The "Fight for 15" and a degree: The relationship between state minimum wage laws and community college enrollment

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Abstract

The minimum wage and its consequences have been the subject of both empirical research and intense political debate. While scholars often consider the effects of a minimum wage change on employment, hours worked, and earnings, this paper considers the role of a minimum wage change in human capital investment decisions. We leverage institution- and state-level data from 2004 to 2013 to estimate the extent to which changes in minimum wage laws impact community college enrollment. Using OLS regression models with fixed effects and difference-in-differences models, we find suggestive evidence of a positive, statistically significant relationship between a state's minimum wage and enrollment at its community colleges. In particular, we find that a state minimum wage hike contributes to increases in part-time enrollment at minority-serving institutions.

The "Fight for 15" and a degree: The relationship between state minimum wage laws and community college enrollment

The dominant narrative of the 2016 elections tells of a slew of victories for the political right. Republicans won the White House and majorities in both houses of Congress while also making gains in state legislatures. Save for a few victories for Democrats in gubernatorial elections, left-leaning voters had little to celebrate. One exception to that narrative relates to state minimum wage laws, as minimum wage increases in 19 states came into effect on January 1, 2017. Overall, these increases will boost pay for 2 million individuals across Democrat- and Republican-controlled states by 2020 (Chandler, 2016). In spite of these successes, the minimum wage is still a divisive issue.

Controversy has surrounded the minimum wage since it was first enacted in the United States in the *Fair Labor Standards Act of 1938*. While President Franklin Roosevelt called it the most important piece of New Deal legislation since the *Social Security Act of 1935*, one prominent legislator went so far as to say that it was "the product of those whose thinking is rooted in an alien philosophy and who are bent upon the destruction of our whole constitutional system and the setting up of a red-labor communistic despotism upon the ruins of our Christian civilization" (Cong. Rec., p. 7421, as cited in Dreier, 2013). Today's political rhetoric is strikingly similar: while House minority leader Nancy Pelosi (D-CA) has argued that Americans "deserve" a minimum wage over ten dollars, Senate majority leader Mitch McConnell (R-KY) has suggested that such a wage would "destroy half a million to one million jobs" (Contorno, 2014; Chumley, 2014). In spite of this polarization, Democrats see a minimum wage hike as an important piece of their midterm election platform. In May of 2017, Rep. Pelosi announced that

the Democrats will seek to raise the minimum wage to $15 an hour in their first 100 hours in power if they win a Congressional majority in 2018 (Schor, 2017). However, the minimum wage might play an important role as a legislative bargaining chip sooner than next year: Sen. Lindsey Graham (R-SC) has announced plans to propose a $10.10 minimum wage as Republicans fight to gain Democrats' support of their tax overhaul this fall (Lesniewski, 2017).

The 2017 victories for minimum wage supporters did not come easily. In recent years, the mobilization of thousands of low wage fast food workers across the country in the "Fight for 15" brought increased attention to the debate over the appropriateness of a mandated living wage. Protesters maintain that they cannot put food on the table, pay bills, or take care of dependents with their current earnings. Furthermore, because they have minimal education, protesters argue they have few alternative employment prospects. In addition, research shows that low-wage industries, like the fast-food industry, are the most likely to change in ways that do not benefit workers. These employers have more opportunities to relocate, change their workforce composition, or invest in technologies, such as kiosk automation, that reduce their need for labor (Aaronson, French, & Sorkin, 2016).

With such discourse on the topic, it is hard to separate the true policy impact of minimum wage legislation from the rhetoric. Luckily, the minimum wage and its consequences have been the subject of a number of studies ranging from the effects on fast food workers to the ability to serve as a poverty-fighting tool (Card and Krueger, 1994; Katz & Krueger, 1992). One area in which the research is lacking, however, is the impact of minimum wage legislation on educational outcomes. Of particular interest is the part the minimum wage has to play in community college and technical school enrollment, as lawmakers see both wages and technical education as policy avenues to alleviate poverty (Sabia & Burkhauser, 2010; Middleton, 1993).

Yet rarely has a study sought to answer the question, "does the minimum wage affect postsecondary enrollment?" This paper seeks to answer that question.

Background and Purpose

At its core, the minimum wage is the lowest compensation that employers can legally pay to their workers. It is a labor standard or a "floor below which Congress will not allow wages to fall" (Bernstein and Shierholz, 2014). At the time of writing this paper, the federal minimum wage is $7.25 per hour. While there are some special wage rates in outlying US territories like the Northern Mariana Islands and American Samoa, all U.S. States must follow the federal minimum or their own state minimum wage, whichever is higher. State minimum wages range from the national minimum of $7.25 in 21 states to $11.00 per hour in Washington and Massachusetts (Figure 1). The 21 states with effective $7.25 minimum wages include 14 states with state minimum wages set to the federal minimum, two states with state minimum wages lower than the federal minimum, and five states that have no state minimum wage law at all (Figure 2). The remaining 29 states have higher minimum wages than the federal minimum (US Dept. of Labor, 2017).

[Figures 1 and 2 about here]

Major empirical studies have focused primarily on the employment effects and poverty rate changes associated changes in minimum wage. Researchers have examined the broad questions of whether minimum wage standards reduce or increase poverty (Burkhauser & Sabia, 2007; Neumark & Wascher, 2002; Card & Kruger, 1994), and whether such standards make

businesses more efficient or force them to lay off workers (Brosnan & Wilkinson, 1998). The controversy exhibited in rhetoric among lawmakers is reflected in disagreement in the literature, as many empirically rich, substantively meaningful studies have contradicted each other.

Perhaps the most well-known study regarding employment effects and minimum wage increases is the study undertaken by Card and Krueger (1994) of fast food restaurant employment rates in New Jersey and Pennsylvania during a minimum wage hike in the Garden State. In 1992, New Jersey raised its minimum wage from $4.25 to $5.05 per hour, while adjacent Pennsylvania kept its minimum wage at the same rate. Using a difference-in-differences framework, Card and Krueger found that an increase in the minimum wage increased, albeit slightly, employment in New Jersey (Card & Krueger, 1994). While this study is often lauded as an exemplar use of the difference-in-differences research framework, it was not without its detractors. In 2000, Neumark and Wascher published a study in which they found a four percent decrease in employment associated with the same minimum wage change in New Jersey. Others have found similar results. Hoffman and Trace (2009) found that as the gap between the two states closed in subsequent federal minimum wage increases, New Jersey experienced a negative impact on its employment rate. However, a study by Olli Ropponen (2011) reconciled the differences with a finding that suggests that the size and scope of the fast food industry in the states moderated the employment effects of the minimum wage increases. In short, workers in small firms experienced improved employment outcomes, while works in large firms did not.

Yet, in a study of the short-term effects of a minimum wage increase in Seattle effective April 1, 2015, a team of researchers from the University of Washington show that the minimum wage increase in Seattle appears to have slightly reduced the employment rate of low-wage workers by about one percentage point (Jardim et al., 2017). The researchers, who employed a

difference-in-differences strategy and synthetic control approach, show that while the low-wage workers who kept working were, on average, modestly better off financially ($13/week) due to the ordinance, they transitioned to jobs outside of Seattle at a higher rate than would have been expected in the absence of the ordinance. Importantly, the authors also found that low-wage workers worked fewer hours per quarter. These findings raise the question, "what did workers do with their new-found non-work time?" One possible explanation is that they sought out postsecondary education.

There is a dearth of research concerning the impact of minimum wage laws on education outcomes, and within the existing body of literature results are mixed. Mattila (1981) has suggested that teenage school enrollment, whether in high school or other levels of education, is positively associated with minimum wage increases. Brown, Gilroy, and Kohen (1981) find that a 10 percent increase in the minimum wage is associated with a one percent decrease in teenage employment, with the likely alternative being school enrollment. Campolieti, Fang, and Gunderson (2005) found no relationship between minimum wage raises and school enrollment, while a substantial number of studies have found that higher minimum wage levels are associated with a decreases in enrollment for high schoolers, with no effect on the 20-24 age group (Cunningham, 1981; Pacheco & Cruickshank, 2007; Turner & Demiralp, 2000). As none of these studies link minimum wage increases with educational enrollment at the postsecondary level, this study stands to make an important contribution. By pursuing the research question, "to what extent do changes in minimum wage impact community college enrollment?" we add to both the minimum wage effects and enrollment management literatures.

Conceptual Framework

Human capital theory maintains that investment in education builds skills valued in the labor market (Becker, 1962). Prospective college students must decide whether to invest in human capital development in spite of capital constraints. Economists generally contend that since United States citizens have access to federal student loans, they are not capital constrained. However, evidence abounds that prospective college students are disinclined to borrow (Cunningham & Santiago, 2008; Burdman, 2005; Caetano, Palacios, & Patrinos, 2011; Palameta & Voyer, 2010; Goldrick-Rab & Kelchen, 2013), resulting in a self-imposed state of capital constraint. In fact, a previous study found that more than 20 percent of high school seniors do not believe they should borrow money for education, and more than 40 percent avoided hypothetical financial aid packages that incorporated student loans (Boatman, Evans, & Soliz, 2015). Students, thus, may not avail themselves of student loans, which are intended to increase their liquidity as they invest in higher education.

Loan averse students may choose to work during college to defray costs and avoid taking on student debt. Economists contend that such a choice results in suboptimal time allocation: by working instead of studying full-time, students earn wages at a lower rate for a longer period of time and also may fail to complete their degree. Community college students may be particularly at risk for taking on additional hours of work to avoid loans, as they already work at a rate greater than that of their peers studying in other sectors (Ma & Baum, 2016). Finding a balance between work hours and academic credit load may be especially delicate for students as they consider whether or not to enroll. When prospective college students avoid loans by finding a balance between the number of credits in which they enroll and the number of hours they work per week, they strategically budget for undertaking the costs of college.

Students decide not to take out loans for valid economic and sociological reasons. Prospective students must decide how much debt to take on based on the estimated future payoff of their degree. If they find that they are unlikely to be able to repay a student loan, it would irrational to choose to take on the debt. Further, the complexity of the financial aid system may prevent students from accessing federal, state, and institutional sources of aid altogether or their unease with complex and limited information may prevent them from borrowing (Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012). From a sociological perspective, cultural beliefs or prior family experiences with credit may deter prospective colleges students from taking on student loans. Asian and Hispanic students are less likely to borrow for college than their White peers (Hillman, 2015).

When considering where or not to enroll, such a student may base their decision on whether or not they can feasibly afford to attend community college using only their own earnings to supplement federal and state grant aid. In this way, a change in the state minimum wage could induce students at the margins of enrolling to pursue postsecondary education. In short, additional earnings gained through a pay raise due to a minimum wage increase may be just enough to induce some students – especially those who are loan averse – to invest in their human capital through community college enrollment.

Another potential reason that the contemporary community college student may not borrow student loans is lack of access: an increasing number of institutions do not package federal student loans or participate in the Title IV loan program. In this era of accountability, some institutions are moving away from packaging student loans, perhaps out of trepidation that student default will put the institution's continued participation in Title IV financial aid at risk. In some states, more than 20 percent of community college students do not have access to federal

student loans at their institution of enrollment (TICAS, 2016). This reality constitutes an additional reason why the minimum wage is an important factor to consider in human capital investment decisions. Lack of access to federal loans at a student's closest community college would reduce student access to capital and figure into calculations of enrollment feasibility. Ultimately, institutional policy decisions about federal student loans stand to make the pay rate of low-wage workers more important in human capital investment considerations.

In this study, we consider students' initial enrollment decisions in the face of an increase to the minimum wage. Considered from a classical economic perspective, we would expect to find that initial community college enrollment would decline with increased wages because the cost of foregone income increases. Thus, the logical marginal change would be a decline in enrollment. However, research on community college students has shown that they engage in budget-oriented mental accounting (Boatman, Evans, & Soliz, 2014). Students are mindful of what they are earning and what it costs to go to community college; they may consider the ways in which their revenue streams and costs of living align in any given month when deciding whether or not to enroll and how many credits to take. A hypothetical student has in mind a certain amount of money they need to make in a month to meet their expenses. An increase in the minimum wage reduces the number of hours they will need to work, and may therefore increase the likelihood that they will choose to enroll in community college, as well as the number of credit hours they can afford to take.

Theory of Action

There are several ways in which changes in the minimum wage could impact community college enrollment. A minimum wage hike is likely to only affect wages of low-skilled workers

(Clemens & Wither, 2014). Given the average educational attainment and financial resources of this subset of the working population, it is logical to focus our analysis of postsecondary enrollment on community colleges. The first possible mechanism of influence is that a minimum wage increase could decrease postsecondary enrollment, especially at community colleges. A higher minimum wage would drive down the skill premium, decreasing incentives for individuals to develop skills, leading to less investment in postsecondary education. Further, community college students are susceptible to changes in tuition price and aid (Heller, 1999; Heller, 1997). If, through a minimum wage increase, an individual sees the boost in wages they seek, that boost may disincentivize investment in a community college education. Wage increases may just be enough to prevent those who may be interested in leaving their jobs and entering into a post-secondary program, as new potential earnings may make the returns to that education seem not worth the costs of leaving a job or taking reduced hours to attend school part-time.

[Figure 3 about here]

Conversely, if firms lay off workers because of the financial burden of the new minimum wage, it is likely that those who suffer will be low-skilled workers (Lane, 2001). In this scenario, involuntary unemployment would provide greater incentive to develop skills through postsecondary training. Those who find themselves without a job after a minimum wage raise will look for new jobs. Those that find employment re-enter the work force. Those that do not may return to school in search of new skills to make them more competitive on the job market.

Lastly, minimum wage increases may positively impact community college enrollment in another way. Increases in the minimum wage may result in enough additional disposable income for those who have an interest in attending community college to perceive greater affordability of a postsecondary education and, therefore, remove a cost barrier to entry.

When weighing the decision to invest in individual human capital development, prospective students consider both benefits and costs of college-going. They consider the benefits, namely the expected wage-gains over their career associated with additional attainment, as well as the expected costs of additional attainment, including direct costs of attendance and foregone earnings. Economists generally model college choice as individuals choosing among a range of options, judged by quality and geography, in order to maximize lifetime utility.

Individuals differ in terms of the returns they can expect from different types of institutions, the available set of choice institutions and majors, and their expected earnings independent of further educational attainment. This modeling typically assumes no limitations in credit markets. The classic formulation leads to an important, and likely untenable, assumption to consider in the context of the present study: individuals choosing to invest in college will generally choose immediate and continuous enrollment over a split of time between college attendance and employment at the non-collegiate wage (Turner, 2004). A growing literature on college affordability and loan aversion has arisen to show the impracticability of this theoretical conclusion. Evidence of increasing time to degree and discontinuous enrollment also conflicts with these predictions. We maintain that the role of credit constraints is an important unaccounted-for factor contributing to this mismatch between theory and reality.

There are both supply- and demand-side factors that contribute to individuals' decisions to enroll and persist in college. With regard to supply, both lower cost and higher quality

postsecondary options contribute to greater attainment. On the demand side, student credit constraints and macroeconomic conditions contribute to individuals' calculations of the utility of additional education.

Data

The data come from the Integrated Postsecondary Data System (IPEDS) and the Bureau of Labor Statistics. The study time period spans ten years, from 2004 to 2013. This study relies on data concerning 2-year public institutions, state-level characteristics, including state minimum wage, and other economic factors.

The unit of analysis is a public, associate's degree granting institution in a given year. The outcome variables include the enrollment and log of enrollment in that institution-year. Enrollment refers to the number of all degree-or-certificate seeking students enrolling for the first time in the fall prior to the year listed. For instance, institutional enrollment for the 2009 - 2010 school year is listed for an institution in year 2010. The outcome variables were obtained from the IPEDS system or were derived from data within that system.

The independent variable is the minimum wage in a state in a given year. While states may set their own minimum wages, the federal minimum applies to those states that do not have their own minimum wage law or have a state minimum lower than that of the federal minimum. Therefore, the minimum wage value associated with each institution in a given year is the minimum wage required by federal law in the aforementioned cases, or by state law if the state minimum wage is higher than the federal minimum. The minimum wages range from the federal minimum wage of $5.15 in 2004 to $9.19 in Washington in 2013.

Covariates include institution-, state-, and national-level variables. Institution-level variables include variables that may affect a student's choice to enroll in community college,

such as the total cost of attendance and percent of students who receive some form of federal or institutional financial aid. State- and federal-level covariates include total state unemployment rate and Congressionally-determined maximum Pell grant amount, respectively. For all variables that involve dollar amounts, we have also included CPI-adjusted versions of the variables. This will allow comparison of the buying power of minimum wage dollars Pell grant money and the relationship of those two variables to the "real" cost-of-attendance. CPI-adjusted variables are in 2013 dollars.

We considered 939 public, 2-year institutions where the highest degree attainable was an associate's degree for inclusion in the analytic sample. All institutions were eligible for Title IV aid, and only 5% of all data entries were incomplete. We excluded tribal colleges and military preparatory institutions from the dataset because of their special missions, separate funding structures, and differing motivations of their student bodies. Furthermore, we excluded institutions in the District of Columbia and U.S. overseas territories like Puerto Rico and Guam. The institutions in the district and territories have special minimum wage laws separate from the norm in U.S. states, few associate's-only institutions, and entirely different funding structures for their community colleges. Several of the institutions (N=32) were missing enrollment or financial aid data for at least one year of the study period. A list of these institutions is included in Appendix A. Some of these institutions were established during the study period, while others were distance-learning learning programs associated with a community college campus. Others still closed for at least a year during the time period for various reasons (e.g. a Louisiana institution that closed in the aftermath of Hurricane Katrina), or closed their doors altogether (permanent closure or consolidation). When institutions with idiosyncratic enrollment anomalies are removed from the sample, only 1% of the data are missing. Specifically, we do not have the

values for the total cost of attendance for 20 institutions. For some, we are missing cost of attendance for one year, while for others we are missing this information across multiple years in the study period.

Upon further inspection, we find that these 20 institutions are geographically diffuse and there is no other discernable characteristic or pattern that explains the missing cost of attendance data. Because it is likely these data are missing at random, we simply remove these cases from the dataset[1]. The final panel dataset includes data for 882 institutions across a ten-year period from 2004 to 2013.

The data are well-suited to the research question in two major ways. First, while the data are institution-level data, not individual-level data, they can still help determine whether a relationship exists between community college enrollment and changes in a state's minimum wage. These data will not allow us to understand why changes in the minimum wage impact enrollment, but will go a long way toward revealing a relationship between the two. Second, our period of study encompasses a time of great change in the minimum wage: no single state had zero changes in their minimum wage during the time period of the study. Consequently, regression models that use state fixed effects will reduce bias that may arise from other state-invariant factors such that a clearer estimate of the enrollment effects of the minimum wage can emerge.

[1] As a robustness check, we imputed the missing data using a multivariate normal model. We generated 50 datasets using the multiple imputation function in STATA. While Rubin's theories on multiple imputations are based on an infinite number of complete datasets, much of the literature relies on only five imputed datasets, as even that small number can result in around 95% relative efficiency for datasets missing up to 50% of the values, provided the missing at random assumption is correct (Acock 2014; Rubin 1987; van Buuren, Boshuizen, and Knook 1999). Much of the reasoning for using five imputed datasets in previous studies is practical in nature – harder-to-use, older computers with less processing power were unable to manage many more than five (Acock 2014). More recent studies have shown that there are some cases that require a larger number of cases, and 20 imputed datasets has become a recent standard (Acock 2014; Kenward and Carpenter 2007). The resulting dataset included 882 institutions across 50 states and 10 years. We ran regression and difference-in-differences models with the imputed data as a robustness check. Those imputed models yielded statistically similar results with some even perfectly matching the coefficients of models run without imputed data.

Method

The greatest problem with studying the relationship between minimum wage increases and community college enrollment is approximating the counterfactual. The perfect experiment would be one in which a researcher could randomly assign prospective students different minimum wages and ensure employers paid those wages. Understandably, the conditions necessary for a true treatment and counterfactual are virtually impossible. Instead, this paper uses two distinct methods to work around this problem.

First, the paper uses ordinary least squares (OLS) regression models, with and without fixed effects, to find associational evidence regarding the relationship between minimum wage increases and community college enrollment. In each of the models, the outcome variable is the log of enrollment or the actual enrollment. We run models with the log of enrollment as a dependent variable in order to better accommodate the range and distribution of community college enrollment sizes in the sample. Consequently, we interpret the coefficient on minimum wage as a percent change, rather than a total number. The variable of interest included in our OLS model is the actual minimum wage in a state. We run three OLS models, each building upon the findings of the last. The first model is a simple regression of the outcome variables on minimum wage, while the second includes state and institution controls. The third model is similar to the second, but adds institution fixed effects. All models use standard errors clustered at the institution-level. We propose the following OLS regression model,

$$Y_{isa} = \rho + \gamma_{ia} + \alpha_{sa} + \delta_{a} + \mu_{i} + \varepsilon_{isa}$$

where Y is the outcome variable, either log of first-time enrollment or actual first-time

enrollment, for institution *i* in state *s* in year *a*. γ is a vector of institution-level financial variables including percent of students receiving aid and total cost of attendance in thousands of dollars. α represents the state unemployment rate for state *s* in year in year *a*. δ represents the maximum Pell grant in a given year, as set at the federal level. For those models that include institutional-level fixed effects, μ represents that fixed effect. Lastly, ε represents the error term and ρ represents the constant. Because we present the models in a stepwise fashion, we exclude terms γ, α, and δ in the first model, and include them in the second and third. We include the μ term only in the third model.

The second method we use is difference-in-differences framework that leverages a change in the minimum wage in a state with a strong and geographically diffuse network of community colleges. In 2006, the North Carolina General Assembly voted to increase the state's minimum wage by 19.4% from the federal minimum of $5.15 to $6.15, beginning the following year. This effectively increased full-time minimum wage workers' salaries by $2,000 when the law came into effect in 2007. North Carolina's surrounding states all maintained their minimum wages at $5.15 either through their state constitutions or the federal minimum wage. All of the states began to increase their minimum wages due to federal minimum wage legislation in 2008, leaving a two-year period of difference between the North Carolina minimum wage and the wages of its surrounding states. We selected these states because they were the only instance in the time period where one state changed its minimum wage laws differently from its neighbors such that all adjacent states remained the same or changed in the same way at the same time. Furthermore, the states have a large number of public associate's degree-granting institutions and large community college enrollments. We run a number of difference-in-differences models. The

first is a basic model without covariates, whereas the second model includes covariates. A third model, includes consumer price index-adjusted (CPI) covariates.

Drawing heavily on the work of Belasco, Rosinger, and Hearn (2015), we model the difference-in-differences equation in the traditional manner as follows,

$$Y_{isa} = \beta_0 + \beta_1 T_i + \beta_2 P_{ia} + \beta_3 (T \times P)_{ia} + \gamma_{ia} + \alpha_{sa} + \delta_a + \psi_a + \varepsilon_{isa}$$

where Y represents the outcome variables of first-time enrollment, log of first-time enrollment, full-time enrollment, log of first-time enrollment, part-time enrollment, and log of part-time enrollment for institution *i* in state *s* in year *a*. T_i is a dichotomous indicator for whether the institution, *i*, received "treatment" a la was located in North Carolina, during any year in the panel, *a*. The coefficient of this measure, β_1, will show any pre-treatment differences between community and technical colleges in North Carolina and its surrounding states. P_{ia} is a dichotomous indicator that equals "1" in years in which North Carolina had a higher minimum wage than its surrounding states; its coefficient, β_2, therefore captures the differences before and after treatment. The coefficient of interest is β_3 of the interaction represented by $(T \times P)_{ia}$, where,

$$\beta_3 = (Y_{NC(after)} - Y_{NC(before)}) - (Y_{States(after)} - Y_{States(before)}),$$

representing the difference in outcomes between the pre- and post- minimum wage increase time periods, controlling for already extant differences between institutions in North Carolina and its surrounding states.

We also include a number of covariates to increase precision of our estimates. The terms γ, α, and δ retain their meanings from the OLS model above, and ψ represents a vector of indicators for Carnegie basic classification. We include indicators for each basic Carnegie classification pertaining to community colleges for two reasons. First, by including some level of classification, we hope to increase precision in our estimates. Second, the basic Carnegie classification for community colleges separates such institutions into groups based on enrollment size and urbanicity. Including classification indicators allows us to account for at least some regional and size differences that may impact enrollment. Lastly, β_0 is the coefficient of the constant and ε represents the error term.

Results

To begin, we looked descriptively at the institutions in the sample along dimensions of enrollment, cost, aid, and state minimum wage and unemployment context, with attention to whether institutions in states at or above the minimum wage differed. Across all institutions in

[Table 1 about here]

the sample, the mean of first-time fall enrollment was around 2280 students with a standard deviation of nearly 2200, suggesting a great range in the enrollment capacity of community colleges in the dataset[2]. Total enrollment at sample institutions did, in fact, range from 31 students to 30,000 students. There were no significant differences in enrollment between institutions in states with minimum wages at the federal minimum or above the federal

[2] Table 1 shows these statistics for 2013. Means in the paper refer to means across all years in the panel.

minimum. There was also a wide range in cost of attendance. The mean cost of attendance was $16,061 with a standard deviation of $3,082; the maximum total cost of attendance for an institution in the dataset was $33,972. This range in cost of attendance reiterates the importance of access to financial capital in the decision to invest in human capital development. Consistent with the national picture of financial aid take-up, the vast majority of the students enrolled in institutions in the dataset received some sort of financial aid. The overall mean proportion of students receiving financial aid was 79.48% with a standard deviation of 14.02. Hourly minimum wage ranged from $5.15 to $9.19 and state unemployment rates, while having a mean of 7.96%, fluctuated between 2.5% and 13.8% depending on the state and the year. Institutions also vary quite a bit in terms of student body racial demographics. The overall means of white and black students were higher in states at the federal minimum wage, though these numbers were not significantly different from the means in states with a higher minimum wage.

[Table 2 about here]

The OLS regression models generally yield positive, statistically significant results. A one dollar increase in the minimum wage is associated with a roughly 370-person increase in first-time enrollment in the basic OLS model (no covariates or fixed effects; Table 2, Model 6). When we add covariates, the magnitude of the point estimate drops and the estimate loses precision (Model 7). We ultimately add inflation-adjusted controls and institutional fixed effects in order to consider within-institution changes keeping in mind inflation in our wage, cost, and aid measures. This full model estimates that a one dollar increase in the minimum wage is associated with a 190-first-time student increase in institutional enrollment. The magnitude of

the coefficient lessens in the CPI-adjusted minimum wage models, as they include the inflationary value of the minimum wage.

Given the wide range in enrollment sizes within the dataset, the log of enrollment models may provide a more meaningful representation of the relationship between the minimum wage and first-time enrollment. Model 1, estimated without covariates or fixed effects, shows a 20 percent increase in community college enrollment associated with a one dollar increase in the minimum wage. When including covariates or institution fixed effects, that percentage decreases to 7 percent in both models. Our fully specified model (CPI-adjusted covariates and institution fixed effects), estimates that within an institution, a one dollar increase in the state minimum wage is associated with an 8 percent increase in first-time enrollment.

While these OLS estimates provide strong evidence for a positive relationship between minimum wage increases and community college enrollment, we use two difference-in-differences approaches to attain causal estimates. In the first approach, we examine the difference in the enrollment measures associated with differential changes in the minimum wage in the state of North Carolina and its surrounding states. We then confine our sample to only minority-serving institutions to determine if there are differential impacts of minimum wage legislation on those institutions that serve a large proportion of Black and Hispanic students. We classify a minority serving institution as an institution with at least a quarter of its students from an underrepresented minority. While a substantial majority of the minimum-wage worker population is white, a greater proportion of the total African-American and Hispanic workforces is paid hourly wages (BLS, 2014). Around five percent of the African-American workforce, a larger percentage than any other race, is paid at or below the minimum wage (BLS, 2014). Therefore, we expect a minimum wage increase would impact a greater percentage of the Black

population than that of any other race. Minority-serving-institutions, therefore, may more likely see changes in enrollment patterns than other institutions.

[Tables 3 and Figure 4 about here]

The main assumption in a randomized control treatment study is that, in the absence of treatment, the treatment and control groups would have been the same on all observable and unobservable characteristics. As this is an unrealistic standard for a difference-in-differences approach, we must look at the underlying similarities in the institutions in North Carolina and her surrounding states. Table three shows some descriptive statistics of North Carolina and surrounding state community colleges. Across all institutions in North Carolina, Georgia, Tennessee, South Carolina, and Virginia from 2004 to 2009, the mean of first-time fall enrollment was around 1488 students with a standard deviation of nearly 1554[3]. Like the national-level sample, this suggests a wide-range in enrollment capacity in the dataset. While not as wide as the national sample, the range ran from 39 first-time students at North Carolina's Mayland Community College in 2004 to 13,113 at Northern Virginia Community College in 2007. Save for a very large difference in the percentage of students receiving aid in North Carolina and surrounding states, most of the measures are qualitatively similar in both groups. In terms of numbers of minority-serving institutions, 34 of North Carolina's 58 community colleges qualify as MSIs, compared to 39 of the institutions in surrounding states. A greater percentage of North Carolina's institutions serve rural populations than those of her surrounding states – around 57 percent for the Tar Heel state and 35 percent for her neighbors.

[3] Table 3 shows these statistics for 2009. Means in the paper refer to means across all years in the panel.

While there may be some underlying differences in institutions across both sides the NC state borders, the states that neighbor North Carolina may still serve as an appropriate counterfactual if strong parallel trends in enrollment occur prior to the implementation of treatment. Figure 4 shows the trends in first-time enrollment over the time period of our study.[4] With the exception of the state of Virginia, the enrollment trends are similar before the introduction of treatment – enrollment in North Carolina, Tennessee, South Carolina, and Georgia grows steadily until 2007, in which North Carolina and Tennessee experience larger growths than the other two states. The mean enrollment at Virginia institutions rises rapidly until 2007, when it then falls dramatically. We still include Virginian institutions in our difference-in-differences model for two reasons. Our first reason is theoretical - those Virginian community colleges near the border of North Carolina likely serve similar labor markets as those across the state's southern border. Our second is practical - as a robustness check, we removed all Virginia institutions from our models and found qualitatively similar results.[5]

The basic North Carolina difference-in-differences model suggests that the state's 2007 increase in its minimum wage caused an average increase in first-time enrollment of around 175 students, or an average 19% increase (Table 4). When we add covariates, we lose precision in both the first-time enrollment and log of first-time enrollment models. When we consider the impact of a minimum wage increase on full-time enrollment, we do not see significant estimates

[4] We chose to feature the trends of the first-time enrollment variable in part because the differences of Virginia from the rest of the group are so apparent in that graph. Line graphs of our other chosen measures are qualitatively similar.

[5] Models with and without Virginia institutions in the control group produce statistically and qualitatively similar results. However, the line graph shows a clear lack of parallel trends in enrollment. While we have not yet fully examined the reasons why Virginia's enrollment trends are so dissimilar, we hypothesize that it may have to do either substantial enrollment differences in those community colleges in the suburban DC area or the high military population at community colleges in the suburban DC and Virginia Beach areas. Changes in the Post 9/11 GI Bill, which was introduced in 2007, may have contributed to the drop in enrollment around that time. Future iterations of this paper may exclude Virginia or include only those institutions in Virginia that serve counties on the state's border with North Carolina.

on count of enrollment, but we see an average 22% increase when considering the log of full-time enrollment (Table 5).

[Tables 5 and 6 about here]

The subsample analysis of minority serving institutions is suggestive of a large, positive effect of a minimum wage increase on both first-time and full-time enrollment. North Carolina's 2007 minimum wage increase led to a first-time enrollment increase of roughly 311 students; when we add CPI-adjusted controls, the magnitude of the estimate increases to roughly 450 (Table 4). The log of enrollment estimate indicates that the minimum wage increase contributed to between a 28% and 34% increase in first-time enrollment. The full-time enrollment estimates with CPI-adjusted controls suggest that the minimum wage increase led to full-time enrollment increases of roughly 52 students (Table 5).

The subsample analysis and full-time enrollment estimates led us to wonder whether we could find evidence of the role that part-time enrollment, particularly at MSIs, is playing in the overall effect estimates. Looking at North Carolina, the 2007 minimum wage increase led to, on average, an increase of roughly 181 part-time students on community college campuses, or a roughly 20% increase in enrollment (Table 6). The enrollment count model loses significance with controls while the log of part-time enrollment model is consistent and positive as controls and CPI-adjusted controls are included[6]. Considering the MSI subsample, we estimate that between 282 (base difference-in-differences) and 423 (difference-in-differences with CPI-

[6] This phenomenon may be due to high multicollinearity between the Carnegie Basic Classification variables and enrollment size. This should come as no surprise given that the Basic classification for community colleges uses enrollment size as a classifier. Models that do not include Carnegie Basic classification indicators, but include the other control variables are qualitatively similar to those in the first model. Future iterations of this paper may focus exclusively on log(enrollment) variables as they minimize bias in this case.

adjusted controls) additional part-time students enrolled at North Carolina community colleges as a result of the 2007 minimum wage increase (Table 6). This is suggestive evidence that the bulk of the overall effect of the North Carolina minimum wage change is derived from a part-time enrollment boost at minority-serving institutions.

Such results would seem to suggest that minimum wage raises increase community college enrollment – especially at minority serving institutions. While there is no way to know with these data the reasons why wage increases cause community college enrollment to increase, a point we will explain in depth in the limitations section of this paper, the third theory seems the most likely: do people feel they simply have more disposable income, making community college enrollment affordable? Alternatively, can they now make the same amount of money for reduced time, making it possible to fill new-found free-time with community college courses?

Discussion

Unfortunately, these data can't determine whether the above-stated mechanism is correct. Perhaps the greatest limitations in these findings are related to the data collected and available. The research question, "to what extent do changes in the minimum wage impact community college enrollment" is in some ways a question focused on individuals. What causes an individual to enroll in an associate's degree program, and how do they ways in which a person interacts with the minimum wage moderate those causes? However, our data are institution-level, not individual-level data. Consequently, our models can only endeavor to approximate a causal relationship between minimum wage changes and community college enrollment at best, and an association at worst. We cannot, however, test the underlying reasons why more individuals

enroll at community colleges when the state in which it is located experiences a minimum wage hike.

Furthermore, there are data limitations in the OLS and difference-in-differences models. There are individual reasons a person may attend a community college that cannot be accounted for at the institutional level. Important controls such as the number of children a student has, or the kind of jobs held by part-time students have to remain sources of uncontrolled variation. Furthermore, some institution-level data that could be helpful in parsing out the possible reasons for enrollment increases, like the distribution of part-time and full-time students within the greater enrollment counts, are not available for all years in the study. Lastly, these methods take into account only state and federal minimum wage laws. While cities with minimum wage laws that differ from state law are few and far between, some, like San Francisco and Seattle, have had higher minimum wages than their state wage at various points in their histories. Future research must take this into account at the institutional level.

Despite these limitations, we believe this paper makes an important contribution to research on the minimum wage and on community and technical college enrollment. In this paper, we attempted to determine a causal relationship between changes in the minimum wage and community college enrollment. We used two methodologies, OLS with fixed effects and several the difference-indifferences models. The results of the OLS portion of the study are clear – there is a positive statistically significant relationship between the minimum wage and postsecondary enrollment at the associate's degree level. All of the models showed a positive relationship between the minimum wage and the enrollment outcome variables. The relationship appeared especially strong in the fixed effects models, in which all associations were positive and statistically significant at least at the 95% significance level. A one-dollar increase in the

minimum wage was associated with an overall enrollment increase of 190 students, or a eight percent increase in enrollment.

That dollar went a lot further in the North Carolina difference-in-differences model, The difference-in-differences estimates suggested that the dollar increase in the state's minimum wage was responsible in some way for a statistically significant average increase of 175 new first-time students in the model without covariates, and, although statistically insignificant, 126 new students in the model with covariates. This amounts to around a 19% change in new enrollment in both cases. However, when we treat overall full-time and part-time enrollment as the outcome variables, community colleges received increases in enrollment of around 20 percent on average.

These phenomena are especially true at minority-serving institutions. In the models we present, community colleges with student populations in which greater than 25 percent of the student population was Black or Hispanic saw full-time enrollment increases of around 30 to 40 percent in both full-time and part-time enrollment as a result of the 2007 increase in the minimum wage in North Carolina. Given that the many of students in North Carolina community college MSIs are part-time students, this increase amounts to around a 400-student increase in part-time enrollment on average when accounting for student financial-factors and institution type.

Conclusions

An age-old, oft-debated argument about the minimum wage is whether it can be used to alleviate or fight poverty (Neumark & Wascher, 2002). Most often studies that address that issue focus only on whether wage increases alone lift people out of poverty. Yet, there are many

mechanisms other than wages that can bring a person out of poverty. Education has long been considered a pathway to the middle class, and a way to open doors to new labor market opportunities. If raising the minimum wage can increase educational enrollment, and possibly attainment, then many of the studies on the poverty-fighting effects of minimum wage increases might actually have under-estimated the ability of minimum wage legislation to fight poverty.

This study shows that in at least one case, the increase in minimum wage increased enrollment in community and technical colleges. The effect was especially pronounced among minority-serving institutions. In this paper, we propose that some minimum-wage-earning people of color may be using wage increases to not only bring home more money but also reduce their work hours; in turn, they attend MSI community colleges part-time and thereby invest in their human capital. If this is the case, increases in the minimum wage may provide an avenue to greater lifetime earnings from traditionally marginalized populations – those who are low-income, and people of color.

This paper provides evidence to support the idea that minimum wage hikes cause enrollment increases. If previous research on minimum wage effects is any indication, we expect someone else will undertake another study on the impact of the minimum wage on community college enrollment, and find different effects. It is our hope that the next generation of minimum wage research will have the benefit of a federal minimum wage increase, and individual level data. There is a huge opportunity for intrepid researchers to gather individual-level data on the reasoning for a person's choice to enroll in community college during or after a minimum wage hike. We don't expect researchers will have to wait a long time. With the topic on the tips of the tongues of leaders from both parties in the House of Representatives and the Senate, surely the next national-level minimum wage raise is in the not-too-distant future.

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Tables and Figures

Table 1: Descriptive Statistics for Colleges within State Wage Groups

	Total	State Above US Minimum Wage	State At US Minimum Wage
First-Time Fall Enrollment	2276	2625	2032
	(2162.81)	(2005.29)	(2236.17)
Full-Time Enrollment	2822	3063	2657
	(2823.12)	(2496.75)	(3018.81)
Part-Time Enrollment	4592	5750	3793
	(5398.00)	(5087.56)	(5465.40)
Percent Receiving Aid	79.48	75.93	81.97
	(14.02)	(13.80)	(13.64)
Total Cost of Attendance	16061.21	16531.88	15732.01
	(3082.24)	(2606.78)	(3338.42)
State Unemployment Rate	7.96	8.77	7.38
	(1.62)	(1.36)	(1.53)
Percent of Students, White	58.66	53.50	62.22
	(23.61)	(25.18)	(21.79)
Percent of Students, Black	14.12	8.70	17.85
	(15.83)	(11.34)	(17.35)
Percent of Students, Hispanic	14.77	22.06	9.76
	(17.50)	(19.74)	(13.70)

Notes: Conditional means listed with standard deviations in parentheses listed above for 882 community colleges across all 50 states in 2013.

Table 2: OLS Regression Results for Enrollment and the Minimum Wage

	Log of First-Time Enrollment					First-Time Enrollment				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Minimum Wage	0.20***	0.07*	0.07***	0.06*	0.08***	369.73***	139.04	162.57***	113.60	189.56***
	(0.02)	(0.03)	(0.01)	(0.03)	(0.01)	(35.27)	(78.49)	(31.75)	(82.62)	(30.62)
Percent receiving aid		-0.02***	-0.00*	-0.02***	-0.00*		-42.87***	0.11	-43.49***	0.40
		(0.00)	(0.00)	(0.00)	(0.00)		(3.82)	(1.55)	(3.86)	(1.54)
Maximum appropriated Pell grant amount		0.00	0.00***	0.00	0.00***		0.06	0.20**	0.00	0.00
		(0.00)	(0.00)	(0.00)	(0.00)		(0.18)	(0.07)	(0.00)	(0.00)
Total cost of attendance in dollars		0.00***	-0.00	0.00***	-0.00		0.06***	-0.00	0.00***	-0.00
		(0.00)	(0.00)	(0.00)	(0.00)		(0.02)	(0.01)	(0.00)	(0.00)
Unemployment rate		0.04***	-0.03***	0.05***	-0.02***		94.33**	-71.98***	94.12***	-54.26***
		(0.01)	(0.00)	(0.01)	(0.00)		(29.60)	(12.37)	(24.81)	(9.66)
Constant	6.00***	7.34***	6.51***	7.56***	6.68***	-252.72	2586.78***	692.48***	2961.84***	920.24***
	(0.11)	(0.10)	(0.05)	(0.12)	(0.05)	(234.32)	(223.52)	(142.84)	(358.00)	(157.49)
Controls		X	X	X	X		X	X	X	X
Controls Adjusted for Inflation				X	X				X	X
Institution Fixed Effects			X		X			X		X

Notes: Standard errors, clustered at the institution level, in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Table 3: Descriptive Statistics for North Carolina Community Colleges and those from Surrounding States

	Total	North Carolina	Surrounding States
Conditional Means			
First-Time Fall Enrollment	1688	1708	1667
	(1410.95)	(1426.01)	(1407.78)
Full-Time Enrollment	2262	1775	2793
	(1859.13)	(1526.1)	(2051.02)
Part-Time Enrollment	2700	2479	2941
	(2279.07)	(2212.18)	(2347.26)
Percent Receiving Aid	73.62	59.45	88.3
	(18.99)	(14.93)	(8.85)
Total Cost of Attendance	14.73	14.56	14.91
	(2.96)	(2.76)	(3.16)
State Unemployment Rate	6.42	6.3	6.55
	(0.20)	(0.00)	(0.22)
Percent of Students, White	61.03	64.59	57.13
	(20.38)	(17.96)	(22.25)
Percent of Students, Black	29.14	24.72	33.98
	(19.85)	(16.09)	(22.45)
Percent of Students, Hispanic	2.78	3.38	2.13
	(2.00)	(2.24)	(1.47)
Counts			
Minority Serving Institutions	73	34	39
Urban Institutions	28	9	19
Suburban Institutions	11	2	9
Town Institutions	22	14	8
Rural Institutions	53	33	20
N =	114	58	56

Notes: Conditional means listed with standard deviations in parentheses listed above for 114 community colleges across all North Carolina, South Carolina, Tennessee, Georgia, and Virginia in 2009.

Table 4: Difference-in-Differences Models of First-Time Enrollment

	First-Time Enrollment			Log of First-Time Enrollment			First-Time Enrollment (MSI)			Log of First-Time Enrollment (MSI)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment (N. Carolina)	-400.72	-817.87*	-834.80*	-0.27*	-0.54***	-0.55***	-610.42	-1631.78**	-1655.46**	-0.30	-0.77***	-0.78***
	(224.40)	(326.57)	(326.83)	(0.14)	(0.13)	(0.13)	(352.68)	(598.11)	(600.43)	(0.20)	(0.20)	(0.20)
Post (2007)	170.93***	75.29	3.15	0.11***	0.06	-0.00	148.55**	-194.69	-273.14	0.10**	-0.05	-0.11
	(40.52)	(97.82)	(100.71)	(0.02)	(0.05)	(0.06)	(52.06)	(138.49)	(153.34)	(0.03)	(0.08)	(0.08)
Treatment X Post	175.46*	121.69	126.73	0.19**	0.16	0.17	310.79**	440.67*	449.49*	0.28**	0.34**	0.34**
	(81.81)	(115.04)	(114.41)	(0.06)	(0.09)	(0.09)	(114.60)	(199.42)	(199.30)	(0.09)	(0.12)	(0.12)
Percent receiving aid		-28.46**	-28.77**		-0.02***	-0.02***		-46.06**	-46.56**		-0.02***	-0.02***
		(8.95)	(8.99)		(0.00)	(0.00)		(17.22)	(17.31)		(0.00)	(0.00)
Maximum Pell grant in $1K		385.78	1.27		0.22	0.00*		738.68*	2.36*		0.33*	0.00
		(214.52)	(0.71)		(0.12)	(0.00)		(331.62)	(1.15)		(0.16)	(0.00)
Total COA in $1K		27.09	0.12		0.02	0.00		-0.39	-0.01		0.01	0.00
		(26.35)	(0.13)		(0.01)	(0.00)		(37.42)	(0.18)		(0.02)	(0.00)
Unemployment rate		-3.59	10.38		0.02	0.03		-64.35	-39.47		0.01	0.02
		(90.11)	(82.09)		(0.05)	(0.04)		(130.82)	(120.42)		(0.07)	(0.06)
Rural-serving Medium		421.41***	421.33***		0.56***	0.56***		427.05*	430.46*		0.59***	0.59***
		(101.59)	(102.10)		(0.09)	(0.09)		(164.87)	(166.04)		(0.11)	(0.11)
Rural-serving Large		1489.85**	1488.99**		1.00***	1.00***		2482.69*	2486.69*		1.29***	1.29***
		(502.65)	(502.07)		(0.19)	(0.18)		(1076.40)	(1078.77)		(0.33)	(0.33)
Suburban-serving Single Campus		859.52**	858.96**		0.79***	0.79***		887.72	896.39		0.82**	0.83**
		(258.07)	(259.15)		(0.16)	(0.16)		(469.78)	(473.09)		(0.24)	(0.24)
Suburban-serving Multicampus		1632.53*	1635.62*		0.83***	0.83***		1985.48*	1992.13*		1.00***	1.01***
		(674.95)	(673.14)		(0.20)	(0.20)		(772.84)	(769.16)		(0.23)	(0.23)
Urban-serving Single Campus		602.38***	595.78***		0.72***	0.72***		446.45*	439.40*		0.71***	0.71***
		(118.82)	(116.71)		(0.14)	(0.14)		(214.62)	(215.59)		(0.16)	(0.16)
Urban-serving Multicampus		1926.67***	1917.33***		1.22***	1.22***		1688.10**	1676.46**		1.21***	1.20***
		(389.32)	(388.12)		(0.16)	(0.16)		(518.62)	(518.73)		(0.20)	(0.20)
Public 2-year under 4-year		-229.73	-234.49		-0.49	-0.49		-157.04	-166.14		-0.39	-0.39
		(249.37)	(249.27)		(0.30)	(0.30)		(272.66)	(273.56)		(0.32)	(0.33)
Constant	1561.74***	1200.00	1748.83*	7.00***	6.50***	6.74***	1725.03***	2287.94	3342.43*	6.94***	6.60***	7.05***
	(186.22)	(766.66)	(739.87)	(0.09)	(0.34)	(0.26)	(307.27)	(1542.38)	(1572.24)	(0.14)	(0.48)	(0.38)
Controls		X	X		X	X		X	X		X	X
CPI Adjustment			X			X			X			X

Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001

Table 5: Difference-in-Differences Models of Full-Time Enrollment

	Full-Time Enrollment			Log of Full-Time Enrollment			Full-Time Enrollment (MSI)			Log of Full-Time Enrollment (MSI)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment (N. Carolina)	-69.27**	-116.67**	-116.91**	-0.60***	-0.85***	-0.85***	-81.09	-166.98*	-168.52*	-0.56**	-0.90***	-0.91***
	(25.59)	(35.56)	(35.32)	(0.15)	(0.15)	(0.15)	(40.79)	(64.96)	(65.08)	(0.20)	(0.24)	(0.24)
Post (2007)	37.27***	39.62***	27.94*	0.15***	0.16**	0.09	29.97**	7.27	-0.12	0.12**	0.02	-0.03
	(6.93)	(11.61)	(11.65)	(0.03)	(0.06)	(0.06)	(8.87)	(14.21)	(16.25)	(0.04)	(0.08)	(0.08)
Treatment X Post	3.34	9.97	10.01	0.22*	0.25*	0.25*	24.00	51.80*	52.17*	0.29*	0.41**	0.41**
	(12.46)	(15.45)	(15.25)	(0.10)	(0.11)	(0.11)	(19.43)	(23.28)	(23.10)	(0.14)	(0.15)	(0.15)
Percent receiving aid		-2.34**	-2.35**		-0.01***	-0.01***		-3.46*	-3.50*		-0.01**	-0.01**
		(0.85)	(0.86)		(0.00)	(0.00)		(1.72)	(1.73)		(0.00)	(0.00)
Maximum Pell grant in $1K		27.56	0.15		0.11	0.00		58.37	0.22		0.19	0.00
		(25.20)	(0.09)		(0.14)	(0.00)		(38.57)	(0.14)		(0.19)	(0.00)
Total COA in $1K		0.57	0.00		0.02	0.00		-3.33	-0.02		0.01	0.00
		(3.38)	(0.02)		(0.02)	(0.00)		(5.11)	(0.02)		(0.02)	(0.00)
Unemployment rate		23.07*	23.02*		0.13**	0.13**		12.50	14.08		0.10	0.11
		(11.38)	(10.33)		(0.05)	(0.04)		(16.20)	(14.92)		(0.07)	(0.06)
Rural-serving Medium		43.36**	43.43**		0.57***	0.57***		40.43*	40.76*		0.48**	0.48**
		(14.17)	(14.22)		(0.14)	(0.14)		(20.01)	(20.16)		(0.16)	(0.16)
Rural-serving Large		200.58**	200.43**		1.23***	1.23***		339.09*	339.37*		1.59***	1.60***
		(66.92)	(66.80)		(0.21)	(0.21)		(144.52)	(144.81)		(0.30)	(0.30)
Suburban-serving Single Campus		132.63**	132.99**		0.92***	0.92***		132.08*	132.89*		0.87**	0.88**
		(41.01)	(41.04)		(0.21)	(0.21)		(65.40)	(65.55)		(0.28)	(0.28)
Suburban-serving Multicampus		233.56*	233.43*		0.97***	0.97***		310.65*	310.90*		1.23***	1.24***
		(101.03)	(100.90)		(0.28)	(0.28)		(121.67)	(121.40)		(0.34)	(0.33)
Urban-serving Single Campus		54.48*	54.54*		0.70**	0.70**		50.38	49.93		0.66**	0.66**
		(24.64)	(24.58)		(0.21)	(0.21)		(33.49)	(33.43)		(0.24)	(0.24)
Urban-serving Multicampus		219.05***	219.21***		1.27***	1.27***		206.93**	206.16**		1.24***	1.23***
		(41.28)	(41.30)		(0.19)	(0.19)		(62.02)	(62.01)		(0.24)	(0.24)
Public 2-year under 4-year		-37.35	-36.65		-0.15	-0.14		-10.81	-11.19		-0.08	-0.08
		(25.92)	(25.83)		(0.31)	(0.31)		(31.66)	(31.93)		(0.31)	(0.31)
Constant	188.31***	45.95	43.86	4.92***	3.93***	3.90***	200.72***	139.76	196.04	4.86***	4.02***	4.23***
	(19.97)	(87.08)	(78.37)	(0.09)	(0.42)	(0.32)	(32.85)	(164.34)	(164.09)	(0.13)	(0.61)	(0.49)
Controls		X	X		X	X		X	X		X	X
CPI Adjustment			X			X			X			X

Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001

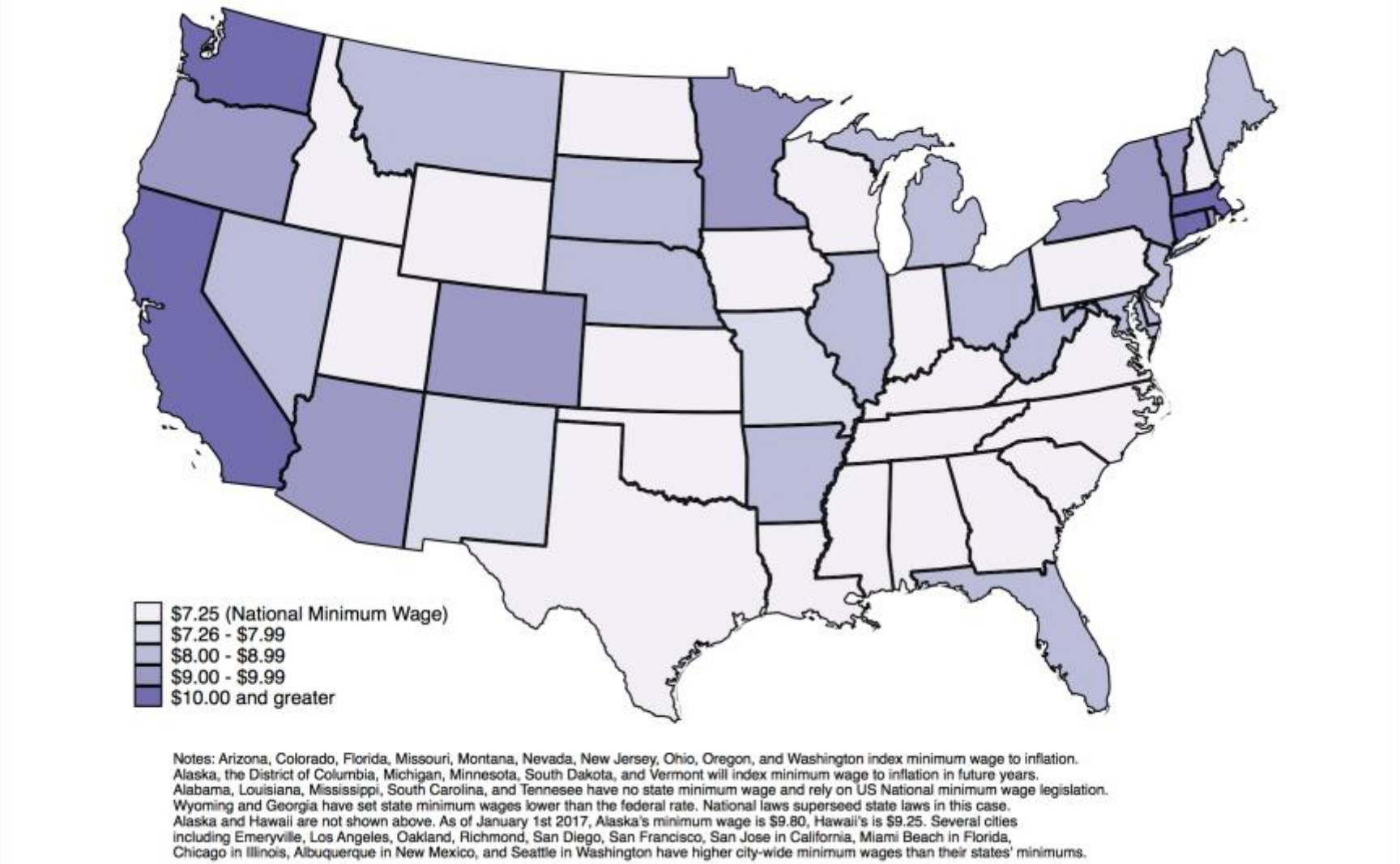
Table 6: Difference-in-Differences Models of Part-Time Enrollment

	Part-Time Enrollment			Log of Part-Time Enrollment			Part-Time Enrollment (MSI)			Log of Part-Time Enrollment (MSI)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment (N. Carolina)	-343.30	-627.10*	-650.43*	-0.23	-0.42***	-0.44***	-537.90	-1339.39*	-1370.72*	-0.23	-0.60**	-0.62**
	(214.39)	(288.18)	(289.44)	(0.14)	(0.12)	(0.12)	(337.45)	(543.76)	(547.77)	(0.21)	(0.19)	(0.19)
Post (2007)	96.21**	-16.31	-69.10	0.07**	0.01	-0.04	70.52	-246.64	-298.49*	0.07	-0.10	-0.15
	(36.27)	(93.65)	(93.34)	(0.03)	(0.05)	(0.05)	(50.61)	(129.21)	(137.12)	(0.04)	(0.08)	(0.08)
Treatment X Post	181.43*	136.00	143.93	0.20***	0.18*	0.18*	282.14**	410.17*	423.17*	0.25**	0.32**	0.32**
	(74.39)	(99.02)	(98.30)	(0.06)	(0.08)	(0.08)	(101.36)	(168.31)	(167.92)	(0.09)	(0.11)	(0.11)
Percent receiving aid		-23.34**	-23.74**		-0.01***	-0.01***		-37.70*	-38.32*		-0.02***	-0.02***
		(7.72)	(7.78)		(0.00)	(0.00)		(15.23)	(15.35)		(0.00)	(0.00)
Maximum Pell grant in $1K		348.60	1.03		0.23*	0.00*		624.81*	1.84		0.00*	0.00*
		(181.95)	(0.59)		(0.10)	(0.00)		(280.15)	(0.96)		(0.00)	(0.00)
Total COA in $1K		33.41	0.15		0.02	0.00		10.32	0.04		0.00	0.00
		(22.25)	(0.11)		(0.01)	(0.00)		(31.82)	(0.15)		(0.00)	(0.00)
Unemployment rate		-43.19	-25.55		-0.01	0.00		-81.00	-52.31		-0.02	-0.01
		(78.03)	(70.06)		(0.04)	(0.04)		(112.12)	(101.86)		(0.06)	(0.05)
Rural-serving Medium		371.84***	371.88***		0.65***	0.65***		401.85**	403.40**		0.70***	0.70***
		(95.85)	(96.11)		(0.09)	(0.09)		(147.40)	(148.50)		(0.11)	(0.11)
Rural-serving Large		1719.59***	1718.02***		1.32***	1.31***		2708.93**	2714.07**		1.63***	1.64***
		(494.10)	(494.72)		(0.17)	(0.17)		(984.11)	(989.07)		(0.29)	(0.29)
Suburban-serving Single Campus		757.56***	756.52***		0.94***	0.94***		731.00	736.21		0.99***	1.00***
		(207.14)	(208.37)		(0.14)	(0.14)		(409.52)	(413.59)		(0.21)	(0.21)
Suburban-serving Multicampus		1851.07**	1853.58**		1.13***	1.13***		2178.43**	2183.63**		1.32***	1.32***
		(701.25)	(699.76)		(0.21)	(0.21)		(783.30)	(780.28)		(0.24)	(0.24)
Urban-serving Single Campus		645.59***	637.49***		0.91***	0.91***		504.46*	494.55*		0.92***	0.92***
		(112.31)	(110.04)		(0.11)	(0.11)		(207.04)	(208.00)		(0.13)	(0.13)
Urban-serving Multicampus		2100.16***	2089.16***		1.52***	1.51***		1853.11***	1838.33***		1.53***	1.53***
		(371.03)	(371.13)		(0.15)	(0.15)		(480.54)	(482.24)		(0.18)	(0.18)
Public 2-year under 4-year		-248.42	-253.99		-0.53*	-0.54*		-184.79	-196.87		-0.43	-0.43
		(220.75)	(218.85)		(0.25)	(0.25)		(251.02)	(248.98)		(0.27)	(0.27)
Constant	1413.40***	913.99	1505.01*	6.87***	6.11***	6.42***	1585.59***	1822.58	2824.39*	6.82***	6.12***	6.63***
	(178.57)	(668.88)	(656.50)	(0.10)	(0.33)	(0.26)	(298.40)	(1363.12)	(1401.41)	(0.15)	(0.46)	(0.39)
Controls		X	X		X	X		X	X		X	X
CPI Adjustment			X			X			X			X

Standard errors in parentheses

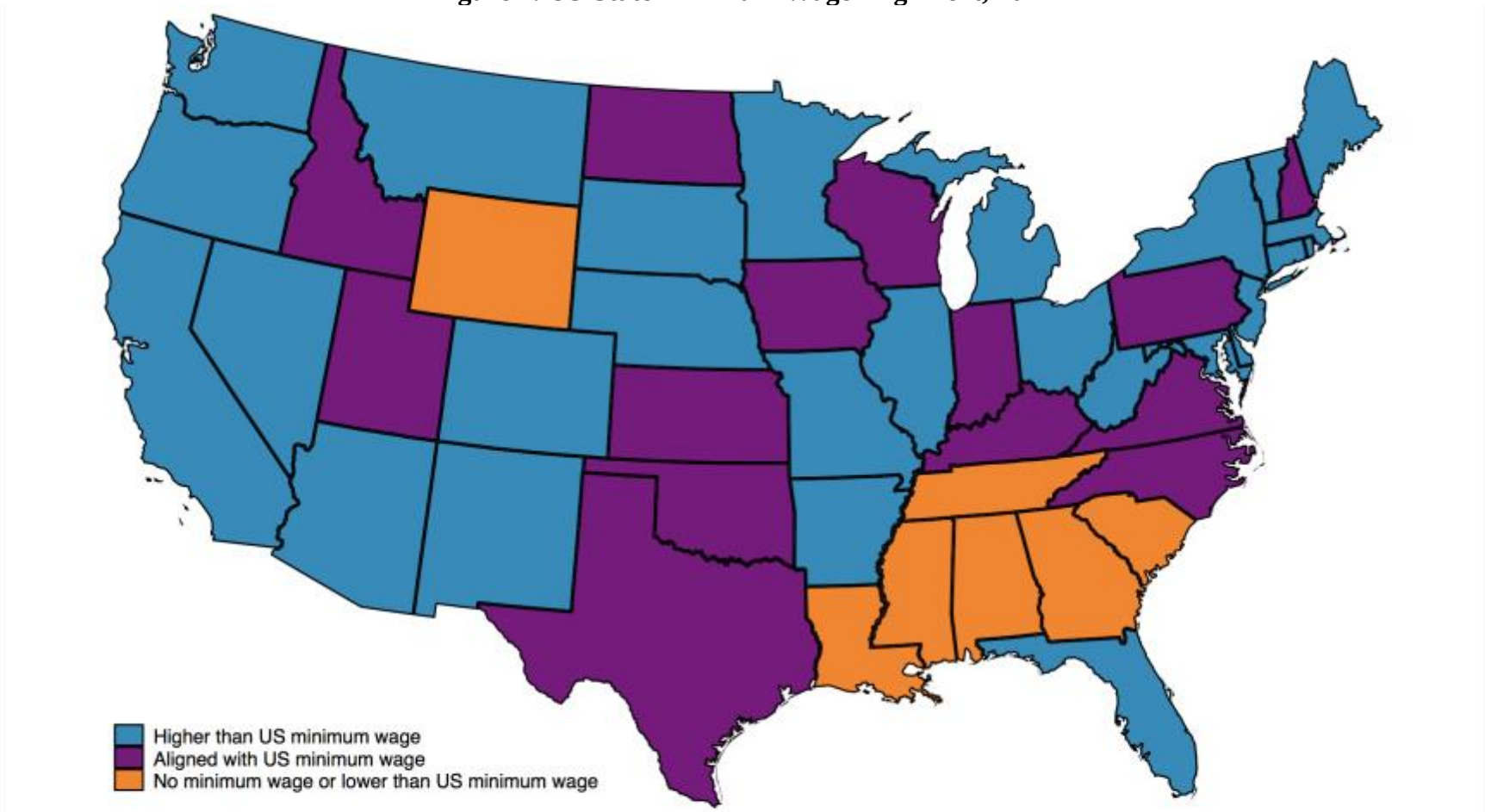
* p<0.05 ** p<0.01 *** p<0.001

Figure 1: Minimum Wage by State in 2017



Notes: Arizona, Colorado, Florida, Missouri, Montana, Nevada, New Jersey, Ohio, Oregon, and Washington index minimum wage to inflation.
Alaska, the District of Columbia, Michigan, Minnesota, South Dakota, and Vermont will index minimum wage to inflation in future years.
Alabama, Louisiana, Mississippi, South Carolina, and Tennesee have no state minimum wage and rely on US National minimum wage legislation.
Wyoming and Georgia have set state minimum wages lower than the federal rate. National laws superseed state laws in this case.
Alaska and Hawaii are not shown above. As of January 1st 2017, Alaska's minimum wage is $9.80, Hawaii's is $9.25. Several cities
including Emeryville, Los Angeles, Oakland, Richmond, San Diego, San Francisco, San Jose in California, Miami Beach in Florida,
Chicago in Illinois, Albuquerque in New Mexico, and Seattle in Washington have higher city-wide minimum wages than their states' minimums.

Figure 2: US-State Minimum Wage Alignment, 2017



Source: Bureau of Labor Statistics

Notes: Alabama, Louisiana, Mississippi, South Carolina, and Tennesee have no state minimum wage and rely on US National minimum wage legislation. Wyoming and Georgia have set state minimum wages lower than the federal rate. National laws superseed state laws in this case Alaska and Hawaii are not shown above. As of January 1st, 2017, both have minimum wages higher than the US minimum wage.

Figure 3: Theory of Action

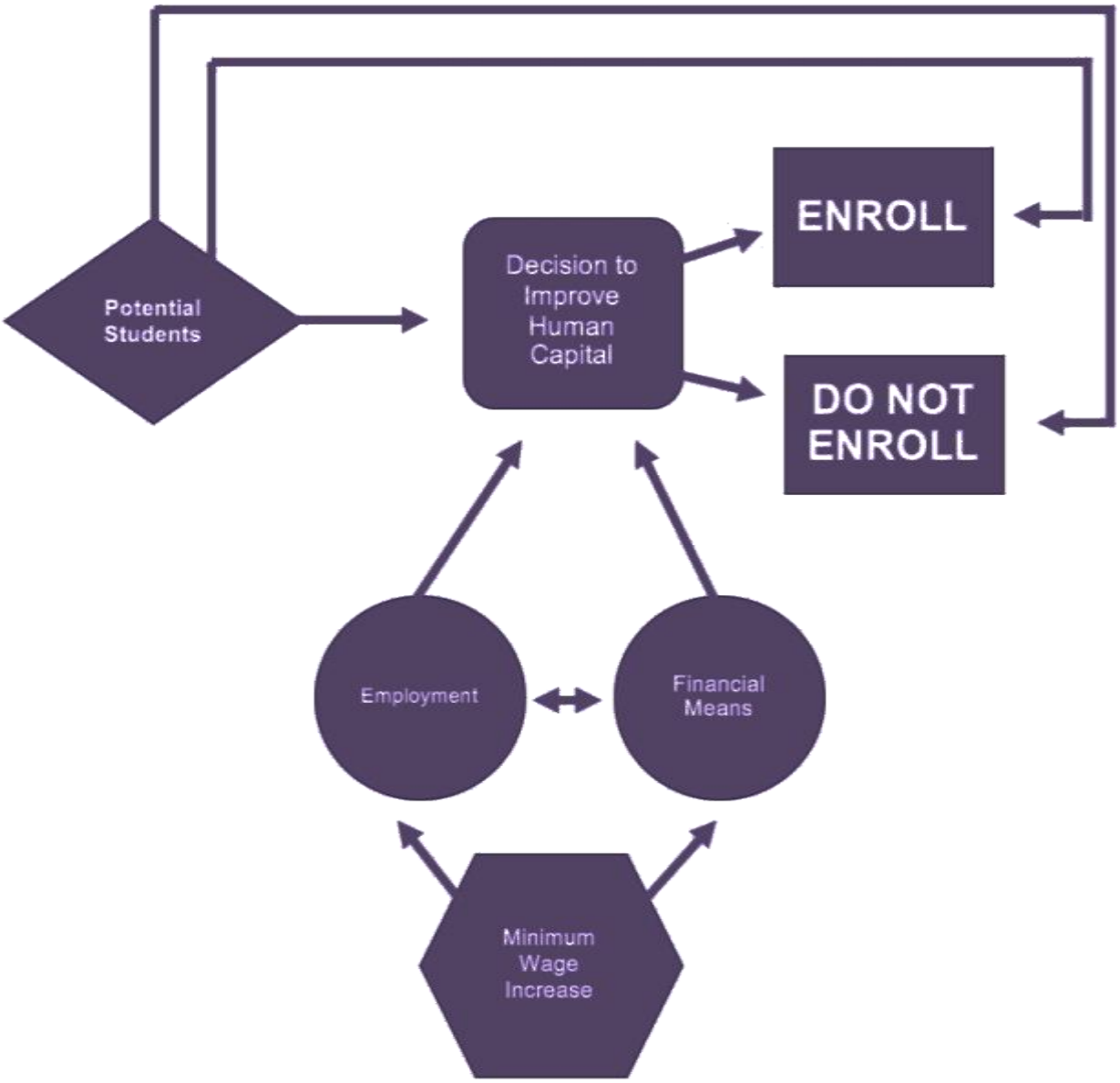


Figure 4: Trends in Enrollment in North Carolina and Surrounding States

Appendices

Appendix A: Institutions with missing enrollment data by state and year[7] (Source: Integrated Postsecondary Education Data System)

Alaska	
AVTEC – Alaska's Institute of Technology	2004 - 2013
California	
Los Angeles County College of Nursing and Allied Health	2004 - 2013
Moreno Valley College[8]	2004 - 2009
Norco College	2004 - 2009
West Hills College-Lemoore	2004 - 2005
Woodland Community College	2004 - 2008
Georgia	
Central Georgia Technical College	2004 - 2013
Georgia Military College – Distance Learning[9]	2004 - 2012
Middle Georgia Technical College	2013
Waycross College[10]	2013
Idaho	
College of Western Idaho[11]	2004 - 2008
Iowa	
Indian Hills Community College	2008 - 2013
Kansas	
Salina Area Technical College	2005 - 2008
Wichita Area Community College	2005 - 2009
Louisiana	
Delgado Community College	2005
Louisiana Delta Community College	2004 - 2013
Northeast Louisiana Technical College	2013
New Hampshire	
Great Bay Community College	2004 - 2005
Lakes Region Community College	2004 - 2005
River Valley Community College	2004 - 2005

[7] Does not include military preparatory institutions or tribal colleges
[8] Founded in 2010
[9] Distance learning program associated with
[10] Closed after the 2012 – 2013 academic year
[11] Established in 2007

Appendix A, continued.

New York	
Stella and Charles Guttman Community College[12]	2005 - 2011
North Carolina	
Carolinas College of Health Sciences	2005 – 2013
Pennsylvania	
Lancaster County Career and Technology Center	2005 - 2013
West Virginia	
Blue Ridge Community and Technical College	2004[13]
Carver Career Center	2005 - 2013
New River Community and Technical College	2004[14]

[12] Established in 2012
[13] First accredited in March 2005
[14] First accredited in February 2005

Appendix B: Institutions missing total cost of attendance by state and year

Alaska	
Prince William Sound Community College	2006
Arizona	
Arizona Western College	2007
Colorado	
Colorado Northwestern Community College	2006 – 2009
Lamar Community College	2008, 2010
Otero Junior College	2005
Kansas	
Cowley County Community College	2008
Dodge City Community College	2004
Minnesota	
Itasca Community College	2005
Northwest Technical College	2010
Missouri	
Crowder College	2007
Three Rivers Community College	2008 - 2010
Montana	
Dawson Community College	2005 – 2008, 2011
Miles Community College	2005 – 2011
Highlands College of Montana Tech	2005 – 2007, 2009
Nebraska	
Nebraska College of Technical Agriculture	2005 – 2007, 2009, 2011
New York	
North Country Community College	2009
North Dakota	
Dakota College at Bottineau	2006 – 2009
North Dakota State College of Science	2005 – 2010
Williston State College	2010
Ohio	
Ohio State University Agricultural Technical Institute	2009 – 2011

Appendix B, continued.

Oklahoma	
Connors State College	2008 – 2009
Eastern Oklahoma State College	2009 – 2011
Murray State College	2009 – 2011
Redlands Community College	2008
Oregon	
Southwestern Oregon Community College	2006 – 2008, 2010
Texas	
Northeast Texas Community College	2008
Ranger College	2005 – 2007
South Plains College	2005 – 2009 2010 - 2011
Texas State Technical College – Marshall	2008, 2010 – 2011
Texas State Technical College – Waco	2005 – 2011
Western Texas College	2005 - 2011
West Virginia	
Pierpont Community and Technical College	2005 – 2012
Wyoming	
Northwest College	2005 – 2011