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The Financial Crisis and College Enrollment
How Have Students and Their Families Responded?

Bridget Terry Long

7.1 Introduction

The Great Recession had far-reaching effects on both the supply and demand sides of higher education. On the supply side, postsecondary institutions experienced cuts to multiple revenue sources, including charitable giving and endowment returns, as detailed in other chapters of this volume. The level of government support was also impacted, especially in the form of state appropriations, which affect tuition prices. In terms of families, or the demand side of higher education, the downturn of the economy affected incomes and unemployment rates, thereby reducing economic well-being and stability. Moreover, home ownership and home equity levels have declined, reducing a major source of wealth and capital for many families. These changes likely impacted both the probability of enrolling in college and what a family can afford and is willing to pay for school.

This chapter explores the multiple ways college affordability was impacted by the Great Recession and the ways these changes affected college enrollment and expenditures. The central question is: How has the Great Recession affected family and student decisions regarding college enrollment, choice, and expenditures? The trends described above lend themselves to conflicting hypotheses. While reductions in family income and increases in tuition

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prices could have negative effects on postsecondary enrollment, growing unemployment could have the opposite effect by reducing the foregone costs of attending school. Previous research has found that college enrollment rates often increase as the unemployment rate grows (Long 2004b), especially among sixteen- to twenty-four-year-olds due to lack of employment opportunities (Bell and Blanchflower 2011). Due to these negative and positive pressures, the predicted net effect of the recession on college enrollment rates is unclear and depends on the relative sizes of each effect.

The Great Recession is also distinctive from earlier recessions in several important ways. At the start of the Great Recession, college costs and student debt levels were at historic highs, suggesting that the role of loans in college enrollment was much more significant than during previous periods. In regard to the recession, it is important to highlight the substantially large, negative impact the economic downturn had on liquidity for many families. Additionally, the Great Recession coincided with the largest cohort of graduating high school students, thereby exacerbating the need for resources and pressure on institutional capacity. On the other hand, federal financial aid increased to an unprecedented level with the goal of enabling more individuals to access college. Therefore, although price increases and labor market effects may have largely determined the impact of past recessions on enrollment trends, the Great Recession occurred in a much more complex context, and the net effect of all of these changes in income, tuition prices, liquidity, demographics, and financial aid is not clear ex ante.

This chapter investigates the net effects of these multiple changes. Using the Integrated Postsecondary Education Data System (IPEDS), an annual survey of colleges, I investigate how families altered decisions about whether to attend and enrollment intensity (full- versus part-time attendance) after the start of the recession. Additionally, I examine possible changes in tuition costs and financial aid received, as measured by revenue received by postsecondary institutions. I exploit geographical differences in the severity of the recession to highlight how enrollment and expenditure trends changed for families in states that suffered more dramatically in terms of growth in unemployment and reductions in home values relative to families in other states.

The analysis suggests college attendance levels increased during the recession, especially in the states most affected by the recession. Part-time enrollment increased while full-time enrollment declined, and the gains in attendance were concentrated among students of color. The tuition revenue collected per student also grew, while grants did not offset the increase in cost and student loans increased.

The next section of the chapter details the effects of the recession on both the supply and demand sides of higher education. Then I describe the data sources and empirical framework. Section 7.4 discusses the results, and section 7.5 concludes.

7.2 The Effects of Recessions: Current Trends and Past Research

7.2.1 Trends in Tuition Pricing

Tuition prices at colleges and universities are influenced by multiple factors, with other revenue sources playing an important role due to the fact that the cost of educating a student is not fully covered by the price students pay. In the case of public institutions, the level of state appropriations is a strong determining factor of tuition levels. State appropriations allow the public colleges and universities to charge in-state students a discounted price and the level and distribution pattern of these state subsidies strongly influences student enrollment decisions (Long 2004a).

During the last several years, state appropriations to higher education have fallen significantly. According to the College Board (2012a), after accounting for inflation, state appropriations per full-time equivalent (FTE) student fell 25 percent from 2006/7 to 2011/12, including a 10 percent reduction from 2010/11 to 2011/12. Such reductions in state appropriations have had serious repercussions on tuition levels at public institutions. As shown in figure 7.1, the historical pattern is that when state appropriations per full-time equivalent (FTE) student fall, the list tuition and fees charged to students typically increase, and this has been the case during this most recent recession.[1] Because state constitutions generally require states to have balanced budgets each year, legislators have been cutting spending, and as with past recessions, appropriations to higher education have been a target. From 2007/8 to 2011/12, the mean list (published) tuition and fees at public four-year institutions increased 27 percent after accounting for inflation; they grew by 24 percent at public two-year institutions during the same period (College Board 2012a).[2]

The impact of declining state appropriation on tuition prices has been particularly large in some states. From 2008/9 to 2010/11, a difference of only two years, mean tuition and required fees at public four-year colleges and universities increased 32 percent in Florida and Georgia, 28 percent in Hawaii, 24 percent in Alabama, and 38 percent in California. Even community colleges, which tend to maintain low tuition growth in keeping with their mission of supporting access and affordability, have experienced increases

1. Often the downturn in state appropriations to higher education is delayed by a year or two after the start of a recession. This is because appropriations are funded out of tax revenue, which can often take a year to be affected by a recession. According to estimates by the National Governors Association during the beginning of the recession, states' combined budget shortfalls for FY2009 were expected to grow to $60 billion and then $80 billion during FY2010 (Chitty 2009). As such, even though this recession began in December 2007, the effect on tax revenue, and then in turn state appropriations and tuition prices, was not felt until the 2008/9 and 2009/10 school years.

2. Tuition means are weighted by full-time undergraduate enrollment. (College Board, *Annual Survey of Colleges*.)

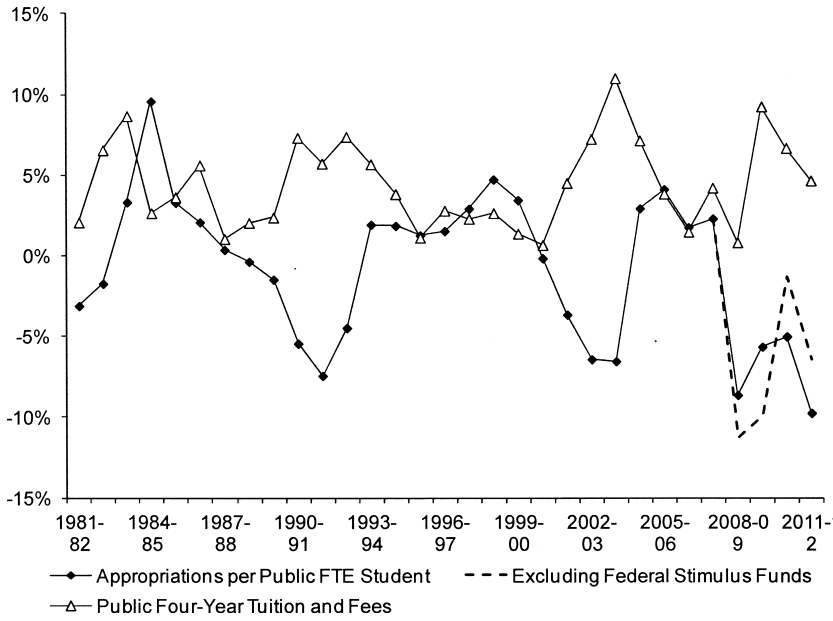

Fig. 7.1 Annual percentage change in state appropriations for higher education and real tuition and fees at public four-year institutions

Source: College Board (2012a, figure 12A).

Notes: State appropriations reported per full-time equivalent (FTE) student. Enrollment for fall 2011 was estimated based on preliminary IPEDS numbers. Appropriations are for institutional operating expenses, not for capital expenditures. Funding includes both tax revenues and other state funds allocated to higher education.

in their prices. During the same two years, mean tuition and required fees at public two-year colleges increased 33 percent in Georgia, 32 percentage in North Carolina, and 25 percent in Virginia.[3]

Fluctuating state appropriations not only affect list tuition prices at public institutions but also students' choices between public and private colleges, as well as the two-year versus four-year decision. When in-kind subsidies are large, students appear to choose public colleges even if the gap in resources between public and private options is substantial. Research also suggests that large levels of state appropriations, an in-kind subsidy, create incentives for students to favor public four-year colleges over two-year institutions (Long 2004b). The recent reductions in state appropriations may cause a shift in enrollment patterns.

During this same time period, the list tuition prices of private, nonprofit institutions have not grown as quickly as their public counterparts. From

3. Calculations by author using College Board (2011, table 6c). Tuition means are weighted by full-time undergraduate enrollment. (College Board, *Annual Survey of Colleges*.)

2007/8 to 2011/12, list tuition and fees at private, nonprofit, four-year institutions grew 13 percent, above the norm but about half of the growth rate at public colleges and universities (College Board 2012a).

7.2.2 Trends in Financial Aid

Underlying all of these increases in college prices is the government financial aid system. Although list price can have an effect on enrollment decisions, it is the net price after the application of financial aid that is the most influential. While tuition has increased in all sectors, government financial aid has, for now, remained robust.

The federal Pell grant is the largest need-based aid program and serves as the foundation for other aid, meaning that if students are eligible, the Pell grant is awarded first. The majority of Pell recipients come from families with incomes in the lowest economic quartile; according to Mahan (2011), about three-quarters of Pell grant recipients during 2008/9 had family incomes at or below $30,000. With the start of the recession, there was increased demand for the Pell grant. According to Chitty (2009), approximately 786,000 more students received a Pell grant in 2008/9 than the previous year. In fact, total expenditures in the Pell grant program doubled from 2007/8 ($15.9 billion) to 2009/10 ($31.5 billion), continuing to rise to $37.0 billion in 2010/11 (College Board 2012b). The growth in beneficiaries over multiple years has caused major financial shortfalls, which Congress has at times provided additional funding to cover. Most recently, to maintain the $5,550 maximum Pell grant award during 2011/12, the Department of Defense Full-Year Continuing Appropriations Act of 2011 (P.L. 112-10) provided $23 billion in discretionary appropriations to the program (Mahan 2011).

The federal student loan sector has also grown and changed to accommodate economic trends and increased need by families. After the recession had an effect on credit markets, causing many private student loan providers to stop or suspend lending, Congress passed the Ensuring Continued Access to Student Loans Act in 2008, which gave the US Department of Education the authority to make direct loans to students. Congress also increased the loan limits for students in the Federal Stafford Loan Program. Similar to the Pell Grant Program, the total amount of government loans has increased substantially during the recession. While the total given in federal loans was $74.6 billion in 2007/8, it rose to $110.4 billion in expenditures by 2010/11 (College Board 2012b).

There has also been increased pressure on institutional aid sources, financial aid given by colleges and universities. Institutional financial aid officers note that there has been a large increase in the number of financial aid applications they receive and requests for institutional aid. Given the growing economic instability caused by the recession, many families have contacted offices with revised aid requests due to changes in their circumstance, such as recent unemployment (Schachter 2009). According to the

College Board (2012b), total institutional grants have increased from $30.5 billion in 2007/8 to $42.1 billion in 2011/12. With the increases in financial aid from both the government and institutions, average net prices to families have not increased as dramatically as list prices during the recession. However, the number of families and students dependent on these aid resources has increased substantially. Although financial aid can dramatically reduce the overall cost of college, many students still have significant unmet needs (Long and Riley 2007; ACSFA 2010). Moreover, the receipt of financial aid is predicated on navigating a lengthy and complicated process, and this has been shown to be a deterrent to families accessing financial aid and attending college (Bettinger et al. 2012).

7.2.3 The Effects of the Great Recession on the Economic Conditions of Families

In the face of this recession, families have suffered lost income, greater debt, and more financial insecurity, factors that might negatively impact college outcomes. First, family incomes have fallen or remained stagnant, partly due to increasing unemployment. Nationally, the unemployment rates grew from 4.7 percent in September 2007 to 10.1 percent in October 2009.[4] For people under the age of twenty-five, unemployment increased from 11.5 percent during the first quarter of 2008 to 18.3 percent during the fourth quarter of 2010 (Bell and Blanchflower 2011).

This period of economic turmoil has also strongly affected the housing market by reducing the value of many families' homes, while others have lost their homes altogether. Glover et al. (2011, 1) conclude that "the average household experienced a decline in net worth of $177,000 between the middle of 2007 and the trough of the asset price decline in the first quarter of 2009." According to the Federal Reserve, American home owners lost more than $7 trillion in home equity. Previous research suggests that changes in home values can affect educational attainment (Johnson 2011), and other research has found that families rely on home equity as a way to finance college (Lovenheim 2011). Therefore, with reductions in home values and the ease of getting a home equity loan, there is some concern that the Great Recession may have reduced the likelihood of college attendance. Access to capital has also been reduced for many families as banks and financial institutions have been less willing to make loans or extend credit. Per household, ownership of credit cards declined 2.8 percent from November 2008 to April 2010. However, conditional on having some debt, credit card debt increased by nearly 25 percent (Hurd and Rohwedder 2010).

Overall, the effects of the recession have been widespread. According to Hurd and Rohwedder (2010, 1), "between November 2008 and April 2010 about 39 percent of households had either been unemployed, had negative

4. Bureau of Labor Statistics. Seasonally adjusted monthly data.

equity in their house, or had been in arrears in their house payments." Still, the severity of the recession has varied geographically. From the beginning of 2007 to the end of 2009, state unemployment rates grew by anywhere from 2.0 to 8.8 percentage points. Looking at changes in home values, another way to measure recession severity, eight states experienced gains in home prices while other states saw their homes lose on average 41.6 percent of their values.[5]

7.2.4 Recessions and the College Enrollment Decision

Under Becker's (1964) human capital model, when deciding whether to continue their educations, individuals compare the benefits of human capital to the costs of obtaining it. In terms of higher education decisions, an individual will weigh the costs and benefits, both monetary and otherwise, to decide whether to prepare for college, enroll in a postsecondary institution, and continue until completing a college degree. Theory suggests that college demand will depend upon the net benefit (benefits minus costs) of education, the prices of alternatives, and the preferences of the individual, subject to a lifetime budget constraint. Among the costs of education are tuition and foregone earnings, the income that an individual could have made had he or she decided to enter the labor market rather than attend school. On the other side, the benefits of higher education include increased earnings. Additional nonmonetary costs and benefits, such as the psychic costs of studying, the consumption value of college, and possible improved health outcomes due to education, may also be important. Numerous studies have confirmed the expected relationship between the factors detailed in the model and enrollment trends (Leslie and Brinkman 1987; Long 2007).

With regard to recessions and the business cycle, as earnings decrease and unemployment becomes more likely, theory suggests that individuals will be more likely to attend college. Such a pattern has been found during earlier recessions. For instance, Dellas and Sakellaris (2003) find that college enrollment decisions are countercyclical with the business cycle. Using the Current Population Survey from 1968 to 1988, which includes four US recessions, they find that a 1 percentage point increase in the unemployment rates is associated with a 2 percent increase in college enrollment. Other work has also found a positive relationship between unemployment rates and college enrollment (Card and Lemieux 2001; Long 2004b).

In some ways, the trends of the Great Recession mirror the economic changes of earlier recessions, and so one might expect to find the same pattern of increasing postsecondary enrollment. There were rampant increases in unemployment and reductions in income. It is also certainly not the first time that colleges and universities have suffered reductions in state appropriations. For instance, during the recession of the early 1990s,

5. See below for a more detailed discussion of these recession indicators.

state appropriations also fell substantially, and this led to substantial tuition increases at public institutions. More recently, during the recession of the early twenty-first century, reductions in state appropriates coupled with declining endowments resulted in significant tuition growth at both public and private colleges and universities (Breneman 2002).

However, while many of the changes brought on by the Great Recession have also been experienced during previous recessions, several factors make the current context very different. Even before the downturn, college prices were a much higher percentage of annual family income than any previous recession, making any marginal increase in tuition harder to overcome than ever before. The percentage of students taking out debt and the mean levels of student debt at baccalaureate graduation were also at historical highs and continuing to increase rapidly. The ability to get loans and willingness to take on debt to finance postsecondary attendance is a greater determinant of college enrollment than ever before, and this recession has had a direct effect on both of those factors. On the other hand, financial aid has increased substantially during this period, much more than any previous recessions. As noted above, total expenditures in the Pell Grant Program went from $15.9 billion in 2007/8 to $37.0 billion in 2010/11 (College Board 2012b).

Another thing that makes this recession different than most others is the demographic change that was also taking place at the same time. In 2008, the United States had the largest class of graduating high school seniors, about 3.2 million students. This exceeded the peak year of the baby boom, which was 1979, by more than 60,000. According to Breneman (2002), during the recessions of the early 1980s and 1990s, the lack of pressure from increased enrollments "served to cushion the economic blows somewhat." The same was not true during the early part of the twenty-first century, and so this helped to spur growth in student loans. The already important role of debt in college financing and the enormous enrollment pressure of the largest cohort of traditional-age college students has exacerbated the need for resources and capacity by institutions and families.

Therefore, unlike past recessions when changes in enrollment trends were largely a matter of price increases and labor market effects, the Great Recession has happened in a much more complex context with positive and negative pressures that might influence college enrollment, and this could have different effects on various subgroup populations. The growth in unemployment and financial aid could encourage many to enroll in college, but the decrease in family income, increase in the difficulty of securing private financing, increasing tuition prices, and strain on institutional capacity suggest that the propensity for college enrollment could decrease. The uncertainty and risk introduced by the recession could also affect college decisions as families may be less likely to take on more expensive, multiyear investments. Given the recession impacted the earning and job prospects of educated workers, some have even questioned whether the returns to college

justify the cost, though employment conditions for individuals with only a high school degree were also adversely affected.

Early work confirms that the effects of the Great Recession have been distinctive from previous periods. Overall, Barr and Turner (2012) find that the enrollment response to the Great Recession has been larger, and they attribute the large growth in attendance to the unusual increase in the availability of financial aid (i.e., the Pell grant) as well as extensions in unemployment insurance benefits. Their research suggests that older students were proportionately more responsive to the recession. The largest shocks to enrollment occurred at community colleges and private baccalaureate (no research) colleges. To summarize, Barr and Turner conclude that while the reductions in state appropriations and increases in tuition prices might attenuate the overall enrollment response, these factors would not be strong enough to "undo" the increase in attendance. This analysis augments the previous work by bringing additional insight to the effects of the recession.

7.3 Data and Empirical Framework

7.3.1 Data Sources

My analysis uses data from the Integrated Postsecondary Education Data System (IPEDS), an annual survey of colleges that participate in the federal student financial aid programs. The IPEDS provides detailed information on multiple aspects of postsecondary institutions, including enrollment, revenue, and financial aid. Using this data set, I am able to measure student decisions and cost information at the institutional level. To capture the introduction to the recession, I use data from 2004/5 to 2009/10, with the postrecession time period being defined as 2007/8 and afterward, thereby allowing three years of observation both before and after the change. To be included in the sample, colleges needed to have at least five of the six possible years of data.

I use state-level variation in the severity of the recession to highlight trends most closely associated with the negative economic consequences of the downturn. The IPEDS data has the disadvantage of being organized by the state of residence of the institution, not the student. For the bulk of colleges, their enrollment and financial information is largely reflective of a population of students from within their state. According to the 2007/8 IPEDS, only 8 percent of students in a beginning cohort are from out of state, on average, though this variable is not collected for all institutions. However, to deal with the concern that institutional data may not be completely reflective of students from within the state, four-year colleges with less than one-third of their students from inside their state have been excluded from the sample.[6]

6. The results of the analysis do not change when lowering this threshold.

In addition, colleges in the most competitive category of the Barron's ratings have also been excluded due to the fact that they tend to respond to more national, rather than state, trends.

To gauge the severity of the recession, I measure how indicators changed from 2007Q1 to 2009Q4. This time frame begins and ends slightly before and after the official dates of the recession (December 2007 to June 2009) to fully capture changes that occurred during the downturn. I use two sets of economic measures. The first are quarterly unemployment rates available from the Bureau of Labor Statistics (BLS) as part of their Local Area Unemployment Statistics (LAUS). The rates are by state and seasonally adjusted. States have been put into two categories based on the size of the increase in the unemployment rate. While state unemployment rates grew by 2 to 8.8 percentage points from 2007Q1 to 2009Q4, states for which the rate grew by 6.5 percentage points or more are categorized as having a "large increase in the unemployment rate." Appendix table 7A.1 lists the states in this category.

The second economic indicator used to judge the severity of the recession focuses on home values. I use the Conventional Mortgage House Price Index (CMHPI), which is produced by the Federal Housing Finance Agency (FHFA). The index is based on Fannie Mae and Freddie Mac-eligible mortgages on single-family detached properties (with loan limits up to $729,750 for one-unit properties). I use the All-Transactions House Price Index, which includes both sales of property and appraisal values from refinance transactions. The CMHPI has been used in other studies on the impact of housing value and wealth on educational outcomes (Johnson 2011; Lovenheim 2011; Lovenheim and Reynolds 2012). From 2007Q1 to 2009Q4, the CMHPI fell in most states, from as little as 1.47 points up to 206 points; in seven states, the index increased during this time. I define states that had their CMHPI fall more than 80 points as having "large reductions in the CMHPI." Appendix table 7A.1 also lists the states in this category.

7.3.2 Empirical Framework

Following the basic human capital framework, college enrollment is modeled as a function of family background, income, and home ownership, which proxy for preparation levels and the ability to pay for college, and unemployment, which is a proxy for the foregone costs of attendance. I examine the effects of the Great Recession in two ways. First, I document differences in college enrollment trends by contrasting enrollment rates before and after the start of the recession, using a dummy variable After_i that is equal to 1 if the school year is 2007/8, 2008/9, or 2009/10, which is equivalent to the fourth quarter of 2007 and afterward. However, because college enrollment rates have generally increased during the last several decades and would have likely continued to increase regardless of the recession, I must also control for this upward trend. I do so by also including a year trend, Year_i, in the model. To control for differences in state higher education sys-

tems and underlying propensities for enrollment, I also include state fixed effects (γ_i). The resulting equation is:

$$(1) \qquad y_j = \alpha_1 + \alpha_2 X_i + \alpha_3 \text{Year}_i + \alpha_4 \text{After}_i + \gamma_i + \varepsilon_{i,}$$

where i is postsecondary institution, y is the outcome of interest, and X is the vector of institutional characteristics that might also determine the outcome. In this equation, α_3 measures the annual growth in college enrollment rates over the entire period (the upward trend that would have happened regardless of the recession), and α_4 gives a sense of whether trends in college enrollment changed from the previous trajectory after the start of the Great Recession. If the Great Recession precipitated a jump in the percentage of individuals attending college *beyond* the already positive annual growth, one would expect α_4 to be positive.

The empirical analysis includes additional controls (X_i) found to be important determinants of an institution's enrollment, tuition costs, and financial aid receipt and amounts, the main outcomes of this analysis. These include: institutional level (dummy variables for two-year and less-than-two-year institutions, with the baseline category being a four-year institution); institutional sector (dummy variables for nonprofit, private, and for-profit institutions, with the baseline category being a public institution); the 2000 Carnegie classification (i.e., whether a research versus master's versus other type of institution); institutional type (dummy variable for being a public flagship, HBCU, HSI, having a medical school, and being affiliated with a hospital); total current operating expenditures; total expenditures squared; list in-state tuition and required fees; and Barron's competitiveness ratings (a series of dummy variables, from noncompetitive to highly competitive). In the regressions that use total enrollment as the dependent variable, I also control for a one-year lag in total enrollment. All other models control for present year total enrollment; for instance, to determine the impact of the recession on full-time enrollment, I control for the size of the institution. Because of persistent differences in the higher education systems of each state, I also include state fixed effects in all models. In the models, the standard errors have been adjusted by clustering at the institutional level.

To determine how the severity of the recession had differential effects on the outcomes, I use a differences-in-differences (DD) methodology. The first difference is before versus after the recession as captured by After_i. The second difference is between states adversely affected by the recession to a large degree versus a small degree. Using ordinary least squares estimation, the DD calculation can be made:

$$(2) \qquad y_j = \beta_1 + \beta_2 (\text{Recession\_High}_i * \text{After}_i) + \beta_3 \text{Recession\_High}_i + b_4 \text{After}_i + \varepsilon_{i.}$$

The parameter β_2 is the reduced-form effect of the recession in highly affected states relative to less-affected states—it measures whether institu-

tions in states that experienced the largest adverse effects from the recession acted differently from institutions in states that were not as affected by the recession (though almost every state experienced the economic downturn to some extent). The variables "Recession_High" and "After" are dummy variables equal to 1 if the college or university's state suffered large increases in unemployment (or large reductions in the home price index) or the quarter was 2007Q4 or after; otherwise, the variables are equal to zero. As noted above, this is an imperfect measure of the impact of the recession because a college may draw some of its students from outside of its state. However, the most selective schools and schools that draw less than one-third of their students from inside their state have been excluded from the sample because they are less likely to respond to state trends.

7.4 The Estimated Effects of the Great Recession

Table 7.1 displays the summary statistics of the IPEDS sample. On the left is the sample of all families. The bulk of the institutions in the sample are four-year colleges and universities, and the sample is evenly split between public and nonprofit, private institutions, with another 19 percent being for-profit, proprietary schools. Most of these schools focus on associate, bachelor's, and master's degrees, though there are a number of specialized institutions, which include schools of engineering and technology, schools of art, music, or design, health profession schools, and schools of business and management. Most of the schools in the sample are noncompetitive or have an unranked competitiveness level, which suggests they are not selective. In terms of the severity of the Great Recession, the states of the colleges and universities experienced an average growth of 5.1 percentage points in the unemployment rate from the first quarter of 2007 to the fourth quarter of 2009. About 22 percent of institutions are designated as being in states that were hardest hit by the recession, defined as experiencing 6.5 percentage points or more growth in unemployment during the time period. In terms of home values, the home price index fell on average 48.6 points in the states of the institutions, of which 20.2 percent being in states that witnessed a reduction in home values of 80 points or more.

7.4.1 The Effects of the Recession on College Enrollment

Table 7.2 focuses on the impact of the recession on college enrollment levels measured at the institutional level. The first three models focus on total fall enrollment,[7] while the following three models examine the total fall full-time equivalent (FTE) enrollment, which adjusts part-time enrollment

7. Students reported are those enrolled in courses creditable toward a degree or other formal award; students enrolled in courses that are part of a vocational or occupational program, including those enrolled in off-campus centers; and high school students taking regular college courses for credit.

Table 7.1 Summary statistics

Institutional level/sector	
Four-year	0.6082
Two-year	0.3721
Less than two-year	0.0196
Public	0.4117
Private (nonprofit)	0.3996
Proprietary (for-profit)	0.1887
Carnegie classification (2000)	
Research/doctoral institutions	0.0648
Master's institutions	0.1635
Bachelor's institutions	0.1542
Associate institutions	0.3511
Specialized institutions	0.1164
Tribal institutions	0.0084
Unknown	0.1416
Institutional type	
Public flagship university	0.0132
Historically black college or university (HBCU)	0.0265
Hispanic-serving institution	0.0114
Has a medical school	0.0334
Affiliated with a hospital	0.0172
Institutional competitiveness (Barron's ranking)	
Noncompetitive	0.3391
Less competitive	0.0777
Competitive	0.1808
Very competitive	0.0601
Highly competitive	0.0185
Unknown competitiveness	0.3238
Other institutional characteristics	
Total student enrollment	5,205
	(10,758)
Total expenditures (per $1,000)	$95,728
	(322,717)
In-state tuition and required fees	$11,051
	(8,641)
Recession severity measures	
State unemployment rate change 2007Q1 to 2009Q4 (percentage points)	5.12
	(1.50)
Large unemp. growth (6.5+ percentage points)	0.2195
State home price index (CMHPI) change 2007Q1 to 2009Q4	–48.63
	(59.65)
Large HPI reduction (fell 80+ points)	0.2020
Observations	20,065
Number of colleges and universities	3,374

Source: IPEDS 2004/5 to 2009/10.

Notes: Four-year colleges with less than one-third of their students from inside their state have been excluded from the sample, along with colleges in the most competitive category of the Barron's ratings (a total of fifty institutions). To be included in the sample, colleges needed to have at least five of the six possible years of data. Standard deviations shown in parentheses.

Table 7.2 **The effects on college enrollment by the severity of the recession**

Dependent variable	Total enrollment			Full-time equivalent (FTE) count		
	(1)	(2)	(3)	(4)	(5)	(6)
After recession	23.64	4.29	4.26	19.99	7.21	8.19
(2007Q4 and after)	(19.16)	(15.93)	(16.15)	(19.45)	(15.55)	(16.12)
After recession *		88.09*			58.17	
Large unemp. growth		(47.87)			(35.82)	
Large unemp. growth (6.5 pct.		–159.05			–177.49	
pts. or more)		(144.09)			(153.66)	
After recession *			95.67**			58.23*
Large HPI reduction			(48.47)			(35.35)
Large HPI reduction (fell 80			–357.20			–317.76
pts. or more)			(219.49)			(221.06)
Year trend	40.60***	40.61***	40.65***	30.97***	30.98***	31.00***
	(7.85)	(7.85)	(7.84)	(6.85)	(6.85)	(6.85)
Observations	19,987	19,987	19,987	19,992	19,992	19,992
R^2	0.99	0.99	0.99	0.99	0.99	0.99

Notes: All regressions include the following controls: institutional level (dummy variables for two-year and less-than-two-year institutions); institutional sector (dummy variables for nonprofit, private, and for-profit institutions); 2000 Carnegie classification; institutional type (dummy variable for being a public flagship, HBCU, HSI, having a medical school, and being affiliated with a hospital); total expenditures; total expenditures squared; list in-state tuition and required fees; Barron's competitiveness ratings (a series of dummy variables); and a one-year lag in total enrollment. All models also include state fixed effects. Standard errors are shown in parentheses and have been clustered by institutional ID. Four-year colleges with less than one-third of their students from inside their state have been excluded from the sample, along with colleges in the most competitive category of the Barron's ratings.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

before adding it to the full-time enrollment number.[8] As shown by the year trend variable, enrollment has generally grown during this time period. Focusing on the effects of the Great Recession, as shown by the "after recession" dummy variable, college enrollment levels at each institution were even a little higher after the start of the recession, though the results are not statistically significant. However, focusing on the enrollment levels in states more severely affected by the recession, it is clear that enrollment increased at a faster rate at these institutions postrecession. In particular, total fall enrollment jumped in states that experienced large increases in unemployment or reductions in the home price index. The effect on the FTE count was also positive but smaller, hinting at the possibility that the growth in enrollment was not all full-time students.

Table 7.3 investigates the effects of the recession on enrollment intensity by separating out the effects of the changes on full-time versus part-time college enrollment. As shown by the first three models, full-time enrollment levels were generally lower after the start of the recession, though colleges and universities in the hardest hit states had a weak overall pattern of small growth in full-time enrollments (the results are not statistically significant). In contrast, part-time enrollment grew substantially after the start of the recession across all states, as shown in models 4 through 6. Similar results are found if one uses the percentage of enrollment that is full-time or part-time rather than enrollment counts.[9]

The impact of the recession on enrollment was not evenly distributed by race or ethnicity. As shown in table 7.4, the growth in enrollment levels favored minority students in states hit hardest by the recession, while the enrollment levels of white students grew slightly overall but declined at institutions in states that struggled the most with the economic effects of the recession. In models 2 and 3, the top row suggested the enrollment of white students grew by about 21 on average per institution, but there were large reductions at institutions in the states most severely affected. Meanwhile, these same states experienced large growth in the level of enrollment among minority students. As suggested by the complicated nature of the context and recession, the effects on college enrollment appear to differ by racial subgroup.

Table 7.5 examines how the completion of certificates and degrees changed after the start of the recession. For instance, models 1 and 2 focus

8. The full-time equivalent of an institution's part-time enrollment is estimated by multiplying part-time enrollment by factors that vary by control and level of institution and level of student. For instance, part-time undergraduate enrollment is multiplied by 0.40 at a public, four-year college. The estimated full-time equivalent of part-time enrollment is then added to the full-time enrollment of the institution.

9. Across all institutions, the percentage of enrollment that was full-time fell about 0.5 percentage points while the percentage of enrollment that was part-time grew about 0.35 percentage points, with small differences in the growth or reduction in states that experienced a huge decline in home values.

Table 7.3 **The effects of the recession on college enrollment intensity (full- and part-time)**

Dependent variable	Full-time enrollment			Part-time enrollment		
	(1)	(2)	(3)	(4)	(5)	(6)
After recession	−35.01	−37.53***	−38.23***	61.48***	48.99***	53.78***
(2007Q4 and after)	(22.24)	(11.15)	(12.85)	(9.94)	(10.04)	(10.01)
After recession *		11.47			55.67	
Large unemp. growth		(69.42)			(34.08)	
Large unemp. growth (6.5 pct.		−38.22			−318.05	
pts. or more)		(493.02)			(472.24)	
After recession *			15.90			38.08
Large HPI reduction			(63.61)			(33.94)
Large HPI reduction (fell 80			−97.99			−589.11
pts. or more)			(626.88)			(649.16)
Year trend	−4.89	−4.89	−4.88	−13.84*	−13.84*	−13.81*
	(13.71)	(13.71)	(13.69)	(7.38)	(7.38)	(7.38)
Observations	20,064	20,064	20,064	17,924	17,924	17,924
R^2	0.89	0.89	0.89	0.89	0.89	0.89

Notes: All regressions include the following controls: institutional level (dummy variables for two-year and less-than-two-year institutions); institutional sector (dummy variables for nonprofit, private, and for-profit institutions), 2000 Carnegie classification; institutional type (dummy variable for being a public flagship, HBCU, HSI, having a medical school, and being affiliated with a hospital); total expenditures; total expenditures squared; list in-state tuition and required fees; Barron's competitiveness ratings (a series of dummy variables); and total student enrollment. All models also include state fixed effects. Standard errors are shown in parentheses and have been clustered by institutional ID. Four-year colleges with less than one-third of their students from inside their state have been excluded from the sample, along with colleges in the most competitive category of the Barron's ratings. Similar results are found if one uses the percentage of enrollment that is full-time or part-time rather than enrollment counts.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 7.4 **The effects of the recession on college enrollment by race/ethnicity**

Dependent variable	White enrollment			Minority enrollment		
	(1)	(2)	(3)	(4)	(5)	(6)
After recession (2007Q4 and after)	−10.29 (7.50)	21.11** (9.78)	20.92** (10.18)	12.33 (10.50)	−3.05 (12.16)	−9.21 (13.16)
After recession * Large unemp. growth		−143.04*** (27.97)			70.09** (34.73)	
Large unemp. growth (more than 6.5 pct. pts.)		347.55 (461.37)			62.75 (379.12)	
After recession * Large HPI reduction			−154.19*** (29.71)			106.42*** (36.24)
Large HPI reduction (fell 80 pts. or more)			345.95 (428.09)			−595.59 (429.50)
Year trend	−29.23*** (8.01)	−29.23*** (8.01)	−29.29*** (8.02)	21.88* (11.23)	21.88* (11.23)	21.93* (11.24)
Observations	20,065	20,065	20,065	20,065	20,065	20,065
R^2	0.88	0.88	0.88	0.82	0.82	0.82

Notes: All regressions include the following controls: institutional level (dummy variables for two-year and less-than-two-year institutions); institutional sector (dummy variables for nonprofit, private, and for-profit institutions), 2000 Carnegie classification; institutional type (dummy variable for being a public flagship, HBCU, HSI, having a medical school, and being affiliated with a hospital); total expenditures; total expenditures squared; list in-state tuition and required fees; Barron's competitiveness ratings (a series of dummy variables); and total student enrollment. All models also include state fixed effects. Standard errors are shown in parentheses and have been clustered by institutional ID. Four-year colleges with less than one-third of their students from inside their state have been excluded from the sample, along with colleges in the most competitive category of the Barron's ratings.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 7.5 **The effects of the recession on degrees and certificates completed**

Dependent variable	Certificates less than one year		Certificates one to two years		Certificates two to four years		Associate degrees		Bachelor's degrees	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
After recession	51.57***	55.96***	16.47***	12.32***	22.21***	25.13***	16.02***	3.47	–9.37**	–36.50***
(2007Q4 and after)	(5.40)	(10.53)	(2.14)	(2.50)	(2.10)	(2.82)	(3.89)	(5.41)	(4.24)	(5.52)
After recession *		–17.36		18.74**		–9.98**		57.21***		119.38***
Large unemp. growth		(32.36)		(8.98)		(4.91)		(21.20)		(23.92)
Large unemp. growth		81.15**		14.76		5.49***		–55.73		46.64
(6.5 pct. pts. or more)		(35.08)		(16.31)		(1.74)		(52.92)		(196.78)
Year trend	2.26	2.26	1.91**	1.90**	0.34	0.33	–0.43	–0.46	10.57***	10.63***
	(1.93)	(1.93)	(0.78)	(0.78)	(0.23)	(0.23)	(1.29)	(1.29)	(2.12)	(2.12)
Observations	13,463	13,463	14,494	14,494	11,215	11,215	16,501	16,501	14,830	14,830
R^2	0.20	0.20	0.25	0.25	0.17	0.17	0.75	0.75	0.87	0.87

Notes: All regressions include the following controls: institutional level (dummy variables for two-year and less-than-two-year institutions); institutional sector (dummy variables for non-profit, private, and for-profit institutions); 2000 Carnegie classification; institutional type (dummy variable for being a public flagship, HBCU, HSI, having a medical school, and being affiliated with a hospital); total expenditures; total expenditures squared; list in-state tuition and required fees; Barron's competitiveness ratings (a series of dummy variables); and total student enrollment. All models also include state fixed effects. Standard errors are shown in parentheses and have been clustered by institutional ID. Four-year colleges with less than one-third of their students from inside their state have been excluded from the sample, along with colleges in the most competitive category of the Barron's ratings.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

on the completion of certificates that take less than one year.[10] The results suggest that after the recession, the number of awards made by institutions in the form of certificates increased, with the largest growth in the number of less-than-one-year certificates. Certificates that take one to two years to complete also increased in states that had especially high growth in unemployment (similar results were found when using the CMHPI definition instead). The number of associate degrees awarded also increased after the recession, most notably in states with higher unemployment rates. In terms of bachelor's degrees, the number awarded fell after the recession in comparison to before, but again, in states that were hit hardest by the recession, the number of bachelor's degrees awarded increased on average. For all these models, similar results were found when looking at the differential effects in states with large reductions in the CMHPI. While this analysis does not include a long enough time frame to suggest that the recession affected initial student pathways and longer-term degree attainment, it may suggest that after the recession, upper-level students were more likely to stay in school to complete their degrees, especially in states where unemployment rates were particularly high.

7.4.2 The Effects of the Recession on What Families Pay: Tuition Costs and Financial Aid

To understand how the recession affected college affordability for families, table 7.6 focuses on the tuition revenue collected by institutions. The outcomes are all adjusted to be reported per FTE student. Models 1 through 3 focus on the gross tuition and required fees revenues collected by colleges, which includes student aid applied to tuition and fees. Models 4 through 6 instead use net tuition and required fees as the dependent variable, which is defined as the amount of money the institution takes in from students after institutional grant aid is provided. Finally, models 7 through 9 isolate the tuition revenue that comes directly from students—it does not count any financial aid, including federal, state, and institutional grants.

From all of the models, it is clear that families paid on average more after the recession than before. This is on top of a general increasing trend in the tuition revenue per FTE that happened throughout the analysis window. Most notably, the amount directly from students and their families increased $360 on average. The growth in costs to families were especially large in the states that experienced the recession more severely, with the increase being far more than double regardless of whether looking at states with large increases in unemployment or reductions in home values. While the Pell grant did increase during this time period, such increases appear to have

10. The outcome is defined as the total number of awards granted that require completion of an organized program of study in less than one academic year (two semesters or three quarters), or designed for completion in less than thirty semester or trimester credit hours by a student enrolled full-time.

Table 7.6 **The effects of the recession on college tuition revenue**

Dependent variable	Gross tuition and fees revenue per FTE			Net tuition and fees revenue per FTE (includes government aid to students)			Net tuition directly from students per FTE (does not include aid)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
After recession	165.26*	44.25	84.70	220.00**	78.67	119.14	360.14***	261.73**	286.27**
(2007Q4 and after)	(95.86)	(106.51)	(95.03)	(92.46)	(101.43)	(89.58)	(113.12)	(122.83)	(116.24)
After recession *		550.49**			643.58***			447.82**	
Large unemp. growth		(233.33)			(230.46)			(174.08)	
Large unemp. growth		1,083.78			1,062.07			350.82	
(more than 6.5 pct. pts.)		(710.62)			(743.35)			(614.67)	
After recession *			398.04**			498.93***			365.11**
Large HPI reduction			(195.09)			(188.17)			(159.08)
Large HPI reduction (fell			2,336.30*			3,483.44**			3,311.11***
80 pts. or more)			(1,321.21)			(1,374.98)			(930.81)
Year trend	157.60***	157.61***	157.77***	122.65***	122.63***	122.83***	–127.12***	–127.12***	–126.97***
	(34.22)	(34.22)	(34.21)	(33.12)	(33.11)	(33.10)	(33.37)	(33.38)	(33.37)
Observations	20,039	20,039	20,039	20,036	20,036	20,036	20,045	20,045	20,045
R^2	0.65	0.65	0.65	0.52	0.52	0.52	0.53	0.53	0.53

Notes: All regressions include the following controls: institutional level (dummy variables for two-year and less-than-two-year institutions); institutional sector (dummy variables for nonprofit, private, and for-profit institutions); 2000 Carnegie classification; institutional type (dummy variable for being a public flagship, HBCU, HSI, having a medical school, and being affiliated with a hospital); total expenditures; total expenditures squared; list in-state tuition and required fees; Barron's competitiveness ratings (a series of dummy variables); and total student enrollment. All models also include state fixed effects. Standard errors are shown in parentheses and have been clustered by institutional ID. Four-year colleges with less than one-third of their students from inside their state have been excluded from the sample, along with colleges in the most competitive category of the Barron's ratings. The outcome is per full-time equivalent student (FTE). Net tuition and required fees is the amount the institution takes in from students after institutional grant aid is provided (it includes government financial aid contributed in the name of the students. Net tuition directly from students is the tuition revenue that comes directly from students and does not count any financial aid [federal, state, local, or institutional grants]).

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

been outweighed by growth in college tuition prices and reductions in other forms of financial aid.

Table 7.7 provides additional evidence to suggest that financial aid receipt declined after the recession. First, even with major changes to the Pell grant, models 1 and 2 suggest that the percentage of students at the institutions in the sample who received a federal grant did not change after the recession. Moreover, the students at those institutions received on average less in grant aid than before. This might not indicate a reduction in an aid program; instead, it may reflect a change in the types of students receiving aid, and the amount could have declined due to less intense attendance patterns (i.e., part-time students receive less financial aid than full-time students). Similar results were found examining states with large reductions in the CMHPI. Meanwhile, student loan amounts increased. While there was a positive, though statistically insignificant, increase in the percentage of students who took out a loan, the mean amount received increased. In separate analyses, I did not find a change in the percentage of students who received institutional grants or the mean amount received.

7.5 Conclusions

The Great Recession has had important effects on both the supply and demand sides of higher education. Families suffered from reduced college affordability in the form of decreasing family incomes and home values and rising college tuition prices. Meanwhile, growing unemployment reduced the foregone costs of attendance, suggesting some of the trends caused by the recession could have had positive effects on college enrollment and spending. Moreover, complications such as the strong reliance on debt to finance college expenditures, large cohorts of recent high school graduates, and changing federal aid policy made the conditions surrounding the Great Recession even more complicated. Taken together, it was unclear, ex ante, what the overall effect of the Great Recession would be on college enrollment and family expenditures.

Taken in sum, the results suggest that the net effect of the recession has been positive in terms of college enrollment levels. While college enrollment increases generally each year, after the start of the Great Recession, there was an additional increase in attendance, and the growth in enrollment levels was concentrated at colleges and universities in the states that were hardest hit by the recession. The growth was strongest in terms of part-time enrollment and among students of color, thereby suggesting that the effects of the recession were not evenly felt by type of potential student. The growth in short-term awards suggests that higher unemployment did reduce the foregone costs of attending college, but the largest growth was in shorter, perhaps more vocational, programs that award certificates that take less than two years to complete. However, there may have also been an effect on degree

Table 7.7 The effects of the recession on financial aid received

Dependent variable	Federal grants				College loans			
	Percentage received		Mean amount received		Percentage received		Mean amount received	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
After recession	–0.3397	–0.6178	–190.86***	–182.70***	0.1138	0.0860	475.98***	506.31***
(2007Q4 and after)	(0.3868)	(0.3974)	(20.39)	(21.50)	(0.3788)	(0.4006)	(45.90)	(47.93)
After recession *		1.2955		–37.74		0.1298		–138.91**
Large unemp. growth		(0.7930)		(29.04)		(0.7202)		(69.94)
Large unemp. growth		15.5182***		–52.57		–8.7517**		–134.52
(more than 6.5 pct. pts.)		(3.5566)		(194.31)		(4.4465)		(260.14)
Year trend	2.2664***	2.2664***	378.23***	378.24***	1.0312***	1.0312***	345.08***	345.11***
	(0.1244)	(0.1244)	(6.88)	(6.88)	(0.1263)	(0.1263)	(15.14)	(15.14)
Observations	18,964	18,964	19,059	19,059	18,964	18,964	17,614	17,614
R^2	0.33	0.33	0.41	0.41	0.52	0.52	0.47	0.47

Notes: All regressions include the following controls: institutional level (dummy variables for two-year and less-than-two-year institutions); institutional sector (dummy variables for nonprofit, private, and for-profit institutions); 2000 Carnegie classification; institutional type (dummy variable for being a public flagship, HBCU, HSI, having a medical school, and being affiliated with a hospital); total expenditures; total expenditures squared; list in-state tuition and required fees; Barron's competitiveness ratings (a series of dummy variables); and total student enrollment. All models also include state fixed effects. Standard errors are shown in parentheses and have been clustered by institutional ID. Four-year colleges with less than one-third of their students from inside their state have been excluded from the sample, along with colleges in the most competitive category of the Barron's ratings. The percentages and mean amounts are for full-time, first-time degree/certificate-seeking undergraduates.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

completion among upper-level students, especially in states that experienced large increases in unemployment.

In terms of college affordability and financing, families paid more in tuition on average. Gross tuition and required fees as well as tuition revenue, not including financial aid, both increased after the recession at a rate that outpaced the general, annual upward trend. These increases were focused at institutions in states most severely affected by the recession. Examining trends in federal grants and loans confirms the findings that college affordability declined during the recession, even with the policy expansion of the Pell grant.

The overall enrollment and cost effects are similar to those found with previous recessions, but given all the factors that changed during the Great Recession, it is not surprising that the impact varied along a number of dimensions, including enrollment intensity, race/ethnicity, and type of degree awarded. The relative strength of the positive and negative influences of the recession varied by type of student. Moreover, just as the severity of the recession differed by state, so did the impact on college enrollment and affordability. This suggests that the effects of the Great Recession were varied due to the complex context.

Appendix

Table 7A.1 **Geographic variation in the severity of the recession (large changes in state unemployment rate and home price index [CMHPI], 2007Q1–2009Q4)**

Large absolute increase in unemployment rate (more than 6.5 percentage points)		Large absolute reduction in HPI (fell 80 points or more)	
Alabama	Illinois	Arizona	Massachusetts
Arizona	Michigan	California	Nevada
California	Nevada	Florida	New Jersey
Florida	Rhode Island	Hawaii	Rhode Island
		Maryland	

Source: Bureau of Labor Statistics (BLS), Local Area Unemployment Statistics (LAUS), Federal Housing Finance Agency (FHFA), housing price index (CMHPI) of conventional mortgages.

Notes: The CMHPI represents Fannie Mae and Freddie Mac-eligible mortgages on single-family detached properties (provided for loan limits up to $729,750 for one-unit properties). The All-Transactions House Price Index, which includes both sales of property and appraisal values from refinance transactions, is used here. The correlation between the two measures is 0.607. The correlation between the two measures is 0.5204.

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