Capacity and Flexibility in CTE Programs
Program Offerings and Student Success

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Note: The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305H150073 to the Regents of the University of California. The opinions expressed are those of the authors alone and do not represent views of the Institute or the U.S. Department of Education, or of the agencies providing data.

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Introduction

- Efforts to improve degree completion focus on community colleges
  - Open access
  - Low cost
  - Career-technical programs
  - Flexible course-taking options

- But, low persistence and completion rates
  - 1/3 of degree-seeking students complete (Snyder et al. 2015)
  - Some heterogeneity across colleges (Cunha and Miller 2014; Kurlaender et al. 2016)

Introduction

- What may explain low completion rates?
  - Information (Deil-Amen & Rosenbaum 2002; Person et al., 2006)
  - Lack of preparation (Bettinger et al. 2013; Kurlaender 2014)
  - Financial constraints (Singell, 2004; Bettinger & Long 2004)

- What may explain heterogeneity across institutions?
  - Instructional expenditures (Stange 2012)
  - Full-time faculty (Calcagno et al 2008)
  - Counseling and student services (Scrivener et al 2015)
  - Mentoring and emergency financial assistance (Evans et al 2017)

- Less research on program flexibility and accessibility to students
  - Important given policy interest in for-profits

Introduction

- What do we mean by flexibility and accessibility?
  - Course/program capacity
  - Course frequency
  - Course scheduling and timing

- How might lack of flexibility affect students?
  - May lead students to defer or switch programs
  - May increase time to completion

- Research Questions:
  - How much flexibility is there in community college CTE programs?
  - Is flexibility associated with improved academic outcomes?

This Project

- Detailed data from California community colleges
  - Course-level and student-level information
  - 114 colleges, more than 2.6 million students per year

- Descriptive evidence on variation in CTE program flexibility
  - Across colleges and programs
  - Within programs over time

- Is CTE program flexibility associated with academic outcomes?
  - Program size
  - Number of completers
  - Years to completion

Data, 2001-2016

- Student-level data
  - Courses taken
  - Degrees/certificates earned
  - Demographics and financial aid

- Detailed course information
  - Enrollment
  - Content
  - Scheduling and timing
  - Online

- Definition of "Programs"
  - Award type (AA/AS, short certificate, long certificate)
  - College
  - Field of study (6-digit CIP codes)
  - Limit to CTE programs only

Course-Level Summary Statistics

	2001	2010
Programs	2683	2766
Courses	66310	53287
Offered Spring and Fall	0.678	0.672
Offered Summer	0.287	0.246
Offered Fall Only	0.100	0.115
Offered Spring Only	0.122	0.127
Once per Week Only	0.384	0.394
Offered Online	0.002	0.183
Offered Morning	0.464	0.422
Offered Evening	0.485	0.413
Offered Weekends	0.127	0.0776

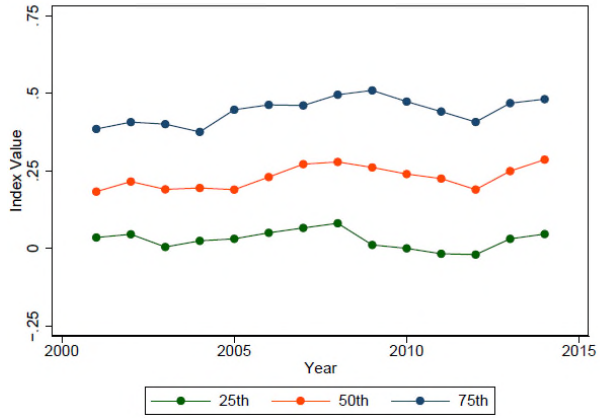
Flexibility Index

- Standardize program level means for each component
- Index is the mean of the standardized scores
- Follows Kling et al. (2007), Hoynes et al. (2016)
- Flip signs when correlation is negative

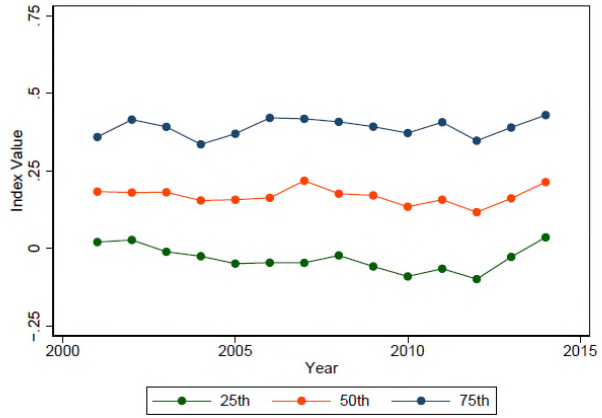
Correlations with Index

Offered Summer	0.594
Offered Spring, Summer, and Fall	0.527
Offered Spring and Fall	0.462
Offered Fall Only	-0.511
Offered Spring Only	-0.585
Offered Spring or Fall Only	-0.711
Once per Week Only	-0.564
Offered Online	0.561
Offered Evening	-0.333
No Timing Information	0.672
Offered 1x per Week	-0.530
Only Offered Weekdays	-0.572
Irregular/Uncscheduled	0.675

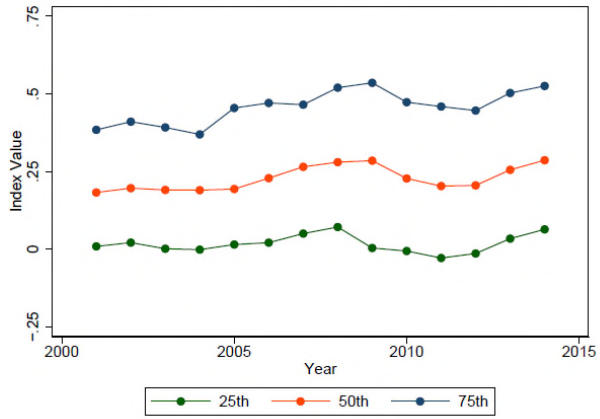
Trends in Flexibility



a) Short Certificate Programs



b) Long Certificate Programs



c) AA/AS programs

Methodology

$$y_{pct} = \pi Flex_{pct} + \beta D_{pct} + \alpha_p + \gamma_t + \theta_c + \epsilon_{pct}$$

- y_{pct}: outcomes
  - *p:* Program
  - *c:* College
  - *t:* Cohort entry year
- $Flex_{pct}$
  - 3 year moving average of flexibility index
- Outcomes
  - Number of new entrants
  - Number of completers within 200% of normative time
  - Years to completion for completers

Number of Entrants

	(1)	(2)	(3)	(4)	(5)	(6)
	Short Certificate		Long Certificate		AA/AS	
Index	535.3***	422.6***	407.8***	406.9***	528.6***	469.0***
	(95.82)	(62.47)	(55.45)	(46.87)	(62.11)	(47.48)
Observations	4670	4670	3138	3138	7987	7987
Programs	899	899	629	629	1353	1353
R2	0.331	0.518	0.526	0.661	0.312	0.472
Y-Mean	535.9	535.9	424.9	424.9	482.1	482.1
Year	X	X	X	X	X	X
Program	X	X	X	X	X	X
Demographics	X	X	X	X	X	X
College		X		X		X

Number of Completers

	(1)	(2)	(3)	(4)	(5)	(6)
	Short Certificate		Long Certificate		AA/AS	
Index	30.20*	26.74**	12.13***	9.522***	21.68***	16.63***
	(14.95)	(8.815)	(2.543)	(2.246)	(3.355)	(2.966)
Observations	5425	5425	3536	3536	5896	5896
Programs	1068	1068	699	699	1179	1179
R2	0.302	0.440	0.451	0.548	0.494	0.598
Y-Mean	29.70	29.70	11.52	11.52	20.66	20.66
Year	X	X	X	X	X	X
Program	X	X	X	X	X	X
Demographics	X	X	X	X	X	X
College		X		X		X

Years to completion, for completers

	(1)	(2)	(3)	(4)	(5)	(6)
	Short Certificate		Long Certificate		AA/AS	
Index	0.003	0.147	-0.292	-0.144	-0.0574	-0.0181
	(0.175)	(0.160)	(0.154)	(0.160)	(0.0939)	(0.0909)
Observations	4999	4999	3082	3082	5737	5737
Programs	992	992	610	610	1149	1149
R2	0.191	0.277	0.302	0.414	0.313	0.387
Y-Mean	3.322	3.322	3.849	3.849	4.306	4.306
Year	X	X	X	X	X	X
Program	X	X	X	X	X	X
Demographics	X	X	X	X	X	X
College		X		X		X

Robustness and Other Analyses

- Robustness and Sensitivity:
  - Demographics and other covariates
  - Weighting outcomes by program size
  - Different specifications of the flexibility index
  - Timing of index
  - Timing of outcomes

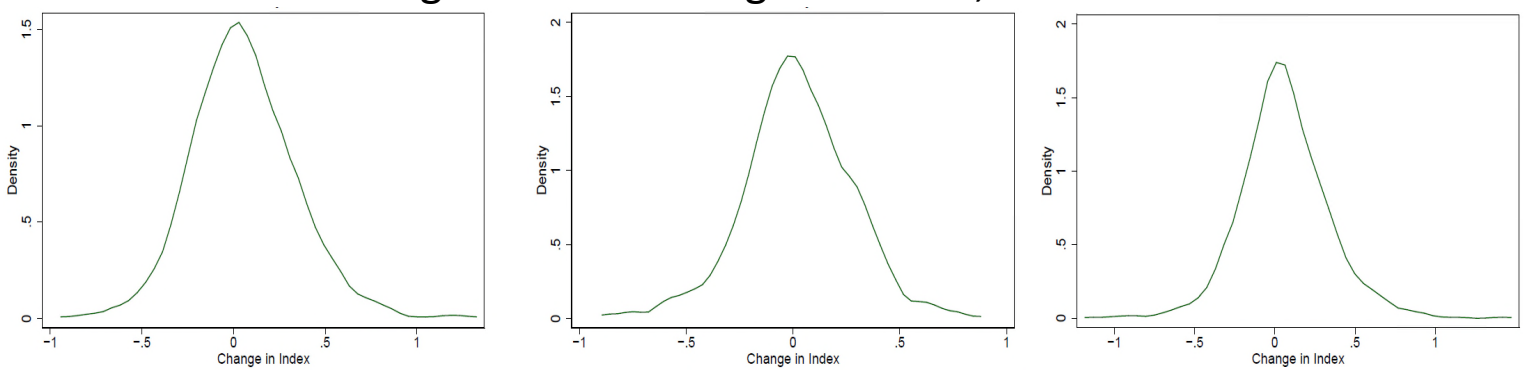
- Other Analyses
  - Effect of each individual component of the index
  - Event study with rise of online classes

Scaling the Findings

- One standard deviation increase in flexibility is associated with
  - Approximately 100% increase in new entrants to a program
  - Approximately 100% increase in completions

- What does one standard deviation increase in flexibility look like?
  - Program fully online
  - Offering most courses in Spring AND Fall
  - Offering most courses in Summer

Program-Level Changes in Index, 2001-2014



a) Short Certificate b) Long Certificate c) AA/AS

Policy Implications

- Many components of the flexibility index relatively easy to implement
  - Evening vs. morning classes
  - Offering class on weekends
  - Offering class once per week

- Small programs likely less able to increase flexibility
  - Especially number of courses, courses throughout the year

- "More research is needed"
  - Our analysis is descriptive, not causal
  - More work to understand when/why programs change flexibility
  - Hopefully a basis for further research and experimentation

Thank you!

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