INVESTIGATING FACTORS ASSOCIATED WITH COLLEGE OPENINGS AND CLOSURES: THE ROLE OF STATE AUTHORIZATION POLICIES

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This paper is one in a series of reports coordinated by the State Higher Education Executive Officers Association (SHEEO) and supported by Arnold Ventures. Given increased public concerns about educational quality, the series is designed to generate innovative empirical research regarding state authorization processes and policies that can serve as a foundation for future research and policy in this understudied area. The views expressed in this paper – and all papers in this series – are those of its author(s) and do not necessarily reflect the views of SHEEO or Arnold Ventures.

ABSTRACT

Between 2016 and 2021, an average of 20 postsecondary institutions, most of which were for-profit institutions, closed each month. Though these closures affected approximately 500,000 students, we know surprisingly little about the factors driving this recent institutional instability and how state policies can better regulate higher education to protect students from predatory institutions and low-quality postsecondary credentials. This paper has two main goals: 1) documenting variation in the stringency of state authorization policies and the landscape of institution openings and closures, and 2) investigating factors that may be correlated with openings, closures, and stringency. We find that the stringency of authorization policies varies greatly across states, but we find no significant associations between our stringency measure and state-level demographic, economic, educational, and political characteristics. Using an institution-level dataset, we find that for-profit institutions are more likely to open and more likely to close relative to nonprofit institutions, but we find no evidence of a consistent association between stringency and openings or closures. Using a state-level dataset, we find no association between stringency and total closures or for-profit closures (both as a count and a percentage of total or for-profit institutions, respectively). We do, however, find a negative relationship between stringency and number of total openings, suggesting that fewer openings occur in states with more stringent authorization policies. This evidence may help capacity-constrained state authorization offices advocate for additional resources to fulfill their role of protecting students from predatory institutions.

INTRODUCTION

Openings and closures of postsecondary institutions can be disruptive for students, both in good and bad ways. On the one hand, institution openings can provide access to higher education in places where access has historically been limited (e.g., in remote or rural areas), and they can provide access to new credentials and modes of delivery. On the other hand, institution closures can leave students scrambling to find a way to finish their education, particularly if the closure happens with little notice (e.g., Butrymowicz, 2020; Folley, 2018; Wong, 2015). The abrupt closures of several for-profit chains in the last decade (e.g., Corinthian Colleges, ITT Technical Institute, and Virginia College) brought attention to the issue of college closures and raised questions about how to better regulate postsecondary institutions to protect students (e.g., Bruckner, 2020; Colston et al., 2020; McCann & Laitinen, 2019).

While the federal government plays a role in setting college accountability standards, states also serve a foundational quality assurance role in the oversight of postsecondary institutions (Tandberg et al., 2019). Prior to enrolling students, institutions must receive legal approval and verify that they meet minimum quality standards to operate in a state through a process called postsecondary state authorization. While state authorization has received increased attention from policy organizations and think tanks (e.g., Harnisch et al., 2016; Kelly et al., 2015; Loonin & McLaughlin, 2011; Tandberg et al., 2019), there is very little empirical literature examining state authorization, and we know relatively little about the authorization process itself and its relationship to institution openings and closures.

Given the critical role state authorization plays in the opening and closure of institutions, we seek to better understand the relationship between the stringency of

authorization policies and institution openings and closures. Evidence that more stringent state authorization policies may keep bad actor institutions out of a state can help state authorization offices more effectively make the case for improving policies and processes. Considering the documented capacity constraints that many state authorization offices face (Boatman & Borowiec, 2021; Hall-Martin, 2021; Natow et al., 2021), limited staffing and financial resources may be a significant barrier for states looking to improve their authorization policies and processes. Research connecting the stringency of state authorization to institution openings and closures could help these offices advocate for greater resources and responsibilities to fulfill the state's obligation to protect students from predatory institutions and programs leading to credentials of low value.

We use a new measure that quantifies the stringency of the authorization processes in each state (Ness, Baser, & Dean, 2021) to explore the relationships between stringency, institution openings and closures, and state-level economic, demographic, political, and educational factors. The stringency measure is cross-sectional and represents the stringency of each state's authorization policy as of the 2020-21 academic year. We conduct both descriptive and regression analyses on a sample of postsecondary institutions that were open in any year between 2005-06 and 2018-19, located within the 50 U.S. states, eligible to receive Title IV funds, and had at least one undergraduate program (for a total of 89,815 institution-year observations).[1] We find no significant associations between our stringency measure and state-level characteristics. Using an institution-level dataset, we find that for-profit institutions are

[1] We include additional details about the sample and a discussion about our sample restrictions in the Data section.

more likely to open and more likely to close relative to nonprofit institutions, but we find no evidence of a consistent association between stringency and openings or closures. Using a state-level dataset, we find no association between stringency and total closures or for-profit closures (both as a count and as a percentage of total or for-profit institutions, respectively). We do, however, find a negative relationship between stringency and number of total openings, suggesting that fewer openings occur in states with more stringent authorization policies. Our analyses suggest there may be relationships between stringency and institution openings and closures, though our findings are limited due to data constraints (e.g., unavailability of a time-varying stringency measure).

BACKGROUND AND POLICY CONTEXT

An increase in postsecondary institution closures in the second half of the 2010s, including several precipitous closures that disproportionately affected adult learners, low-income students, and students of color (Vasquez & Bauman, 2019), has led to increased calls for greater oversight and public accountability of the postsecondary education sector (Tandberg et al., 2019). Some of these closures may be attributable to the development of gainful employment regulations in the mid-2010s, which linked postsecondary programs' eligibility for federal financial aid to debt and repayment outcomes of their graduates. Existing evidence suggests that the passage of these regulations led to a higher likelihood of closure among low-performing programs and colleges (Kelchen & Liu, 2021).[2]

[2] Gainful employment regulations were repealed before any program or college lost access to federal financial aid. However, the passage of these regulations (even before they were enforced) led to closures of programs and colleges that did not meet the minimum gainful employment standards.

Quality assurance oversight of postsecondary institutions participating in Title IV programs under the Higher Education Act is the responsibility of three entities collectively known as the program integrity triad or regulatory triad (Kelchen, 2018). Institutions must be certified by the United States Department of Education (ED), accredited by an ED-approved accrediting body, and authorized to operate in the state in which the institution is physically located (Hegji, 2019). Each member of the triad has a specific role. Accreditors are charged with ensuring each institution meets minimum academic quality standards. The federal government verifies institutional and financial capacity to administer financial aid programs. States are responsible for ensuring consumer protections (Hegji, 2019; Kelchen, 2018).

While the state role in the program integrity triad is focused on consumer protection (Kelchen, 2018), states serve a much larger quality assurance role and are arguably the most important actor when considering the opening of new institutions. Before a postsecondary institution can begin offering credentials, it must be legally authorized to do so. The legal authority to issue degrees has traditionally been recognized as a state responsibility under the reserve powers clause of the Tenth Amendment to the United States Constitution, and state authorization is the process through which institutions are recognized as legitimate degree-granting entities (Contreras, 2017a). State authorization is viewed as the first official act that must be completed before an institution can begin operating. Chronologically, state authorization happens first and provides the basis on which the other program integrity triad members' requirements build (Tandberg et al., 2019). Regional accreditors and the federal government both require state authorization as a prerequisite for receiving accreditation or participating in federal aid programs. Additionally, participation in federal aid programs and

seeking accreditation are voluntary. For institutions that do not qualify for Title IV aid programs but which offer short-term credentials or institutions that choose not to seek accreditation, states are the only entity with oversight authority over these education providers.[3]

Every state has a unique authorization process that collects and assesses information and data to ensure institutions meet minimum quality standards to offer postsecondary credentials. Within states, the authorization process can vary by whether an institution is degree-granting or non-degree-granting and other factors, such as institutional control and mode of delivery (e.g., distance education versus in-person instruction). Even with these differences, there are many commonalities in the types of information and data states collect to ensure institutions have the capacity to enroll and serve students.

The State Authorization Process

The basic tenets of each state's authorization process are established in statute, with additional requirements and specifications provided through administrative rules and application materials. The enabling statutes typically establish the authorization office and rulemaking authority, baseline authorization requirements, and criteria for exempting an institution from authorization. Public institutions, which are chartered by statute or a state constitution and subject to separate accountability requirements, are generally exempt from the authorization and renewal processes. Additionally, at least 21 states provide exemptions for certain religious institutions (Contreras, 2017b). Other common exemptions include employer-

[3] Because the federal government requires institutions receiving Title IV funds to report data annually, we know that there were between 6,138 and 7,253 institutions open each year in the years of our data collection (2005-2018). Because institutions not receiving Title IV funds are regulated by the states (and not the federal government), any data about these institutions is collected by individual states, each of which has different reporting requirements and rules about making data available to the public. Thus, we do not have an estimate of the total number of institutions operating in the U.S. and cannot provide an estimate of how many institutions do not receive Title IV funding.

sponsored training programs that are designed for employees and some types of schools, such as cosmetology schools, that are overseen by a dedicated state board. Though administrative rules vary by state, institutions that intend to enroll students via online or distance education must typically be authorized to operate in a state regardless of physical presence (i.e., whether the institution has a "brick and mortar" location within the state). Administrative rules and application packets build on the statutory requirements and outline the specific information and data institutions must provide for authorization.

The initial authorization process is designed to ensure that a new postsecondary education provider meets basic quality standards to offer credentials and often begins with an institution requesting an application packet from the appropriate authorization office. Twenty states have more than one authorization office, and most states have separate authorization processes for degree-granting and non-degree-granting institutions. Complete applications must typically be submitted with all information requested by the state before an application will be considered.

While application requirements vary by state, many require institutions to submit information on organization and governance, academics, student protections, and student outcomes. Ness, Baser, and Dean (2021) collected data about 41 dimensions of the initial authorization process organized into four metric groups (organizational and governance metrics, academic metrics, consumer protection metrics, and student outcome metrics). *Table 1* lists the dimensions included in each of the four metric groups.

Table 1: Stringency Dimensions by Metric Group

Metric Group	Dimension
Organizational and Governance Metrics	Governing Board/Ownership
	Organizational Structure
	Mission & Vision
	Administrator Qualifications
	Advertising & Marketing Practices
	Recruiting Practices
	Institutional Accreditation Information
	Program/Specialized Accreditation Information
	Articles of Incorporation or Business License to Operate in the State
	Business Licenses (Fire, Zoning, Safety)
	Personnel License
Academic Metrics	Curricula
	Credit-Hour Requirements
	Instructor Qualifications
	Student Support Services
	Course Catalog
	Student Handbook
	Enrollment Agreement
	Library Resources
	Facilities
	Tuition and Fee Schedule
	Admission Requirements
	Graduation Requirements
	Demonstration of Program/Institutional Need (Market Analysis)
Consumer Protection Metrics	Student Grievance Policies
	Student Record Procedures
	School Closure/Teach-Out Plan
	Tuition Refund Policy
	Tuition Recovery Fund (or Student Protection Funds)
	Surety Bond
	Audited Financial Statements
	Multiyear (2+) Financial Statements
	Multiyear (2+) Budget Projections
	Liability Insurance
Student Outcome Metrics	Retention Rates
	Graduation/Completion Rates
	Job Placement Rates
	Cohort Default Rates
	Wage Data
	Debt-to-Income Ratio
	State Licensing/Professional Certification Examination Passage Rate

Organization and governance information includes details about institutional ownership, organizational structure, and top administrators. States with more stringent authorization processes require background checks for owners and administrators. These background checks help prevent owners who have been involved in illicit practices or affiliated with an institution that previously closed precipitously from opening a new institution. Academic information includes details about the programs and courses being offered, including degree requirements, course descriptions, and student handbooks. Additionally, states may require that faculty hold certain credentials such as advanced degrees in the area in which they will be teaching and that academic facilities such as libraries meet standards for the degree offerings. Student protections can include information on tuition refund policies, enrollment agreements, student protection funds, and surety bonds. Student protection funds require institutions to contribute to a fund managed by the state that will be used to provide students refunds if the institution closes. Surety bonds function similarly to student protection funds and require institutions to set aside revenue that can be used to refund students if the institution closes. States also collect information on recruiting practices and review recruiting materials. Several states require recruiting agents to obtain licenses from the state before they can begin communicating with potential students. Financial information can include audited financial statements for an institution with a financial history, a business plan, cash on hand, and information on expected revenue and expenses. In some instances, states require institutions to provide evidence or a market analysis that there is sufficient demand for its program offerings.

Following the submission of completed application materials, the state authorization office reviews the materials and often conducts a site visit to ensure the institution has the proper space, academic facilities, and equipment to provide the programs being offered. Copies of business licenses and documentation that the facilities meet safety and fire code standards are also common authorization requirements. Once an institution meets the authorization requirements, it may be awarded full authorization status or, in some states, a provisional status pending additional requirements, such as obtaining accreditation. Following initial authorization, institutions will need to renew their authorization license on a regular basis, usually every one to five years.

Much like the initial authorization process, the renewal process varies greatly by state not only in the amount of time between renewal but also in stringency. In addition to temporal renewals, other factors may trigger the need for renewal of authorization, such as change in ownership, change in location, opening a branch campus, and new program offerings. The renewal process tends to be similar to the initial authorization process. Institutions must complete an application packet with the required information on organization and governance, academics, consumer protections, and student outcomes prior to the end of the initial authorization period. Student outcome measures, such as retention rates, graduation rates, job placement rates, cohort default rates, and wage data, can serve as important indicators of how well institutions are serving students.

Institution Closures and State Authorization

Institution closures are incredibly disruptive for students, especially precipitous closures that happen with little warning. Students must navigate hurdles, such as receiving tuition refunds, identifying which (if any) credits transfer, and obtaining copies of their academic

records (Berman, 2018; Harris, 2018; Wong, 2015). When bad actor institutions that have defrauded students close, students must also seek federal loan forgiveness, adding to their burden. These closures, however, may be unavoidable and, in fact, may provide a benefit by protecting future students from enrolling at predatory institutions that offer programs and credentials of little value. From the states' perspective, then, there may be good reasons for some institutions to close, particularly if these closures weed out bad actors that are currently operating within the state.

With the recent increase in institution closures, the program integrity triad has come under more scrutiny, with critics claiming triad members have failed or waited too long to take action against bad actors (McCann & Laitinen, 2019). While reform proposals often highlight several actions the federal government and accreditors can take (e.g., Colston et al., 2020), states are often the only triad entity that still has obligations to students after an institution closes. States serve as the repository for student records, help manage teach-out agreements, and enforce tuition refund policies (Tandberg, 2018). Recognizing the importance of states has increased calls for strengthening the state role in the program integrity triad (Bruckner, 2020; Ness, Baser, & Dean, 2021; Tandberg et al., 2019).

While predicting which institutions will close can be difficult (Kelchen, 2020), states with more stringent oversight processes may be better positioned to identify troubled institutions and establish orderly processes to wind down operations that cause the least disruption to students. Following the recent wave of closures, several states have improved oversight processes to better monitor institutional finances and provide stronger consumer protections following closures. For example, Massachusetts developed a new process to annually assess the

financial health of private institutions (Massachusetts Department of Higher Education, n.d.), and Illinois strengthened the authority of the Illinois Board of Higher Education to secure and correct student records (Lohman & Bernoteit, 2019). In addition to assessing the financial health of institutions and establishing processes for maintaining and accessing student records, states with stringent processes for addressing institution closures have rules requiring notice of closure a minimum number of months in advance of ceasing operations and requiring teach-out agreements. Teach-out agreements have been identified as an important consumer protection during a closure because they establish written agreements between the closing institution and other institutions where students can continue their educations (Nash & McCann, 2020).

Given the central role state authorization plays in the opening and closure of institutions, we wanted to better understand the relationship between the stringency of authorization policies and the opening and closure of institutions. If a more stringent state authorization process is associated with keeping bad actors out of a state, then state authorization offices can make the case for improving policies and processes. Recent research on state authorization highlights the capacity challenges many authorization offices face (Boatman & Borowiec, 2021; Hall-Martin, 2021; Natow et al., 2021). With limited staffing and financial resources, capacity constraints may be a barrier for states looking to improve the stringency of authorization processes to better protect students in the event of institution closures. However, evidence that more stringent policies and processes are effective could help these offices advocate for greater resources and responsibilities to fulfill the state consumer protection role.

DATA AND METHODS

Data

We constructed a panel dataset for all Title IV-eligible postsecondary institutions offering undergraduate programs in all 50 U.S. states for the years 2005-2018. Our dataset contains state- and institution-level characteristics gathered from many different sources. The data sources we used and variables we included in our analysis are summarized in *Table 2*.

Table 2**:** Summary of Data Sources and Variables

Level	**Variable**	**Data Source**
State	Total Population	U.S. Census Bureau, American Community Survey
	Population Share by Race/Ethnicity	
	Share of Adults with a College Degree	
	Unemployment Rate	
	State Gross Domestic Product	U.S. Bureau of Economic Analysis
	Per Capita Personal Income	
	Population Density	U.S. Census Bureau, Decennial Census
	State Spending on Higher Education[4]	State Higher Education Executive Officers Association, State Higher Education Finance report
	Party of Elected Governor (2005-2011)	Michigan State University, Institute for Public Policy and Social Research, Correlates of State Policy Project (v.2.2)
	Party Control of State Legislature	
	Party of Elected Governor (2012-2018)	National Conference of State Legislatures
	Number of Title IV-Eligible Institutions Offering Undergraduate Degrees	U.S. Department of Education, College Scorecard
	Stringency of State Authorization Policies	Researchers at the Louise McBee Institute of Higher Education[5]
Institution	Indicator of Undergraduate Degree Offerings	U.S. Department of Education, National Center for Education

[4] State spending includes state appropriations and student financial aid programs.

[5] Researchers at the University of Georgia's Institute for Higher Education (Erik Ness, Sean Baser, and Matt Dean) collected extensive qualitative data about postsecondary authorization policies in each state which were then coded to create the stringency metric used in our models. More details about their data collection process are included in the paragraphs that follow and in their excellent report (Ness, Baser, & Dean, 2021).

Level	Variable	Data Source
	Indicators for Public, Private Nonprofit, or For-Profit Institutions	Statistics, Integrated Postsecondary Education Data System
	Admission Rate	
	Enrollment Share by Race/Ethnicity	
	Enrollment Share by Gender	
	Share of Students Receiving Pell Grants	
	Graduation Rate (150% Time)	
	School Closings and Openings	Federal Student Aid, Postsecondary Education Participants System

Our outcomes of interest for this report are the opening and closing of Title IV institutions. There are a few sources we could use to glean that information, but the most reliable and readily available source is the Postsecondary Education Participants System (PEPS). Following Kelchen's (2020) work on closed campuses, we define a college closure as a main campus closure (i.e., '00' in last two-digits of the OPEID) in the PEPS data. There are other ways to define closure, including examining branch closures of a certain size or within a specific sector or state, but those analyses are left to future work. We define college openings using the same data source (PEPS), limiting our definition to the day a main campus receives Title IV approval from Federal Student Aid. Certainly, there are many non-Title IV campuses opening and closing that must be go through state authorization processes, but data limitations prohibit us from defining either variable in more encompassing ways.

Our main independent variable of interest is a measure of the stringency of the postsecondary authorization process in each state.[6] The measure we used is based on extensive

[6] As mentioned in the Introduction, our stringency measure is cross-sectional and represents the stringency of a state's authorization policies as of the 2020-21 academic year. In the panel dataset we construct, we assume stringency is time-invariant and carry this value backward to all the prior years in our dataset. The analytic limitations and implications of using this cross-sectional measure are discussed further in the Limitations section.

qualitative data collection completed by researchers at the University of Georgia's Institute for Higher Education (Ness, Baser, & Dean, 2021). They collected these data from a thorough review of each state's postsecondary authorization policy, including agency websites, administrative rules and regulations, state laws, and NC-SARA's state authorization guide.[7] Materials not publicly available were requested from the appropriate personnel within authorizing agencies. Specifically, they collected data about 41 dimensions of the initial authorization process organized into four metric groups (organizational and governance metrics, academic metrics, consumer protection metrics, and student outcome metrics).[8] They then coded each dimension in terms of stringency (with 0 being least stringent, 1 being moderately stringent, and 2 being most stringent). For this study, we calculated the stringency measure in two ways: the sum of scores for all 41 dimensions (which can range from 0 to 82) and the mean of scores for all 41 dimensions (which can range from 0 to 2). For additional details on the stringency metrics, data collection protocols, or the iterative process that led to choosing these scoring categories and approaches, please see Ness, Baser, and Dean (2021).

We also used principal component analysis (PCA) to reduce the dimensionality of our stringency measure in a systematic, data-driven way while maintaining as much of the variation from the original dataset as possible. Rather than simply taking the sum or mean of all 41 dimensions, PCA generates linear combinations of the original dimensions of stringency and creates uncorrelated multidimensional components to eliminate redundancy (and, potentially,

[7] Some states have more than one authorization policy or process for different types of institutions. In some cases, these processes are managed by different agencies.
[8] The dimensions included in each metric group are *listed* in *Table 1* in the Background and Policy Context section.

to increase interpretability).[9] Using different stringency measures also serves as a robustness check to assess whether our results are sensitive to how we calculate the stringency measure.

The remaining independent variables in *Table 2* are included in some of the regressions described in the next section. Prior work in the political economy of higher education motivates their inclusion, as we try to mitigate and capture the other state- and institution-level factors that might simultaneously impact the closing and opening of colleges in addition to the stringency of the authorization practices and policies in each state.

Though there are many important metrics included from a bevy of publicly available sources, some of these data are not as complete as we hoped. As such, we dealt with missing values in two ways. First, we carried values forward and backward for institutions that had non-missing values in some years but missing values in other years. For example, if an institution had a non-missing value in 2017 and a missing value in 2018, we simply carried forward the 2017 value to 2018. Second, we replaced any remaining missing values with the median value for all institutions in that year. For example, if an institution had missing values for a particular variable in all years (i.e., there was no non-missing value to carry forward or backward), we simply replaced the missing value with the median value for that variable in that year. We created a series of indicator variables to flag the observations with missing values for each variable and included these indicators in the regression models to control for the missingness.

[9] For an example of another dimensionality reduction method used on the same stringency measure, see Fowles (2021), who uses Gaussian Mixture Modeling (GMM).

This approach allowed us to keep all institutions in our regression models, whereas they would have been dropped via listwise deletion otherwise.[10]

We started with a comprehensive list of postsecondary institutions from the U.S. Department of Education's College Scorecard database. We included any postsecondary institution that was open at any point between academic years 2005-06 and 2018-19 (102,628 unduplicated, institution-year observations). We then merged this dataset with institution-level data from the Integrated Postsecondary Education Data System (IPEDS). We first dropped all institutions that were not in one of the 50 U.S. states (7,102 institution-year observations) because the state-level covariates we included in our models were only available for the 50 U.S. states. We then dropped all institutions that were not Title IV eligible (1,704 institution-year observations) because only Title IV-eligible institutions are required to report data annually to IPEDS, so we do not have institution-level covariates for institutions that are not eligible for Title IV. Finally, we dropped institutions that did not have any undergraduate programs (4,007 institution-year observations) to remove graduate-only institutions (e.g., divinity schools), giving us a final analytic sample of 89,815 institution-year observations. Finally, we merged this dataset with our state-level characteristics to create an analytic dataset with both institution- and state-level variables.

Methods

This study provides descriptive and correlational analyses for our variables of interest: postsecondary institution openings and closures and our state-level stringency measure. To do this, we first regress an indicator for institution closure on several institution- and state-level

[10] To ensure our results are robust to alternative specifications, we also run each model using listwise deletion and present those results in *Appendix A.*

characteristics to explore whether these characteristics are associated with an institution's likelihood of closure. Our first hypothesis is that stringency is negatively correlated with closures. We hypothesize that a more stringent authorization policy will keep bad actors out of a state, leading to a lower likelihood of closure for currently operating institutions. Our second hypothesis is that stringency will have a stronger correlation (i.e., more negative correlation) with closures for for-profit institutions relative to nonprofit institutions. We hypothesize that for-profit institutions will be more sensitive to a stringent authorization policy because for-profit institutions are more likely to be subject to authorization requirements than nonprofit institutions. We run the following model to test these hypotheses:

$$(1)\ CLOSE_{is,t+1} = \alpha + \beta_1 STR_s + \beta_2 FP_{it} + \beta_3 (STR_s \times FP_{it}) + \gamma X_{it} + \delta Z_{st} + \lambda_t + \varepsilon_{ist}$$

$CLOSE_{is,t+1}$ is a binary indicator equal to 1 if institution *i* operating in state *s* in year *t* closed in the subsequent year and 0 otherwise. STR_s represents our time-invariant stringency measure, and β_1 represents the expected difference in likelihood of institution closure given a 1-unit increase in our stringency measure. FP_{it} represents a binary indicator equal to 1 if institution *i* is classified as for-profit in year *t* and 0 otherwise. $(STR_s \times FP_{it})$ represents the interaction between the stringency measure and the for-profit indicator, which allows us to detect differences in the stringency coefficient by institution control (for-profit or nonprofit). X_{it} represents a vector of time-variant institution-level characteristics,[11] and γ represents its corresponding vector of coefficients. Z_{st} represents a vector of time-variant state-level

[11] As listed in *Table 2*, the institution-level covariates we include in each model are as follows: indicators of undergraduate degree types offered; indicators for public, private nonprofit, and private for-profit institution; admission rate (if applicable); enrollment share by race/ethnicity; enrollment share by gender; share of students receiving Pell Grants; and graduation rate within 150% time.

characteristics,[12] and δ represents its corresponding vector of coefficients. λ_t represents year fixed effects.[13] ε_{ist} is a robust error term.

Second, we regress an indicator for institution openings on several institution- and state-level characteristics to explore whether these characteristics are associated with an institution's likelihood of opening. Our first hypothesis is that stringency is negatively correlated with institution openings. We hypothesize that a stringent authorization policy will keep bad actors out of a state due to the higher cost of complying with authorization requirements (relative to states with less stringent authorization requirements), leading to a lower likelihood of new institutions opening. Our second hypothesis is that stringency will have a stronger (i.e., more negative) correlation with openings for for-profit institutions relative to nonprofit institutions. We hypothesize that for-profit institutions will be more sensitive to a stringent authorization policy because for-profit institutions are more likely to be subject to authorization requirements than nonprofit institutions. We run the following model to test these hypotheses:

$$(2)\ OPEN_{ist} = \alpha + \beta_1 STR_s + \beta_2 FP_{it} + \beta_3 (STR_s \times FP_{it}) + \gamma X_{it} + \delta Z_{s,t-1} + \lambda_t + \varepsilon_{ist}$$

$OPEN_{ist}$ is a binary indicator equal to 1 if institution *i* operating in state *s* in year *t* opened in the given year and 0 otherwise. STR_s represents our time-invariant stringency measure, and β_1 represents the expected difference in likelihood of an institution opening given a 1-unit increase in our stringency measure. FP_{it} represents a binary indicator equal to 1 if institution *i*

[12] As listed in *Table 2*, the state-level covariates we include in each model are as follows: total state population; population share by race/ethnicity; share of adults with a college degree; unemployment rate (age 16+); state gross domestic product; per capita personal income; population density; state spending on higher education (including state appropriations and state student financial aid programs); party of elected governor; party control of state legislature; and number of Title IV-eligible institutions offering undergraduate degrees.

[13] To ensure our results are robust to alternative specifications, we also run each model without year fixed effects and present those results in *Appendix A*.

is classified as for-profit in year t and 0 otherwise. $(STR_s \times FP_{it})$ represents the interaction between the stringency measure and the for-profit indicator, which allows us to detect differences in the stringency coefficient by institution control (for-profit or nonprofit). X_{it} represents a vector of time-variant institution-level characteristics, and γ represents its corresponding vector of coefficients. $Z_{s,t-1}$ represents a vector of time-variant state-level characteristics (in the year prior to the institution opening), and δ represents its corresponding vector of coefficients. λ_t represents year fixed effects. ε_{ist} is a robust error term.

Third, we regress institution closures at the state level on state characteristics to explore whether these characteristics are associated with the number or percentage of institutions that close in the subsequent year. Relative to our institution-level model (i.e., Model 1), this model provides a slightly different perspective on the relationship between stringency and closures, which we believe is appropriate, given that our key independent variable is measured at the state level. We run this model for all institutions and then limit the sample to just for-profit institutions, with closures expressed as both a raw count and as a percentage of all institutions or for-profit institutions, respectively (for a total of four models). Our first hypothesis is that states with more stringent authorization policies will have fewer total college closures. We hypothesize that a stringent authorization policy will keep bad actors out of a state, leading to fewer closures within the state. Our second hypothesis is that states with more stringent state authorization policies will have fewer for-profit college closures within their borders. We hypothesize that the for-profit sector is more sensitive to a stringent postsecondary authorization policy because for-profit institutions are more likely to be subject to authorization requirements than nonprofit institutions.

$$(3)\ CLOSE_{s,t+1} = \alpha + \beta STR_s + \delta Z_{st} + \lambda_t + \varepsilon_{st}$$

$CLOSE_{s,t+1}$ represents our outcomes of interest: college closures in state *s* in year *t+1*, expressed as both a raw count and as a percentage of all institutions or for-profit institutions. STR_s represents our time-invariant stringency measure, and β represents the expected difference in the number or percentage of institution closures given a 1-unit increase in our stringency measure. Z_{st} represents a vector of time-variant state-level characteristics, and δ represents its corresponding vector of coefficients. λ_t represents year fixed effects. ε_{st} is a robust error term.

Fourth, we regress institution openings at the state level on state characteristics to explore whether these characteristics are associated with openings in the subsequent year. We run this model for all institutions and then limit the sample to just for-profit institutions, with openings expressed as both a raw count and as a percentage of all institutions or for-profit institutions, respectively (for a total of four models). Our first hypothesis is that states with more stringent authorization policies will have fewer total colleges opening. We hypothesize that a stringent authorization policy will keep bad actors out of a state due to the higher cost of complying with authorization requirements (relative to other states with less stringent authorization requirements), leading to fewer new institutions opening within the state. Our second hypothesis is that states with more stringent authorization policies will have fewer for-profit colleges opening. We hypothesize that the for-profit sector is more sensitive to a stringent authorization policy because for-profit institutions are more likely to be subject to authorization requirements than nonprofit institutions.

$$(4)\ OPEN_{st} = \alpha + \beta STR_s + \delta Z_{s,t-1} + \lambda_t + \varepsilon_{st}$$

$OPEN_{st}$ represents our outcomes of interest: college openings in state s in year t, expressed as both a raw count and as a percentage of all institutions or for-profit institutions. STR_s represents our time-invariant stringency measure, and β represents the expected difference in the number or percentage of institution openings given a 1-unit increase in our stringency measure. $Z_{s,t}$ represents a vector of time-variant state-level characteristics (in the year prior to the openings), and δ represents its corresponding vector of coefficients. λ_t represents year fixed effects. ε_{st} is a robust error term.

LIMITATIONS

Though every effort was made to use the data available to us, there are two notable limitations. While our study is one of the first to make use of Ness, Baser, and Dean's (2021) extensive data on initial authorization, those data are limited to only a cross-section of the most recent initial authorization policies and requirements. As such, we are unable to leverage within-state variation over time to produce a less biased estimate of the effects of authorization stringency on college openings and closures. For instance, while we hypothesized that closures would be less frequent in states with the most stringent policies due to those policies keeping bad actors out of a given state, it may be just as likely that those more stringent policies were enacted in response to less credible colleges entering in flux. Thus, we may be examining the initial authorization requirements after those changes went into effect. Further, we are only able to assess between-state variance in stringency and its impact on the outcomes of interest and not within-state variance in stringency. Ideally, researchers will be able to evaluate the impact of states switching to a more or less stringent authorization policy on institution openings and closures in future work.

Additionally, our definitions of college openings and closures could be more refined. We rely on publicly available data on closures and openings, but not all those events should be treated equally. There is a stark contrast between a campus that abruptly closes, leaving students no time to find another option, and a campus that closes in a more orderly fashion, perhaps even announcing said closure a year or more before the closure date. It is also important to note that while we limited openings to only main campuses, not all administrative entities in PEPS use that designation similarly. In future research, we could limit our definition of campus openings to include only campuses with a minimum of 100, 200, or even 500 students to capture a campus's impact more appropriately in a community or state.[14]

RESULTS

Stringency Measures

Descriptive Analyses for Stringency Measures

Table 3 summarizes various measures of stringency. The first row is simply a sum of the scores for all 41 dimensions, each of which is assigned a score between 0 and 2 (i.e., the maximum possible sum score is 82 points). There is a wide range of sum scores, with the lowest observed value equal to 3 points and the highest observed value equal to 64 points. The mean (40.37 points) is a bit lower than the median (44.5 points), suggesting that the distribution is slightly left skewed. This means that though most states have sum scores around 44, there are a few outliers with particularly low scores, which pulls the mean below the median. The variation between states is presented visually in *Figure 1* and explored in greater depth in the

[14] This sample restriction would require both PEPS and IPEDS data, so we could only capture institution openings for campuses that report to both PEPS and IPEDS if we were to restrict the sample based on enrollment.

accompanying narrative below. The second row in *Table 3* is the mean of the scores for all 41 dimensions, so the maximum possible value is 2 points. This measure tells a similar story; there are a wide range of values, and the distribution is slightly left-skewed. The last four rows show the mean scores for all the dimensions in each of the four metric groups (Organizational and Governance metrics, Academic metrics, Consumer Protection metrics, and Student Outcome metrics).[15] The Academic metrics have the highest scores (mean of 1.23 and median of 1.38), suggesting that states generally have more stringent requirements for the academic metrics relative to other metrics. The Student Outcome metrics have the lowest scores (mean of 0.29 and median of 0), suggesting that few states require institutions seeking authorization to report on student outcomes. This is not a surprising finding, given that many institutions may not have enrolled and/or graduated any students when they are applying for initial authorization. The Student Outcome metrics are more relevant for institutions seeking reauthorization.

Table 3**:** Summary Statistics for Stringency Measures

Stringency Measure	Mean	Std. Dev.	Median	Min	Max
Sum of 41 Dimensions	40.37	15.52	44.50	3.00	64.00
Mean of 41 Dimensions	0.98	0.38	1.09	0.07	1.56
Mean of Organizational and Governance Metrics	1.13	0.47	1.18	0.09	2.00
Mean of Academic Metrics	1.23	0.51	1.38	0.00	1.92
Mean of Consumer Protection Metrics	1.00	0.39	1.10	0.00	1.70
Mean of Student Outcome Metrics	0.29	0.41	0.00	0.00	1.71

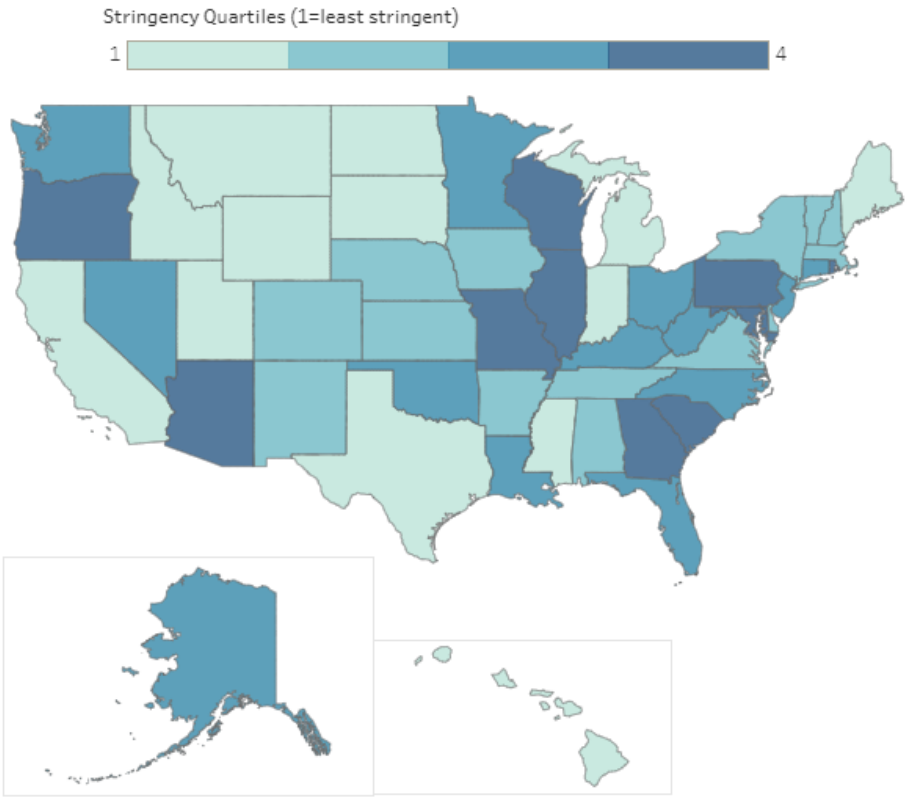
Figure 1 shows the mean stringency score (on a scale of 0 to 2) for each state on a map that is shaded by stringency quartiles. Lighter shades of blue represent states with lower stringency scores (in the first quartile), while darker shades of blue represent states with higher stringency scores (in the fourth quartile). Many states have more than one agency or process

[15] *Table 1* in the Background and Policy Context section lists the dimensions included in each metric group.

for authorization, so we take the mean of all scores within each state. *Table 4* summarizes the stringency scores by quartile.

Figure 1 reveals some interesting and perhaps unexpected trends. Our assumption was that more conservative states that prefer limited government would have less stringent authorization policies, and that is certainly true in some cases (e.g., the Northern Rockies region, including the Dakotas, Montana, and Idaho). On the other hand, we expected that liberal states would tend to have more stringent authorization policies. We see that some of the states with the most stringent authorization policies are quite liberal (as expected, e.g., Oregon and Maryland). However, one of the most consistently liberal states, California, does not seem to have particularly stringent authorization policies, while other states with relatively stringent authorization policies have historically been more conservative (e.g., Arizona, Missouri, Georgia, and South Carolina). We explore the relationship between stringency and political affiliation in greater depth in *Figure 2* below.

Figure 1: Stringency Measure (in Quartiles) by State



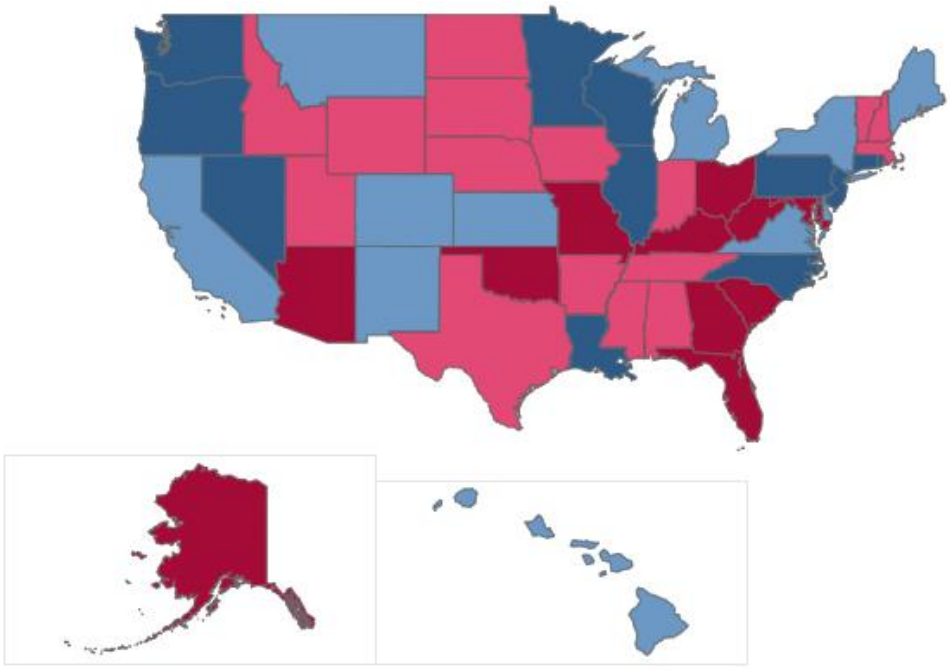
Stingency quartiles range from 1 (least stringent) to 4 (most stringent).

Table 4: Stringency Summary Statistics by Quartile

Quartile	Observations	Mean	Std. Dev.	Min.	Max.
Quartile 1	13	0.500	0.254	0.073	0.780
Quartile 2	14	0.999	0.070	0.829	1.073
Quartile 3	13	1.146	0.039	1.089	1.207
Quartile 4	11	1.387	0.092	1.268	1.549

Figure 2 shows the mean stringency score (on a scale of 0 to 2) for each state on a map that is colored by the political affiliation of its governor in 2019 (red if Republican and blue if Democrat) and shaded darker if its stringency score is above the median (i.e., the state has a more stringent authorization process). Of the 27 states with a Republican governor, 11 (40.7%) have a stringency score above the median. Of the 23 states with a Democratic governor, 12 (52.2%) have a stringency score above the median. These findings suggest that there may be some relationship between party identification of the governor and authorization stringency. However, it may not be particularly strong and perhaps changes in authorization policies lag transitions in state gubernatorial leadership. This map could look quite different in the coming years if authorization policies change in response to recent transitions from Democrat to Republican leadership or vice versa.

Figure 2: Stringency Measure by Political Party of 2019 Governor

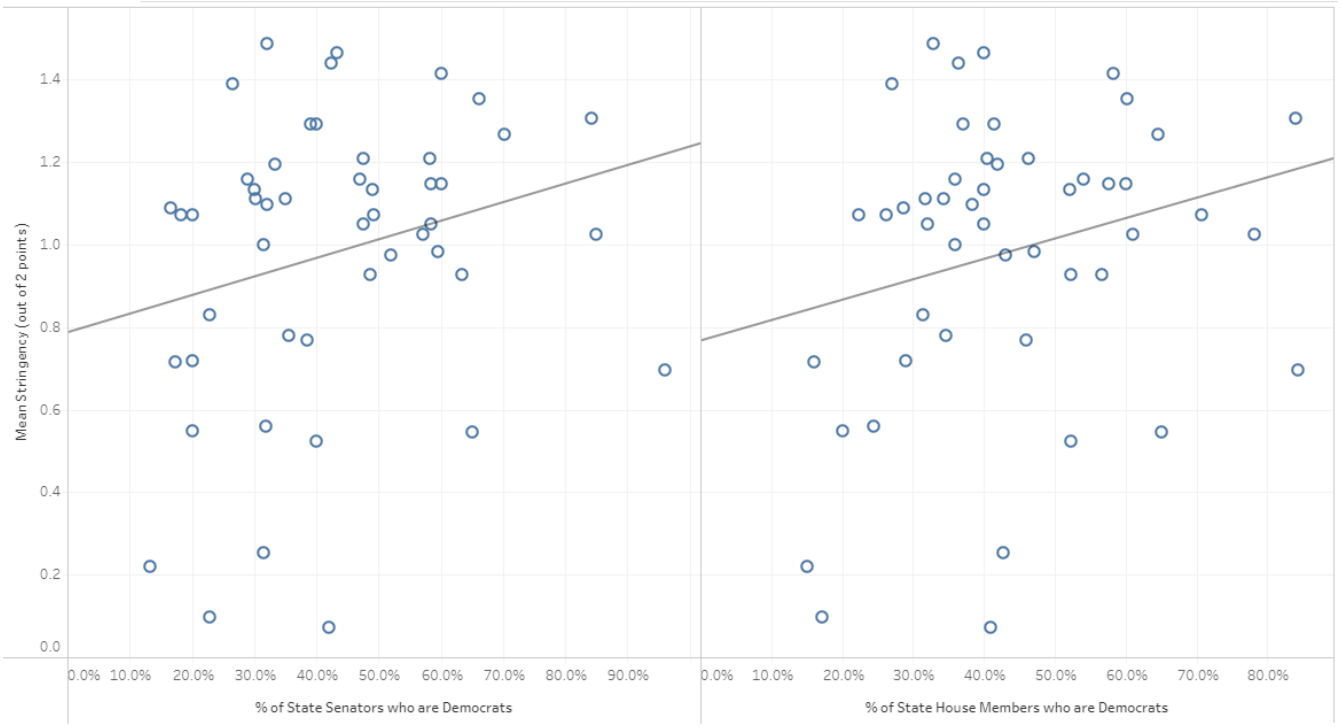


States with a Democratic governor in 2019 are colored blue, and states with a Republican governor in 2019 are colored red. States with a stringency score at or below the median have a lighter shade of red or blue, and states with a stringency score above the median have a darker shade of red or blue.

Figure 3 shows two scatterplots depicting the relationship between the percentage of the state Senate (left panel) and state House (right panel) members who are affiliated with the Democratic party and the mean stringency score (ranging from 0 to 2 points). Both trend lines suggest a positive relationship between the share of Democrats and mean stringency, but neither coefficient is statistically significant at a 95% confidence level, though both approach

statistical significance.[16] Again, this is not a surprising finding, particularly if it is the case that changes in state authorization policies lag changes in state political leadership.

Figure 3: Mean Stringency and Percentage of Democrats in State Legislatures



Principal Component Analysis for Stringency Measures

We used principal component analysis (PCA) to reduce the dimensionality of our stringency measure, which comprises 41 scored dimensions, while minimizing information loss. Convention dictates that we keep components with an eigenvalue greater than one, which would leave us with the first 11 components generated by the PCA. *Table 5* displays the eigenvalue, proportion of variance explained, and cumulative variance explained by the first 11

[16] The estimated line for the left panel: MeanStringency = 0.787 + 0.450 * PctSenateDem. The p-value for the coefficient on PctSenateDem is 0.088. The estimated line for the right panel: MeanStringency = 0.767 + 0.494 * PctHouseDem. The p-value for the coefficient on PctHouseDem is 0.098.

components, which cumulatively explain more than three-quarters of the variance (76.6%). This table shows, however, that nearly a third (32.6%) of the variance is explained by the first component alone (which represents academic standards or quality) and the variance explained by the additional components is much smaller by comparison.

Table 5**:** Eigenvalues and Explained Variance for Components with Eigenvalues Greater than 1

Component	Eigenvalue	Proportion of Variance Explained	Cumulative Variance Explained
Component 1	13.374	0.326	0.326
Component 2	3.320	0.081	0.407
Component 3	2.623	0.064	0.471
Component 4	1.917	0.047	0.518
Component 5	1.835	0.045	0.563
Component 6	1.675	0.041	0.604
Component 7	1.640	0.040	0.644
Component 8	1.473	0.036	0.679
Component 9	1.297	0.032	0.711
Component 10	1.149	0.028	0.739
Component 11	1.100	0.027	0.766

Figure 4 displays the eigenvalues for each component in a scree plot, which makes it even more evident that the first component explains much more of the variance than the subsequent components. A more subjective rule of thumb for deciding on the number of components to keep is identifying the “elbow” of the scree plot, where the eigenvalues seem to level off. In this case, the elbow suggests that we might keep the first four components.

Figure 4: Scree Plot of Eigenvalues after PCA

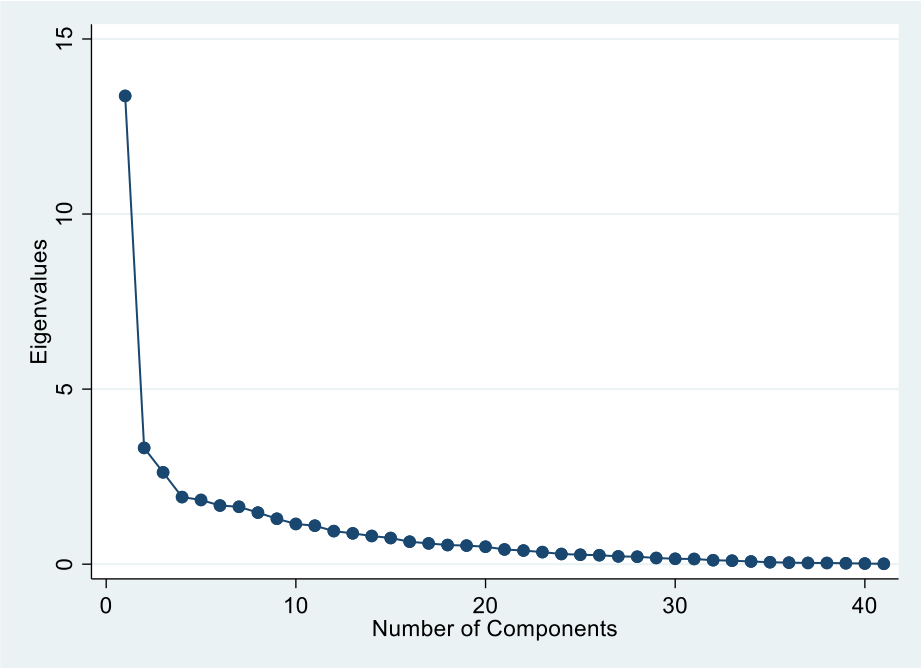


Table 6 shows the eigenvectors containing the variable loadings for each of the first four components as well as the remaining unexplained variance.[17] Each component is a linear combination of the 41 dimensions, and the variable loadings can be interpreted as the coefficients on each of the 41 dimensions. These loadings give us insight about what aspect(s) of stringency each component represents, and the loadings with the largest absolute value for each component are highlighted in yellow for ease of interpretation. The loadings for the first component are largest for several of the academic metrics (instructor qualifications, curricula, course catalog, admission requirements, and credit-hour requirements), so the first component represents academic standards or quality. The loadings for the second component are largest for several of the student outcome metrics (wage data, cohort default rates,

[17] *Table A1* shows the eigenvectors containing the variable loadings for each component with an eigenvalue greater than one (i.e., the first 11 components).

graduation/completion rates, and job placement rates), so the second component represents graduation and post-graduation student outcomes. The largest loading (by far) for the third component is for institutional accreditation, so the third component represents accreditation or quality assurance. Finally, the largest loading for the fourth component is multiyear budget projections, so the fourth component represents long-range financial planning or financial stability.

Table 6: Eigenvectors for First Four Components[18]

Stringency Metric	Comp 1	Comp 2	Comp 3	Comp 4	Unexp. Var.
Governing Board/Ownership	0.191	0.005	0.199	-0.015	0.215
Organizational Structure	0.150	-0.123	-0.165	0.064	0.314
Mission & Vision	0.183	-0.170	-0.108	0.065	0.189
Administrator Qualifications	0.172	0.095	-0.007	0.093	0.367
Advertising & Marketing Practices	0.187	-0.042	0.051	-0.146	0.283
Recruiting Practices	0.183	-0.036	0.108	0.087	0.270
Institutional Accreditation Information	0.029	-0.005	0.393	0.144	0.158
Program/Specialized Accreditation Information	0.115	0.019	0.234	0.000	0.239
Articles of Incorporation or Business License to Operate in the State	0.084	-0.257	0.111	-0.159	0.349
Business Licenses (Fire, Zoning, Safety)	0.189	-0.209	-0.097	-0.115	0.268
Personnel License	0.153	0.033	-0.038	-0.153	0.200
Curricula	0.231	0.046	0.068	-0.013	0.201
Credit-Hour Requirements	0.227	-0.119	-0.098	0.006	0.144
Instructor Qualifications	0.234	0.069	0.033	0.043	0.151
Student Support Services	0.176	0.024	-0.206	-0.093	0.248
Course Catalog	0.229	-0.131	-0.017	-0.047	0.199
Student Handbook	0.074	0.011	0.092	-0.344	0.213
Enrollment Agreement	0.152	-0.133	0.212	-0.156	0.255
Library Resources	0.164	-0.031	0.009	0.333	0.271
Facilities	0.210	0.076	-0.102	0.064	0.241
Tuition and Fee Schedule	0.199	0.073	0.089	-0.010	0.174
Admission Requirements	0.227	-0.056	-0.127	0.093	0.153
Graduation Requirements	0.202	-0.103	-0.178	0.060	0.216

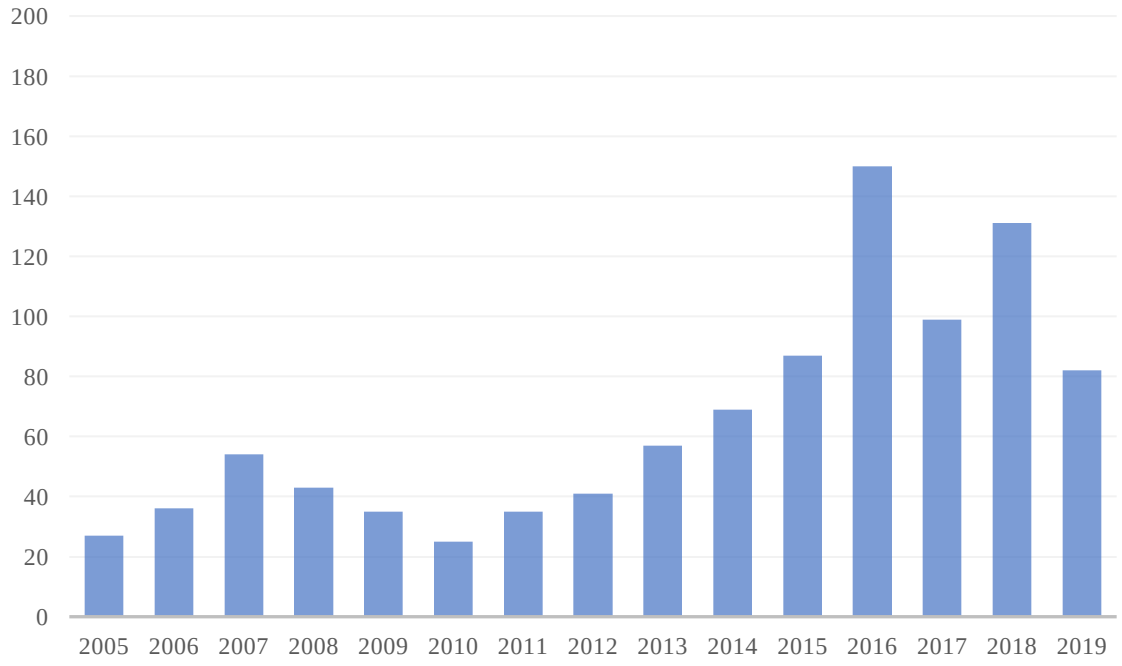
[18] For each component, the loadings with the largest absolute value are highlighted in yellow for ease of interpretation.

Stringency Metric	Comp 1	Comp 2	Comp 3	Comp 4	Unexp. Var.
Demonstration of Program/ Institutional Need (Market Analysis)	0.139	-0.021	-0.094	0.301	0.281
Student Grievance Policies	0.181	0.023	0.270	0.080	0.270
Student Record Procedures	0.174	0.004	0.043	-0.224	0.236
School Closure/Teach-Out Plan	0.103	0.222	0.119	-0.008	0.180
Tuition Refund Policy	0.219	0.024	0.037	-0.141	0.207
Tuition Recovery Fund (or Student Protection Funds)	0.052	0.122	0.263	0.184	0.317
Surety Bond	0.120	0.053	0.184	0.047	0.215
Audited Financial Statements	0.189	0.051	0.095	-0.173	0.215
Multiyear (2+) Financial Statements	0.058	-0.043	-0.186	0.247	0.177
Multiyear (2+) Budget Projections	0.080	0.042	0.059	0.458	0.131
Liability Insurance	0.121	-0.040	-0.241	-0.211	0.333
Retention Rates	0.117	-0.024	-0.175	0.110	0.265
Graduation/Completion Rates	0.071	0.366	-0.245	-0.017	0.153
Job Placement Rates	0.105	0.339	-0.085	-0.004	0.363
Cohort Default Rates	0.054	0.400	0.088	-0.054	0.251
Wage Data	0.018	0.432	0.046	-0.086	0.242
Debt-to-Income Ratio	0.040	0.118	-0.138	0.099	0.297
State Licensing/Professional Certification Examination Passage Rate	0.053	0.254	-0.253	-0.088	0.149

Descriptive Analyses for Closures and Openings

Figure 5 shows the number of college closures occurring each calendar year from 2005-2019. Again, our definition of closure includes any main campus closure[19] that is reported by PEPS and available in their publicly available college closure reports. Over this 15-year period, there are almost 1,000 closures, with the majority occurring in the latter half of the 2010s.

Figure 5: Count of College Closures



Examining the closures by state reveals patterns that might be expected. In short, those states with the highest number of campuses also experience the most college closures.[20] Moreover, most closures (80%) occur within the for-profit sector, rather than the private nonprofit sector. *Table 7* shows the breakdown of closures for the 10 states with the most

[19] Main campuses are defined as having "00" in last two-digits of the OPEID in the PEPS data. Our counts of campus closures and openings do not include any branch or satellite campuses.

[20] This is the primary reason we include an "exposure term" (i.e., a logged count of Title IV-eligible institutions offering undergraduate degrees in each state) in all our models. This allows us to control for the size of a state and the relative availability of higher education opportunities within the state.

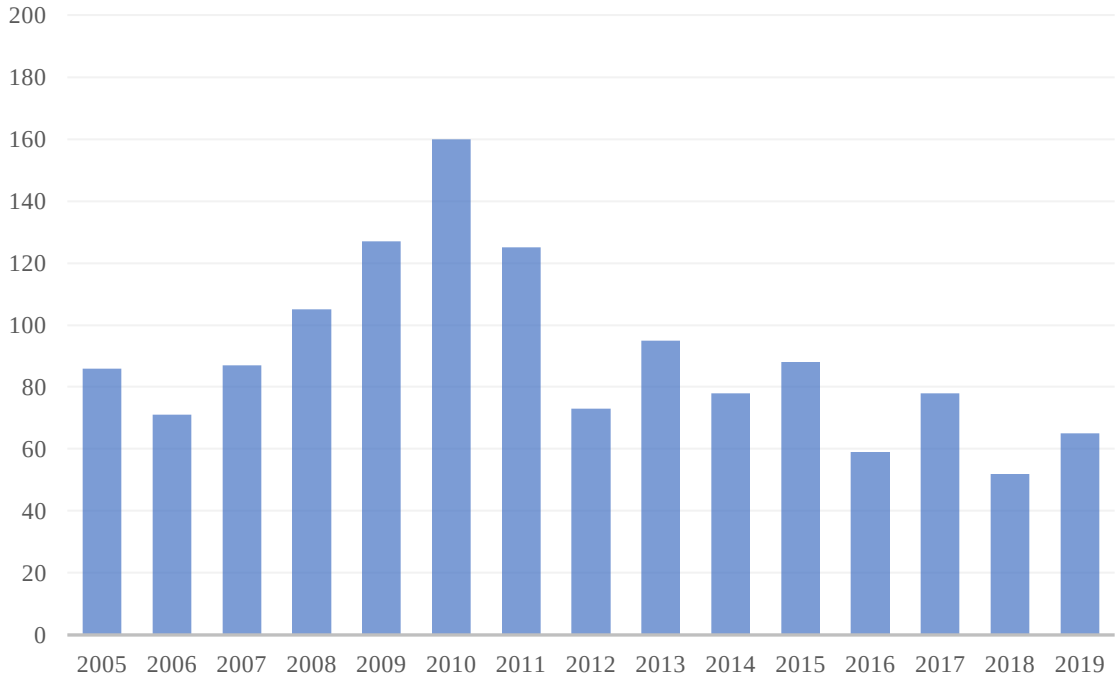
closures over this 15-year period. The closures in these 10 states make up more than 50% of the almost 1,000 closures that occurred.

Table 7: States with the Most Campus Closures

State	Nonprofit	For-Profit	Total
California	11	128	139
Pennsylvania	13	47	60
New York	17	42	59
Florida	5	50	55
Texas	4	51	55
Ohio	8	38	46
Illinois	18	25	43
Missouri	6	27	33
Washington	8	23	31
Tennessee	4	26	30

The number of openings from 2005-2019 is approximately 40% greater than the number of closures. Moreover, the patterns across the time series also mirror the trends in college closures with most of the openings occurring in the first half of the time series. There seems to be a particularly large increase in college openings in 2009-2011, the years immediately following the Great Recession. Though we cannot definitively say why we observe an increase in openings, we suspect the large increases in college enrollment during the Great Recession and the availability of stimulus funding from the American Recovery and Reinvestment Act may have encouraged opportunistic new providers to enter a growing higher education market while the federal government was making substantial investments. *Figure 6* shows these trends across our years of interest.

Figure 6: Count of College Openings



Again, the vast majority (i.e., more than 75%) of these openings occur within the private for-profit sector with the top 10 states experiencing more than half of the openings across this 15-year period. *Table 8* shows these counts by institution type for the 10 states with the most openings occurring.

Table 8: States with the Most Campus Openings

State	Nonprofit	For-Profit	Total
California	41	181	222
Florida	12	118	130
New York	44	56	100
Texas	13	85	98
Illinois	20	36	56
New Jersey	20	23	43
Pennsylvania	16	24	40
Missouri	9	26	35
Ohio	5	30	35
Virginia	9	26	35

The trends in openings and closures suggest that perhaps some of the campuses that opened during our time horizon also closed during that same 15-year period. In fact, almost 15% of the schools we identify as opening closed prior to the end of 2019. These findings suggest that some institutions seem to operate like businesses, and many of their new ventures fail. This churn in college openings and closures is rarely discussed in higher education research or policy circles but is integral to our understanding of the comprehensive landscape of higher education in the U.S. We see an opportunity for future research in this space.

Correlations between Stringency and State-Level Characteristics

Table 9 shows pairwise correlations between our stringency measure (i.e., the mean score of the 41 dimensions)[21] and a host of state-level characteristics. There are no correlations that are statistically significant at the 95% confidence level after accounting for multiple hypothesis testing using Bonferroni and Sidak adjustments (Abdi, 2007). These results suggest that the stringency of state authorization policies may be independent of observable state-level political, economic, demographic, and educational characteristics or correlated with unobservable characteristics.[22]

[21] Because the mean and sum of stringency scores are linear transformations of one another, the correlations between the stringency measures and the state-level covariates are the same regardless of which stringency measure we use. Thus, to avoid redundancy, we only show the correlations for mean stringency and each state-level covariate.

[22] *Table A2* in *Appendix A* shows results from a regression of two of our stringency measures (the sum and mean of the 41 scored dimensions) on several state-level characteristics to explore the associations between them. None of the coefficients are statistically significant at the 95% confidence level. This may be attributable, at least in part, to the small sample size, which limits our statistical power and results in large standard errors. In this model, we only have 50 observations for the 50 states since we do not have longitudinal data for the stringency measure. We also tried more parsimonious model specifications with fewer covariates, but none of our model specifications yielded statistically significant associations.

Table 9: Pairwise Correlations between Mean Stringency Score and State-Level Covariates

	Mean Stringency Score
Population (in 1000s)	0.0495
% of Population that is Hispanic	0.1017
% of Population that is White (Non-Hispanic)	-0.1856
% of Population that is Black (Non-Hispanic)	0.2984
% of Population that is Asian (Non-Hispanic)	-0.0055
Associate Degree or Higher (Age 25-64)	-0.0009
Unemployment Rate (Age 16+)	0.2918
% State Senate that is Democratic	0.2353
% State House that is Democratic	0.2251
Democratic Governor	0.0683
Pro-Education Public Opinion	-0.0107
% Tax Revenue Allocated to Higher Education	-0.237
Per Capita Support for Higher Education (Real $)	-0.2636
Per Capita Personal Income (in 1000s, Real $)	0.0388
State GDP (in Millions, Chained 2012 $)	0.0125
Population Density	0.2577

* $p<0.05$.

Regressing Institution-Level Closures on Stringency and For-Profit Status

Table 10 shows the results of Model 1, which regresses an indicator of institution closure on one of two stringency measures, an indicator of an institution's for-profit status, and an interaction between the two. We include an interaction term because we hypothesize that stringency will have a stronger correlation (i.e., more negative correlation) with closures for for-profit institutions relative to nonprofit institutions. We expect for-profit institutions to be more sensitive to a stringent authorization policy because for-profit institutions are more likely to be subject to authorization requirements than nonprofit institutions. Columns 1 through 3 include the sum of the 41 scored dimensions, and Columns 4 through 6 include the mean of the 41 scored dimensions. We added state- and institution-level covariates in a stepwise fashion, so Columns 1 and 4 include no covariates, Columns 2 and 5 include state-level covariates, and Columns 3 and 6 include state- and institution-level covariates. The results tell a similar story

regardless of the stringency measure we use. The specifications without institution-level covariates show that for-profit institutions have a significantly higher likelihood of closure than nonprofit institutions (1.4 to 1.5 percentage points). The specifications with institution-level covariates do not have a significant coefficient on the for-profit indicator. The interaction term is not significant in any specification, suggesting that the relationship between stringency and closures is not different for for-profit institutions relative to nonprofit institutions. *Tables A3* through *A6* in *Appendix A* show the results of a few robustness checks and alternative model specifications, most of which are similar to the results in *Table 10*.

Table 10: Regressing Institution-Level Closures on Stringency Measures and For-Profit Status

Variables	(1) Closures	(2) Closures	(3) Closures	(4) Closures	(5) Closures	(6) Closures
Sum Stringency	0.000	0.000	0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency				0.000	0.003	0.003
				(0.001)	(0.002)	(0.002)
For-Profit Institution	0.015**	0.014**	0.006	0.015**	0.014**	0.006
	(0.005)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)
Sum Stringency x For-Profit	-0.000	-0.000	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency x For-Profit				-0.001	-0.001	-0.001
				(0.004)	(0.003)	(0.003)
Constant	0.002	0.003	0.001	0.002	0.003	0.001
	(0.001)	(0.017)	(0.018)	(0.001)	(0.017)	(0.018)
State-Level Covariates?	N	Y	Y	N	Y	Y
Institution-Level Covariates?	N	N	Y	N	N	Y
Year FE?	Y	Y	Y	Y	Y	Y
Observations	89,815	89,815	89,815	89,815	89,815	89,815
R-Squared	0.005	0.006	0.009	0.005	0.006	0.009
Number of Years	14	14	14	14	14	14

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Regressing Institution-Level Openings on Stringency and For-Profit Status

Table 11 shows the results of Model 2, which regresses an indicator of institution openings on one of two stringency measures, an indicator of an institution's for-profit status,

and an interaction between the two. The format of the table precisely mirrors the format of *Table 10*. The results are consistent regardless of the stringency measure we use. In every specification, for-profit institutions have a significantly higher likelihood of opening than nonprofit institutions (between 2.2 and 2.6 percentage points). Neither the stringency measures nor the interaction terms have a consistently significant or substantively meaningful coefficient. *Tables A7* through *A10* in *Appendix* A show the results of a few robustness checks and alternative model specifications, most of which are qualitatively similar to the results presented in *Table 11*. The only exception is that the interaction term is significant in some specifications and not others, though it is never significant when we include institution-level covariates.

Table 11**:** Regressing Institution-Level Openings on Stringency Measures and For-Profit Status

Variables	(1) Openings	(2) Openings	(3) Openings	(4) Openings	(5) Openings	(6) Openings
Sum Stringency	-0.000*	0.000	0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency				-0.002*	0.002	0.001
				(0.001)	(0.001)	(0.001)
For-Profit Institution	0.026***	0.024***	0.022***	0.026***	0.024***	0.022***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Sum Stringency x For-Profit	-0.000*	-0.000	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency x For-Profit				-0.007*	-0.006	-0.005
				(0.003)	(0.003)	(0.003)
Constant	0.006***	0.008	-0.009	0.006***	0.008	-0.009
	(0.001)	(0.017)	(0.016)	(0.001)	(0.017)	(0.016)
State-Level Covariates?	N	Y	Y	N	Y	Y
Institution-Level Covariates?	N	N	Y	N	N	Y
Year FE?	Y	Y	Y	Y	Y	Y
Observations	83,672	83,622	83,622	83,672	83,622	83,622
R-Squared	0.007	0.009	0.048	0.007	0.009	0.048
Number of Years	13	13	13	13	13	13

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Regressing State-Level Closures on Stringency

Table 12 shows the results of Model 3, which regresses four different measures of state-level institution closures (count and percentage of closures for all institutions and just for-profit institutions) on two measures of stringency (sum and mean of the 41 scored dimensions). None of the specifications show a statistically significant association between stringency and closures, though this may be attributable, at least in part, to the small sample size (i.e., 700 state-year observations), which results in large standard errors. *Tables A11* and *A12* in *Appendix A* show the results of a few robustness checks and alternative model specifications, which are similar to the results presented in *Table 12*. *Table A13* in *Appendix A* shows that the second PCA component (which represents states that require information about graduation and post-graduation student outcomes for authorization) is negatively associated with the count of closures, while the eighth component (which represents states that do not require a surety bond for authorization) is positively associated with count of closures. This finding may provide some evidence of what aspects of the authorization process may be particularly effective at reducing the risk of institutional closures (e.g., requiring institutions to report student outcome data and secure a surety bond prior to authorization).

Table 12: Regressing State-Level Closures on Stringency Measures

Variables	Total Closure Count		Total Closure %		For-Profit Closure Count		For-Profit Closure %	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sum Stringency	0.004		0.000		0.003		0.000	
	(0.003)		(0.000)		(0.003)		(0.000)	
Mean Stringency		0.144		0.001		0.128		0.001
		(0.112)		(0.001)		(0.118)		(0.004)
Constant	1.318	1.318	-0.009	-0.009	1.714	1.714	-0.000	-0.000
	(1.290)	(1.290)	(0.022)	(0.022)	(1.180)	(1.180)	(0.030)	(0.030)
State-Level Covariates?	N	Y	N	Y	N	Y	N	Y
Year FE?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	700	700	700	700	700	700	700	700
R-Squared	0.442	0.442	0.051	0.051	0.408	0.408	0.038	0.038
Number of Years	14	14	14	14	14	14	14	14

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Regressing State-Level Openings on Stringency

Table 13 shows the results of Model 4, which regresses four different measures of state-level institution openings (count and percentage of openings for all institutions and just for-profit institutions) on two measures of stringency (sum and mean of the 41 scored dimensions). The only significant coefficients we see suggest that states with more stringent authorization policies have fewer total institution openings (but not significantly fewer for-profit openings). When using the sum of the 41 scored dimensions (ranging from 0 to 82), we estimate that a 1-point increase in stringency is associated with 0.008 fewer total openings per year. We would expect, then, that a state with the highest possible stringency score would have, on average, 0.656 fewer openings per year than a state with the lowest possible stringency score. This translates to approximately 8.5 fewer openings over the 13 years for which we have data. When using the mean of the 41 scored dimensions (ranging from 0 to 2), we estimate that a 1-point increase in stringency (i.e., a state increasing from minimal to moderate stringency or moderate to maximal stringency) is associated with 0.341 fewer total openings per year, translating to approximately 4.4 fewer openings over the 13 years in our dataset. We do not detect a significant correlation between stringency and percentage of institution openings, which suggests that the significant results could be largely driven by small states with stringent authorization policies and few closures or larger states with lax authorization policies and more closures. Accounting for different state sizes by taking the percentage rather than the raw count may cause the significance to vanish.

Tables A14 and *A15* in *Appendix A* show the results of a few robustness checks, which largely show that our significant result is not robust to alternative model specifications. Though the coefficients in both tables are approximately the same magnitude as the coefficients in

Table 13, we find no significant coefficients in either *Table A14* or *A15*. *Table A16* in *Appendix A* shows that the third PCA component (which represents states that require information about institutional accreditation or quality assurance for authorization) is positively associated with the count of openings, the fourth component (which represents states that require evidence of long-range financial planning or financial stability for authorization) is negatively associated with count of openings, and the eighth component (which represents states that do not require a surety bond for authorization) is positively associated with count of openings. Again, these findings may provide some evidence regarding which aspects of the authorization process may encourage institution openings (e.g., requiring institutions to report on institutional accreditation for authorization) or have a chilling effect on institution openings (requiring institutions to provide evidence of long-range financial planning or secure a surety bond for authorization).

Table 13: Regressing State-Level Openings on Stringency Measures

Variables	Total Openings Count		Total Openings %		For-Profit Openings Count		For-Profit Openings %	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sum Stringency	-0.008*		-0.000		-0.006		-0.000	
	(0.004)		(0.000)		(0.004)		(0.000)	
Mean Stringency		-0.341*		-0.001		-0.250		-0.003
		(0.156)		(0.002)		(0.148)		(0.006)
Constant	-1.074	-1.074	-0.009	-0.009	-1.092	-1.092	-0.012	-0.012
	(1.867)	(1.867)	(0.026)	(0.026)	(1.639)	(1.639)	(0.035)	(0.035)
State-Level Covariates?	N	Y	N	Y	N	Y	N	Y
Year FE?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	650	650	650	650	650	650	650	650
R-Squared	0.671	0.671	0.116	0.116	0.631	0.631	0.052	0.052
Number of Years	13	13	13	13	13	13	13	13

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

CONCLUSION

Our descriptive analyses show some evidence that states with more Democratic politicians (i.e., governor and state legislators) tend to have more stringent authorization policies. This makes intuitive sense, given that Republican politicians tend to prefer less government regulation than their Democratic counterparts. However, we did not find any statistically significant correlations between state-level political factors and our stringency measures. In fact, we did not find any statistically significant correlations between our stringency measure and any state-level political, economic, demographic, or educational factors. This may be at least partially attributable to limited statistical power due to the small sample size (n=50) because our stringency measure is not time-variant, but it is also possible that the stringency of a state's postsecondary authorization policy is independent of the state-level characteristics we included. Future work leveraging time-variant measures of stringency would provide more convincing evidence.

Another interesting and perhaps surprising finding of our descriptive analyses is that nearly 15% of the schools we identify as opening between 2005 and 2019 closed prior to the end of 2019. This finding suggests that some institutions operate like businesses, and many of these new ventures fail, even within a relatively limited timeframe (i.e., 14 years). This makes intuitive sense, given that most openings and closures happened within the for-profit sector. This number would certainly be much higher if we looked at openings and closures over a longer time horizon. This churn in college openings and closures is rarely discussed in higher education research or policy but is an important piece of the higher education landscape in the U.S. We see an enormous opportunity for future research in this area.

Models 1 and 2 explore the relationships between stringency and institution closures and openings (respectively) using an institution-level dataset. In our fully specified models, which include a host of state- and institution-level covariates, we find no statistically significant association between closures and stringency, regardless of the stringency measure we choose (sum of the 41 scored dimensions, mean of the 41 scored dimensions, or a subset of the principal components from our PCA). This finding does not align with our original hypothesis. We expected that more stringent authorization policies would keep bad actors out of the state, resulting in fewer closures. We do find evidence, though, that for-profit institutions have a significantly higher likelihood of closure than nonprofit institutions (1.4 to 1.5 percentage points), and this aligns with our ex-ante expectations. In Model 2, we similarly do not find any consistent associations between stringency and institution openings, but we find that for-profit institutions have a significantly higher likelihood of opening than nonprofit institutions (between 2.2 and 2.6 percentage points). This is not a surprising finding, given that we know for-profit institutions open and close much more frequently than public and private nonprofit institutions.

Models 3 and 4 explore the relationships between stringency and institution closures and openings (respectively) using a state-level dataset. We found no statistically significant associations between stringency and closures at the state level (Model 3), but we found a significant and negative correlation between stringency and the count of total openings (Model 4). When we account for the size of a state by calculating the openings as a percentage of all institutions (or for-profit institutions), however, the coefficient becomes nearly zero and is no longer significant. This finding suggests the significant results may be driven by small states with

stringent authorization policies and few closures or larger states with lax authorization policies and more closures; when we account for size, the significance is washed out. In both Models 3 and 4, we find that certain PCA components are significantly correlated with openings and/or closures, which may provide evidence for state authorizing agencies about which aspects of the authorization process are most effective at encouraging or discouraging openings and closures. We find that requiring institutions to report student outcome data and secure a surety bond prior to authorization are negatively correlated with total closures. We also find that requiring institutions to report on institutional accreditation for authorization is associated with increased institution openings (perhaps because providing evidence of accreditation may be the only requirement for authorization in some states), while requiring institutions to provide evidence of long-range financial planning or secure a surety bond for authorization seems to have a negative correlation with openings.

Our analyses suggest there may be relationships between stringency and institution openings and closures, but our results are ultimately inconclusive. For example, we find a negative association between stringency and openings at the state level but not at the institution level, and this association is only significant when we use a count of institution openings as our dependent variable rather than a percentage of institutions that open. We hypothesize that data limitations may inhibit our ability to consistently detect relationships between stringency, institution openings and closures, and other state- and institution-level characteristics. In particular, we used a time-invariant stringency measure as part of a panel dataset. Though the development of this stringency measure is an incredibly valuable contribution to the state authorization literature, it provides an incomplete picture of

authorization in each state over time and limits our statistical power in the correlational models.

We believe there are many opportunities to advance the research frontier in this space. Future work could add great value by examining changes in state authorization policies and processes over time to provide a longitudinal perspective on the relationship of stringency to institution openings and closures. To more robustly assess the impact of stringency on institutional behaviors and outcomes, we either need historical data on authorization stringency (i.e., from years prior to 2020-21) or outcome data captured after stringency was measured (i.e., openings and closures occurring after 2020-21). Qualitative interviews of authorizing agency personnel could also shed light on the motivation behind changes in state authorization (e.g., scandals or fraud that prompted policymakers to require greater oversight of postsecondary institutions) and provide a more complete picture of the history and political context of state authorization. Qualitative data about factors that contributed to institution closures (gathered through interviews with either state or institution personnel) could also provide important insight into how and why institutions decide to cease operations. A recent survey of state authorization offices (Hall-Martin, 2021) could also yield important information about the administrative capacity of authorizing agencies and the resources (e.g., staff and funding) each state dedicates to authorization. Another potentially interesting approach to this research is to examine how institutions strategically respond to authorization policies. For instance, institutions may choose to close low-performing programs that put them at risk of not being reauthorized rather than closing entirely. Alternatively, institutions or systems may decide to consolidate or merge with another institution to minimize the disruption to existing

students. These strategic institutional responses may have very different effects on student outcomes and may be influenced by state authorization policies. Understanding the relationship between state authorization and institutions' behavior provides crucial insight about how policies and processes can protect students from unscrupulous institutions and unanticipated disruptions to their education.

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APPENDIX A: SUPPLEMENTAL TABLES

Table A1: Eigenvectors for Components with Eigenvalues Greater than 1[23]

Stringency Metric	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	Comp11	Unexp. Var.
Governing Board/Ownership	0.191	0.005	0.199	-0.015	-0.235	-0.055	-0.222	0.007	0.039	0.060	-0.020	0.215
Organizational Structure	0.150	-0.123	-0.165	0.064	0.072	0.025	-0.003	0.385	0.033	-0.131	0.062	0.314
Mission & Vision	0.183	-0.170	-0.108	0.065	-0.062	0.065	0.012	0.141	0.364	0.070	0.086	0.189
Administrator Qualifications	0.172	0.095	-0.007	0.093	0.016	-0.082	-0.209	-0.011	0.212	0.081	-0.195	0.367
Advertising & Marketing Practices	0.187	-0.042	0.051	-0.146	0.006	0.086	0.044	-0.231	0.119	0.064	0.271	0.283
Recruiting Practices	0.183	-0.036	0.108	0.087	0.226	0.062	0.022	-0.252	0.122	0.030	0.137	0.270
Institutional Accreditation Information	0.029	-0.005	0.393	0.144	0.178	0.291	0.210	0.150	-0.013	0.259	0.060	0.158
Program/Specialized Accreditation Information	0.115	0.019	0.234	0.000	0.108	0.188	0.340	0.097	0.151	0.085	-0.328	0.239
Articles of Incorporation or Business License to Operate in the State	0.084	-0.257	0.111	-0.159	0.219	0.141	0.008	0.160	-0.240	-0.125	0.065	0.349
Business Licenses (Fire, Zoning, Safety)	0.189	-0.209	-0.097	-0.115	-0.090	-0.020	-0.107	-0.095	-0.002	0.102	-0.039	0.268
Personnel License	0.153	0.033	-0.038	-0.153	0.176	-0.136	0.287	-0.198	0.117	-0.041	-0.348	0.200
Curricula	0.231	0.046	0.068	-0.013	-0.018	-0.027	0.072	0.061	-0.158	-0.106	-0.054	0.201
Credit-Hour Requirements	0.227	-0.119	-0.098	0.006	0.103	-0.008	0.018	0.043	-0.145	-0.171	-0.116	0.144
Instructor Qualifications	0.234	0.069	0.033	0.043	-0.078	-0.042	-0.124	0.021	-0.165	-0.061	-0.115	0.151
Student Support Services	0.176	0.024	-0.206	-0.093	-0.095	0.178	0.226	-0.063	0.173	-0.076	0.045	0.248
Course Catalog	0.229	-0.131	-0.017	-0.047	0.045	-0.100	0.003	0.049	-0.061	-0.101	0.017	0.199
Student Handbook	0.074	0.011	0.092	-0.344	0.205	0.157	-0.299	-0.059	0.329	-0.209	0.075	0.213
Enrollment Agreement	0.152	-0.133	0.212	-0.156	0.262	-0.142	0.024	0.123	-0.072	0.103	0.093	0.255
Library Resources	0.164	-0.031	0.009	0.333	-0.134	-0.008	-0.229	0.121	0.053	0.085	0.060	0.271
Facilities	0.210	0.076	-0.102	0.064	-0.065	0.052	0.161	0.089	0.016	-0.158	-0.137	0.241

[23] For each component, the loadings with the largest absolute value are highlighted in yellow for ease of interpretation.

Stringency Metric	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	Comp11	Unexp. Var.
Tuition and Fee Schedule	0.199	0.073	0.089	-0.010	-0.116	-0.147	-0.180	-0.061	-0.220	0.031	-0.260	0.174
Admission Requirements	0.227	-0.056	-0.127	0.093	0.091	-0.051	-0.111	-0.105	-0.036	-0.132	-0.090	0.153
Graduation Requirements	0.202	-0.103	-0.178	0.060	0.150	0.092	-0.025	0.156	0.118	-0.009	-0.040	0.216
Demonstration of Program/ Institutional Need (Market Analysis)	0.139	-0.021	-0.094	0.301	-0.029	0.112	0.062	-0.202	0.186	-0.327	0.062	0.281
Student Grievance Policies	0.181	0.023	0.270	0.080	-0.068	0.083	0.015	-0.161	-0.111	0.112	0.030	0.270
Student Record Procedures	0.174	0.004	0.043	-0.224	-0.206	0.081	0.076	0.241	-0.041	0.079	0.245	0.236
School Closure/Teach-Out Plan	0.103	0.222	0.119	-0.008	-0.098	-0.050	0.363	0.061	-0.201	-0.223	0.337	0.180
Tuition Refund Policy	0.219	0.024	0.037	-0.141	-0.136	-0.061	-0.055	0.002	-0.199	0.061	-0.090	0.207
Tuition Recovery Fund (or Student Protection Funds)	0.052	0.122	0.263	0.184	0.022	-0.349	0.135	0.178	0.118	-0.145	-0.158	0.317
Surety Bond	0.120	0.053	0.184	0.047	-0.005	-0.158	0.041	-0.513	-0.038	-0.095	0.206	0.215
Audited Financial Statements	0.189	0.051	0.095	-0.173	-0.298	0.065	-0.083	0.088	0.048	0.115	0.076	0.215
Multiyear (2+) Financial Statements	0.058	-0.043	-0.186	0.247	-0.215	0.465	0.047	-0.105	-0.268	-0.039	0.039	0.177
Multiyear (2+) Budget Projections	0.080	0.042	0.059	0.458	0.331	-0.045	-0.216	0.048	-0.142	0.126	0.184	0.131
Liability Insurance	0.121	-0.040	-0.241	-0.211	0.086	-0.187	-0.002	-0.073	-0.158	0.277	0.160	0.333
Retention Rates	0.117	-0.024	-0.175	0.110	0.012	-0.126	0.163	-0.019	0.160	0.541	0.070	0.265
Graduation/Completion Rates	0.071	0.366	-0.245	-0.017	-0.002	0.127	0.128	-0.051	-0.145	0.214	-0.193	0.153
Job Placement Rates	0.105	0.339	-0.085	-0.004	0.156	0.064	-0.012	-0.060	0.087	0.134	0.041	0.363
Cohort Default Rates	0.054	0.400	0.088	-0.054	0.020	0.162	-0.162	0.064	0.156	-0.103	0.118	0.251
Wage Data	0.018	0.432	0.046	-0.086	-0.017	0.071	-0.186	0.175	0.051	-0.013	-0.008	0.242
Debt-to-Income Ratio	0.040	0.118	-0.138	0.099	-0.124	-0.433	0.196	0.152	0.137	-0.097	0.291	0.297
State Licensing/Professional Certification Examination Passage Rate	0.053	0.254	-0.253	-0.088	0.424	0.000	-0.058	0.053	-0.215	-0.056	0.109	0.149

Table A2: Regressing Stringency Measures on State Characteristics

	(1) Sum Stringency	(2) Mean Stringency
Population (in 1000s)	0.002	0.000
	(0.002)	(0.000)
% of Population that is Hispanic	81.451	1.987
	(99.697)	(2.432)
% of Population that is White (Non-Hispanic)	48.884	1.192
	(82.420)	(2.010)
% of Population that is Black (Non-Hispanic)	82.542	2.013
	(86.085)	(2.100)
% of Population that is Asian (Non-Hispanic)	68.562	1.672
	(137.108)	(3.344)
Associate Degree or Higher (Age 25-64)	-7.875	-0.192
	(83.504)	(2.037)
Unemployment Rate (Age 16+)	375.539	9.159
	(556.799)	(13.580)
% of State Senate that is Democratic	10.775	0.263
	(26.294)	(0.641)
% of State House that is Democratic	11.430	0.279
	(28.739)	(0.701)
Unicameral State Legislature (Nebraska)	15.720	0.383
	(8.954)	(0.218)
Democratic Governor	-1.761	-0.043
	(6.454)	(0.157)
Pro-Education Public Opinion	-46.195	-1.127
	(46.194)	(1.127)
% Tax Revenue Allocated to Higher Education	-35.859	-0.875
	(251.460)	(6.133)
Per Capita Support for Higher Education (Real $)	-27.953	-0.682
	(39.038)	(0.952)
Per Capita Personal Income (in 1000s, Real $)	0.569	0.014
	(0.562)	(0.014)
State GDP (in Millions, Chained 2012 $)	-0.000	-0.000
	(0.000)	(0.000)
Population Density	-0.008	-0.000
	(0.009)	(0.000)
Constant	-21.594	-0.527
	(100.842)	(2.460)
Observations	50	50
R-Squared	0.349	0.349

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A3: Regressing Institution-Level Closures on Stringency Measures, Listwise Deletion

Variables	(1) Closures	(2) Closures	(3) Closures	(4) Closures	(5) Closures	(6) Closures
Sum Stringency	0.000	0.000	0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency				0.000	0.004	0.005
				(0.001)	(0.002)	(0.002)
For-Profit Institution	0.015**	0.015*	0.005	0.015**	0.015*	0.005
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)
Sum Stringency x For-Profit	-0.000	-0.000	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency x For-Profit				-0.001	-0.004	-0.001
				(0.004)	(0.003)	(0.003)
Constant	0.002	0.015	0.012	0.002	0.015	0.012
	(0.001)	(0.021)	(0.025)	(0.001)	(0.021)	(0.025)
State-Level Covariates?	N	Y	Y	N	Y	Y
Institution-Level Covariates?	N	N	Y	N	N	Y
Year FE?	Y	Y	Y	Y	Y	Y
Observations	89,815	71,786	43,216	89,815	71,786	43,216
R-Squared	0.005	0.005	0.009	0.005	0.005	0.009
Number of Years	14	14	11	14	14	11

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A4: Regressing Institution-Level Closures on Stringency Measures, Cross-Sectional Data

Variables	(1) Closures	(2) Closures	(3) Closures	(4) Closures	(5) Closures	(6) Closures
Sum Stringency	0.000	0.000	0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency				0.000	0.002	0.001
				(0.001)	(0.005)	(0.004)
For-Profit Institution	0.014	0.015	0.008	0.014	0.015	0.008
	(0.009)	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)
Sum Stringency x For-Profit	-0.000	-0.000	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency x For-Profit				-0.004	-0.004	-0.004
				(0.009)	(0.009)	(0.009)
Constant	0.001	-0.009	-0.009	0.001	-0.009	-0.009
	(0.002)	(0.053)	(0.054)	(0.002)	(0.053)	(0.054)
State-Level Covariates?	N	Y	Y	N	Y	Y
Institution-Level Covariates?	N	N	Y	N	N	Y
Year FE?	Y	Y	Y	Y	Y	Y
Observations	5,808	5,808	5,808	5,808	5,808	5,808
R-Squared	0.004	0.008	0.012	0.004	0.008	0.012
Number of Years	1	1	1	1	1	1

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A5: Regressing Institution-Level Closures on Stringency Measures, No Year FEs

Variables	(1) Closures	(2) Closures	(3) Closures	(4) Closures	(5) Closures	(6) Closures
Sum Stringency	0.000	0.000	0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency				0.000	0.002	0.002
				(0.001)	(0.001)	(0.001)
For-Profit Institution	0.015***	0.014***	0.005*	0.015***	0.014***	0.005*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Sum Stringency x For-Profit	-0.000	-0.000	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency x For-Profit				-0.001	-0.001	-0.001
				(0.002)	(0.002)	(0.002)
Constant	0.002**	0.008	0.008	0.002**	0.008	0.008
	(0.001)	(0.019)	(0.019)	(0.001)	(0.019)	(0.019)
State-Level Covariates?	N	Y	Y	N	Y	Y
Institution-Level Covariates?	N	N	Y	N	N	Y
Year FE?	N	N	N	N	N	N
Observations	89,815	89,815	89,815	89,815	89,815	89,815
R-Squared	0.005	0.007	0.010	0.005	0.007	0.010
Number of Years	14	14	14	14	14	14

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A6: Regressing Institution-Level Closures on Alternative Stringency Measures

Variables	(1) Closures	(2) Closures	(3) Closures	(4) Closures	(5) Closures
Sum Stringency	0.000*				
	(0.000)				
Mean Stringency		0.002*			
		(0.001)			
Component 1			0.000	0.000	0.000
			(0.000)	(0.000)	(0.000)
Component 2				-0.000	-0.000
				(0.000)	(0.000)
Component 3				0.000	0.000
				(0.000)	(0.000)
Component 4				0.000	0.000
				(0.000)	(0.000)
Component 5					0.000
					(0.000)
Component 6					0.000
					(0.000)
Component 7					-0.000
					(0.000)
Component 8					0.001*
					(0.000)
Component 9					-0.000
					(0.001)
Component 10					0.000
					(0.000)
Component 11					-0.001*
					(0.000)
Constant	0.001	0.001	0.004	0.002	-0.012
	(0.018)	(0.018)	(0.018)	(0.017)	(0.016)

All models include state- and institution-level covariates and year FEs. Observations = 89,815. Number of years = 14. R-squared = 0.009. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05. The **first** component represents states that require evidence of **academic standards** for authorization. The **second** component represents states that require information about **graduation and post-graduation student outcomes** for authorization. The **third** component represents states that require information about **institutional accreditation** for authorization. The **fourth** component represents states that require evidence of **long-range financial planning** for authorization. The **fifth** component represents states that require information about state licensure or professional certification **examination pass rates** for authorization. The **sixth** component represents states that require evidence of **prior financial stability** for authorization. The **seventh** component represents states that require information about **programmatic accreditation** for authorization. The **eighth** component represents states that do not require a **surety bond** for authorization. The **ninth** component represents states that require information about an institution's **mission and vision** for authorization. The **tenth** component represents states that require information about **retention rates** for authorization. The **eleventh** component represents states that do not require information about **personnel licensure** for authorization.

Table A7: Regressing Institution-Level Openings on Stringency Measures, Listwise Deletion

Variables	(1) Openings	(2) Openings	(3) Openings	(4) Openings	(5) Openings	(6) Openings
Sum Stringency	-0.000*	0.000	0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency				-0.002*	0.002	0.001
				(0.001)	(0.001)	(0.002)
For-Profit Institution	0.026***	0.024***	0.027**	0.026***	0.024***	0.027**
	(0.004)	(0.004)	(0.007)	(0.004)	(0.004)	(0.007)
Sum Stringency x For-Profit	-0.000*	-0.000	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency x For-Profit				-0.007*	-0.006	-0.005
				(0.003)	(0.003)	(0.004)
Constant	0.006***	0.008	0.029	0.006***	0.008	0.029
	(0.001)	(0.017)	(0.018)	(0.001)	(0.017)	(0.018)
State-Level Covariates?	N	Y	Y	N	Y	Y
Institution-Level Covariates?	N	N	Y	N	N	Y
Year FE?	Y	Y	Y	Y	Y	Y
Observations	83,672	83,622	58,057	83,672	83,622	58,057
R-Squared	0.007	0.009	0.050	0.007	0.009	0.050
Number of Years	13	13	11	13	13	11

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A8: Regressing Institution-Level Openings on Stringency Measures, Cross-Sectional Data

Variables	(1) Openings	(2) Openings	(3) Openings	(4) Openings	(5) Openings	(6) Openings
Sum Stringency	-0.000	-0.000	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency				-0.004	-0.002	-0.001
				(0.004)	(0.005)	(0.005)
For-Profit Institution	0.030**	0.028*	0.027*	0.030**	0.028*	0.027*
	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)	(0.012)
Sum Stringency x For-Profit	-0.000	-0.000	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency x For-Profit				-0.014	-0.015	-0.015
				(0.010)	(0.010)	(0.010)
Constant	0.009*	0.016	0.079	0.009*	0.016	0.079
	(0.004)	(0.062)	(0.066)	(0.004)	(0.062)	(0.066)
State-Level Covariates?	N	Y	Y	N	Y	Y
Institution-Level Covariates?	N	N	Y	N	N	Y
Year FE?	Y	Y	Y	Y	Y	Y
Observations	5,808	5,808	5,808	5,808	5,808	5,808
R-Squared	0.006	0.012	0.069	0.006	0.012	0.069
Number of Years	1	1	1	1	1	1

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A9: Regressing Institution-Level Openings on Stringency Measures, No Year FEs

Variables	(1) Openings	(2) Openings	(3) Openings	(4) Openings	(5) Openings	(6) Openings
Sum Stringency	-0.000	0.000	0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency				-0.002	0.002	0.001
				(0.001)	(0.002)	(0.002)
For-Profit Institution	0.026***	0.024***	0.022***	0.026***	0.024***	0.022***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Sum Stringency x For-Profit	-0.000**	-0.000*	-0.000			
	(0.000)	(0.000)	(0.000)			
Mean Stringency x For-Profit				-0.007**	-0.006*	-0.005
				(0.003)	(0.003)	(0.003)
Constant	0.006***	0.005	-0.008	0.006***	0.005	-0.008
	(0.001)	(0.020)	(0.021)	(0.001)	(0.020)	(0.021)
State-Level Covariates?	N	Y	Y	N	Y	Y
Institution-Level Covariates?	N	N	Y	N	N	Y
Year FE?	N	N	N	N	N	N
Observations	83,672	83,622	83,622	83,672	83,622	83,622
R-Squared	0.007	0.009	0.048	0.007	0.009	0.048
Number of Years	13	13	13	13	13	13

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A10: Regressing Institution-Level Openings on Alternative Stringency Measures

Variables	(1) Openings	(2) Openings	(3) Openings	(4) Openings	(5) Openings
Sum Stringency	-0.000				
	(0.000)				
Mean Stringency		-0.001			
		(0.002)			
Component 1			-0.000	-0.000	-0.000
			(0.000)	(0.000)	(0.000)
Component 2				0.000	-0.000
				(0.000)	(0.000)
Component 3				0.001	0.001*
				(0.000)	(0.000)
Component 4				-0.000	-0.000
				(0.000)	(0.000)
Component 5					-0.001
					(0.000)
Component 6					0.000
					(0.000)
Component 7					0.001*
					(0.000)
Component 8					0.000
					(0.000)
Component 9					-0.001
					(0.001)
Component 10					-0.001
					(0.001)
Component 11					-0.001
					(0.001)
Constant	-0.009	-0.009	-0.008	-0.004	0.003
	(0.016)	(0.016)	(0.016)	(0.019)	(0.022)

All models include state- and institution-level covariates and year FEs. Observations = 83,622. Number of years = 13. R-squared = 0.048. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05. The **first** component represents states that require evidence of **academic standards** for authorization. The **second** component represents states that require information about **graduation and post-graduation student outcomes** for authorization. The **third** component represents states that require information about **institutional accreditation** for authorization. The **fourth** component represents states that require evidence of **long-range financial planning** for authorization. The **fifth** component represents states that require information about state licensure or professional certification **examination pass rates** for authorization. The **sixth** component represents states that require evidence of **prior financial stability** for authorization. The **seventh** component represents states that require information about **programmatic accreditation** for authorization. The **eighth** component represents states that do not require a **surety bond** for authorization. The **ninth** component represents states that require information about an institution's **mission and vision** for authorization. The **tenth** component represents states that require information about **retention rates** for authorization. The **eleventh** component represents states that do not require information about **personnel licensure** for authorization.

Table A11: Regressing State-Level Closures on Stringency Measures, Listwise Deletion

Variables	Total Closure Count		Total Closure %		For-Profit Closure Count		For-Profit Closure %	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sum Stringency	0.004		0.000		0.003		-0.000	
	(0.003)		(0.000)		(0.002)		(0.000)	
Mean Stringency		0.150		0.001		0.103		-0.000
		(0.113)		(0.002)		(0.099)		(0.004)
Constant	2.302	2.302	0.000	0.000	2.258	2.258	0.002	0.002
	(1.248)	(1.248)	(0.027)	(0.027)	(1.414)	(1.414)	(0.038)	(0.038)
State-Level Covariates?	N	Y	N	Y	N	Y	N	Y
Year FE?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	553	553	553	553	553	553	553	553
R-Squared	0.461	0.461	0.065	0.065	0.419	0.419	0.039	0.039
Number of Years	14	14	14	14	14	14	14	14

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A12: Regressing State-Level Closures on Stringency Measures, No Year FEs

Variables	Total Closure Count		Total Closure %		For-Profit Closure Count		For-Profit Closure %	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sum Stringency	0.004		0.000		0.003		0.000	
	(0.003)		(0.000)		(0.003)		(0.000)	
Mean Stringency		0.160		0.002		0.131		0.001
		(0.134)		(0.002)		(0.124)		(0.004)
Constant	2.168	2.168	0.001	0.001	2.399	2.399	0.012	0.012
	(1.456)	(1.456)	(0.024)	(0.024)	(1.304)	(1.304)	(0.038)	(0.038)
State-Level Covariates?	N	Y	N	Y	N	Y	N	Y
Year FE?	N	N	N	N	N	N	N	N
Observations	700	700	700	700	700	700	700	700
R-Squared	0.420	0.420	0.096	0.096	0.389	0.389	0.084	0.084
Number of Years	14	14	14	14	14	14	14	14

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A13: Regressing State-Level Closures on Stringency Principal Components

Variables	Total Closure Count			Total Closure %			For-Profit Closure Count			For-Profit Closure %		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Component 1	0.012	0.009	0.009	0.000	0.000	0.000	0.012	0.008	0.008	0.000	0.000	0.000
	(0.011)	(0.011)	(0.010)	(0.000)	(0.000)	(0.000)	(0.011)	(0.011)	(0.011)	(0.000)	(0.000)	(0.000)
Component 2		-0.057*	-0.067*		-0.000	-0.000		-0.064*	-0.077*		-0.001	-0.001
		(0.024)	(0.029)		(0.000)	(0.000)		(0.024)	(0.027)		(0.000)	(0.001)
Component 3		0.046	0.023		0.000	0.000		0.034	0.011		-0.000	-0.001
		(0.034)	(0.035)		(0.000)	(0.000)		(0.032)	(0.032)		(0.001)	(0.001)
Component 4		0.008	0.027		0.000	0.000		-0.014	0.009		0.000	0.001
		(0.055)	(0.054)		(0.000)	(0.000)		(0.053)	(0.054)		(0.001)	(0.001)
Component 5			0.050			-0.000			0.041			0.000
			(0.042)			(0.000)			(0.036)			(0.001)
Component 6			0.067			-0.000			0.043			-0.000
			(0.038)			(0.000)			(0.041)			(0.001)
Component 7			-0.034			-0.000			-0.053			-0.000
			(0.048)			(0.001)			(0.039)			(0.001)
Component 8			0.109*			0.001*			0.097*			0.001
			(0.040)			(0.000)			(0.040)			(0.001)
Component 9			0.034			-0.000			0.062			-0.000
			(0.073)			(0.001)			(0.064)			(0.001)
Component 10			-0.002			-0.001			0.003			-0.001
			(0.054)			(0.000)			(0.046)			(0.001)
Component 11			-0.069			-0.000			-0.080			-0.003*
			(0.053)			(0.000)			(0.046)			(0.001)
Constant	1.447	0.508	0.624	-0.007	-0.012	0.001	1.843	0.835	1.015	0.001	-0.008	0.018
	(1.341)	(1.429)	(1.747)	(0.023)	(0.023)	(0.023)	(1.243)	(1.353)	(1.614)	(0.029)	(0.030)	(0.024)
R-Squared	0.442	0.446	0.451	0.051	0.054	0.061	0.408	0.412	0.418	0.038	0.041	0.051

All models include state-level covariates and year FEs. Observations = 700. Number of years = 14. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05. The **first** component represents states that require evidence of **academic standards**. The **second** component represents states that require information about **graduation and post-graduation student outcomes**. The **third** component represents states that require information about **institutional accreditation**. The **fourth** component represents states that require evidence of **long-range financial planning**. The **fifth** component represents states that require information about state licensure or professional certification **examination pass rates**. The **sixth** component represents states that require evidence of **prior financial stability**. The **seventh** component represents states that require information about **programmatic accreditation**. The **eighth** component represents states that do not require a **surety bond**. The **ninth** component represents states that require information about an institution's **mission and vision**. The **tenth** component represents states that require information about **retention rates**. The **eleventh** component represents states that do not require information about **personnel licensure**.

Table A14: Regressing State-Level Openings on Stringency Measures, Listwise Deletion

Variables	Total Openings Count		Total Openings %		For-Profit Openings Count		For-Profit Openings %	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sum Stringency	-0.006		-0.000		-0.003		-0.000	
	(0.004)		(0.000)		(0.004)		(0.000)	
Mean Stringency		-0.241		-0.000		-0.138		-0.001
		(0.149)		(0.002)		(0.154)		(0.006)
Constant	-1.366	-1.366	-0.013	-0.013	-1.213	-1.213	-0.019	-0.019
	(2.197)	(2.197)	(0.030)	(0.030)	(1.937)	(1.937)	(0.044)	(0.044)
State-Level Covariates?	N	Y	N	Y	N	Y	N	Y
Year FE?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	552	552	552	552	552	552	552	552
R-Squared	0.675	0.675	0.110	0.110	0.639	0.639	0.046	0.046
Number of Years	13	13	13	13	13	13	13	13

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A15: Regressing State-Level Openings on Stringency Measures, No Year FEs

Variables	Total Openings Count		Total Openings %		For-Profit Openings Count		For-Profit Openings %	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sum Stringency	-0.008		-0.000		-0.006		-0.000	
	(0.005)		(0.000)		(0.005)		(0.000)	
Mean Stringency		-0.344		-0.001		-0.258		-0.003
		(0.204)		(0.002)		(0.189)		(0.005)
Constant	-2.014	-2.014	-0.017	-0.017	-2.039	-2.039	-0.033	-0.033
	(1.725)	(1.725)	(0.032)	(0.032)	(1.604)	(1.604)	(0.046)	(0.046)
State-Level Covariates?	N	Y	N	Y	N	Y	N	Y
Year FE?	N	N	N	N	N	N	N	N
Observations	650	650	650	650	650	650	650	650
R-Squared	0.659	0.659	0.102	0.102	0.618	0.618	0.058	0.058
Number of Years	13	13	13	13	13	13	13	13

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.

Table A16: Regressing State-Level Openings on Stringency Principal Components

Variables	Total Opening Count			Total Opening %			For-Profit Opening Count			For-Profit Opening %		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Component 1	-0.029	-0.036*	-0.037*	-0.000	-0.000	-0.000	-0.020	-0.026	-0.029	-0.000	-0.000	-0.000
	(0.014)	(0.014)	(0.016)	(0.000)	(0.000)	(0.000)	(0.013)	(0.014)	(0.015)	(0.001)	(0.001)	(0.001)
Component 2		-0.049	-0.033		-0.000	-0.000		-0.038	-0.028		-0.001	-0.001
		(0.032)	(0.037)		(0.000)	(0.000)		(0.024)	(0.029)		(0.001)	(0.001)
Component 3		0.178***	0.190***		0.001	0.001*		0.157**	0.167**		0.001	0.001
		(0.037)	(0.042)		(0.000)	(0.000)		(0.037)	(0.041)		(0.001)	(0.001)
Component 4		-0.177**	-0.173**		-0.001*	-0.001*		-0.131*	-0.121*		-0.001	-0.000
		(0.048)	(0.043)		(0.000)	(0.000)		(0.047)	(0.043)		(0.001)	(0.001)
Component 5			-0.034			-0.001			-0.040			-0.001
			(0.042)			(0.001)			(0.030)			(0.001)
Component 6			-0.030			-0.001*			-0.057			-0.002
			(0.040)			(0.000)			(0.036)			(0.001)
Component 7			0.092*			0.000			0.056			0.001
			(0.034)			(0.000)			(0.033)			(0.001)
Component 8			0.132**			-0.001			0.100*			0.001
			(0.040)			(0.000)			(0.041)			(0.001)
Component 9			-0.081			-0.000			-0.032			0.001
			(0.072)			(0.001)			(0.065)			(0.002)
Component 10			-0.057			-0.001			-0.057			-0.002
			(0.091)			(0.001)			(0.075)			(0.002)
Component 11			-0.020			0.000			-0.028			-0.002
			(0.088)			(0.001)			(0.092)			(0.001)
Constant	-1.382	-2.308	-0.271	-0.009	-0.013	0.001	-1.299	-2.062	-0.106	-0.014	-0.030	0.012
	(1.898)	(1.907)	(2.060)	(0.028)	(0.027)	(0.028)	(1.669)	(1.685)	(1.785)	(0.034)	(0.034)	(0.030)
R-Squared	0.671	0.684	0.690	0.116	0.121	0.135	0.631	0.643	0.648	0.052	0.057	0.069

All models include state-level covariates and year FEs. Observations = 650. Number of years = 13. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05. The **first** component represents states that require evidence of **academic standards**. The **second** component represents states that require information about **graduation and post-graduation student outcomes**. The **third** component represents states that require information about **institutional accreditation**. The **fourth** component represents states that require evidence of **long-range financial planning**. The **fifth** component represents states that require information about state licensure or professional certification **examination pass rates**. The **sixth** component represents states that require evidence of **prior financial stability**. The **seventh** component represents states that require information about **programmatic accreditation**. The **eighth** component represents states that do not require a **surety bond**. The **ninth** component represents states that require information about an institution's **mission and vision**. The **tenth** component represents states that require information about **retention rates**. The **eleventh** component represents states that do not require information about **personnel licensure**.