | 1,037,137 | 1,037,137 | 1,037,137 |
| Cragg-Donald | 10,761,691 | 10,763,467 | 10,576,213 | 10,762,107 | 10,763,884 | 10,576,618 | 10,783,649 | 10,785,436 | 10,597,726 |
| **Second-Year Dropout** | | | | | | | | | |
| Eligible × exposed (2nd year) | -0.014*** | -0.014*** | -0.014*** | -0.049*** | -0.049*** | -0.050*** | -0.003 | -0.003 | -0.008 |
| | (0.005) | (0.005) | (0.005) | (0.010) | (0.010) | (0.009) | (0.005) | (0.005) | (0.005) |
| Cohort effects | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Control variables | No | No | Yes | No | No | Yes | No | No | Yes |
| Observations | 526,147 | 526,147 | 521,391 | 301,826 | 301,826 | 297,440 | 224,857 | 224,857 | 224,480 |
| Cragg-Donald | 40,887,766 | 40,887,893 | 38,270,537 | 11,742,481 | 11,741,672 | 10,985,932 | 22,570,275 | 22,567,295 | 21,934,238 |

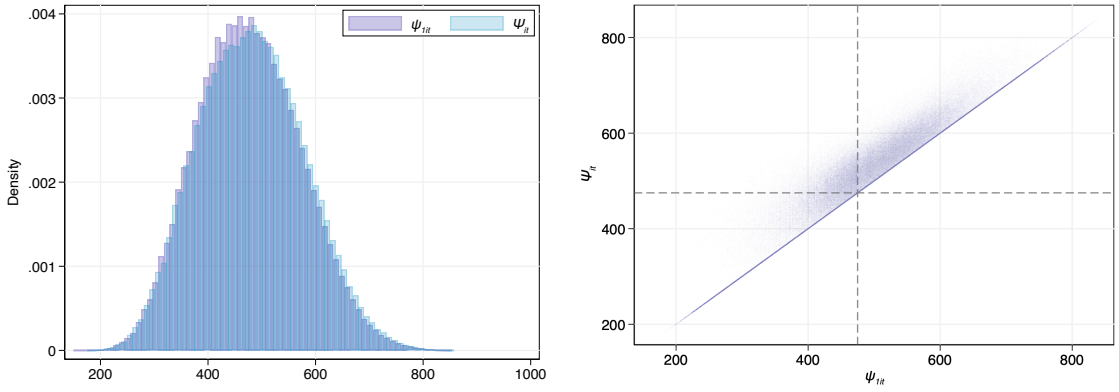
*Notes:* 2SLS estimates instrumenting $\text{eligible}_{it}$ with $\text{eligible}_{2it}$. Clustered standard errors at the class level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Control variables are the same as in Tables 3, 4, and 5.

## Table B.2: IV-Diff-in-Disc Design for Two-Year Outcomes

| | **Two-Year Enrollment** | | | | | | **Second-Year Dropout** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All students | | | GPA < 5.3 | | | All students | | | GPA < 5.3 | | |
| | HES | Universities | Vocational | HES | Universities | Vocational | HES | Universities | Vocational | HES | Universities | Vocational |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Difference | 0.024*** | 0.024*** | 0.001 | 0.046** | 0.033** | 0.005** | -0.009** | -0.000** | -0.025** | -0.025** | -0.020** | -0.051** |
| | (0.009) | (0.008) | (0.008) | (0.019) | (0.014) | (0.015) | (0.007) | (0.014) | (0.011) | (0.017) | (0.031) | (0.025) |
| Exposed | 0.097*** | 0.142*** | -0.051*** | 0.095*** | 0.088*** | -0.002*** | -0.008** | -0.019** | 0.001*** | -0.029*** | -0.009*** | -0.038** |
| | (0.005) | (0.005) | (0.005) | (0.009) | (0.007) | (0.009) | (0.004) | (0.008) | (0.006) | (0.010) | (0.019) | (0.016) |
| Unexposed | 0.073*** | 0.117*** | -0.052*** | 0.049*** | 0.054*** | -0.007 | 0.001*** | -0.019* | 0.027*** | -0.004*** | 0.010*** | 0.013 |
| | (0.008) | (0.007) | (0.006) | (0.017) | (0.011) | (0.012) | (0.006) | (0.011) | (0.009) | (0.014) | (0.025) | (0.019) |
| Bandwidth | | | | | | | | | | | | |
| *Exposed* | 58.077 | 37.934 | 38.461 | 64.812 | 51.634 | 48.703 | 54.348 | 51.297 | 46.782 | 50.644 | 54.499 | 31.156 |
| *Unexposed* | 53.155 | 50.305 | 48.858 | 35.814 | 44.375 | 45.506 | 50.402 | 49.227 | 50.556 | 41.813 | 38.712 | 50.574 |
| Observations | | | | | | | | | | | | |
| *Exposed* | 133,494 | 88,264 | 89,627 | 38,607 | 31,115 | 29,424 | 69,669 | 30,248 | 32,749 | 15,517 | 6,386 | 5,968 |
| *Unexposed* | 61,536 | 58,343 | 56,759 | 11,691 | 14,464 | 14,832 | 28,947 | 13,368 | 15,330 | 6,267 | 2,471 | 4,341 |

*Notes:* Optimal bandwidths separately selected by exposure. Triangular kernel is used in local linear regressions. Standard errors clustered at the class level in parentheses. *** p< 0.01, ** p< 0.05, * p< 0.1.

Figure B.1: Immediate and Two-Year-Best PSU Scores




(a) Histograms

(b) Scatter Plot

Table B.3: Immediate vs Two-Year Eligibility

| | Two-year eligibility | | |
|---|---|---|---|
| | Yes | No | Total |
| Immediate eligibility | | | |
| Yes | 77.27% | 0% | 77.27% |
| No | 0.76% | 21.97% | 22.73% |
| Total | 78.03% | 21.97% | 100.00% |

Table C.2: Evidence of Female Delay

| | Repetition | | Improvement | |
|---|---|---|---|---|
| | All students | Non-enrolled | All students | Non-enrolled |
| | (1) | (2) | (3) | (4) |
| Female × exposed | 0.008** | 0.034*** | 0.005 | -0.013** |
| | (0.003) | (0.007) | (0.005) | (0.005) |
| Female | 0.029*** | 0.060*** | 0.024*** | 0.006* |
| | (0.002) | (0.005) | (0.003) | (0.003) |
| Exposed | -0.009*** | 0.004 | -0.077*** | -0.024*** |
| | (0.003) | (0.007) | (0.004) | (0.004) |
| Observations | 1,023,720 | 452,286 | 196,854 | 155,145 |

*Notes:* Clustered standard errors at the class level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Repetition and Improvement are indicator variables. All students comprises the sample of students who sat the PSU immediately after high school graduation. Non-enrolled is the subsample of students that did not enroll immediately. Cohort 2015 is excluded because we do not have access to PSU scores for year 2016.

# B IV Details

Our IV linear regression model is given by the structural equation

$$\underbrace{y_{it}}_{1\times 1} = \underbrace{\boldsymbol{x}_{it}'}_{K\times 1}\underbrace{\boldsymbol{\lambda}}_{K\times 1} + \underbrace{\eta_{it}}_{1\times 1} \tag{B.1}$$

and the first stage

$$\underbrace{\boldsymbol{x}_{2it}}_{K_2\times 1} = \underbrace{\boldsymbol{\Gamma}}_{K_2\times L}\underbrace{\boldsymbol{z}_{it}}_{L\times 1} + \underbrace{\boldsymbol{\nu}_{it}}_{K_2\times 1} \tag{B.2}$$

where

$$\underbrace{\boldsymbol{x}_{it}}_{K\times 1} = \begin{pmatrix} \underbrace{\boldsymbol{x}_{1it}}_{K_1\times 1} \\ \underbrace{\boldsymbol{x}_{2it}}_{K_2\times 1} \end{pmatrix} \qquad \text{and} \qquad \boldsymbol{z}_{it} = \begin{pmatrix} \underbrace{\boldsymbol{x}_{1it}}_{K_1\times 1} \\ \underbrace{\boldsymbol{z}_{2it}}_{L_2\times 1} \end{pmatrix}$$

whith $K = K_1 + K_2$ and $L = K_1 + L_2 \geq K$.

Partition

$$\underbrace{\boldsymbol{\Gamma}}_{K_2\times L} = \Big[\underbrace{\boldsymbol{\Gamma}_1}_{K_2\times K_1} \quad \underbrace{\boldsymbol{\Gamma}_2}_{K_2\times L_2}\Big] \qquad \text{and} \qquad \underbrace{\boldsymbol{\lambda}}_{K\times 1} = \begin{bmatrix} \underbrace{\boldsymbol{\lambda}_1}_{K_1\times 1} \\ \underbrace{\boldsymbol{\lambda}_2}_{K_2\times 1} \end{bmatrix}$$

and rewrite Equation (B.2) as

$$\underbrace{\boldsymbol{x}_{2it}}_{K_2\times 1} = \Big[\underbrace{\boldsymbol{\Gamma}_1}_{K_2\times K_1} \quad \underbrace{\boldsymbol{\Gamma}_2}_{K_2\times L_2}\Big] \begin{pmatrix} \underbrace{\boldsymbol{x}_{1it}}_{K_1\times 1} \\ \underbrace{\boldsymbol{z}_{2it}}_{L_2\times 1} \end{pmatrix} + \underbrace{\boldsymbol{\nu}_{it}}_{K_2\times 1}. \tag{B.2'}$$

Now, plugging Equation (B.2') into (B.1), we obtain

$$\begin{aligned} \underbrace{y_{it}}_{1\times 1} &= \underbrace{\Big[\boldsymbol{x}_{1it}' \quad \Big(\boldsymbol{x}_{1it}'\boldsymbol{\Gamma}_1' + \boldsymbol{z}_{2it}'\boldsymbol{\Gamma}_2' + \boldsymbol{\nu}_{it}'\Big)\Big]}_{1\times K}\underbrace{\begin{bmatrix}\boldsymbol{\lambda}_1 \\ \boldsymbol{\lambda}_2\end{bmatrix}}_{K\times 1} + \underbrace{\eta_{it}}_{1\times 1} \\ &= \underbrace{\boldsymbol{x}_{1it}'}_{1\times K_1}\underbrace{\Big(\boldsymbol{\lambda}_1 + \boldsymbol{\Gamma}_1'\boldsymbol{\lambda}_2\Big)}_{K_1\times 1} + \underbrace{\boldsymbol{z}_{2it}'}_{1\times L_2}\underbrace{\boldsymbol{\Gamma}_2'\boldsymbol{\lambda}_2}_{L_2\times 1} + \underbrace{\boldsymbol{\nu}_{it}'\boldsymbol{\lambda}_2 + \eta_{it}}_{1\times 1} \\ &\equiv \underbrace{\boldsymbol{x}_{1it}'}_{1\times K_1}\underbrace{\boldsymbol{\beta}_1}_{K_1\times 1} + \underbrace{\boldsymbol{z}_{2it}'}_{1\times L_2}\underbrace{\boldsymbol{\beta}_2}_{L_2\times 1} + \underbrace{\varepsilon_{it}}_{1\times 1}. \end{aligned}$$

Finally, letting

$$\underbrace{\boldsymbol{\beta}}_{L\times 1} \equiv \begin{bmatrix} \underbrace{\boldsymbol{\beta}_1}_{K_1\times 1} \\ \underbrace{\boldsymbol{\beta}_2}_{L_2\times 1} \end{bmatrix},$$

we obtain the reduced form

$$\underbrace{y_{it}}_{1\times 1} = \underbrace{\boldsymbol{z}_{it}'}_{1\times L}\underbrace{\boldsymbol{\beta}}_{L\times 1} + \underbrace{\varepsilon_{it}}_{1\times 1}. \tag{1}$$

Notice that

$$\mathbb{E}\big[\underbrace{\boldsymbol{z}_{it}}_{L\times 1}\underbrace{\boldsymbol{\nu}_{it}'}_{1\times K_2}\big] = \underbrace{\mathbf{0}}_{L\times K_2}$$

by construction since Equation (B.2) is a linear projection. Therefore,

$$\mathbb{E}\big[\boldsymbol{z}_{it}\,\varepsilon_{it}\big] = 0 \implies \mathbb{E}\big[\boldsymbol{z}_{it}\,\eta_{it}\big] = 0$$

since

$$\mathbb{E}\big[\boldsymbol{z}_{it}\,\varepsilon_{it}\big] = \mathbb{E}\big[\boldsymbol{z}_{it}\,\boldsymbol{\nu}_{it}'\big]\,\boldsymbol{\lambda}_2 + \mathbb{E}\big[\boldsymbol{z}_{it}\,\eta_{it}\big]$$

by definition.

In our DiD-IV setup, the parallel trends assumption underlying our main specification—given by Equation (1)—implies that $\mathbb{E}\big[\boldsymbol{z}_{it}\,\varepsilon_{it}\big] = 0$. Thus, by the argument above, the independence/ignorability requirement for a valid instrument is satisfied for our excluded instruments $\boldsymbol{z}_{2it}$ under the parallel trends assumption.