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The Impact of Offering Baccalaureate Degrees on Institutional Enrollment in Community Colleges

Jeremy Wright-Kim[1]

Abstract

Objective: The community college sector plays a vital role in broadening access to education and helping states meet their workforce needs. An emerging trend and potential lever to better achieve these goals is the community college baccalaureate or CCB. Yet, opponents wonder whether CCBs may lead community colleges to abandon their traditional logics. This study attempts to help address this question. **Methods:** Using institution-level panel data, I employ various difference-in-difference approaches to estimate the impact of CCB adoption on overall enrollment levels, as well as the enrollment of historically underrepresented student populations. **Results:** I find that CCB adoption leads to significant increases in overall student enrollment; these results are robust to alternative specifications and control groups. Yet, enrollment-related impacts vary by selected student populations. I find no consistent evidence that CCB adoption shifts community colleges away from their commitment to underrepresented students, though there may be a tipping point not yet reached by current levels of CCB adoption. **Contributions:** These findings have important implications for policy and practice as institutional leaders and policy makers continue to debate, adopt, and implement baccalaureate programing at the community college level.

Keywords

policy, enrollment, educational access, community college baccalaureate

[1]University of Michigan, Ann Arbor, USA

Corresponding Author:
Jeremy Wright-Kim, Center for the Study of Higher and Postsecondary Education (CSHPE), University of Michigan, 610 East University Avenue, Ann Arbor, MI 48109, USA.
Email: jwrightk@umich.edu

Recent years have seen substantial proliferation of the community college baccalaureate, or CCB, including new authorizations, expansions from pilot programs, and the lifting of some states' restrictions on the number of CCBs allowed to be offered (Fulton, 2020). As of late 2021, 24 states have authorized their community colleges to offer CCBs (Love et al., 2021). Some estimates suggest there are almost 1,000 CCBs across over 100 institutions, representing approximately 15% of all community colleges (Floyd & Skolnik, 2019).

Though approval processes vary, common requirements for CCB authorization highlight shared characteristics across these emergent programs. For example, adoptive institutions must typically show their proposed degrees—often applied baccalaureates—directly address issues of local or state-level workforce needs (Fulton, 2015, 2020). Stakeholders must also often justify the need for the new degree program by providing evidence of a lack of access to comparable 4-year degrees for students in their service area (Floyd & Skolnik, 2019). Accordingly, advocates for the CCB movement note its potential to "increase geographical, financial and academic access" to baccalaureate-level education, while promoting "upward mobility" and "economic development" to meet shifting workforce needs (Walker & Pendleton, 2013, p. 10). CCBs may be particularly useful in helping states meet attainment goals in high-need professions (Bragg, 2019; Nettles, 2017), address persistent disparities across student populations in bachelor's degree attainment (Ma et al., 2020), and increase access to the "good jobs" that 4-year credentials can provide (Carnevale et al., 2019, p. 2).

Despite these potential benefits, CCBs are not without detractors. Opponents have cited multiple concerns, including the negative impacts on nearby 4-year institutions and how the non-traditional degrees will fare on the job market as justifications for limiting CCB proliferation (Floyd et al., 2005; Fulton, 2020), though, emergent research suggests these worries are largely unwarranted (Kaikkonen & Quarles, 2018; Love, 2020; Ortagus et al., 2020). A broader recurring area of concern is the impact of CCB adoption on the community colleges themselves and the extent to which their growth into baccalaureate-granting institutions and emphasis on workforce-oriented credentials may disrupt the focus on other aspects of their historic missions. Levin et al. (2018) described this process as a "deinstitutionalization of community college attributes and values" (p. 31).

Extant research provides little evidence of a wholesale divergence from the sector's traditional attributes and values, though, scholars note significant shifts in areas including tuition and fees and other financial policies, staff hiring and faculty expectations, and academic and support programing (Elue & Martinez, 2019; Martinez, 2019; McKinney et al., 2013; Ortagus & Hu, 2019). Still, concerns remain that adoptive institutions may lose sight of their former natures as community colleges, namely their enrollment and service of historically underrepresented students, including those who are low-income, adult, and minoritized (Bragg & Soler, 2016; Levin, 2004; Russell, 2013). A departure from this focus would be particularly concerning, as the sector serves as the most accessible entry into higher education for a wide swath of students (Cohen et al., 2014).

Research on the enrollment-related effects of CCB adoption remains mixed. Descriptive evidence suggests CCBs increase enrollment (Manias, 2007; Mejia, 2012) while also serving a more diverse population than local 4-year programs, including larger shares of low-income and adult students (Love, 2020; Neuhard, 2013). Others have noted significant increases in undergraduate enrollment at the state level post-CCB adoption but found null effects for certain minoritized populations (i.e., Latinx students), concluding that CCBs may attract students with workforce-relevant degree offerings but fall short in their access-oriented functions (Vidal-Rodriguez, 2019). Indeed, research suggests some implementers situate their CCBs primarily as tools for economic development instead of levers to diversify enrollments (Cuellar & Gándara, 2021). Meanwhile, other scholars identify decreases in racial diversity among certain degree fields, suggesting negative access-related effects of CCB adoption (Park et al., 2018) and a diversion of focus from historically underrepresented populations on behalf of adoptive institutions.

As policymakers and institutional leaders continue to debate and implement CCBs, it remains crucial to explore how expansion toward baccalaureate-level education is "aligned with or incongruent with [the] historic institutional mission" of the community college sector, particularly its focus on "underserved student populations" (Bragg & Soler, 2016, p. 68). This study builds on this prior work and contributes to our understanding of the impacts of CCB adoption by taking a national perspective and leveraging quasi-experimental methods to estimate the impact on enrollments at the institutional level and address the following questions:

- What is the effect of community college baccalaureate adoption on overall institutional enrollment?
- What is the effect of community college baccalaureate adoption on the enrollment of student populations traditionally served by the community college sector (i.e., underrepresented racial/ethnic minoritized students, low-income students, and adults)?

In line with prior research (e.g., Vidal-Rodriguez, 2019), this study attempts to highlight the extent that CCB adoption supports its ostensible goals of workforce development and access (McKinney et al., 2013) by not only attracting enrollments via newly adopted, workforce-oriented credentials, but doing so while continuing to support historically underrepresented students. Additionally, grounded in the perspectives of institutional practices as representations of values and mission (e.g., Greenwood et al., 2011), institutional enrollments can serve as potential indications of the influence of CCB adoption and its congruence with the historical values of the community college sector.

Literature Review

Community colleges have long inhabited a unique space within higher education, encompassing a wider range of functions when compared to their traditional 4-year counterparts. The sector is tasked with fulfilling both pre-college (i.e., developmental

education) and collegiate functions (e.g., transfer), as well as vocational, occupational, and community-oriented programing (Cohen et al., 2014). Amidst fulfillment of these functions, the sector has simultaneously supported multiple overarching missions and principles, including economic development, social mobility, and community engagement (Scott & Biag, 2015). Reflected in its moniker as "democracy's college," the most foundational guiding principles of the sector lie in its commitment to open access and educational opportunity (Gonzales & Ayers, 2018; Levin et al., 2016).

Yet, as the sector of higher education most responsive to external pressures and the shifting needs of their communities, the missions and functions of community colleges have changed over time (Gumport, 2003). For example, in an analysis of over 400 community college mission statements, Ayers (2015) noted a growing emphasis on degree completion and the collegiate function of community colleges since 2004, as compared to their roles in occupational or vocational education. Other research suggests community colleges have also grown to emphasize global competitiveness and economic viability as opposed to more social-oriented goals (e.g., Ayers, 2013). While this flexibility in emphasis of various missions may help the sector address the changing needs of its constituents, the "persistent ambiguity" has led some scholars to question the impact such shifting foci may have on institutional policy and practice, as well the sector's historic values (Gumport, 2003, p. 39).

The proliferation of community college baccalaureate (CCB) adoption has catalyzed further interest in the impacts of shifting missions within the sector. In their study of community colleges turned universities in Canada, Levin et al. (2016) noted the potential prioritization of certain students and programs deemed of more "economic benefit" than others (p. 174). A recent survey of 32 US community colleges with at least one baccalaureate program noted a similar emphasis on "address[ing] unmet needs in the community" like workforce development, but also to increase access to higher education for place-bound students (McKinney et al., 2013, p. 58). Accommodating these multiple goals has led to shifts in institutional policy and practice, including altered spending in academic and support services and financial aid (Elue & Martinez, 2019; Martinez, 2018) and adapted hiring practices of faculty and staff to support programing as baccalaureate-granting colleges (McKinney & Morris, 2010); some institutions terminated certain 2-year programs (Martinez, 2020), though CCB-granting institutions seem overall committed to their associate-degree function post-adoption (Ortagus et al., 2020).

Despite the espoused focus on educational access, some shifts in behavior amidst CCB-adoption may serve as potential barriers to enrollment. Some community college administrators described a narrowing of their admissions policies from "open-door" to "open-access" after CCB adoption (McKinney & Morris, 2010, p. 202), including increased selectivity due to limited program size and capacity (Floyd & Skolnik, 2019). Research also shows significant increases in tuition and fees at CCB-granting institutions (Ortagus & Hu, 2019), suggesting potential financial barriers to enrollment for the price-sensitive students who tend to enroll at community colleges (Cohen et al., 2014).

Evidence suggests adoptive institutions may achieve their goal of workforce development by increasing enrollments after implementing CCBs tied to economic needs, but the increases may not be distributed across populations historically served by the community college sector. Case studies of select programs highlight consistent increases in enrollment post-CCB adoption over time (e.g., Mejia, 2012). In Florida alone, between 2003 and 2010, FTE enrollment in CCBs increased by approximately 900% (Bilsky et al., 2012). However, leveraging a difference-in-differences approach, Park et al. (2018) noted a 6.28% decrease in the share of Black and Hispanic graduates when exploring the effect of CCB adoption on the state's teacher education programs, suggesting some CCBs may not attract underrepresented minorities.

In the only known quasi-experimental analysis of enrollment to date, Vidal-Rodriguez (2019) explored the state-level effects of CCB adoption between 1990 and 2014. The author estimated a 0.05% increase in total FTE enrollment in adoptive states but found null effects when looking only at Latino students, suggesting neither a divergence nor an emphasis on serving certain populations post-adoption. Highlighting this potential point, studies of CCB policies in Florida, Washington, Texas (Cuellar & Gándara, 2021), and California (Martinez & Acevedo, 2022) suggest implementers may be operating CCBs without specific attention toward using them to address gaps in educational enrollment and attainment for racial/ethnic minorities.

Alternatively, despite potential barriers like selective admissions and higher tuition costs (Floyd & Skolnik, 2019), extant descriptive evidence suggests that CCBs continue to attract and serve lower-income and adult students. For example, in Florida, the state with the highest levels of CCB adoption, recent data show that CCB graduates are older than graduates of associate degree programs within the same field as well as upper-division students in the state's university system; over half (58%) of CCB-graduates between 2016 and 2018 were ages 30 or over, compared to an average age of 22 at state universities. Descriptive reports of CCBs in Florida and beyond note large portions of participants also coming from lower-income backgrounds, as measured by Pell grant or other aid receipt (e.g., Makela et al., 2015; Neuhard, 2013).

Amidst these shifts in institutional behavior as new 4-year degree-granting institutions and a growing workforce development orientation via baccalaureate programs tied to economic need, scholars question to what extent adoptive institutions will "shed the logic of community colleges," including their focus on historically underserved students (Levin et al., 2016, p. 177). The broadening of institutional functions and missions need not always be antithetical to educational access for underserved students (e.g., Doran, 2015; Levin et al., 2018). However, the evidence presented in extant research suggests further examination of the enrollment-related impacts of CCB adoption will provide useful insight into how adoptive institutions are, or are not, shifting behaviors that are (in)congruent with their historical missions (Bragg & Soler, 2016).

Theoretical Framework

This study is informed by new institutionalism theory and its extensions, specifically the institutional logics perspective (Ivancheva et al., 2020; Thornton et al., 2012). As an organizational field, U.S. higher education is highly complex, accommodating multiple institutional types with varied missions (Scott & Biag, 2015). Institutional logics posits that these various types of institutions are guided by "taken-for-granted assumptions, beliefs, norms, and practices" that influence how they behave and conduct their work (Ishimaru & Galloway, 2020, p. 6). Earlier neo-institutional scholarship emphasized the importance of the external environment on institutional behavior and how organizations facing similar "regulations and environmental conditions" (Quirke, 2013, p. 1676) may respond to those stimuli by growing to operate more similarly to one another (DiMaggio & Powell, 1983). Institutional logics supports the importance of these stimuli but centers the interests and values embedded within an organization as the key mechanisms through which behavior can be explained, and views institutional practices as a reflection of organizations' dominant logics (Thornton et al., 2012).

Given the fragmentated nature of the constituents upon which educational institutions are dependent, and which place various pressures on institutional behavior, colleges and universities must operate through multiple logics simultaneously (Greenwood et al., 2011). For example, community colleges are interested in fulfilling an array of programmatic functions, including academic transfer and community programing, as well as exemplifying certain values through practice, such as economic development, access, and equity (Cohen et al., 2014; Scott & Biag, 2015). Deemed a "constellation of logics," the presence of multiple logics may result in a "win-win" if the logics complement one another but can cause tension if the goals embedded within them conflict (Goodrick & Reay, 2011, p. 402). Organizations can navigate these conflicts in many ways, including emphasizing one logic over another, removing the logic(s) in conflict altogether, or building links between the competing demands (Wry et al., 2011). Institutions could also emerge as new hybrid organizations (Skelcher & Smith, 2015) that "incorporate elements from different institutional logics" (Pache & Santos, 2013, p. 972).

The need to contend with multiple logics has existed for the community college since its inception (Scott & Biag, 2015). However, changing community needs and expectations have resulted in shifting logics over time. For example, organizational logics have evolved to focus more heavily on economic development, including remaining competitive in the global workforce market (Ayers, 2013). Community colleges have also needed to contend with the growing emphasis of the neoliberal logic in higher education, which can conflict with the sector's historical logics of equity and access (Levin et al., 2018).

Shifts in organizational identities "can also catalyze changes in logics" (Thornton et al., 2012). Conceptualized as "collective identity" within the institutional theory framework, this perspective suggests that organizations of the same type may resemble one another in normative orientations and practices (Wry et al., 2011, p. 449).

Collective identities can help distinguish between types of organizations, such as a "small liberal arts college versus large research universities" (Thornton et al., 2012, p. 128). Although collective identities within an organizational field (e.g., associate- vs. baccalaureate-level institution) tend not to result in identical values and practices among institutions of the same type, such group membership does influence broad organizational behavior and may shape how institutions react when reconciling multiple logics (Greenwood et al., 2011).

CCB adoption may set the stage for the need to accommodate new and increasingly complex logics. An institutional focus on increasing enrollments in and through baccalaureate programs directly tied to economic needs suggest a prevailing workforce development logic (e.g., Bragg, 2019). Yet, shifting admissions policies, rising prices, and other changes in behavior in service of this logic may affect other institutional goals, particularly if attention to those alternative logics is not present in CCB discussions (Cuellar & Gándara, 2021; Floyd & Skolnik, 2019; Ortagus & Hu, 2019). This study attempts to shed light on how CCB adoptive institutions serve their "constellation of logics" through enrollment behavior amidst expansion into baccalaureate-level education.

Data

To address the research questions, I constructed a panel data set spanning AY 1999 to 2000 to 2017 to 2018 of all public 2- and 4-year institutions in the U.S. ($n = 1{,}673$) to ensure capture of potential community college baccalaureate-granting institutions (now categorized as 4-year) and appropriate comparison institutions (non-adopting 2-year). I drew from research (Floyd & Skolnik, 2019), state legislation, and institutional academic catalogs to identify CCB-granting institutions and assign treatment years (see Supplemental Appendix A). I then limited the sample to all treated institutions and all public 2-year institutions that never adopted baccalaureate programing ($n = 838$). I utilized listwise deletion to remove institutions not present across the entire panel and those with missing outcome data. The resulting analytic sample consists of 702 institutions across 19 years, including 78 CCB-granting institutions.

To examine the effect of CCB adoption on overall enrollment, I utilize two measures—total fall headcount and full-time-equivalent (FTE) enrollment—allowing me to explore shifts in both total enrollment and enrollment intensity. I constructed the measure of underrepresented racial/ethnic minority students as the total number of African American, Hispanic, Native American, and Multiracial (first available in 2010) students. To explore shifts in the sector's support of low-income students post-CCB, I used the number of first-time, full-time students receiving federal grants. Finally, I explore the extent to which CCB-adopting institutions continue to serve non-traditional-age students using the number of adult students ages 25 and older. Institutions are required to report age-related enrollment only in odd-numbered years. I follow Kelchen's (2018) approach and use data interpolation to impute non-reported values for even years.

All outcome measures and institution-level variables come from the Integrated Postsecondary Data System (IPEDS) and are pulled from the Delta Cost Project (Hurlburt et al., 2017) when available. All race, income, and age-related outcomes are modeled as total counts, as well as proportions of enrollment, to identify shifts in absolute number of students served and potential shifts in institutional focus. All financial variables are adjusted to 2017 constant dollars using the CPI-U scalar. All non-proportion outcomes are logged to address potential outliers and simplify interpretation as percent changes.

To isolate the effects of CCB adoption on student enrollment, I include a series of time-varying institution-, county-, and state-level characteristics as controls. Selection of these variables is guided by prior research on forces that influence enrollment at community colleges. I account for the economic predictors of community college enrollment by controlling for state- and county-level unemployment rates and local median income, as individuals are more likely to pursue higher education during economic downturns as a means toward gainful employment (Hillman & Orians, 2013). To account for the relationship between net price and college enrollment (e.g., Dynarski & Scott-Clayton, 2013), I control for tuition and fees and availability of federal grant aid. Like others (e.g., Kelchen, 2018), I also include state-level measures of political partisanship of governorships and legislative bodies shown to influence tuition levels and the availability of financial aid for prospective students. I include a series of population demographics (e.g., age) at county- and state-levels that may influence the level and characteristics of community college enrollment (Dowd & Shieh, 2014; Grawe, 2018; Ortagus & Hu, 2019, 2020). Table 1 provides descriptive statistics of outcome and control variables. (See Supplemental Appendix B for additional information).

Empirical Strategy

This study leverages a generalized difference-in-differences (DiD) approach within the two-way fixed effects (TWFE) framework to estimate the average treatment effect of CCB adoption by comparing the differences in selected outcomes between treated and control units before and after treatment (Angrist & Pischke, 2009). Under the parallel trends assumption, the control group serves an appropriate counterfactual (Rubin, 1974) which allows one to approximate what *would* have happened to institutional enrollment at CCB-granting institutions had they *not* implemented CCB policies. As states adopted and institutions implemented CCBs in varying years, this approach allows treatment timing to vary across institution.

Specifically, I estimate the following equation:

$$Y_{it} = \alpha_0 + \alpha_t + c_i + \beta_1 CCB_{it} + \beta_2 X_{it} + \epsilon_{it} \quad (1)$$

where Y_{it} is the outcome; α_t and c_i are time and unit fixed effects, respectively; CCB_{it} is a treatment indicator that equals one in all years in which an institution implements a community college baccalaureate program and is zero otherwise; X_{it} includes a vector of theoretically- and empirically-justified covariates; and ϵ_{it} represents the robust

Table 1. Average Value of Variables Included in the Analyses.

	Treatment group ($n = 78$)	All non-CCB institutions ($n = 624$)	Institutions in CCB states ($n = 165$)	Institutions in non-CCB states ($n = 459$)	PSW group ($n = 624$)
Outcome and treatment variables					
Total fall enrollment	10,689 (11,043)	6,935 (7,986)	9,970 (10,713)	5,844 (6,399)	9,475 (9,438)
Full-time equivalent enrollment	6,323 (6,195)	4,084 (4,463)	5,548 (5,718)	3,557 (3,779)	5,523 (5,232)
Total URM enrollment	3,894 (7,249)	2,087 (3,332)	3,919 (5,096)	1,428 (2,030)	3,283 (4,509)
Proportion of URM students enrolled	27.7 (20.1)	26.3 (20.0)	35.4 (21.2)	23.0 (18.4)	28.4 (20.3)
Total low-income enrollment	469 (697)	330 (359)	340 (363)	326 (356)	397 (459)
Proportion of low-income students enrolled	42.8 (16.8)	48.4 (17.4)	45.2 (17.3)	49.6 (17.2)	45.3 (16.9)
Total adult enrollment	3,974 (3,905)	2,581 (2,841)	3,608 (3,767)	2,212 (2,315)	3,592 (3,506)
Proportion of adults enrolled	40.4 (11.9)	38.9 (11.3)	39.8 (11.3)	38.6 (11.2)	39.8 (10.0)
Number of CCB programs	1.6 (3.5)	—	—	—	—
State-level controls					
Unemployment rate	6.2 (2.2)	5.9 (2.0)	6.2 (2.2)	5.8 (1.9)	6.1 (2.1)
Median income	50,728 (9,038)	50,668 (9,809)	51,591 (8,582)	50,336 (10,194)	51,849 (9,586)
Number of public high school graduates	132,288 (103,125)	108,583 (105,061)	220,101 (141,870)	68,495 (41,159)	135,766 (120,880)
Proportion of state spending allocated to higher education	11.2 (4.3)	11.8 (5.5)	11.8 (4.7)	11.8 (5.7)	11.4 (4.9)
Legislative partisanship					
Split/not applicable	14.6	16.9	12.2	18.6	15.9
Republican	52.2	42.7	43.2	42.5	39.6
Democratic	33.1	40.4	44.6	38.9	44.4
Governorship partisanship					
Split/not applicable	0	0.8	0	1.0	0
Republican	59.7	51.9	62.8	48.4	48.8
Democratic	40.3	47.3	37.2	50.6	50.6
County-level controls					
Total population	984,990 (1,919,246)	548,024 (1,336,726)	1,078,454 (2,161,618)	357,347 (782,545)	1,001,528 (2,004,002)
Proportion of population age 19–65	59.0 (3.7)	58.7 (2.6)	58.8 (3.1)	58.7 (2.4)	59.5 (2.9)
Total URM population	427,000 (1,110,393)	231,437 (734,111)	554,611 (1,254,178)	115,263 (341,022)	453,988 (1,149,171)

(continued)

Table 1. (continued)

	Treatment group (*n* = 78)	All non-CCB institutions (*n* = 624)	Institutions in CCB states (*n* = 165)	Institutions in non-CCB states (*n* = 459)	PSW group (*n* = 624)
Total population 25 years old and above	657,196 (1,252,845)	357,868 (868,178)	695,159 (1,401,335)	236,619 (513,162)	656,667 (1,303,912)
Proportion of population living in poverty	14.6 (4.9)	14.7 (5.5)	15.6 (5.0)	14.4 (5.6)	14.5 (4.9)
Per capita income	46,599 (15,160)	43,694 (12,051)	45,138 (13,472)	43,176 (11,454)	46,024 (12,600)
Unemployment rate	6.5 (2.7)	6.2 (2.5)	6.4 (2.6)	6.1 (2.5)	6.3 (2.5)
Institution-level controls					
Average tuition and fees	2,747 (1,069)	2,862 (1,316)	1,830 (1,012)	3,232 (1,211)	2,677 (1,265)
Average federal grant award	4,094 (951)	4,063 (972)	4,162 (1,025)	4,028 (949)	4,086 (910)

Note. Standard deviations in parentheses. Financial values adjusted to 2,017 dollars. PSW = propensity score weighted.

standard errors clustered at the institution level to address issues of serial correlation which may bias estimates (Bertrand et al., 2004).

Equation (1) provides a single estimate of the average treatment effect of CCB adoption. However, such an approach fails to explore the heterogeneity in the number of CCB program offerings at a given treated institution. For example, in the most recent year of the panel, CCB-granting institutions offered between one baccalaureate program and 21 programs (see Supplemental Appendix A). To explore this variation in program adoption and its potential to influence enrollment-related effects, I follow the suggestion outlined by Imbens and Wooldridge (2009) and others (e.g., Kelchen et al., 2019) to incorporate a continuous treatment variable in a difference-in-differences framework. I rerun the model outlined above but replace the binary indicator, CCB_{it}, with the number of CCBs[1] at an institution in a given year. To account for a potentially non-linear relationship, I also include a quadratic term of the number of CCBs.

I take several steps to improve internal validity and adherence to the parallel trends assumption described above to retrieve unbiased treatment effects (Angrist & Pischke, 2009). I utilize multiple control groups which aids in the identification of a "compelling counterfactual to the treated units" to help ensure parallel trends and serve as a robustness check (Furquim et al., 2020, p. 24). The first control group consists of all non-treated (i.e., non-CCB granting) 2-year public community colleges. The second includes all non-adopting institutions in states with at least one CCB-granting institution. The third control group is all public 2-year institutions in non-adopting states. Though time-varying treatment precludes the assessment of trends in outcomes pre- and post-treatment (e.g., Bell et al., 2020), visualizations of the constructed groups

(e.g., Li & Kennedy, 2018) suggest overall parallel trends between treatment and control groups, particularly in earlier years before many institutions adopted CCBs (see Supplemental Appendix C).

There is notable potential for selection bias as community colleges approved to confer baccalaureate degrees may be systematically different than non-adopting institutions (Daun-Barnett & Escalante, 2014). To account for this, I construct a final comparison group using propensity score weighting (Rosenbaum & Rubin, 1983) to compare statistically similar CCB-adopting and non-adopting institutions. Specifically, I utilize generalized boosted modeling to predict the likelihood an institution implements a community college baccalaureate based on state-, county-, and institution-level covariates (Table 1). Like prior work utilizing propensity weighting and longitudinal data within a difference-in-differences approach (Ortagus & Hu, 2020; Rosinger et al., 2019), I construct the weights using characteristics from the panel's base year.

I also follow prior research (Furquim et al., 2020) to estimate event-study models that test for pre-existing trends and violations of the parallel trends assumption. Estimated models across outcome and control group show few issues with consistent significant pre-existing trends before CCB adoption (see Supplemental Appendix D). To further account for the potential for pre-existing trends and improve the internal validity of estimates by allowing outcomes to follow different trends across institutions, I also include an institution-specific linear time trend in my model specifications (Angrist & Pischke, 2009).

Recent developments in two-way fixed-effects estimators (TWFE), including generalized DiD, suggest estimates may be biased by inappropriate comparisons between early and later treated units, particularly in the event of dynamic treatment effects (e.g., growing effects over time; Goodman-Bacon, 2018). To assess this issue, I employ Goodman-Bacon's (2018) decomposition to test for potential bias and derive the weights associated with comparisons between time-varying adopters. The test suggests the treatment effects are based primarily on appropriate comparisons. When comparing treated units to all non-treated public community colleges, 95% of the estimate comes from proper comparisons (i.e., treated vs. untreated), while approximately 5% stems from comparisons between early and later treated units. The comparisons between treated and untreated institutions in the same state and comparisons between treated institutions and control institutions in non-adoptive states were weighted 82% and 92%, respectively. The estimates from the propensity score comparisons were similarly weighted.

Recent advancements also offer alternative estimators that bypass these concerns stemming from TWFE estimation. Callaway and Sant'Anna (2021) propose utilizing a group-time average treatment effect, which avoids concerns stemming from improper comparisons and the "negative weight problem" by estimating average treatment effects by treatment period (p. 14). The group-time average effects can be modeled utilizing outcome regression (OR), propensity score weighting (PSW), or a doubly-robust approach (DR), which combines both methods and yields unbiased estimates so long as either the outcome or conditional probabilities are correctly modeled (see

Callaway & Sant'Anna, 2021, for more thorough review). Additionally, the approach allows for aggregation of the treatment effect relative to length of exposure, yielding an alternative event study measure to further assess violations of the parallel trends assumption (insignificant pre-treatment effects support the event study estimates in Supplemental Appendix D). As a final check to the estimates yielded from Equation 1, I employ the OR and DR extensions to estimate the impact of CCB adoption on institutional enrollments.[2]

Finally, I adjusted my primary analyses to account for the fact that I am testing multiple hypotheses regarding the effect of CCB adoption across various measures of enrollment. I employed a Benjamini and Hochberg (1995) correction, which is employed by the What Works Clearinghouse as well as prior research (Gándara & Li, 2020; U.S. Department of Education, 2014) and reduces the likelihood of committing a Type 1 error by controlling the false discovery rate; I set the false discovery rate at 0.10. The results presented below account for these adjustments; however, for simplicity and ease of interpretation, I include the standard p-value notation.

Limitations

This study has the potential for omitted variable bias. I attempt to address this issue by controlling for a rich series of theoretically and empirically justified covariates shown to influence community college behavior and enrollments. Moreover, I utilize a series of control groups to ensure comparisons between similar institutions. I also conduct a final robustness check by running additional specifications as a time-based placebo test to ensure the identified impacts of CCB adoption are a function of treatment and not an unrelated time-effect taking place simultaneously to treatment. To do so, I estimate models for each of the outcomes of interest including panel data from 2000 to 2004 before all but three of my treated institutions adopt CCBs. Then, I assign "treatment" to institutions in 2001, 2002, and 2003. Insignificant results (see Supplemental Appendix E) suggest confidence in the primary results.

The analyses may also be limited by my measurement of the treatment. Accurately quantifying the number of CCBs is difficult given the lack of a single definition of what constitutes a CCB. I follow a common operationalization of the term (see Floyd & Skolnik, 2019 for a more thorough discussion) in my construction of the continuous treatment variable. Following a different methodological approach to counting CCBs may lead to different results. The estimates derived from specifications using these non-binary treatment measures should be interpreted with these caveats in mind. (Please see *Discussion* section for related considerations.)

My use of publicly available, institution-level IPEDS data also limits the study in two ways. First, utilizing aggregated enrollment measures precludes examining enrollment by CCB and non-CCB programs. Second, the proxy measures I leverage to represent the populations historically supported by the community college sector (minoritized students, lower-income students, adult students; Cohen et al., 2014) mask variation within these communities. For example, aggregating minoritized students into a single "URM" group masks the potential differences across the individual

student populations, including those not categorized in IPEDS; use of federal grant receipt as a way to assess an institution's support of low-income students similarly overlooks many students, as many low-income students are ineligible for federal grants or may simply not complete the FAFSA (Kofoed, 2017). More research with more nuanced data is required to better address these issues. However, these aggregated measures in tandem with an empirical strategy that accounts for potential confounders impacting institutional enrollments still provide an opportunity to explore the extent to which CCB adoption, on average, presents a commitment, divergence, or reconstructing of institutional logics at adoptive community colleges.

Findings

The findings proceed as follows. I first present the average treatment effects of community college baccalaureate (CCB) adoption using the binary treatment specification. I show the estimates yielded from the generalized difference-in-difference approach of equation (1), before discussing the group-time average effects (Callaway & Sant'Anna, 2021). Then, I present the incremental impacts of CCB adoption, as measured by the number of CCBs implemented in a given year.

The Effects of Overall CCB Adoption on Enrollment

Table 2 presents the main coefficients of overall CCB adoption across the range of selected outcomes and control groups. Models were first estimated with the full range of covariates, as well as institution and year-fixed effects, and then again with the inclusion of the unit-specific linear time trend to account for pre-existing trends and help relax the parallel trends assumption. As shown, CCB adoption has a consistent statistically significant positive effect on overall enrollment levels, both overall and for select student groups. Coefficients for the logged outcomes may be interpreted as percentage-point changes. There is also suggestive evidence for significant shifts in students served from certain populations.

CCB adoption had a significant positive impact on overall student enrollment across all control groups. Specifically, CCB adoption is associated with an approximate 6% ($p < .05$) to 9.6% ($p < .001$) increase in total fall enrollment. The impact on full-time equivalent enrollment is also positive and significant, though slightly larger in magnitude, ranging from an approximately 11% ($p < .001$) increase to 16% ($p < .001$). This suggests that the availability of community college baccalaureates may not only increase institutional enrollment, but also encourage increased enrollment intensity (i.e., full-time).

The results in Table 2 indicate that at least some of the growth in overall enrollment is coming from the student populations that are historically underrepresented in higher education, including low-income and adult student enrollment. Increases in low-income students post-CCB adoption range from approximately 15% ($p < .01$) when compared to all non-adoptive institutions after the inclusion of the unit-specific linear trend, to almost 9% ($p < .05$) in the propensity score weighted model. Adult student

Table 2. Main Effects of CCB Adoption for Selected Enrollment Outcomes..

	All non-CCB institutions		Institutions in CCB states		Institutions in non-CCB states		Weighted[a]	
	Time trend		Time trend		Time trend		Time trend	
Total fall enrollment[b]	0.059*	0.065**	0.094***	0.096***	0.052*	0.059*	0.073***	0.076***
	(0.025)	(0.025)	(0.023)	(0.024)	(0.025)	(0.025)	(0.018)	(0.018)
Full-time equivalent enrollment[b]	0.131***	0.139***	0.158***	0.160***	0.118***	0.128***	0.113***	0.119***
	(0.023)	(0.023)	(0.022)	(0.022)	(0.023)	(0.023)	(0.017)	(0.018)
Total URM enrollment[b]	0.082*	0.096**	0.067	0.069	0.121**	0.134***	0.067*	0.074**
	(0.037)	(0.036)	(0.046)	(0.046)	(0.039)	(0.037)	(0.027)	(0.027)
% URM students	1.422*	0.853	−0.449	−0.565	2.580***	1.791**	0.615	0.356
	(0.642)	(0.615)	(0.791)	(0.757)	(0.610)	(0.603)	(0.496)	(0.478)
Total low-income enrollment[b]	0.147**	0.149**	0.131**	0.131**	0.129**	0.131**	0.092*	0.088*
	(0.046)	(0.045)	(0.044)	(0.043)	(0.046)	(0.046)	(0.041)	(0.041)
% Low-income students	3.558***	3.595***	2.518*	2.512*	3.407***	3.428***	2.267**	2.265**
	(0.862)	(0.863)	(0.982)	(0.987)	(0.872)	(0.874)	(0.825)	(0.829)
Total adult enrollment[b]	0.094***	0.100***	0.103***	0.099***	0.123***	0.129***	0.084***	0.081***
	(0.027)	(0.027)	(0.027)	(0.028)	(0.029)	(0.029)	(0.021)	(0.022)
% Adult students	1.283**	1.451**	0.660	0.652	2.213***	2.426***	0.371	0.451
	(0.489)	(0.521)	(0.542)	(0.536)	(0.551)	(0.554)	(0.429)	(0.438)
Linear time trend	No	Yes	No	Yes	No	Yes	No	Yes
Number of institutions	702	702	243	243	537	537	702	702
Number of observations	13,338	13,338	4,617	4,617	10,203	10,203	13,338	13,338

Note. Standard error in parentheses. All models include institution and year fixed effects and full covariates; tables with full covariate coefficients available upon request. URM = underrepresented minority.

[a]Weighted by characteristics in first year of panel.

[b]Outcomes are logged.

*$p < .05$. **$p < .01$. ***$p < .001$.

enrollment increased between 8%and 10% ($p < .001$), on average, across comparison groups. However, the impacts on enrollment of URM students are less clear. When compared to community colleges in non-adoptive states, CCB-adoption is associated with an approximate 13% ($p < .001$) increase in the enrollment of students from underrepresented racial/ethnic minorities. When compared to all non-adoptive institutions and the weighted comparison groups, the results show increases of almost 10% ($p < .01$) and 7% ($p < .01$), respectively. However, in-state comparisons of URM enrollment post-CCB adoption yields insignificant results.

The results in Table 2 also suggest that increases in enrollment of students from historically underrepresented populations somewhat shift the overall demographics of the student body at adoptive institutions, particularly for low-income students. For example, as a proportion of all students enrolled, increases in the share of students coming from lower-income backgrounds increased, on average, between approximately 2.5% ($p < .05$) to around 3.5% ($p < .001$) across comparison groups. There is

some suggestive evidence of increases in the proportion of adults enrolled at CCB-granting institutions when compared to all non-CCB-granting institutions (1.45, $p < .01$) and institutions in non-adoptive states (approximately 2.4%, $p < .001$); comparisons within state and the weighted group suggest positive, yet insignificant, increases in the proportion of adults enrolled. Alternatively, the associated shifts in proportion of total students identified as URM are more inconsistent. Comparisons between institutions in non-adopting states show positive average increases (almost 2%, $p < .01$) but suggest no impacts across national and weighted comparison groups; in-state comparisons suggest a decrease, though the estimate is also statistically insignificant.

Table 3 presents the group-time average estimated effects as described in Callaway and Sant'Anna (2021). Limited sample size by treatment year hinders exploration of impacts across all previously constructed control groups (i.e., in-state). These estimates, however, serve as a general robustness check and suggest mixed support for the initial findings. Similar to Table 2, I note significant increases ranging from 5% to 8% and 12% to 14% ($p < .05$) for total fall and FTE enrollment, respectively. I also find corroborating significant increases in enrollment of low-income students (7%–9%) and adult students (7%–12%). Table 3 also shows initial increases in total URM enrollment, yet are rendered insignificant when compared to all non-CCB institutions after the inclusion of the doubly-robust (DR) approach.

Regarding shifts in proportion of enrollment by student population, as in Table 2, I find a significant increase of approximately 1.5% ($p < .05$) in URM enrollment when compared to institutions in non-adoptive states, but no impact across the other comparison group. Unlike the primary estimates, I find less consistent evidence of shifts in the proportion of enrollments from the remaining student populations. Initial estimates using outcome regression show increases of adults as a proportion of overall enrollment from approximately 1% to 2% ($p < .05$), though this relationship holds only in the non-adoptive state comparison using the doubly-robust approach. Table 3 shows null effects on the proportion of low-income students enrolled.

The Effects of Incremental CCB Adoption on Enrollment

Table 4 presents the effects of CCB adoption as measured by intensity of adoption (i.e., number of CCBs offered). As the alternative specification used in Table 3 accommodates only binary treatments (Callaway & Sant'Anna, 2021), these estimates are an extension of the approach in Equation 1 and the initial main effects (Table 2). As expected, utilizing a continuous treatment variable reduces the size of the estimates compared to the overall main effects. The results suggest a potentially concave relationship between the number of CCBs and certain enrollment measures. Kelchen et al. (2019) note "interpreting what the change in dosage level means from a practical perspective" can be difficult given the reductions in the estimated effects associated with this approach (p. 10). However, this extension provides some indication regarding the impact of an additional CCB offering and suggests that observed enrollment effects

Table 3. Main Effects of CCB Adoption for Selected Enrollment Outcome—Group-Time Average Effects.

	All non-CCB institutions		Institutions in non-CCB states	
	OR	DR	OR	DR
Total fall enrollment[a]	0.07*	0.05*	0.07*	0.08*
	(0.01)	(0.01)	(0.02)	(0.02)
Full-time equivalent enrollment[a]	0.13*	0.12*	0.14*	0.14*
	(0.02)	(0.02)	(0.02)	(0.02)
Total URM enrollment[a]	0.09*	0.05	0.15*	0.08*
	(0.03)	(0.03)	(0.04)	(0.02)
% URM students	0.67	0.38	1.39*	1.49*
	(0.43)	(0.40)	(0.48)	(0.51)
Total low-income enrollment[a]	0.07*	0.07*	0.09*	0.09*
	(0.03)	(0.04)	(0.04)	(0.04)
% Low-income students	1.00	1.30	−0.17	0.94
	(0.87)	(1.02)	(1.03)	(1.02)
Total adult enrollment[a]	0.09*	0.07*	0.11*	0.12*
	(0.02)	(0.02)	(0.02)	(0.03)
% Adult students	1.11*	0.74	1.80*	1.70*
	(0.36)	(0.38)	(0.53)	(0.50)
Number of institutions	702	702	537	537
Number of observations	13,338	13,338	10,203	10,203

Note. Clustered bootstrapped standard error in parentheses. Models include full covariates; full tables available upon request; models estimated via "did" R package as outlined in Callaway and Sant'Anna (2021); sample size precludes in-state comparison; propensity score weighted comparison omitted due to inclusion of PSW in the DR estimation. URM = underrepresented minority; OR = outcomes regression; DR = doubly robust.

[a]Outcomes are logged.

*Indicates significance.

may vary based on level of adoption. Sensitivity analyses using a categorical construction of the treatment generally support this finding (see Supplemental Appendix F).[3]

For every additional CCB offered, there is an associated increase of approximately 1.6% to 2.6% ($p < .05$) in total enrollment across control groups. Like the estimates in Table 2, associated increases with full-time equivalent enrollment are slightly larger, ranging between 2.7% ($p < .001$) in the weighted comparison to approximately 4% ($p < .001$) when comparing treated institutions to all non-treated institutions in states with CCB authorization. However, a significant negative quadratic term suggests that these increases may diminish over time. The estimated increases in FTE enrollment shrink by approximately 0.1% per additional CCB.

Examination of CCB effects for total enrollment of adult and low-income students support the main findings across both specifications (Tables 2 and 3). For every

additional program, adoptive institutions experience an approximate 2% to 3% ($p < .001$) increase in students ages 25 and over; results are consistent across models. Estimates in Table 4 also show increases in low-income student enrollment, ranging from 1% ($p < .01$) to 3% ($p < .001$). Negative coefficients of the quadratic term suggest these increases may diminish over time, though they failed to reach significant levels.

In line with the primary findings, Table 4 shows inconsistent evidence of significant positive shifts in the proportion of adult students enrolled. When compared to all non-CCB granting institutions and those in non-adoptive states, a one-unit increase in the number of CCBs offered is associated with a 0.3 to 0.6 unit increase in proportion of adults enrolled, respectively; the other control group comparisons are insignificant. Negative quadratic coefficients suggest these gains may diminish as the number of CCBs grow, though the estimates are insignificant in all but the in-state comparison. Alternatively, the results show consistent increases in the share of low-income students by approximately 0.4% to 0.7% ($p < .001$) as the number of CCBs grow. However, given the previously identified null group-time average effects (Table 3), the evidence of significant proportionate shifts of low-income students is inconclusive.

The effects on total and proportion of URM students enrolled are mixed. As the number of CCBs offered increases, the results suggest increases between approximately 1% and 3% in total underrepresented minority enrollment, though the findings are not significant across all models. Examination of the proportion of URM students enrolled suggests increases ranging from approximately 0.3% to 0.6% associated with CCB-adoption when comparing treated institutions to all non-CCB-granting institutions and those in states without CCB authorization, though the increases decrease by approximately 0.01 to 0.025 for each additional baccalaureate program implemented. When compared with institutions in the same state, however, CCB adoption is associated with a small, yet significant decrease in the proportion of URM students (approximately 0.2%, $p < .05$). This finding aligns with the primary in-state comparison estimates (Table 2) and suggests institutions offering CCBs may be increasing their enrollments via other non-URM student populations. However, coupled with positive or null impacts on the proportion of URM students across the remaining comparison groups and primary estimates (Tables 2 and 3), the evidence for significant shifts in either direction is inconclusive.

Discussion and Implications

Despite the somewhat divisive nature of community college baccalaureate (CCB) adoption, particularly in discussion of CCB-related public policy at the state-level (e.g., Floyd & Skolnik, 2019; Thor & Bustamante, 2013), the range and number of CCBs implemented in the U.S. continue to grow (Fulton, 2020). CCBs may serve as potential levers to address educational attainment and workforce needs by offering geographic and financial access to baccalaureate-level credentials in high need occupational areas (Bragg, 2019). Examination of the enrollment behavior amongst

Table 4. Effects of CCB Adoption by Intensity—Number of CCB Programs Measured as a Continuous Variable.

	All non-CCB institutions	Institutions in CCB states	Institutions in non-CCB states	Weighted[a]
Total fall enrollment[b]				
CCBs	0.020*	0.026**	0.016*	0.019**
	(0.007)	(0.008)	(0.007)	(0.007)
$CCBs^2$	−0.0005	−0.0009*	−0.0004	−0.0007
	(0.0004)	(0.0005)	(0.0004)	(0.0004)
Full-time equivalent enrollment[b]				
CCBs	0.036***	0.041***	0.032***	0.027***
	(0.007)	(0.004)	(0.003)	(0.002)
$CCBs^2$	−0.001**	−0.001***	−0.0009***	−0.0008***
	(0.0004)	(0.0002)	(0.0002)	(0.0001)
Total URM enrollment[b]				
CCBs	0.016**	0.007	0.027***	0.005
	(0.006)	(0.006)	(0.006)	(0.003)
$CCBs^2$	−0.0005	−0.0003	−0.001*	−0.0001
	(0.0004)	(0.0004)	(0.0004)	(0.0002)
% Of URM students enrolled				
CCBs	0.283***	−0.244*	0.574***	−0.019
	(0.084)	(0.105)	(0.074)	(0.041)
$CCBs^2$	−0.013*	−0.007	−0.025***	−0.002
	(0.005)	(0.006)	(0.005)	(0.002)
Total low-income enrollment[b]				
CCBs	0.030***	0.025**	0.024**	0.012**
	(0.008)	(0.008)	(0.008)	(0.004)
$CCBs^2$	−0.0007	−0.0006	−0.0005	−0.0002
	(0.0004)	(0.0005)	(0.0005)	(0.0002)
% Of low-income students enrolled				
CCBs	0.751***	0.435*	0.716***	0.372***
	(0.184)	(0.187)	(0.188)	(0.075)
$CCBs^2$	−0.018	−0.007	−0.016	−0.003
	(0.012)	(0.011)	(0.012)	(0.004)
Total adult enrollment[b]				
CCBs	0.025***	0.025***	0.034***	0.019***
	(0.004)	(0.005)	(0.004)	(0.002)
$CCBs^2$	−0.001**	−0.001**	−0.001***	−0.001***
	(0.0003)	(0.0003)	(0.0003)	(0.0001)
% Of adults enrolled				
CCBs	0.330**	0.111	0.599***	0.053
	(0.124)	(0.095)	(0.135)	(0.044)
$CCBs^2$	−0.013	−0.005	−0.021*	−0.003
	(0.008)	(0.006)	(0.008)	(0.003)
Number of institutions	702	243	537	702

Note. Standard error in parentheses. All models include institution and year fixed effects, full covariates, and time trend; tables with full covariate coefficients available upon request. URM = underrepresented minority. $CCBs^2$ = the number of CCB programs squared.

[a]Weighted by characteristics in first year of panel.

[b]Outcomes are logged.

*$p < .05$. **$p < .01$. ***$p < .001$.

CCB-granting institutions offers not only a perspective toward how institutions may achieve these workforce and access-oriented goals via baccalaureate education, but also the extent to which they potentially shed the historical logics of the community college sector (Levin et al., 2018) while adapting to their new collective identity as baccalaureate-granting institutions.

Consistent with findings from previous qualitative (e.g., Neuhard, 2013) and quasi-experimental state-level analyses (Vidal-Rodriguez, 2019), findings presented here show that CCB adoption increases institutional enrollment. In addition to attracting overall enrollments via baccalaureate-level education often tied to economic needs, the results presented here show that adoptive institutions are doing so via a commitment to the students historically supported by the community college sector, particularly low-income and adult students. Yet, in line with prior research (e.g., Daun-Barnett & Escalante, 2014), CCBs may be less successful in attracting racially/ethnically minoritized students. Overall, however, these findings contradict persistent concerns that CCB adoption portends the end of the community college sector as we know it (e.g., Russell, 2013) or a deinstitutionalization of the access-oriented logics and values upon which it was founded (Levin et al., 2018). Rather, amidst name changes (Floyd & Skolnik, 2019) and expanding missions, CCB-granting institutions may be emerging as a new hybrid institution (Skelcher & Smith, 2015) where baccalaureate-education and its increased orientation toward workforce development operates in tandem with institutions' access-oriented commitment to their communities (e.g., Skolnik, 2011). Yet, given documented shifts in other institutional behavior and logics, including finance policy, admissions selectivity, support services, and grant and research generation (e.g., Martinez, 2018; McKinney et al., 2013), stakeholders should consider how to ensure support of historically underserved populations remains prominent among the many "constellation of logics" championed by CCB-granting institutions (Goodrick & Reay, 2011; Thornton et al., 2012).

Varied impacts on enrollment across student groups suggest important considerations for future CCB development and implementation. For example, the results suggest CCBs may be a useful tool in providing access and (re)introducing adult students into the educational pipeline. Given the importance of this population to overall attainment levels (Nettles, 2017), institutional leaders and policymakers should consider how CCBs may be leveraged to help increase access, as well as meet attainment benchmarks at state and federal levels (e.g., Lumina Foundation, 2020). As such, CCB adoption may be an example of what Goodrick and Reay (2011) described as a "win-win" of shifts in institutional practice that support multiple logics simultaneously.

Examination of CCB adoption and URM students points to potentially more nuanced implications. While some comparisons presented here suggest increases in URM enrollment post-adoption, others show no associated impacts. However, in-state comparisons show evidence of decreases in the proportion of the student population identified as URM, suggesting that any increases in URM enrollment may be outpaced by increases from other populations. These inconsistent findings fail to provide conclusive evidence of the associated impacts of CCB adoption on institutions' support of URM students. When coupled with prior research (e.g., Park et al., 2018;

Vidal-Rodriguez, 2019), they point to a vital need for further examination. Policymakers and institutional leaders should note that operating through a "largely color-neutral lens" and merely relying on their local racial and ethnic demographics may be an ineffective approach to supporting URM students amidst CCB adoption (Cuellar & Gándara, 2021, p. 67). Moreover, institutions increasing their implementation of CCBs, which seem more effective in attracting other underserved groups (i.e., adult, low-income) should take steps toward ensuring such investments do not narrow their historical access-oriented logics and de-emphasize enrollment of URM students.

Alternatively, despite research showing increases in overall tuition rates and higher differential tuition rates often established for baccalaureate programs (Floyd, 2006; Ortagus & Hu, 2019), adoptive institutions continue to serve lower-income students. However, the ability to continue to serve lower-income students may depend on institutions' ability to keep CCB prices lower than comparable programs (Ortagus & Hu, 2019). Given consistent increases in tuition and fees over time in the community college sector and elsewhere (Ma et al., 2020), institutional leaders should consider how to keep their baccalaureate offerings affordable. Alternatively, policymakers should consider how to allocate financial resources to adoptive institutions not only in one-time sums to cover start-up costs (e.g., Bemmel et al., 2008), but via consistent state appropriations to help institutions cover the increased costs associated with baccalaureate-level education (Levin, 2004) without having to shift the cost of providing these programs onto their students.

Most state legislation authorizing CCB adoption and implementation outlines not only the number of eligible institutions, but often the number of CCBs each institution is allowed to offer (Fulton, 2015; Soler, 2019). This study presents the first known attempt to quantify the incremental effect of CCB adoption on institutional enrollments. Overall, the results suggest that severely limiting the number of baccalaureate programs an institution provides may hinder potential increases in access and enrollment. For example, while the increases diminish in size for each additional program adopted, the impact of additional CCBs for adult student enrollment remains positive far beyond the median three CCBs implemented per institution in this study. However, the estimates provided here utilizing the continuous treatment are imprecise. More research is required to understand the incremental effects of CCB adoption on institutional enrollment behavior, including on the student populations examined in this study; pending data availability, a more precise line of inquiry may include the effects of CCB adoption as the share of baccalaureate versus associate degree programs changes. Still, the initial results presented here suggest policymakers should consider the tradeoffs between student access and their inclination to maintain a stratified system of public postsecondary education when including limitations in the number of programs offerings in state-level CCB authorization.

Finally, in addition to further examination of the incremental effects of CCB adoption overall, this study points to multiple lines for future research. Given the differences in the impact of CCB adoption on institutional enrollment by student group, future research should explore associated shifts for disaggregated racial and ethnic groups, as well as other broader categories of students enrolled in the sector (e.g.,

ELL, developmental education) to further assess how growth into 4-year programing influences adoptive institutions' logics and services toward other populations; differential impacts by CCB type (e.g., STEM vs. non-STEM) may also prove insightful. Given the evidence that CCB adoption may also be shifting student behavior, as suggested by increases in enrollment intensity (i.e., FTE), future research should build on extant literature (e.g., Shah, 2010) to further explore potential shifts in student behavior and experiences amidst CCB expansion, including institutional responses to such shifts.

Conclusion

The findings of this study help inform policymakers and institutional practitioners of the potential effects of CCB adoption as they continue to debate, adopt, and implement baccalaureate programing at the community college level. This study also helps address questions of the congruence of CCB adoption with the sector's historical mission and logics by providing insight into the effects of potential shifts on students served post-CCB adoption. Overall, there is no consistent evidence that CCB adoption leads to institutional divestment from serving the populations they traditionally support, one common argument against CCBs. To the contrary, there is suggestive evidence that CCB-granting institutions reinforce their commitment to certain historically underrepresented populations by increasing access to baccalaureate-level education for adults and low-income students, though more may need to be done to ensure adoptive institutions continue to support underrepresented racially and ethnically minoritized students. There may also be a sort of "diseconomy of scale" at which the benefits of CCB adoption are negated. However, based on the current landscape of CCB adoption, most states and institutions are far away from such a tipping point.

Author Note

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ORCID iD

Jeremy Wright-Kim https://orcid.org/0000-0002-4201-0616

Supplemental Material

Supplemental material for this article is available online.

Notes

1. The number of CCBs was calculated using state legislation, institutional academic catalogs, resources provided by the Community College Baccalaureate Association, and prior research. CCBs were counted as distinct offerings if they led to a different degree type (e.g., Bachelor of Applied Science vs. Bachelor of Arts) or distinct academic paths (e.g., a Bachelor of Arts in mathematics education vs. a Bachelor of Arts in digital humanities). Specializations within a program of study were not counted as distinct CCBs. A full list of programs by year is available upon request.
2. Analyses were conducted using the *R* package "did." Given its focus on binary treatment, this approach serves only as a check to the primary specification in equation (1) and is unable to accommodate the continuous treatment. Sample size limitations also precluded analysis across the "in-state" comparison group.
3. I follow prior research (e.g., Gershenson & Tekin, 2018) and construct a categorical treatment as an alternative specification (Supplemental Appendix F). Transformation of a continuous treatment into a categorical variable may be impractical if there is an uneven distribution of units across categories or no clear policy-relevant justification for the cutoffs (Kelchen et al., 2019). I identify "average" adopters as those having fewer than four CCBs, the median number of programs in the final year of the dataset. Institutions with four or more CCBs are categorized as high adopters.

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Author Biography

Jeremy Wright-Kim is an assistant professor in the Center for the Study of Higher and Postsecondary Education (CSHPE) at the University of Michigan. He studies how to leverage policy to increase access, equity, and institutional stability, particularly within the community college sector.