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Predicting College Financial Distress and Its Local Economic Effects

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ABSTRACT

We examine the link between college financial distress – exemplified, in its most severe form, by full institution closures – and local economic activity. Using historic data on institutional characteristics, finances, student body, and staff combined with precise closure dates, we first develop a predictive model of closures, utilizing factors such as operational revenue and expense patterns, to sources of revenue, to metrics of liquidity and leverage, to declining enrollment patterns, and prior signs of significant financial strain. We then use these predictions to document our estimated increase in the likelihood of future closures due to commonly predicted scenarios (e.g., enrollment declines), concluding that the enrollment challenges are predicted to increase the number of institutions at risk of severe financial distress (including closure) between 50% and 400% for reasonable scenarios of fiscal shocks. We next estimate the impact of college closures on county-level measures of employment, wages, and population. We find that it takes counties 8 quarters to recover to the pre-closure levels of employment and 5 quarters to recover to the pre-closure level of total county wages. Counties that experience college closures – especially of larger institutions – also experience population declines as both students and employees seek opportunities elsewhere.

Keywords: higher education, college, university, enrollment, tuition, revenue, budget, closure, fiscal challenges, demographic cliff

JEL Codes: I22, I23, J21, J24

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I. Introduction

College closures, mergers, and other forms of financial distress can have profound effects not only on students and employees of the affected institutions, but also on local economics – particularly in areas where the education institution serves as an anchor of local economic activity. Measuring and predicting financial distress for institutions of higher education is more important than ever, yet this endeavor is difficult due to the complexity of their financial structures and due to the availability of suitable data. In this paper, we will explore various forms of fiscal challenges facing colleges and universities, the predictors of financial distress at the institutional, local, and state levels (including both long-term trends and temporary shocks like the COVID-19 pandemic), and the effect of institutional financial distress on their local economies.

The higher education industry is facing serious financial headwinds in the post-pandemic era. One key challenge is declines in enrollment, as the number of students enrolled in degree-granting colleges and universities fell by 15% between 2010 and 2021 (National Center for Education Statistics, 2023). Enrollment declines were particularly stark during the height of the pandemic as individuals chose to participate in a strong labor market over taking classes that were primarily offered online, but participation in higher education was already falling prior to the pandemic. This trend may have finally reversed during the fall 2023 semester, which saw the first across-the-board increase in enrollment in many years (National Student Clearinghouse Research Center, 2024).

Part of this decline is frequently blamed on what is referred to as the "demographic cliff" in higher education, a decline in the number of high school graduates in parts of the country that is spreading across more states (Bransberger et al., 2020; Grawe, 2018). This has undoubtedly

contributed to enrollment declines, but the share of high school graduates immediately enrolling in college has fallen from 70% to 62% over the last decade (National Center for Education Statistics, 2023). This decline, which also began before the pandemic, could reflect growing skepticism among the public about the value of higher education (e.g., Brenan, 2023).

The other primary source of students—adult learners—has also seen substantial declines over the last decade. The enrollment of adult learners has traditionally been countercyclical relative to the economy, as potential students seek out community colleges and broad-access private institutions when recessions hit (Barr & Turner, 2015; Hillman & Orians, 2013). The number of students over the age of 25 has fallen by nearly half since the Great Recession (authors' calculations using Integrated Postsecondary Education Data System data), meaning that colleges do not have as large of an alternative market of students to consider when the labor market is strong.

Growing competition for students along with an increasing number of states limiting the tuition-setting authority of public colleges (Kelchen & Pingel, 2024) has limited institutions' ability to increase tuition revenue from existing students. Listed prices for tuition and fees have been at or below the rate of inflation since 2018 following decades of substantial real increases (Ma & Pender, 2023). Tuition discount rates have steadily risen over time, surpassing 50% at private nonprofit colleges in 2022 (National Association of College and University Business Officers, 2023). At the same time, operating costs have also risen quickly due to the pandemic-era inflationary shock and a longer trend of rising benefits expenses (Commonfund Institute, 2023).

These financial pressures on higher education have elevated college closures as a major higher education policy issue. While there have been predictions of a wave of closures for the

last decade (e.g., Eide, 2018; Horn, 2018), most colleges survived the pandemic thanks to timely federal support and taking emergency actions to freeze or reduce personnel costs (Natow, 2021). However, the withdrawal of pandemic-era federal funding along with existing stressors has likely resulted in an increase in closures during 2023 (Sanchez, 2024). There has also been a wave of colleges declaring financial exigency, eliminating academic programs and employees in an effort to cut costs and to avoid potential closures (Ambrose & Nietzel, 2024). Even flagship universities such as West Virginia University and Pennsylvania State University have pursued sizable reductions in the number of academic programs as they face budget deficits (Burke, 2024; Povich, 2023).

Considerable attention has been given to the plight of students attending colleges that close, as it negatively affects the likelihood of students eventually earning a credential (Burns et al., 2023). But the potential effects of closures can spill over into the broader communities, as colleges often serve as anchor institutions—economic and cultural engines of their local communities (Birch et al., 2013; Harris & Holley, 2016). Research on the effects of mass layoffs in other sectors has found declines in total regional employment as some workers either move to a new region or drop out of the labor market entirely (Celli et al., 2023; Foote et al., 2019). These questions have yet to be explored in the higher education setting.

In this study, we combine rich data on higher education institutions' students, staff, and financial circumstances with county-level data on local economic conditions to answer the following research questions:

1) To what extent can college financial distress (substantial downsizing or closures) be predicted based on operational metrics and local economic conditions in preceding years?

2) What types of institutions may be at risk of financial distress in the future based on reasonable scenarios of enrollment changes and broader economic conditions?
3) What are the local effects of college financial distress on local labor markets and economic activity?
4) Putting it all together, what are the predicted future local employment and economic effects of college financial distress based on various scenarios of enrollment changes and broader economic conditions considered in 2)?

II. Higher Education Landscape and Fiscal Challenges

In this section, we begin by reviewing the history of financial distress and college closures as well as examining research on factors associated with college closures. We then discuss the relationship between higher education, the labor market, and regional economic growth before concluding with an examination of the role that colleges and universities play as anchor institutions in their local communities.

A. Financial Distress and College Closures

Financial challenges have long played an important role in the history of American higher education. For example, Harvard was able to continue operating in the 1640s and 1650s through fundraising one-quarter of a bushel of corn ("colledge corne") from each local family (Curti & Nash, 1965). College closures also have a long history in America, as roughly 80% of colleges that were ever in operation in the country had closed by 1860 (Tewksbury, 1932). However, an analysis of nearly 500 private nonprofit colleges that were identified as having limited resources in 1972 found that nearly 85% of the institutions continued to operate in some

form four decades later (Tarrant et al., 2018). This suggests a substantial amount of resilience in the sector. Public higher education systems, in particular, rarely suffer closures due to local and state financial support, but do sometimes face mergers and consolidations (which are more difficult to observe and outside of the scope of the present study).

A number of analysts and consulting firms have identified factors that they view as being indicative of college closures without empirically testing their accuracy (e.g., Denneen & Dretler, 2012; Parthenon-EY, 2017; Zemsky et al., 2020). There is much less research that examines factors associated with a higher risk of closure using a regression framework. Institutional characteristics that are related to closure include being an HBCU or a women's college, while being an urban college reduces the likelihood of closure (Britton et al., 2023; Zapp & Dahmen, 2023). Financial characteristics associated with closures include lower faculty salaries, lower tuition, smaller endowments, and higher levels of instructional spending (Bates & Santerre, 2000; Britton et al., 2023; Porter & Ramirez, 2009).

We take inspiration from our study from Kelchen (2020), who used linear probability models to predict college closures within two and four years separately for private nonprofit and for-profit institutions. Some of the key variables related to closures in that study included declines in enrollment, increases in the tuition discount rate, a decline in endowment values, and triggering Department of Education's monitoring metrics for Title IV eligibility: failing the federal financial responsibility test or being on the more serious level 2 of heightened cash monitoring. While these models were able to identify colleges at the highest risk of closures, only a small fraction of the riskiest institutions closed in the short term.

B. Higher Education, the Labor Market, and Economic Growth

While higher education serves numerous purposes including personal growth, fostering civic engagement, and advancing society, students and policymakers place particular focus on colleges' role in preparing students for the labor market. Students consistently rate getting a good job and making money as some of the most important reasons for going to college (e.g., Stolzenberg et al., 2020), and a growing number of states are explicitly tying public funding for higher education to workforce-related metrics (Kelchen et al., 2024b). And the sizable economic returns for college completers—albeit with significant variation by field of study, student ability, and the price tag of the credential—highlight the importance of higher education in the labor market (Webber, 2016; Zhang et al., 2024).

There is a sizable body of research showing a strong relationship between the availability of higher education opportunities in a local community and economic health. Much of the relationship is due to increased employment because many graduates (particularly at less selective colleges) stay in the area (Conzelmann et al., 2023) and because of the service-related jobs that are associated with having colleges in the area (Lee, 2019). By comparing counties that received public universities to counties that were runners-up for those institutions, research showed that counties with colleges enjoyed higher levels of educational attainment and employment in human capital intensive industries (Andrews, 2023; Russell et al., 2022). Using the same research design, Russell and Andrews (2022) and Howard et al. (2022) showed increases in economic mobility and local economic resilience in counties with college campuses. Lehnert et al. (2024) found that opening new branch campuses of existing public colleges is associated with significant increases in local economic output.

C. Colleges as Anchor Institutions

As the previous section demonstrates, higher education institutions serve an important role for economic development and regional prosperity. This fits into a broader body of literature in the field of consumer finance regarding the role of sizable employers such as hospitals and colleges as anchor institutions that attract other businesses and help to develop a larger employment base (e.g., Harkavy & Zuckerman, 1999; Harker et al., 2022). There is also work specifically considering the role of higher education as anchor institutions (Birch et al., 2013; Harris & Holley, 2016).

It is also important to emphasize that colleges serve as more than economic engines of local communities. Particularly in more rural and isolated areas, higher education institutions have the potential to function as the cultural hub of communities by supporting civic engagement, the arts, and providing entertainment and educational opportunities (Ashley et al., 2023; Howard, 2014). An important activity of many colleges is noncredit courses, which can serve to develop individuals' skills for the labor market or to simply promote lifelong learning (Arena, 2013; Xu & Ran, 2020). The proximity to colleges has even been a factor in the retirement decisions of some Americans, as they seek out a stimulating environment in their golden years (Smith et al., 2014).

Put together, colleges have the ability to attract individuals to local communities and to better the overall quality of life. For those reasons, struggles of higher education institutions—through closures or cutbacks caused by severe financial distress—are of particular interest to researchers and policymakers alike. This is the motivation behind our analysis to examine the effects of closures or severe declines in institutional health on postsecondary enrollment and local economic health.

D. Institutional Setting

The American higher education system today consists of approximately 6,000 colleges and universities that receive federal financial aid under Title IV of the federal Higher Education Act. There is also a substantial number of very small colleges, particularly in the for-profit sector, that operate without receiving federal financial aid (e.g., Cellini & Goldin, 2014) and are outside the scope of this chapter due to a lack of available data. As an industry, American higher education directly produces approximately $700 billion in expenditures, enrolls nearly 25 million students, and has approximately three million employees. In the following section, we discuss key revenue and expenditure categories and the implications for institutional finances.

Tuition Revenue

Table 1 highlights key revenue categories by institutional sector from the 2021-22 academic year. The most important revenue source for private nonprofit and for-profit colleges, and the second most important primary revenue source for public colleges, is revenue from tuition and fees. Between the early 1970s and mid-2010s, listed real tuition and fee rates more than tripled at public and private nonprofit colleges as strong demand for higher education allowed colleges to continue increasing their prices. But since 2018, tuition increases have consistently been below the rate of inflation (Ma & Pender, 2023) and tuition discount rates have continued to rise (National Association of College and University Business Officers, 2023).

Table 1: Revenues by Institutional Sector, 2021-22

	Public		Private nonprofit		For profit	
	Amount	(pct)	Amount	(pct)	Amount	(pct)
Total revenue	**460.97**	**100.0**	**220.42**	**100.0**	**18.06**	**100.0**
Tuition and fees	79.84	17.3	81.62	37.0	16.66	92.3
Appropriations	102.17	22.2	1.36	0.6	0.03	0.2
Grants and contracts	66.27	14.4	39.75	18.0	0.40	2.2
Auxiliary enterprises	28.00	6.1	17.91	8.1	0.11	0.6
Hospitals	66.86	14.5	39.43	17.9	0.00	0.0
Investment revenue	-11.32	-2.5	-26.40	-12.0	0.04	0.2
Gifts	11.66	2.5	26.40	12.0	0.00	0.0
Other	117.48	25.5	40.36	18.3	0.82	4.5

Source: IPEDS: https://nces.ed.gov/ipeds/search/viewtable?tableid=36100

Notes:
Dollar values are in billions. Approximately $15 billion in revenues from 17 FASB-reporting public institutions is excluded from this table.

Public universities are in a particularly challenging situation because a majority of states explicitly restrict how much institutions can increase tuition (Kelchen & Pingel, 2023), and legislatures and governors can pressure colleges to limit tuition increases even without a formal tuition control mechanism being in place (Kelchen, 2018). This has led public universities to prioritize recruiting and enrolling out-of-state students (Jaquette & Curs, 2015), although these efforts often fail to generate additional revenue for colleges (Kelchen, 2021). At selective public universities, these efforts to recruit out-of-state students have crowded out in-state students—particularly underrepresented minority students (Curs & Jaquette, 2017; Jaquette et al., 2016).

Government Appropriations

The single most important source of revenues for public institutions is appropriations, which primarily consists of local and state funding to support general operations. At least some community colleges in nearly 30 states receive local funding, which makes up roughly 21% of

total revenue for community colleges in those states (Ortagus et al., 2022). State support for public higher education is much larger (approximately $106 billion in Fiscal Year 2022 compared to $12 billion in local funding), and is spread across two-year and four-year institutions (Kunkle & Laderman, 2023). There is a strong relationship between state funding and improved completion rates and post-college outcomes alike (Chakrabarti et al., 2020).

State funding for public higher education is highly volatile, with implications for students and colleges alike (Delaney, 2023). Much of this volatility is driven by higher education's function as a balancing wheel in state budgets (Delaney & Doyle, 2018; Hovey, 1999), as states make sharp cuts in appropriations during recessions in order to fund other priorities that do not have alternative revenue sources such as tuition. This leaves public colleges, particularly those that have been heavily reliant on state funding, particularly vulnerable to declines in resources and tuition increases as enrollment increases during periods of reduced state funding (Barr & Turner, 2013; Rosinger et al., 2022a). Research by Webber (2017) has also shown a relationship between state funding cuts and tuition increases, although tuition increases only backfill a portion of lost appropriations.

States allocate approximately 90% of support for public higher education to institutions, with financial aid to students—a category that is rapidly growing—making up the remainder of support (Kunkle & Laderman, 2023). States use a variety of methods to allocate funding to institutions. These include no clear funding mechanism (particularly in the four-year sector), base-adjusted methods that tie current funding to the previous year's funding, enrollment and/or performance-based models, and hybrid models that combine enrollment and/or performance components with protected base funding (Kelchen et al., 2023).

Most of the research on higher education funding models has focused on performance funding, which accounts for roughly ten percent of state appropriations (Rosinger et al., 2022b). This research generally fails to find meaningful positive effects of performance funding on student outcomes along with the presence of unintended consequences for equity (Ortagus et al., 2020); research on the effects of other funding models also comes to a similar set of muted finding (Kelchen et al., 2024a).

Research and Hospital Revenue

For a relatively small number of large public and private nonprofit universities, research (represented primarily through grants and contracts) and hospitals make up a majority of total revenue reported to the U.S. Department of Education. An example of this is the University of Michigan at Ann Arbor, which generated $5.6 billion in hospital revenue and $1.3 billion in grants and contracts in Fiscal Year 2022 compared to $1.4 billion in tuition revenue (authors' calculations using IPEDS data). Only 89 universities contributed to the nearly $67 billion in hospital revenue, as not all university-connected hospitals report financials in conjunction with universities.

Research funding is distributed across a larger group of institutions, although the vast majority of dollars flows to the 146 institutions that are designated as Research I universities in the Carnegie classifications. Research grants and contracts frequently come with indirect cost allowances that help to fund the infrastructures of personnel and facilities that are needed to support a research enterprise. These indirect cost rates tend to be higher for grants received from federal agencies compared to nonprofit foundations, creating strong pressures to seek federal research funds (Graddy-Reed et al., 2021).

Auxiliary Enterprise Revenue

Auxiliary enterprises consist of activities that are not directly tied to instruction, research, and student services. Some of these activities, such as housing, food service, and parking, are typically expected to break even or potentially help support other campus activities through generating a profit. Other activities, such as athletics, may be allowed to operate at a loss in order to help achieve other institutional priorities. Auxiliary revenues reflect a modest share of overall revenue across higher education, but are particularly important at residential liberal arts colleges and large research universities with sizable on-campus populations and prominent intercollegiate athletics programs.

Because housing, dining, and parking generate consistent revenue streams, a growing number of public universities have sought capital to upgrade their facilities in these areas. This can take the form of issuing bonds to finance improvements (Denison et al., 2014) or through using public-private partnerships that leverage private capital to make improvements and then lease the assets back to universities (McClure et al., 2017; Storms et al., 2017). Private universities typically issue bonds on their own, which helps to explain higher debt burdens among private than public institutions because some debt associated with public universities is held outside of balance sheets (Ward et al., 2022).

The vast majority of revenue from intercollegiate athletics comes from the approximately 360 universities in Division I of the National Collegiate Athletic Association (NCAA), and much of this revenue is concentrated among the approximately 60 institutions in the most powerful athletic conferences. Forty-nine public universities brought in more than $100 million in athletics revenues in the 2021-22 fiscal year (USA Today, 2024), but many Division I institutions still rely on student fees and institutional contributions in order to fund athletics. Total student fees for athletics are in excess of $1 billion per year and can exceed $2,000 per student per year at

some universities (Enright et al., 2020). Meanwhile, smaller institutions view athletics as a way to recruit tuition-paying students who want to continue their athletic careers and thus are willing to operate athletics with little direct revenue (Knox, 2023).

Investment and Gift Revenue

Like research and hospital revenue, the vast majority of support from private donors is concentrated in a small number of colleges. Just 136 colleges or university systems in the United States had endowments of more than $1 billion in Fiscal Year 2023, but that made up more than 80% of all endowment assets in American higher education. Going further, five institutions held 25% of all endowment assets and 25 institutions held half of all assets (Redd, 2024). Private institutions are far more reliant on endowments and investment income than public institutions, as private institutions hold the majority of assets and tend to have smaller student bodies to support (Baum et al., 2018).

A college's endowment does not consist of one singly piggy bank that leaders can use in any way they see fit. Rather, endowments are made up of numerous accounts that frequently have restrictions placed on their usage by donors. Common categories for giving include student financial aid, funding the building and maintenance of facilities, and supporting faculty positions. Institutional leadership can petition a court to remove restrictions in the case of financial distress (e.g., Moody, 2024), but those efforts tend to be expensive to undertake and can damage relationships with donors. In general, colleges are expected to spend approximately 4% to 5% of a rolling average value of the endowment each year. This is below the long-term rate of return, which allows endowments to keep growing (American Council on Education, 2014). It also helps to smooth out year-over-year changes in the value of the endowment, which have been considerable over the last decade.

Expenditures

One of the key challenges facing colleges and universities is that operating costs have risen faster than general inflation for decades, driven by rising expenses for health insurance and administrative support (Commonfund Institute, 2023). To provide an extreme example of rising costs, the University of Delaware announced in early 2024 a freeze on all nonessential spending in large part due to skyrocketing health insurance costs driven by the popular weight loss drug Ozempic (Greene, 2024; Owens, 2024). This is a particular concern for public institutions, which often have limited control over benefits costs compared to private institutions.

Higher education suffers from Baumol's (1967) cost disease as an industry that relies on highly educated labor and is unable to incorporate technological efficiencies as well as many other fields; this has explained the majority of rising operating costs over time (Archibald & Feldman, 2008). However, Bowen's rule, in which colleges seek to raise as much money as possible in order to spend it on educationally worthwhile pursuits, likely also plays a role in rising expenditures as institutions try to keep up with their peers (Bowen, 1980; Kolpin & Stater, 2024).

As a labor-intensive industry, expenses related to personnel are by far the single largest expenditure category in most institutions' budgets. While the share of faculty who are tenured or are on the tenure track has steadily declined over time (Colby, 2023), even a move to contingent faculty does not eliminate the need for individuals to teach classes. The two other primary drivers of institutional expenses are maintaining facilities and debt service. Both of these categories also tend to be difficult to move in the short or medium term, as there is often little ability to sell off assets that are on an existing college campus and bonds are often paid off over a

period of several decades. As a result, it is difficult for colleges to make meaningful reductions to budgets without eliminating a broad range of academic programs.

Table 2 highlights key functional expenses by institutional sector in the 2021-22 academic year. More money was spent on instruction than any single other category across both public and private nonprofit institutions, but this only included between 26% and 30% of all spending. This low share of spending on instruction often raises concerns regarding so-called administrative bloat, which is a rare argument that unites faculty members with advocates from across the ideological spectrum (e.g., American Council of Trustees and Alumni, 2021; Ginsberg, 2011; Whistle & Erickson, 2019).

The construction of the instructional expenditures category in IPEDS is relatively narrow, excluding key functions such as advising, information technology, and student support services. These three categories represent just under one-fourth of all spending at public institutions, but 60% of spending at for-profit colleges. Research has shown that spending in these areas has been shown to significantly improve student outcomes (Griffith & Rask, 2016; Webber & Ehrenberg, 2010). Spending on other categories, such as research, auxiliary enterprises, and hospitals tends to be more closely aligned with the associated revenue categories and is less driven by tuition dollars and state appropriations.

Table 2: Expenses by Institutional Sector, 2021-22

	Public		Private nonprofit		For profit	
	Amount	(pct)	Amount	(pct)	Amount	(pct)
Total expenses	**439.79**	**100.0**	**246.08**	**100.0**	**15.80**	**100.0**
Instruction	116.14	26.4	68.48	27.8	4.77	30.2
Research	44.64	10.2	26.66	10.8	0.01	0.1
Academic support	34.49	7.8	20.84	8.5	1.54	9.7
Student services	24.00	5.5	21.14	8.6	3.07	19.4
Institutional support	40.93	9.3	30.51	12.4	4.99	31.6
Auxiliary enterprises	33.51	7.6	18.18	7.4	0.22	1.4
Hospitals	64.33	14.6	39.81	16.2	0.00	0.0
Other	81.74	18.6	20.45	8.3	1.21	7.7

Source: IPEDS: https://nces.ed.gov/ipeds/search/viewtable?tableid=36100

Notes:
Dollar values are in billions. Approximately $15 billion in expenditures from 17 FASB-reporting public institutions is excluded from this table.

III. Data Sources

A. Institutional Characteristics

We obtained information on the historical features of colleges and universities (organizational structure, location, and finances) and on the characteristics of their students and staff from the Department of Education's Integrated Postsecondary Education Data System (IPEDS) data. The panel we assembled spans 1990 to 2022 and is based on data which is collected annually on the academic year calendar for each UNITID (IPEDS ID for an individual institution).

The rich IPEDS data includes hundreds of variables, with many of them only available for certain institution types or enrollment/revenue thresholds. The main variables drawn from IPEDS that are of focus for this study include:

- Enrollment: total full-time equivalent (FTE); full time v. part time enrollment; undergraduate v. graduate enrollment; admit rate; yield rate.
- Graduation: completion rate.
- Staff: total staff and outlays; instructional staff and outlays.
- Revenue: total revenue; operating revenue; shares of revenue from Title IV funds, appropriations, net tuition revenue, auxiliary revenue, and gifts; tuition discount rate.
- Expenses: total expenses; operating expenses; share of expenses on education-related expenditures (instruction, academic support, and student services).
- Assets: total assets; endowment; unrestricted net assets.
- Derived Financial Metrics: operating margin; days cash on hand (liquidity); debt to assets (leverage); debt to operating margin (liquidity).

Additionally, we created indicators for whether FTE enrollment, total revenue, or endowment values decreased by ten percent or more to reflect sizable shocks to institutional operations. For tuition discount rates, tuition reliance, and the admit rate, we further created indicators for increases of five percentage points or more. Note that most fields have considerable coverage – at least 2001 and onward – but many are missing for a variety of reasons, both idiosyncratic and systemic. For example, institutions that only grant certificates frequently do not report detailed asset or other financial data. In such cases, and when there is low risk of bias due to a correlation between the missing values and likelihood of closure (conditional on covariates), we have opted to set missing values to zero but include an indicator for the reason data is missing (e.g., institution type such that detailed financial data is unavailable) in order to maximize sample size.

To consider college closures in the context of this study, we brought in the Closed School Weekly Reports from the Federal Student Aid's (FSA's) Postsecondary Education Participants System (PEPS) database. FSA data classify institutions based on their Office of Postsecondary Education identification number (OPEID), which is based on the unit of analysis under which a

program participation agreement is entered upon with the Department of Education (Office of Federal Student Aid, 2017). We restricted the sample of institutions in the PEPS data to those where the main campus (FSA OPEID ending in "00"), as opposed to a branch/satellite campus, closed. We made this decision because colleges frequently make decisions to close branch campuses that may only offer one or two programs of study; fully 90% of closures in PEPS in the 2010s were of branch campuses.[1] The PEPS data includes a precise date of closure, with the caveat that a small number of colleges closed, reopened, and then closed again during the period of analysis. For purposes of all of our methods, we consider the first closure only.

Combining data at the IPEDS UnitID and FSA OPEID levels is a complex endeavor as there the relationship between the two classifications is not one-to-one. College and university systems often operate under the same program participation agreement with the FSA, and thus all report data together under what is often called a "parent-child" agreement (Jaquette & Parra, 2014). However, seemingly similar university systems differ in whether institutions report separately or jointly to FSA. For example, Indiana University and University of Wisconsin campuses report separately, while Ohio State University and Rutgers University report as systems. Further complicating this data merge is that colleges that share the same program participation agreement can report certain IPEDS data elements (such as finance and completions) at the OPEID level while reporting other elements (such as graduation rates and student demographics) at the UnitID level (National Center for Education Statistics, 2018). We do our best to account for these peculiarities in our treatment of the datasets, with the result that our coverage of closures is not very thorough before 2001. As a result, most of our institution-

[1] An example of this is Georgia's Piedmont College, which closed 32 branch campuses in 2020 alone. All of these campuses were in local school buildings. A similar dynamic occurred at Oregon's Concordia University, which closed its main campus in 2020. However, it closed multiple branch campuses in area school buildings in 2014, which was near the peak of its enrollment and years before any financial challenges.

level analysis focus on years 2001 and later, though we are actively pursuing methods to improve our coverage of closures into the 1990s by creating a UnitID-OPEID crosswalk.

In addition to the IPEDS and PEPS closures data, we bring in Financial Responsibility Composite (FRC) Score data, publicly available from 2006 onward, from the FSA. The FRC score reflects the overall relative financial health of higher education institutions along a scale from negative 1.0 to positive 3.0, with a score at or above 1.5 considered as the threshold for financial responsibility without posting a letter of credit. We track the actual score and also define indicator variables for whether a college "failed" to pass the FRA's financial responsibility test using a threshold of 1. Although FRC scores have been calculated since at least 1996, only scores from the 2006-07 academic year forward have been released due to alleged data quality concerns (Kelchen, 2020).

In order to flag institutions in precarious financial condition, we used the College Scorecard data on colleges placed on Heightened Cash Monitoring (HCM) level 2, the most serious level of federal monitoring that requires a college to be reimbursed for any federal student aid disbursed instead of receiving funds in advance (Office of Federal Student Aid, 2019). Also from the College Scorecard, we obtained cohort default rates (CDRs) for the vast majority of institutions (all colleges and universities that participated in the federal student loan system). Our cohort default rate is a composite of two-year (for cohorts of students entering repayment prior to or during FY 2012) and three-year (FY 2013 and onward) CDRs.

We also used the predominant degree from the College Scorecard to classify institutions into public 2-year (or less), public 4-year (or more), private non-profit 2-year (or less), private non-profit 4-year (or more), private for-profit 2-year (or less), and private for-profit 4-year (or more). Considering the predominant degree classification better reflects the institutions' focus,

since highest degree offered would often classify community colleges that offer a single, small B.A. program as "4-year" institutions. About a fifth of colleges are missing information on the predominant degree level variable, so we supplemented with Carnegie classifications where available and counted the rest as two-year colleges (confirmed by visual inspection of the data for missing predominant degree level).

B. Local Economic Indicators

Our predominant source for local economic indicators used in our analysis of the effects of college financial distress and closures and as covariates in predictors of college financial distress are county level metrics from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW). The QCEW contains quarterly counts of employment, establishments, and wages reported by employers covering more than 95 percent of U.S. jobs, overall and by detailed industry (6-digit NAICS group) from 1990 to 2022. Practically speaking, since the higher education sector can cover a relatively small number of establishments in many counties relative to overall establishments and employment, the sector-specific data is often suppressed due to small cell sizes. Therefore, we use overall levels of employment, establishments, and wages at the county-quarter level in our event studies.

We also collected measures of annual wages, proprietors' income, and other income (nominal and per capita) received by local residents at the county level, from 1967 to 2022, from the U.S. Bureau of Economic Analysis.

Finally, we collected estimates of the poverty rate at the county level from the Small Area Income and Poverty Estimates survey from the U.S. Census Bureau for 1997 - 2022. The county-

level unemployment rate was obtained from the Bureau of Labor Statistics' Local Area Unemployment Statistics program for 1990 - 2022.

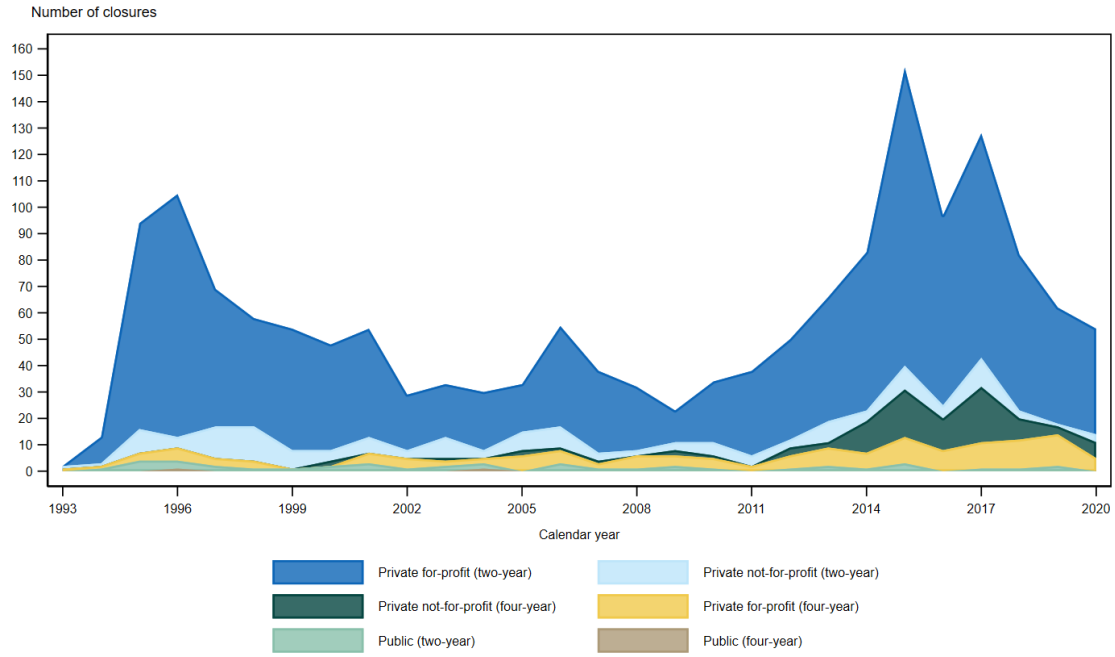
C. Analytical Sample – Closure Predictions

Figure 1 highlights the number of colleges that closed in each year between 1993 and 2019, broken down by institutional type and level based on the predominant degree offered. A total of 922 colleges closed during the period of analysis, with more than half of these closures occurring among two-year for-profit colleges, with the number of closures peaking in 2016-2018. Among the two-thirds of colleges that reported to IPEDS one full academic year prior to closure (for example, 2017-18 enrollment for a 2019 closure), mean FTE enrollment was 337 students at nonprofit colleges and 262 students at for-profit colleges. Most colleges in the sample were small, with mean enrollment among nonprofit colleges being 1,202 students and just 557 students at for-profit colleges, such that closed schools are somewhat smaller than average (but not dramatically so). This is confirmed in **Figure 2**, which plots the number of students affected by college closures each year, by institution classification. At its peak, more than 50,000 students attended institutions that would close the following academic year.

A striking fact emerges from **Figure 1**: public institutions hardly ever close. Indeed, despite challenging operational metrics, public institutions under financial pressure tend to remain open, particularly if there is a dearth of public education options in the local area. If more drastic measures are required in order to address financial distress among public institutions, more often than not it will be mergers or consolidations that are presented as the remedy, and not closure. This is in part because closing a public college is a deeply political decision, similar to closing military bases. As a result, less drastic steps are typically taken that preserve an educational option in the local community. In future work, we hope to collect data on these

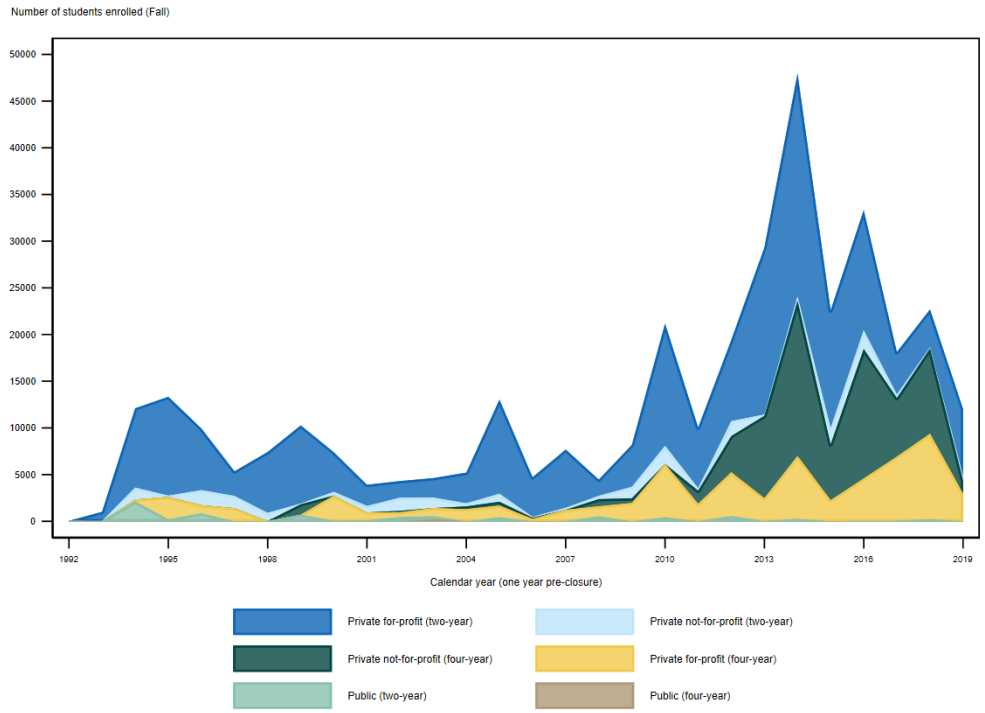
mergers and consolidations, but they are not available for the present study, such that we focus our analysis on private non-profit and private for-profit institutions, for the most part.

Figure 1 – Number of Closed Institutions by Institution Type and Year, 1993-2022



Source: Authors' calculations based on PEPS Closed School Reports, 1993-2022.

Figure 2 – Number of Students Enrolled in Closed Institutions in Year Before Closure, by Institution Type and Year, 1993-2022



Source: Authors' calculations based on PEPS Closed School Reports, 1993-2022.

As discussed previously, due to our inability to perfectly connect UNITIDs in IPEDS data to OPEIDs in the PEPS Closed School Reports in the 1990's, our institution-level analysis focus on years 2001 and later; we are pursuing methods to improve our coverage of closures into the 1990s. Once we restrict our attention to institutions that have multiple years of coverage for most variables of interest in the closure prediction regressions (such that we are able to take lags of key explanatory variables), we consider over 3,500 colleges operating at some point during 2001-2022 (2009-2022 for specifications using financial covariates available only in the latter part of the 2000's, such as FRC scores).

D. Analytical Sample – Local Economic Effects of Closures

For our county-level estimation of college closure's ripple effects on the local economy, we first combine county-quarter level data on wages, employment, and establishments from the QCEW with IPEDS data aggregated to the county and quarter. From IPEDS, we can glean employment levels and staff expenditures for the higher education sector. Because our IPEDS data on closed schools is currently reliable only 2001 and onward, we restrict our analysis to 2001-2022 for most of the local economic effects estimation. That said, because we can reliably derive an indicator for a county that experienced a college closure in a given quarter from the PEPS data, we conduct additional estimation for 1990-2022 using only the QCEW data for total county employment, wages, and establishments (but not sector-specific metrics). We have near-universal coverage of counties and quarters for the quarterly event studies, though there are a few counties that have entered and exited the sample during our time period.

We also combine annual data from the BEA with an indicator for a county which experienced a college closure in a particular year, derived from PEPS. We are able to observe all counties back to 1990, though we again restrict our analysis to 2000 onward for most purposes for comparability with our IPEDS analysis.

IV. Methodology

A. Predictions of Financial Distress

We build on the analysis in Kelchen (2020) examining the extent to which institutional and local economic conditions in a given year were associated with a college closing two years or four years later. To do this, we first produce a series of least absolute shrinkage and selection operator (LASSO) estimates as part of a data-driven covariate selection process. We do this to focus our attention on the set of covariates that produces the smallest out-of-sample mean squared error of

the predictions, thereby reducing the dimensionality of the prediction problem while simultaneously identifying the strongest predictors of financial distress for colleges.

Once we identify the optimal set of covariates for our sample, we then estimate the following equation using a linear probability model:[2]

$$Closure_{it} = \alpha + \beta X_{i,t-2} + \gamma X_{i,t-4} \ldots + \delta W_i \ldots + \varepsilon_{it}, \quad (1)$$

where $Closure_{it}$ represents an indicator for whether institution *i* was closed as of time *t*, $X_{i,t-n}$ represent nth lags of time-varying institutional characteristics (e.g., revenue, enrollment), and W_i represents time-invariant institutional characteristics (e.g., sector or predominant degree level). For an alternate specification, we also include lagged county-level poverty rate and unemployment rate among our covariates to ascertain whether the local economic environment might be driving college financial distress.

B. Simulating Changes in Closures

With a model predicting college closures in hand, we can use the estimated coefficients to simulate aggregate predicted closures under different potential paths for institutions of higher education. In other words, what types of institutions may be at risk of financial distress in the future given reasonable and extreme scenarios on enrollment and revenue trends? Still on the horizon for many schools is the so-called "demographic cliff", which could see overall higher education enrollment drop by as much as fifteen percent between 2025 and 2029. These impacts would be concentrated locally and regionally based on declines in college age populations resulting from changes in migration and fertility rate patterns, such that some institutions of

[2] Our results are generally comparable if we instead use a logit or a probit model.

higher education (e.g., those in the Northeast and Midwest) could see even larger downturns while others (e.g., those serving Hispanic students) would be largely unaffected.

To start, we use 2019 as a baseline, and estimate the change (increase) in closures suggested by our estimated coefficients for the following scenarios:

a) The enrollment declines institutions have experienced since 2019 persist into the future (with no recovery or further decline),
b) The predicted "demographic cliff" style (e.g., Grawe, 2018) aggregate enrollment declines of 15% between 2025 and 2029 come to pass, or
c) Colleges experience a dramatic decline in enrollment of 10% or more in a single year.

For each of the scenarios, we provide the number of affected institutions, students, degrees conferred, and expenses (to proxy for local spending by the college).

C. Estimation of Local Economic Effects of Closures

Next, we consider the effect of college closures on the local economic area, focusing on counties. Since college closures are not random events, a traditional estimator in staggered difference-in-differences designs may not recover proper treatment effects for counties that experienced closures if there is treatment effect heterogeneity (Goodman-Bacon, 2021; Sun and Abraham, 2021; Borusyak, Jaravel, and Spiess, 2024). For example, the timing of the closure in a particular county may be correlated with local, state, or regional level economic shocks or policy changes that also affect college financials and county economic outcomes.

To circumvent these potential challenges, we estimate the effect of closures on local economic activity using the Borusyak, Jaravel, and Spiess (2024) imputation method, which amounts to fitting a regression of the outcome of interest on county and time fixed effects on

never treated counties, then using that regression to impute the counterfactual outcomes of treated counties. Under parallel trends assumptions, we can then derive estimates of the time-varying effects of closures on indicators of local economic activity. Under the Borusyak, Jaravel, and Spiess (2024) method, the treatment effects are expressed relative to the average outcome from period 1 to the period before treatment.

V. Results

A. Closures Predictions

For many institutions, the current state of their financial health is in a time of transition. The pandemic was disruptive in many ways, some negative (e.g., revenue drops) and others less so (e.g., government funding). Many colleges have experienced enrollment drops due to a variety of demographic and labor market factors. However, unprecedented support from the CARES Act served as bridge funding to protect against catastrophic financial consequences. But with CARES Act money exhausted, and enrollments still lagging behind pre-pandemic levels at most colleges and universities, budgets are facing renewed strain.

To get a sense of the possible impacts we may see on college closures, we estimate models predicting college closure as a function of institutional characteristics, as described in the previous section (full output of the models can be found in Appendix A). Using 2019 as a baseline (to avoid contamination by COVID-19 induced disruptions), if the enrollment declines that colleges have experienced since then persist into the future (no recovery or further decline), we can expect to see a 53 percent increase in the annual number of closures (9 off a base of 17, on average). If the demographic cliff enrollment declines of 15 percent come to pass, our estimates suggest a 67 percent increase in the annual number of closures (11 off a base of 17, on

average). Finally, for colleges which experience a decline in enrollment of ten percent or more in a single year, their likelihood of closure nearly quadruples (63 off a base of 17, on average). Our findings related to the increase in predicted closures and the associated estimates of affected students and reductions in degrees conferred and local spending are presented in **Table 3**. The most extreme scenario would see closures comparable to the peak observed in the last couple of decades, with over 50 thousand students annually affected by the disruption and over $377 million eliminated in annual local spending by the affected institutions.

Table 3: Predicted Additional Annual Closures under Selected Scenarios

	(1) 2019 Enrollment Patterns Continue		(2) Demographic Cliff		(3) Enrollment Drop of 10% in Single Year	
	Number	Percent	Number	Percent	Number	Percent
Institutions	**9**	**53%**	**11**	**67%**	**63**	**371%**
Students	7,409		8,905		52,307	
Degrees and Certifications	1,511		1,816		10,667	
Expenses	$53m		$64m		$377m	

Source: Authors' analyses using data PEPS, IPEDS, and College Scorecard.
Notes:
Predictions are based on the outlined scenarios and coefficient estimates from Appendix A, model (1).

While these effects might seem small at a national level, they are significant for the handful of counties predicted to experience college closures in a given year. It is important to point out that most institutions that close are somewhat smaller than average, with the mean closed school enrolling an FTE student body of about 847 students, though the distribution is

skewed. This means that, even if these predictions are accurate, many (if not all) of these additional predicted closures are unlikely to be institutions known outside of their local communities or states, but their closures would be quite disruptive to those local communities. Some institutions can be considered significant employers even in small/modest size communities.

Even ignoring the potential negative effects due to reduced training capacity in a county which loses a college, the immediate employment effects as a share of the labor force might be large. This includes not just the loss in employment coming directly from the college, but also the immediate spillovers from establishments that provide goods/services to schools (most notably food service). Moreover, most students work while attending college, so any working students who are either attracted to/kept from leaving the community due to the presence of the school will also contribute the treatment effect. We consider these "spillover" effects in the next section, while noting that controlling for lagged local economic conditions in model (2) presented in Appendix A did not improve our model's predictive power, nor are these additional covariates statistically significant. Going into our analysis of county-level effects of college closures, we have no evidence for the concern that local economic conditions might be driving institutions to closure in a systematic way.

B. Local Economic Effects of Closures

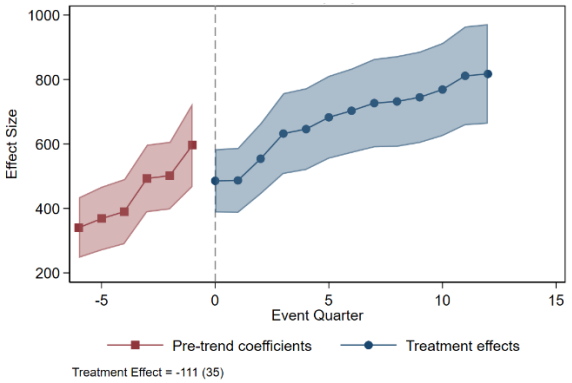
There is a wide range of potentially reasonable treatment effects for counties that experience a college closure, ranging from no impact at all if the college's employees/students quickly find other work, to effects several times the size of the institution that closed. We begin by estimating the most direct impact on the local economy using data from IPEDS Staff Survey

to get a sense of the number college (and adjacent) jobs that are lost within a county. This serves as a sort of "first stage," as well as a validity check for our data construction. In **Figure 3**, panel (a) we see a decline in higher education employment in counties that experienced a closure of more than 100 workers relative to pre-closure. Of note here is that it takes four years for the number of higher education workers in a county to fully recover following a closure, and even longer to attain what would be the counterfactual trend in employment absent the closure.[3]

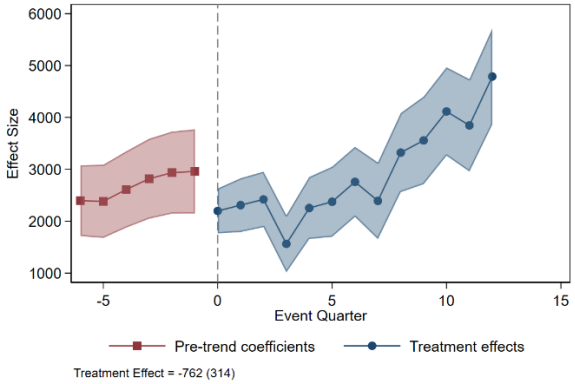
Figure 3 – Effect of College Closure on County-Level Economic Indicators

[3] We note that many institutions, and particularly institutions that ultimately close, are missing staffing data and we are considering alternate sources for personnel measures at the sector and quarter level. Patterns in panel (a) of Figure 3 should be interpreted with caution.

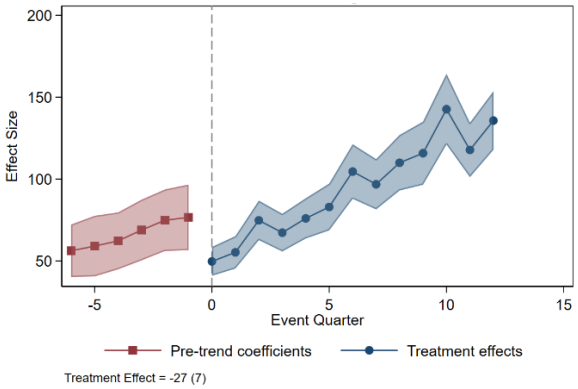
(a)
Higher Education Employment



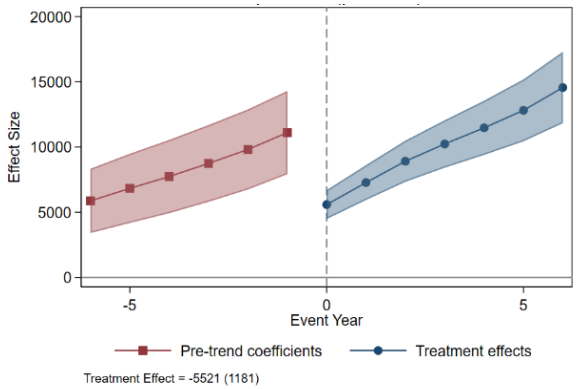
(b)
County Employment (QCEW)



(c)
County Wages (QCEW)



(d)
County Population (BEA)



Source: Authors' analyses using data from PEPS, IPEDS, QCEW, and BEA, 2001-2022.

We now consider overall labor market characteristics of counties from the QCEW to estimate the overall impact on economic activity. In **Figure 3**, panel (b), we see that overall employment drops by 762 workers following a college closure, on average, and takes 9 quarters to recover to the same level of employment as prior to the closure. In addition to the drop at the time of closure, the slope of employment growth appears to flatten, suggesting slower employment growth among the remaining enterprises compared with the closed institution of higher education.

Figure 3, panel (c) shows a similar pattern for overall county wages declining by $27 million per quarter, on average, though the recovery is quicker than employment. Given that this equates to $140k per job lost, it likely represents some degree of spillovers to earnings on the intensive margin for some workers. Note that the wages are in nominal terms, such that they may be recovering more quickly than employment or establishments in part because of inflation.

Bringing in county demographic data from the BEA, **Figure 3,** panel (d) shows county population declines following the closure, likely accounting for the bulk of the loss in employment.

Taken together, these results paint a picture of significant economic strain in the county following college closures. Subsequent analysis should focus on understanding the reallocation of workers and population within and across counties as a result of college closures. While it appears clear that migrations occur, it will be important to study individual-level data in order to comprehensively understand the magnitude and distribution of the disruptions individuals directly affected by closures (both students and staff) and the county population tangentially engaged in economic activity around the college face in the aftermath.

We note that, for all of the outcomes considered, we included no control variables other than year fixed effects, but are considering alternate specifications that would incorporate covariates and also consider treatment intensity (e.g., size of the closed institution relative to higher education sector or overall county employment). Even with no controls included, there is no evidence of pre-trends that would invalidate our conclusions of negative and persistent treatment effects of closures on local economic outcomes, as it appears that employment and wages in counties that experienced closure are on par or more positive than for control counties.

VI. Discussion

Colleges and universities are facing unprecedented fiscal challenges in today's economic climate. The cost of education is rising, while many colleges have faced enrollment challenges over the last decade. The COVID-19 pandemic caused significant disruptions to higher education, including decreased enrollment and increased expenses, exacerbating many institutions' liquidity, and even solvency, concerns. Moreover, many funding streams – exemplified, perhaps, by federal financial aid – are active areas of public policy and administration. Yet both the precursors to colleges' fiscal challenges and their broader economic impact are an understudied area in higher education finance, even as the economic importance of institutions of higher education has grown significantly over the past century as college attendance rates have steadily climbed.

Our study contributes to this literature by examining the link between college financial distress – exemplified, in its most severe form, by full institution closures – and local economic activity. Using data on past closures, we first develop a predictive model of closures, incorporating a range of predictors, from operational revenue and expense patterns, to sources of revenue, to metrics of liquidity and leverage, to declining enrollment patterns, and prior signs of significant financial strain. We then use these predictions to document our estimated increase in the likelihood of future closures due to commonly predicted scenarios. In particular, we focus on enrollment declines – both temporary, such as those that arose during the COVID-19 pandemic, and systemic, like those resulting from predicted future demographic changes – which are often accompanied by fiscal challenges and represent one of the strongest explanatory variables in our predictive models. We conclude that the enrollment challenges are predicted to significantly increase the number of institutions at risk of severe financial distress, including closure.

We next estimate the impact of college closures from 1990 to 2022 on county-level measures of employment and wages, and population. We find that counties experience significant economic pain following the typical college closure. Specifically, it takes counties 8 quarters to recover to the pre-closure levels of employment and 5 quarters to recover to the pre-closure level of total county wages. Counties that experience college closures – especially of larger institutions – also experience population declines as both students and employees seek opportunities elsewhere. Our data do not allow us to assess the patterns in migration – both of persons and of workers – across counties nor the changes in the distributions of economic circumstances. We hope that future work will build on our study and shed further light on the effect of these college-induced disruptions on temporary or permanent reallocations of human capital and employment within and across local and regional economic areas.

We caution that our estimates of negative effects of college financial distress and closures should not be taken to suggest that counties should seek to prevent college closures. A comprehensive welfare analysis is likely to show that institutions of higher education (and particularly those in the for-profit sector) do not close randomly or without cause. If these institutions are unable to produce outcomes that students, employers, or society at large find valuable, then they should not be artificially sustained by governments absent significant evidence of positive externalities. Indeed, extending the existence of an educational institution destined for failure may actually compound the locality's fiscal problems if the college is never able to survive on its own. While our predictive models of college financial distress and closure may not be able to accurately predict the eventual failure of each individual institution, they may be useful to federal or regional governments preparing for sector-level disruptions and their subsequent economic fallout. Indeed, our results suggest that local communities may be able to

anticipate and prepare for labor market and infrastructure disruptions if a college closing appears imminent and be prepared to use whatever levers available to support affected community members and businesses during the transition.

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Appendix A: Predicting College Closures

Outcome = School Closed	(1)	(2)
Log FTE Enrollment 2 Years Prior	-0.000957***	-0.00108**
	(0.000203)	(0.000465)
Log New FTFT Enrollment 2 Years Prior	0.000122	0.000171
	(0.000186)	(0.000358)
Had Pell Revenue 2 Years Prior	-9.33e-06	-1.39e-05
	(9.19e-06)	(1.27e-05)
For-profit, Did Not Fill Out Detailed Financial Module 2 Years Prior	-0.00272***	-0.00317***
	(0.000696)	(0.000780)
% Expenses on Instruction 2 Years Prior	6.35e-05	7.64e-05***
	(8.70e-05)	(2.18e-05)
Operating Margin 2 Years Prior	0.000231	0.000265*
	(0.000188)	(0.000135)
Operating Margin 4 Years Prior	5.75e-06	3.91e-06
	(6.02e-05)	(1.09e-05)
10% Revenue Drop 2 Years Prior	0.00174***	0.00160**
	(0.000434)	(0.000768)
5% Rise in Title IV Revenue 2 Years Prior	-0.000451	-0.000729
	(0.000462)	(0.000743)
% revenue from Title IV 2 Years Prior	2.92e-06	2.91e-06
	(9.79e-06)	(1.47e-05)
Days Cash on Hand 2 Years Prior	-1.14e-06*	-1.18e-06**
	(6.03e-07)	(4.88e-07)
10% Net Revenue Drop 2 Years Prior	0.000689**	0.000853**
	(0.000310)	(0.000350)
Failed FRC Test 2 Years Prior	0.00274***	0.00283**
	(0.000568)	(0.00120)
Completion Rate 2 Years Prior	-0.00454***	-0.00532***
	(0.000741)	(0.00167)
Completion Rate 4 Years Prior	0.00172**	0.00202*
	(0.000767)	(0.00118)
Cohort Default Rate 2 Years Prior	0.00189	0.000781
	(0.00227)	(0.00325)
Student Loan Revenue 2 Years Prior	1.54e-05**	2.01e-05*
	(6.28e-06)	(1.21e-05)
Any Student Aid 2 Years Prior	-6.05e-05***	-6.96e-05**
	(1.01e-05)	(3.24e-05)
5% Rise in Title IV Aid 2 Years Prior	-0.00124***	-0.00137**
	(0.000461)	(0.000579)
Institution Sector FE	Yes	Yes
Year FE	Yes	Yes
Local Economic Controls	No	Yes
Constant	-0.00106	-0.00258
	(0.0113)	(0.00255)
N	48,907	40,357
R-squared	0.011	0.011