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Breaking Down Barriers:
The Impact of State Authorization Reciprocity on Online Enrollment

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Growth in Online Enrollments and the Formation of NC-SARA

- Growth in online enrollment
  - Older learners and parents need more flexibility
  - Most students attend nearby colleges, online education expands options
- States serve as gatekeeper for authorization complicating online education across state lines
- NC-SARA forms in 2014
  - As of 2021, 49 states (all but California), the District of Columbia (DC), Puerto Rico (PR), and the US Virgin Islands (USVI) have joined NC-SARA

Debate over NC-SARA

- Proponents:
  - Expands opportunities
  - Reduced regulatory and administrative burdens

- Opponents:
  - Reduces state oversight
  - Lowers standards to weakest participant

Research Questions

- How does NC-SARA participation impact online enrollments?
- Do early adopters benefit more from NC-SARA participation?
- Do colleges with more established online programs benefit more from NC-SARA participation?
- Do for-profit colleges, known to be agile organizations, adapt and benefit more from NC-SARA participation?

Analysis Groups

- **Treatment on the treated (TOT):** We estimate the effect of SARA participation on online enrollments for SARA-participating institutions that joined SARA once they were eligible (because their state joined). The control in this specification includes those institutions not participating in SARA, whether or not their state joined. This specification includes all years that institutions and states joined SARA during our examination period, 2014 through 2018.

- **Intent to treat (ITT):** We estimate the effect of SARA participation on online enrollments for all institutions in a SARA member state, whether or not the institutions joined SARA. The control in this specification includes those institutions in states that had not yet joined SARA, including California, which has still not become a member state. This specification includes all years that institutions and states joined SARA during our examination period, 2014 through 2018.

Analytic Approach

- Difference-in-differences approach
  - Estimate if colleges moving along similar trajectories respond differently to the new policy
  - Staggered timing meant accounting for new econometrics literature (use Cenzig et al. and Abraham and Sun as robustness checks to the two-way fixed effects)

Early adopters had larger online programs, were more reliant on online education, and were larger institutions

	Control	2014	2015	2016	2017	2018	Total Sample
Exclusive Online Enrollment	220	2,268	1,185	546	496	585	444
	(639)	(4,009)	(4,026)	(1,122)	(1,881)	(1,272)	(1,643)
Partially Online Enrollment	443	2,824	1,262	1,117	837	1,189	765
	(958)	(5,242)	(2,130)	(1,576)	(1,299)	(2,441)	(1,501)
Proportion Offering Bachelor's	0.54	0.69	0.76	0.65	0.74	0.69	0.63
	(0.50)	(0.48)	(0.43)	(0.48)	(0.44)	(0.46)	(0.48)
Proportion Public	0.36	0.94	0.62	0.64	0.48	0.54	0.47
	(0.48)	(0.25)	(0.49)	(0.48)	(0.50)	(0.50)	(0.50)
Total Fall Enrollment	3,457	13,664	7,443	6,361	5,547	6,765	4,960
	(5,631)	(24,270)	(9,054)	(7,760)	(6,430)	(9,123)	(7,183)
Share URM	0.34	0.15	0.17	0.24	0.25	0.31	0.29
	(0.26)	(0.09)	(0.13)	(0.19)	(0.22)	(0.22)	(0.24)
Share Pell	0.46	0.29	0.36	0.41	0.41	0.42	0.43
	(0.21)	(0.10)	(0.13)	(0.15)	(0.16)	(0.16)	(0.19)
Share Enrolled Online	0.06	0.26	0.15	0.11	0.10	0.09	0.08
	(0.14)	(0.21)	(0.22)	(0.15)	(0.16)	(0.12)	(0.15)
Proportion For-Profit	0.23	0.00	0.08	0.03	0.09	0.04	0.14
	(0.42)	(0.0)	(0.26)	(0.16)	(0.28)	(0.20)	(0.35)
State Attainment Rate	0.41	0.40	0.41	0.38	0.40	0.41	0.40
	(0.05)	(0.07)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
State Income per Capita	46,277	45,829	43,835	42,014	44,171	44,671	44,839
	(6,574)	(7,648)	(4,848)	(4,570)	(7,527)	(7,023)	(6,555)
State Population	15,600,000	2,602,469	4,534,307	8,774,060	9,449,501	13,300,000	12,100,000
	(12,500,000)	(2,325,741)	(2,361,656)	(6,913,331)	(6,450,155)	(7,109,095)	(10,500,000)
Number of New Institutions in SARA	1,583	16	278	567	557	238	3,239

For-profits comprise a relatively small share of NC-SARA participants

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	(0.50)	(0.48)	(0.43)	(0.48)	(0.44)	(0.46)	(0.48)
Proportion Public	0.36	0.94	0.62	0.64	0.48	0.54	0.47
	(0.48)	(0.25)	(0.49)	(0.48)	(0.50)	(0.50)	(0.50)
Total Fall Enrollment	3,457	13,664	7,443	6,361	5,547	6,765	4,960
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State Attainment Rate	0.41	0.40	0.41	0.38	0.40	0.41	0.40
	(0.05)	(0.07)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
State Income per Capita	46,277	45,829	43,835	42,014	44,171	44,671	44,839
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State Population	15,600,000	2,602,469	4,534,307	8,774,060	9,449,501	13,300,000	12,100,000
	(12,500,000)	(2,325,741)	(2,361,656)	(6,913,331)	(6,450,155)	(7,109,095)	(10,500,000)
Number of New Institutions in SARA	1,583	16	278	567	557	238	3,239

Table 2: Estimated Relationship Between SARA Participation and Exclusively Online Enrollment

- Participating institutions increased online enrollment by 46 students; 121 students among early adopters
- No evidence of spillover effects
- Effect size grows over time

Column Heading	TOT Full Sample	ITT Full Sample	Temporal Effects TOT Full Sample	Temporal Effects ITT Full Sample	TOT Early Adopters	ITT Early Adopters
	(1)	(2)	(3)	(4)	(5)	(6)
Inst. SARA Participant	46.33***				121.8**	
	(15.63)				(56.32)	
State SARA Participant		0.523				10.87
		(12.32)				(14.87)
Year 1			38.82***	7.778		
			(12.52)	(12.83)		
Year 2			46.74**	7.309		
			(20.79)	(26.63)		
Year 3			83.75**	13.66		
			(37.29)	(42.04)		
Year 4			171.7**	53.10		
			(84.66)	(60.08)		
Year 5			706.0	21.57		
			(564.2)	(71.89)		
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Institution FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,603	22,603	22,603	22,603	13,125	13,125
R-squared	0.594	0.593	0.595	0.594	0.649	0.648
Number of Institutions	3,229	3,229	3,229	3,229	1,875	1,875

Robust standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.1*

Table 3: Estimate Relationship Between SARA Participation and Partially Online Enrollment

Column Heading	TOT Full Sample	ITT Full Sample	Temporal Effects TOT Full Sample	Temporal Effects ITT Full Sample	TOT Early Adopters	ITT Early Adopters
	(1)	(2)	(3)	(4)	(5)	(6)
Inst. SARA Participant	119.2***				171.0***	
	(16.81)				(39.67)	
State SARA Participant		-27.83				-75.94**
		(18.81)				(33.99)
Year 1			81.49***	-31.60		
			(14.72)	(21.76)		
Year 2			146.9***	-34.10		
			(21.20)	(34.13)		
Year 3			233.2***	-50.27		
			(33.86)	(48.46)		
Year 4			243.4***	-57.39		
			(53.50)	(67.87)		
Year 5			586.6***	-53.40		
			(205.9)	(86.61)		
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Institution FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,603	22,603	22,603	22,603	13,125	13,125
R-squared	0.103	0.100	0.106	0.100	0.071	0.068
Number of Institutions	3,229	3,229	3,229	3,229	1,875	1,875

Robust standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.1*

- Participating institutions increased hybrid enrollment by 120 students; 171 students among early adopters
- Hybrid programs appear to shrink overall in early adopting states
- Effect size grows over time

Table 4: Heterogeneous Effects of SARA Participation

- For-profits don't appear to disproportionately benefit
- Pre-SARA online capacity does not appear to impact effect
- High-reliance early adopters appear to lose hybrid students

	Exclusively Online Enrollment			Partially Online Enrollment		
	TOT Early Adopters	TOT Early Adopters	TOT Early Adopters	TOT Early Adopters	TOT Early Adopters	TOT Early Adopters
	(1)	(2)	(3)	(1)	(2)	(3)
Inst. SARA Participant	115.5**	79.99	74.86	180.9***	183.3***	256.5***
	(57.35)	(50.24)	(53.10)	(35.86)	(35.70)	(46.70)
SARA x For-Profit	86.67			-137.5		
	(348.2)			(96.03)		
SARA x Capacity		0.0340			-0.0100	
		(0.0590)			(0.0129)	
SARA x Reliance			304.4			-554.3***
			(409.6)			(160.3)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Institution FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,125	13,125	13,125	13,125	13,125	13,125
R-squared	0.649	0.651	0.649	0.071	0.071	0.074
Number of Institutions	1,875	1,875	1,875	1,875	1,875	1,875

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Takeaways and Future Research

- **Expanding online enrollment for participants, especially early adopters, appears to expand pool of potential students**
  - We should consider capturing the administrative and financial benefits of reciprocity agreements
  - Additional research to understand the types of programs that are growing

- **Evidence suggests online learning and returns to online credential may lag in-person, especially for historically underserved groups**
  - Are new students learning and completing credentials?
  - Do online credentials from out-of-state institutions hold the same value in local labor markets?

- **For-profit schools do not appear to disproportionately benefits, assuage concerns of predatory institutions taking advantage of the agreements**

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Thank You

Appendix

Equations

$$Y_{ist} = \alpha + \beta_1 SARA_{ist} + X_{it} + Z_{st} + \delta_t + \mu_i + \varepsilon_{ist}$$

$$Y_{ist} = \alpha + \beta_1 SARA_{st} + X_{it} + Z_{st} + \delta_t + \lambda_s + \varepsilon_{ist}$$

$$Y_{ist} = \alpha + \beta_1 SARA_{ist} + \beta_2 (SARA_{ist} \bullet \delta_t) + X_{it} + Z_{st} + \delta_t + \mu_i + \varepsilon_{ist}$$

$$Y_{ist} = \alpha + \beta_1 SARA_{ist} \times For\ Profit_i + \beta_2 SARA_{ist} + \beta_3 ForProfit_i + X_{it}$$

$$+ Z_{st} + \delta_t + \lambda_s + \varepsilon_{ist}$$

$$Y_{ist} = \alpha + \beta_1 SARA_{ist} \times Capacity_{i,t=2013} + \beta_2 SARA_{ist} + \beta_3 Capacity_{i,t=2013} + X_{it}$$

$$+ Z_{st} + \delta_t + \lambda_s + \varepsilon_{ist}$$

$$Y_{ist} = \alpha + \beta_1 SARA_{ist} \times Reliance_{i,t=2013} + \beta_2 SARA_{ist} + \beta_3 Reliance_{i,t=2013} + X_{it}$$

$$+ Z_{st} + \delta_t + \lambda_s + \varepsilon_{ist}$$