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6

The Impact of the Financial Crisis on Faculty Labor Markets

Sarah E. Turner

What impact has the Great Recession had on the faculty labor market in the United States?[1] In the initial stage of the financial crisis, the relatively widespread announcement of hiring freezes, salary freezes, and work furloughs—particularly at public universities—suggested a nontrivial potential impact of macroeconomic conditions on employment and wages. Because faculty are an "input" in the higher education market, financial shocks to universities affecting hiring and compensation potentially impact student outcomes such as degree attainment, research flows, and the distribution of faculty among colleges and universities.

Unlike demand for other goods and services, which commonly decline in an economic downturn, demand for college and university education tends to increase. As evidence, total enrollment increased from 18.2 million to 20.4 million between fall 2007 and fall 2009. Yet, with substantial declines in state appropriations combined with endowment losses early in the financial crisis, instructional staffing has not adjusted commensurately and there is evidence of a substantial increase in student-faculty ratios, particularly at public colleges and universities.

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1. The NBER dates the most recent recession as the eighteen-month period from December 2007 to June 2009. In this analysis, we refer more generally to the financial crisis taking hold on a global scale in September 2008. Because the financial crisis hit college and university budgets with some lag, our focus in this chapter is on how faculty salaries and staffing have adjusted since 2008. In addition, the analysis concentrates on employment outcomes in the United States. One unanswered question is whether the financial crisis in the United States increased the flow of recent doctorates and faculty to universities abroad.

The adjustment of the faculty labor market to an economic downturn has potential effects on the "outputs" of higher education in terms of degree attainment and knowledge production. One point of consideration is the extent to which the impact of the Great Recession should be seen as a transitory event, with little long-term consequences, or as a structural change in the market conditions in US higher education.

A related observation is that the pace of adjustment of faculty labor markets is quite slow, particularly outside the most junior or "rookie" hires and nontenure-track appointments. Most fields operate on annual hiring cycles and senior hires generally take at least a year between initial posting and the commencement of a new hire. In all but the most opportunistic cases, movement of faculty in response to the financial crisis would not be initiated until the fall of 2009, with visible relocation not present until 2010. This process of long lags is not only a market characteristic, but places some notable limits on this analysis as much of the available data has yet to be released for years in which the effects of the recession are most likely to be seen.

Among colleges and universities in the United States there is considerable heterogeneity in sources of funds and how these resources have been affected by the fiscal crisis. Indeed, it is well established that US higher education is highly stratified in resources and student inputs, with this stratification increasing markedly in recent decades (Hoxby 2009). This analysis emphasizes the considerable heterogeneity across institutions in both the magnitude of the initial impact of the recent financial crisis and the duration of these effects. There are some indications that the financial crisis may widen stratification among institutions as resource differences determine an institution's capacity to hire at the junior and senior levels, as well as competing for top faculty in particular areas of expertise. A point of emphasis is that extended shocks are likely to have much larger impacts on a university's capacity to hire and retain faculty than even large shocks of short duration.

Perhaps the most significant distinction with lasting consequences for faculty labor markets and overall resources in higher education is the division between public and private colleges and universities. While there is no question that well-endowed institutions faced a significant hit to assets and liquidity at the start of the Great Recession, such shocks have proven to be relatively transitory. In contrast, those institutions receiving substantial state appropriations have faced more extended cuts in funding while also facing significant limitations in the capacity to raise alternative revenues through increased tuition charges. Institutions relying substantially on tuition revenues have also faced extended challenges: lagging incomes (and wealth loss) among families limits their capacity to pay for college and, in turn, the extent to which universities are able to cover (increasing) costs with tuition increases. Public institutions face a particularly difficult challenge as reductions in state support leave increasing tuition as one of the few channels of revenue available to avoid reductions in resources per student or student crowd-out.

The result is that the Great Recession has further widened differences between public and private universities in faculty staffing and, to some degree, salaries. In addition to the growing divergence between public and private institutions, differences among institutions within the private sector have also widened, as tuition-dependent private institutions face significant budgetary challenges.

This analysis begins with a brief discussion of the dynamics of faculty labor markets, outlining the importance of the tenure system, enrollment demand, and revenue structures in shaping faculty employment and wage responses to the Great Recession. In the second section, we provide an overview of employment and wage responses in the Great Recession, comparing the staffing responses in the Great Recession to prior cyclical downturns. This section distinguishes outcomes by faculty rank, focusing particular attention on the "rookie" market or recently minted PhDs, which is of particular significance in academia given the extent to which tenure limits the capacity to adjust employment of more experienced inputs.[2] The third section of the analysis turns to the presentation and testing of hypotheses about the determinants of adjustment of employment and salaries among institutions, examining how revenue sources and local economic conditions impact employment outcomes. In the final section, we consider whether there are discernible long-term implications and lessons from the observed evidence.

6.1 Why Are Faculty Labor Markets Different? Expected Responses to the Great Recession

The impact of recessionary conditions on faculty labor markets is vastly different than in labor markets in goods-producing sectors. Among the points of contrast to emphasize are the differences in the nature of the employment relationship in faculty labor markets (notably tenure), countercyclical demand in enrollment, and the structure of revenues affected by cyclical shocks.

6.1.1 Faculty Employment Arrangements

First, with a substantial share of faculty at four-year colleges and universities appointed with tenure or in tenure-track appointments, university administrators have limited capacity to terminate employment or close

2. A particular area of interest explored in only the most limited way in this analysis is the extent to which the Great Recession changes faculty retirement decisions. One hypothesis is that faculty experiencing large declines in wealth associated with loss of housing value or loss of retirement equity may choose to postpone retirement. Two dimensions make the question of whether the response to the Great Recession differs from other fiscal downturns. First, with the end of mandatory retirement in 1994, many faculty are now unconstrained. In addition, as a higher fraction of faculty are now covered by defined contribution rather than defined-benefit pension plans, we would expect somewhat greater sensitivity to market conditions in retirement decisions.

departments where demand may be lagging or the mode of delivery may be obsolete. Data from the National Study of Postsecondary Faculty indicate that about 92 percent of all full-time faculty and instructional staff were employed at an institution with a tenure system.[3] In turn, of those faculty employed at an institution with tenure, 52 percent held tenure while 22 percent were in a tenure-track position. Thus, the capacity to make major changes in employment may be far more limited than in other sectors of the economy.

While it is possible for colleges and universities to eliminate tenured positions by closing entire departments or programs, the incidence of such restructuring is exceedingly limited (see Johnson and Turner 2009). One might also ask why small departments are not merged with each other to enhance efficiency.

6.1.2 Cyclical Enrollment Demand

Unlike many consumption goods, the student demand for higher education tends to increase during cyclical downturns as an empirical matter. While decreased capacity to finance college reduces enrollment demand or shifts students to relatively low cost institutions,[4] weak labor market conditions correspond to a relatively low opportunity cost of time and greater enrollment demand. Figure 6.1 shows the overall trend in college enrollment in relation to the unemployment rate. The top panel illustrates the secular increase in college enrollment in recent decades while the bottom panel shows the change in enrollment net of the secular trend.

As has been well documented, student enrollment demand is markedly countercyclical. In work conducted before the Great Recession, Fitzpatrick and Turner (2007) examined age-specific responses in college enrollment to state-level variation in the unemployment rate (1977–2003). They found that changes in local unemployment rates produce the largest relative changes in enrollment for those twenty-two and older, with a 1 percentage point change in the local unemployment rate producing about a 0.3 percentage point change in the enrollment for those between the ages of twenty-two and twenty-seven. More recently, Barr and Turner (2013) document considerable procyclicality in postsecondary enrollment for both recent high school graduates and older students in response to the most recent economic downturn.

The intuition is straightforward: as jobs become scarce, the opportunity cost of college falls. The change in enrollment tends to be concentrated among students who are at the margin of attending college, including nontraditional students (Turner 2003). Significantly, much of the increase in

3. US Department of Education, National Center for Education Statistics, 2004 National Study of Postsecondary Faculty, http://nces.ed.gov/das/library/tables_listings/showtable2004.asp?popup=true&tableID=1313&rt=p.

4. For example, Lovenheim (2011) shows that, particularly for relatively low-income families, changes in housing wealth have a significant effect on enrollment.

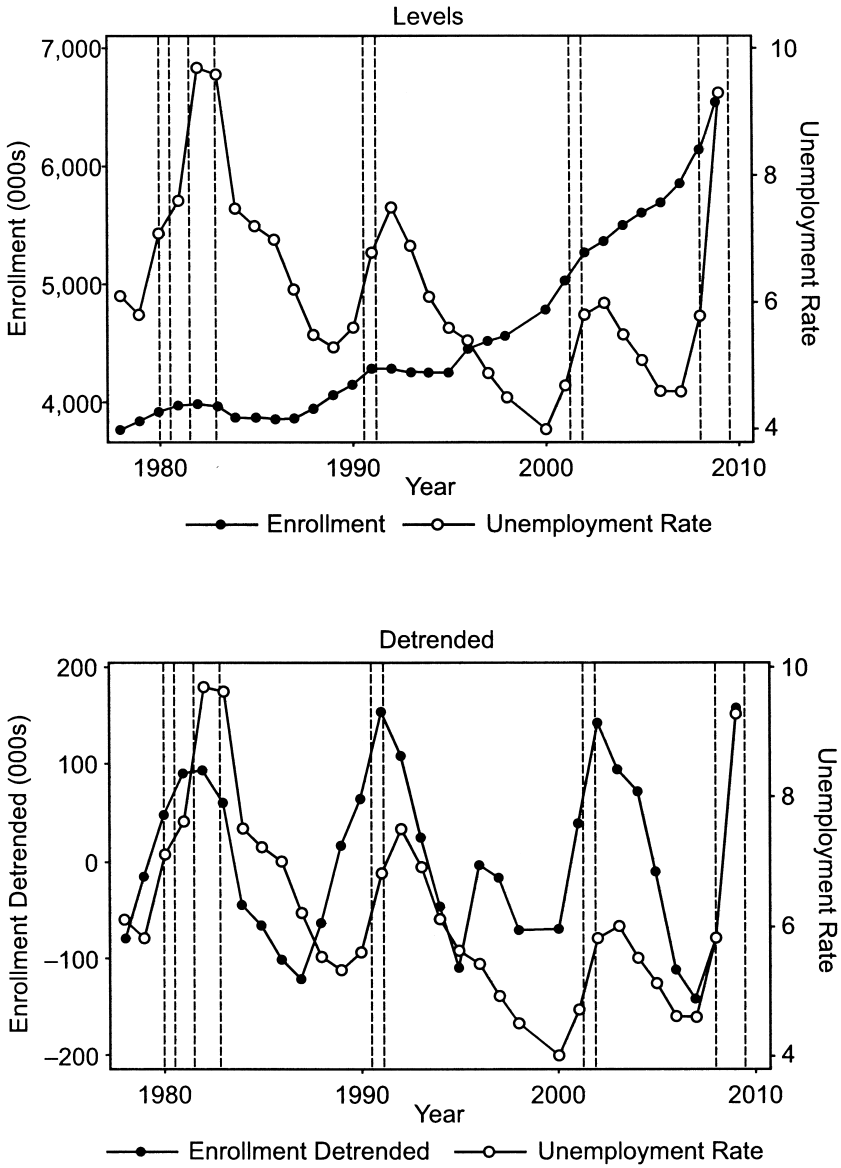


Fig. 6.1 Trends in total enrollment and unemployment rates, 1980–2012

Sources: Figure from Barr and Turner (2013). Enrollment data are from NCES institution aggregate enrollment figures derived from HEGIS and IPEDS surveys.

Notes: "Detrended" enrollment removes a cubic trend from the series. Vertical lines indicate recessions as benchmarked by NBER.

college enrollment comes from students outside the pool of recent high school graduates (Betts and McFarland 1995; Christian 2006). There is far less research evidence to draw on with respect to the question of how recessions affect college choice. There is some evidence to suggest that fiscal downturns may lead moderate income students who are unlikely to be eligible for financial aid to shift from private colleges and universities to public colleges and universities, though such effects are not well established. (A point that we return to later in this chapter is that this enrollment response is disproportionately concentrated at open access, four-year institutions and community colleges.)

Increases in enrollment are most prominent at colleges and universities that are relatively elastic in supply, including open access four-year institutions. These institutions are generally nonresidential and focus degree and certificate programs in technical, professional, and vocational fields. In addition, there is some evidence that the enrollment response in the Great Recession has been somewhat greater than in prior cyclical downturns, resulting in part from a jump in the generosity of federal Title IV funding (including the increase in the maximum Pell grant). The Pell grant increased to a level of $5,500 in 2010, greater than the constant dollar value of the 1976 level of $5,345, which is an appreciable rise over the low of $3,430 in 1994 in constant dollars (Barr and Turner 2013). The increasing generosity of the Pell program and the rise in the number of recipients has contributed to a substantial increase in program expenditures over the last decade, with total expenditures rising from $7.9 billion in 2000 to $35.6 billion in 2010 (College Board 2011). The American Opportunity Tax Credit introduced under the American Recovery and Reinvestment Act of 2009 (ARRA) supplanted the Hope and Lifetime Learning credits with the rebranded tax credits, not only raising the annual credit from $1,800 to $2500, but also expanding the credit to higher- and lower-income taxpayers by expanding the phase-out range and adding a provision for refundability.

The College Board (2011) estimates that these tax-based expenditures for college education increased from $4.75 billion in 1998 to $14.83 billion in 2010. A distinguishing feature of the most recent recessionary period is the extent to which the generosity of federal financial aid programs such as Pell, but also tuition tax credits, increased at the start of the cyclical downturn.

When thinking about faculty staffing responses to the Great Recession, it is important to distinguish "new demand" and "replacement demand." To the extent that the increase in the enrollment demand in the Great Recession is purely transitory, one might think of it as imprudent for a university to respond to a short-term growth in student demand with a long-term hiring investment (such a tenure or tenure-track position). In this regard, we would expect those institutions with the largest cyclical increases in enrollment demand to respond in large part with increases in temporary staffing.

6.1.3 Revenue Streams in the Great Recession

While increased demand might be thought of as "good news" for faculty labor markets, substantial shocks to other college and university revenue sources during the financial crisis have had an adverse effect on tenure-track hiring and salaries in recent years. For most colleges and universities, tuition ("fee for service") covers only a portion of college and university operating expenditures. Students at many colleges and universities are the recipients of substantial subsidies from public appropriations and private endowment funds. Over the course of the last several decades, there is evidence that student subsidies have increased at the most selective institutions (particularly in the private sector), while declining somewhat in the public sector (see Hoxby 2009; Bound, Lovenheim, and Turner 2010).

A marked feature of the Great Recession is the extent to which both appropriations from public sources and private investment returns declined. Figure 6.2 shows state appropriations per full-time equivalent (FTE) at public institutions along with total state appropriations by year; figure 6.3 presents endowment returns. One point to note is that the timing of the decline in endowment returns actually modestly precedes the decline in state appropriations, suggesting that the impact of the fiscal crisis started somewhat earlier for endowment-dependent privates than for public institutions dependent on state appropriations. While 2007/8 is a "local peak" in appropriations, endowment income started its slide in this year only to fall dramatically in 2008/9.

Yet, while endowment returns have largely recovered in the two most recent years, state appropriations continue to slide on an aggregate level as well as a per-student basis. Moreover, while federal stimulus resources passing through the states may have moderated the impact of declining state resources in 2010 and 2011, this source of funding had largely disappeared by the 2011/12 academic year. For public universities, these funding cuts are layered on top of state funding mechanisms that were in disrepair prior to the recession (Kane, Orszag, and Gunter 2003). Kane, Orszag, and Gunter (2003) identify crowd out from Medicaid as one factor placing downward pressure on state higher-education funding while Rizzo (2004) identifies elementary- and secondary-education funding as another source of fiscal pressure on higher education. The evidence is clear that pressure to reduce state funding on higher education started well before the financial crisis (Bettinger and Williams 2012).

Examination of revenue streams by type of institution serves to illustrate how different types of colleges and universities are impacted by changes in the availability of funding for higher education. Table 6.1 shows the primary revenue sources for four-year colleges and research universities in the public and private sector for selected years from 1999–2009. In the public sector, a notable observation is that the ratio of net tuition (posted

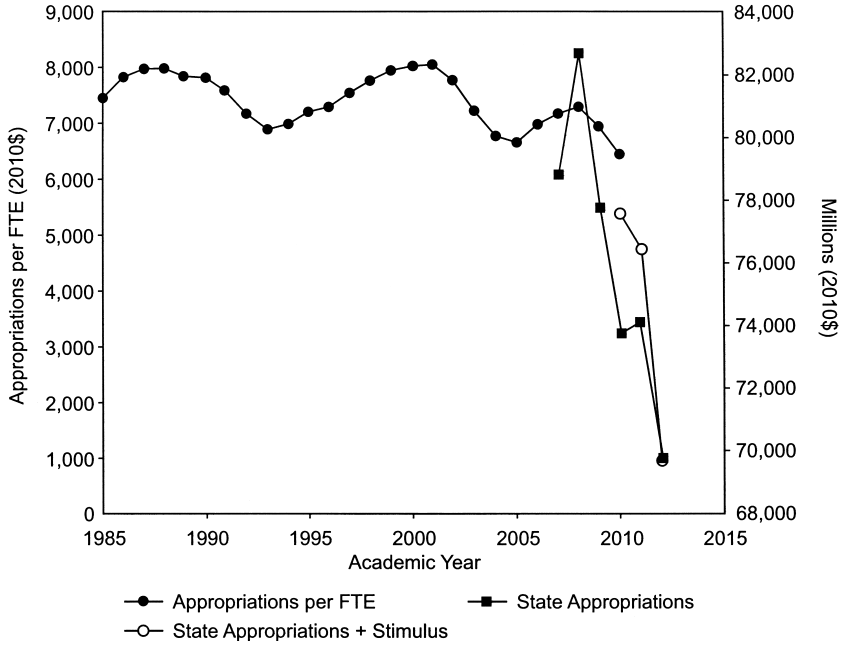


Fig. 6.2 Public educational appropriations per FTE and overall, 1985–2010

Source: State Higher Education Executive Offices and State Higher Education Finance (SHEF) project (http://www.sheeo.org/finance/shef-home.htm).

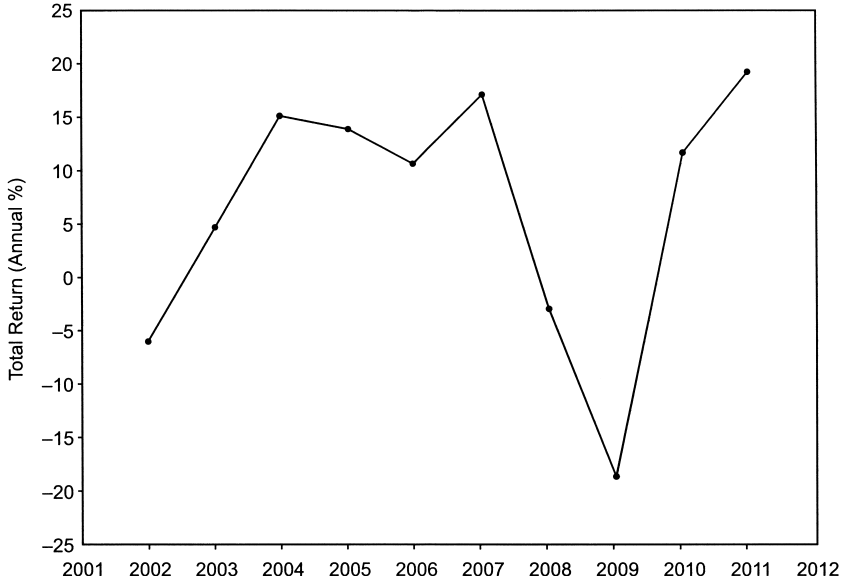


Fig. 6.3 Average annual endowment returns

Source: NACUBO endowment survey.

Table 6.1 Average revenues per FTE student, academic year 1999–2009

	Public			Private-nonprofit		
	Revenues per FTE (2009$)					
	1999	2007	2009	1999	2007	2009
	Research institutions					
Net tuition	5,353	7,500	8,030	16,825	19,780	20,363
State and local appropriations	10,370	9,453	8,686	499	783	714
Federal appropriations + grants	4,940	7,908	8,098	9,105	11,431	11,273
Auxiliary enterprises	8,747	10,139	10,915	18,079	22,475	22,142
Operating revenues	29,410	34,752	35,736	43,777	53,661	53,617
Private gifts, investment, endowment return	2,204	3,351	–387	26,612	46,342	–30,256
Total operating revenue	31,614	38,103	35,350	70,389	100,004	23,361
	MA institutions					
Net tuition	4,075	5,580	5,923	11,895	14,242	14,864
State and local appropriations	7,411	6,772	6,416	442	345	362
Federal appropriations + grants	1,493	1,990	1,968	1,046	906	892
Auxiliary enterprises	3,009	3,308	3,527	3,612	4,128	4,018
Operating revenues	15,956	17,591	17,778	16,458	19,255	19,762
Private gifts, investment, endowment return	407	614	273	5,096	5,778	–1,258
Total operating revenue	16,351	18,205	18,050	21,537	25,033	18,504

Source: Trends in College Spending 1999–2009. Delta Cost Project.

tuition-institutional aid) to operating revenues is about 0.22 among research universities and about 0.33 at master of arts (MA)-level institutions, implying the importance of subsidies from other sources. While the per-student subsidy from state sources declined between 2007 and 2009 (by 8 percent in the research sector and 5.2 percent in the MA sector), this decline followed secular declines of more than 8 percent between 1999 and 2007. As an accounting matter, the income statement records investment gains and losses along with private gifts on an annual basis that illustrate the large fluctuations in endowment returns. To this end, the magnitude of the 2009 market losses on a per-student basis are readily apparent for 2009 with per-student investment returns and private gifts declining by more than $30,000 among private research institutions. Because private institutions use spending-rule policies to smooth payouts over time, with typical spending rates about 5 percent of assets computed as a moving average over several years,[5] the realized

5. Brown et al. (2010) show that universities do not follow payout rules strictly, but actively reduce payouts when faced with negative (not positive) shocks to returns.

change in spending is appreciably more modest than the overall gains and losses from endowment and private gifts.

Over the course of the last decade, there has been quite a dramatic increase in net tuition revenues defined as the difference between the "sticker price" charges and institutional financial aid. At public institutions, net tuition revenues per FTE increased about 40 percent between 1999 and 2007, followed by increases of 6–7 percent between 2007 and 2009. In turn, net tuitions have also increased at private institutions, albeit from a higher base. For private institutions outside the research universities, tuition is the primary source of revenue and, as a result, changes in family financial conditions that impact capacity to pay for college may affect these institutions most markedly. Still, as "affordability" has become a buzzword in the political dialogue, there are strong limits on the further upward pressure in tuition that can realistically follow. While much of the political dialogue focuses on the increase in the "sticker" price increases,[6] net tuition revenue rises less than a dollar for dollar with increases in posted tuition as the financial need of aid-eligible students increases while the pool of aid-eligible students for whom expected family contribution is less than expected college costs may also increase.

In effect, funding shocks to appropriations from the states and declines in private funding sources effectively shift in the budget constraint to colleges and universities. Consider a simplified university budget constraint in which expenditures on faculty (F at wages w) and expenditures on capital and other inputs (K at price p) equal revenues from state appropriations, federal grants, and net tuition.

$$FW + pK = \text{Appropriations} + \text{Federal Support} + \text{Endowment Returns and Private Gifts} + \text{Net Tuition}.$$

In effect, funding shocks to appropriations from the state- and private-funding sources effectively shift in the budget constraint available to colleges and universities. Limited capacity to substitute capital for labor, combined with few degrees of freedom to reallocate workers, leaves few levers in the hands of university administrators. Moreover, colleges and universities will likely face limited capacity to raise tuition to produce additional revenues. The result is a tough choice between adding students at a "diluted," lower level of resources per student or raising tuition (Bound and Turner 2007).

So, when the financial crisis effectively cuts one or more of the sources of support in this budget constraint, how do universities adjust faculty

6. Bowen (2012) notes "The word 'affordability' has achieved iconic status and become a part of the ad wars in the 2012 presidential campaign." Such dialogue follows from attention to reference points such as the rise in the average price of a year at an in-state, public four-year college to $8,244 in 2011/12 from $2,242 (in 2011 dollars) thirty years earlier, which represents an annual growth rate of 4.4 percent beyond inflation (College Board 2011). As College Board data demonstrate, the charges net of financial aid by parents and students have increased much more modestly given the rise in the availability of federal financial aid and efforts by colleges and universities to increase need-based financial aid.

staffing?[7] In effect, the only options for adjustment are in compensation and hiring, with hiring latitude most likely constrained to junior-level appointments. Given the diversity of revenue sources across institutions as well as state-specific variation, we would expect to see considerable differences across universities in their response. Still, while revenue shocks may be local, faculty labor markets are largely integrated and national; the result is that the extent to which an institution can curtail compensation is effectively dictated by a competitive market.

In the next section, we present broad trends in hiring and compensation in the faculty labor market at the national level. In section 6.3, we turn to the measurement of how institutional characteristics and revenue composition explain changes in the faculty labor market in the Great Recession.

6.2 Broad Empirical Context

The sharp declines in revenues from state appropriations and private sources that became evident in 2008/9 brought an immediate response among some public administrators and university leaders. The most publicly visible manifestations of the financial crisis were the across-the-board personnel measures taken at some institutions including suspension of hiring, salary freezes, and furloughs, which amount to reductions in real earnings. In an informal analysis of university websites and student newspapers, we identified 24 of 100 research universities that instituted hiring freezes between the fall of 2008 and the spring of 2009, while an additional fourteen institutions instituted salary freezes. Table 6.2 provides examples of specific policies enacted at Association of American Universities (AAU) and National Association of Independent Colleges and Universities (NAICU) institutions. Especially hard-hit states include California, Maryland, and Illinois, which instituted across-the-board faculty furlough policies.

As is well known to university leaders, such across-the-board policies likely generate some inefficiency because they do not allow for the consideration of differential impacts and returns to staffing cuts. (Indeed, policies requiring cuts in core functions may actually increase costs as institutions must hire more expensive temporary staff or pay overtime in order to meet the needs of basic service provision.) Before turning to the examination of institutional microdata, this analysis charts the staffing and salary changes in the Great Recession in the context of other secular and cyclical trends over the last three decades.

6.2.1 Staffing Trends

Examined over the course of the last several decades, overall faculty-staffing levels have increased unambiguously across institution types. (Figure 6.4

7. Private institutions may have greater capacity than public institutions to adjust to temporary revenue shortfalls with intertemporal borrowing.

Table 6.2 **Faculty hiring and compensation policies in response to Great Recession**

A. AAU universities

Institution	Control	Hiring freeze	Salary freeze	Furlough
Indiana University	Public	2010/11 administrative pers.	2009/10 & 2010/11: 2 years of faculty and staff	
The Ohio State University	Public		2009/10	
The Pennsylvania State University	Public		2009/10 & announced March 25, 2011 faculty and salary freezes effective July 1, 2011	
Purdue University	Public		2008/9 & 2009/10: Oct 2010 merit-based increases returned system-wide	
Rutgers, The State University of New Jersey	Public		FY2010 faculty and staff	
University of California, Davis	Public		Jan. 14, 2009 top admin. and senior management pay freeze through 2009/10	July 16th, 2009, a 2009/10 SYSTEM- WIDE furlough faculty and staff required 11–26 days
University of California, Berkeley	Public	Staff 2009/10 to present	Jan. 14, 2009, top admin. and senior management pay freeze 2009 through 2011	July 16th, 2009, a 2009/10 SYSTEM-WIDE furlough faculty and staff required 11–26 days
University of California, Irvine	Public		Jan. 14, 2009, top admin. and senior management pay freeze 2009 through 2012	July 16th, 2009, a 2009/10 SYSTEM -WIDE furlough faculty and staff required 11–26 days
University of California, Los Angeles	Public	Mar. 29, 2009, hiring reduction (faculty with EVC/provost approval/staff maintaining level of open positions on general funds; 354 FTE in 2009). (2013/14?)	Jan. 14, 2009, top admin. and senior management pay freeze 2009 through 2013	July 16th, 2009, a 2009/10 SYSTEM-WIDE furlough faculty and staff required 11–26 days
University of California, San Diego	Public		Jan. 14, 2009, top admin. and senior management pay freeze 2009 through 2014	July 16th, 2009, a 2009/10 SYSTEM-WIDE furlough faculty and staff required 11–26 days
University of California, Santa Barbara	Public		Jan. 14, 2009, top admin. and senior management pay freeze 2009 through 2015	July 16th, 2009, a 2009/10 SYSTEM-WIDE furlough faculty and staff required 11–26 days

University of Illinois at Urbana Champaign	Public		2009/10	
University of Maryland at College Park	Public	Late 2008 system-wide "soft" hiring freeze with administrator review ends May 11, 2009. July 29th hiring freeze announced.		Sept 19, 2009, plan announced furloughs beginning FY2010 & 2011. State-funded faculty and staff
University of Michigan	Public			
University of Minnesota, Twin Cities	Public	November 11, 2008: System-wide hiring freeze of all nonessential positions.		
University of Missouri-Columbia	Public	November 18, 2008: Missouri system-wide hiring freeze for nongrant and noncontract-funded faculty and staff.		
The University of North Carolina at Chapel Hill	Public	January 3, 2011. State-funded positions hiring freeze for FY2011/12		
University of Virginia	Public	2008/9: External soft hiring freeze for admin/staff.		
The University of Wisconsin-Madison	Public			All employees Sept. 2010 results in 3% decrease
Brown University	Private	Nov. 1, 2008 (temporary for staff and admin)		
Carnegie Mellon University	Private	Dec. 9, 2007: Freeze July 1, 2009 through June 30, 2010. March 27, 2011, end planed before 2011/12 academic year.		
Harvard University	Private	November 25, 2008: Staff hiring frozen and dean of arts & sci. encourages canceling faculty searches	Dec. 9, 2008, faculty and nonunion staff	
Johns Hopkins University	Private	Feb. 13, 2009		
New York University	Private	February 27, 2008: NYU admin. hiring freeze		

(*continued*)

Table 6.2 (continued)

B. NAICU institutions

Cost-cutting steps	2008 responses of independent colleges and universities to economic conditions		2009 responses of independent colleges and universities to economic conditions	
	Number	Percent	Number	Percent
Froze tuition levels	17	4.6	13	4.6
Froze new hiring	185	49.9	152	53.5
Froze salaries	82	22.1	133	46.8
Cut or froze institutional student aid budget	31	8.4	124	43.7
Slowed down current construction/renovation projects	180	48.5	107	37.7
Delayed maintenance	145	39.1	87	30.6
Laid off faculty	39	10.5	20	7
Laid off staff (nonfaculty)	58	15.6	54	19
Gave smaller than usual salary increases	154	41.5	78	27.5
Cut salaries/benefits	27	7.3	48	16.9
Cancelled planned construction/renovation projects	79	21.3	44	15.5
Cut student services	36	9.7	12	4.2
Cut academic programs	27	7.3	11	3.9

Sources: For panel A, author's compilation from university websites and press accounts. For panel B, "Survey on the Impact of the Economic Conditions on 2009 Enrollment, Financial Aid and Budgeting at Independent Colleges and Universities." NAICU, June 19, 2009. Available online at http://www.naicu.edu/news_room/full-results-naicu-fall-2009-economic-impact-survey. "Preliminary Results: Survey on the Impact of the Economic Conditions on Independent Colleges and Universities." NAICU, December 18, 2008. Available online at http://www.naicu.edu/docLib/200812181_naicueconsurveyprelim.pdf.

shows the increase from 1970 to 2010 using highly aggregated Department of Education data and combines staffing changes across a wide range of institutions.) Consistent with overall trends in enrollment growth, increases have been greatest in the two-year sector and among public institutions, with a marked shift to part-time staffing also evident in the data.

Beyond the broad secular trends in these data, there is also evident cyclical variation in faculty staffing. To see this variation, Figure 6.5 shows the changes in student-faculty ratios over the extended interval from 1990 to the present. Vertical lines on these graphs correspond to periods of documented recession and the unemployment rate is shown on the right axis. To quantify this change, we present a regression of the log of student-faculty measures on the log of national unemployment measures with the inclusion of a secular time trend. Over the whole interval, a 10 percent increase in the unemployment rate links to a 1.2 percent increase in the student-faculty ratios, with these adjustments particularly large at two-year institutions and in the public sector. Indeed, the largest adjustments are among part-time faculty and one would expect that such changes incorporate temporary adjustments to enrollment demand.

As will become evident in the next section, changes in staffing ratios in cyclical downturns are not simply limited adjustment to new demand. With sharp budget cuts, colleges and universities often address short-term budget constraints with suspensions in hiring.

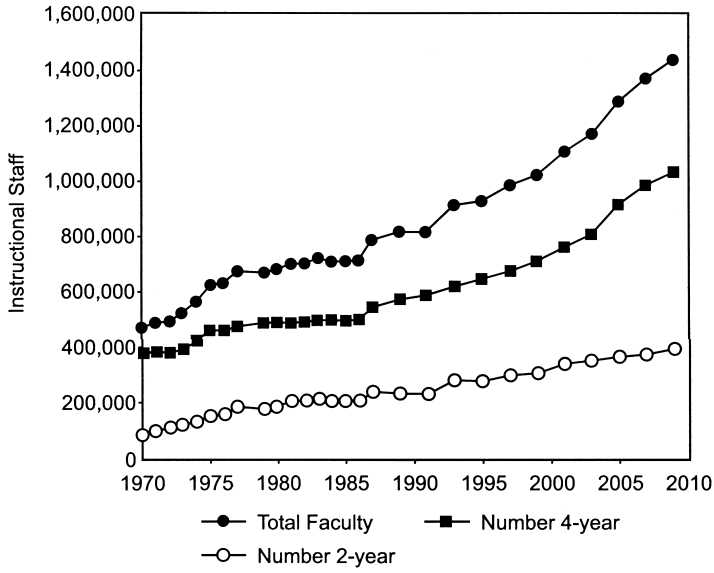
6.2.2 Rookie Market Evidence

While federal and national data collections present only limited information on new hires, the effects of recessionary conditions on the market for junior faculty are evident in discipline-specific sources. Table 6.3 presents job postings by selected fields (economics, English, foreign languages, and sociology) as reported by professional associations. These data provide clear evidence of the sharp contraction in employment activity beginning with academic year 2008/9 and continuing to a steep drop in2009/10.[8]

In the English field, assistant professor postings dropped 27 percent (from 990 to 714) between 2007 and 2008 and then declined a further 21 percent (to 562) between 2008 and 2009. Similarly, foreign language postings fell from 779 to 635, then to 452 between 2007 and 2009. While there was some modest recovery in these fields in 2010 and 2011, junior faculty postings in 2011 were 35 percent below the 2007 level in English and 34 percent below the 2007 level in foreign language fields. An interesting point of note is that postings at the nontenure-track instructor rank declined—but much more modestly—than those in the tenure-track category. There are some indica-

8. What is more, it is widely suspected that job postings in 2009/10 are an overestimate of the number of departments that engaged in full searches, as there is considerable evidence of canceled searches in the fall of 2008 and winter 2010.

A. Counts of Instructional Staff



B. Share of Instructional Staff by Full-Time Status and Institutional Type

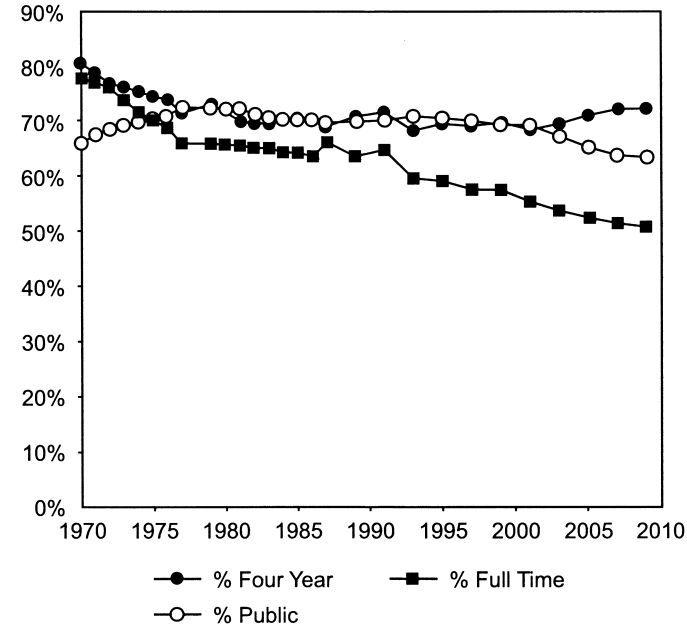


Fig. 6.4 Overall trends in instructional staff, 1970–2010

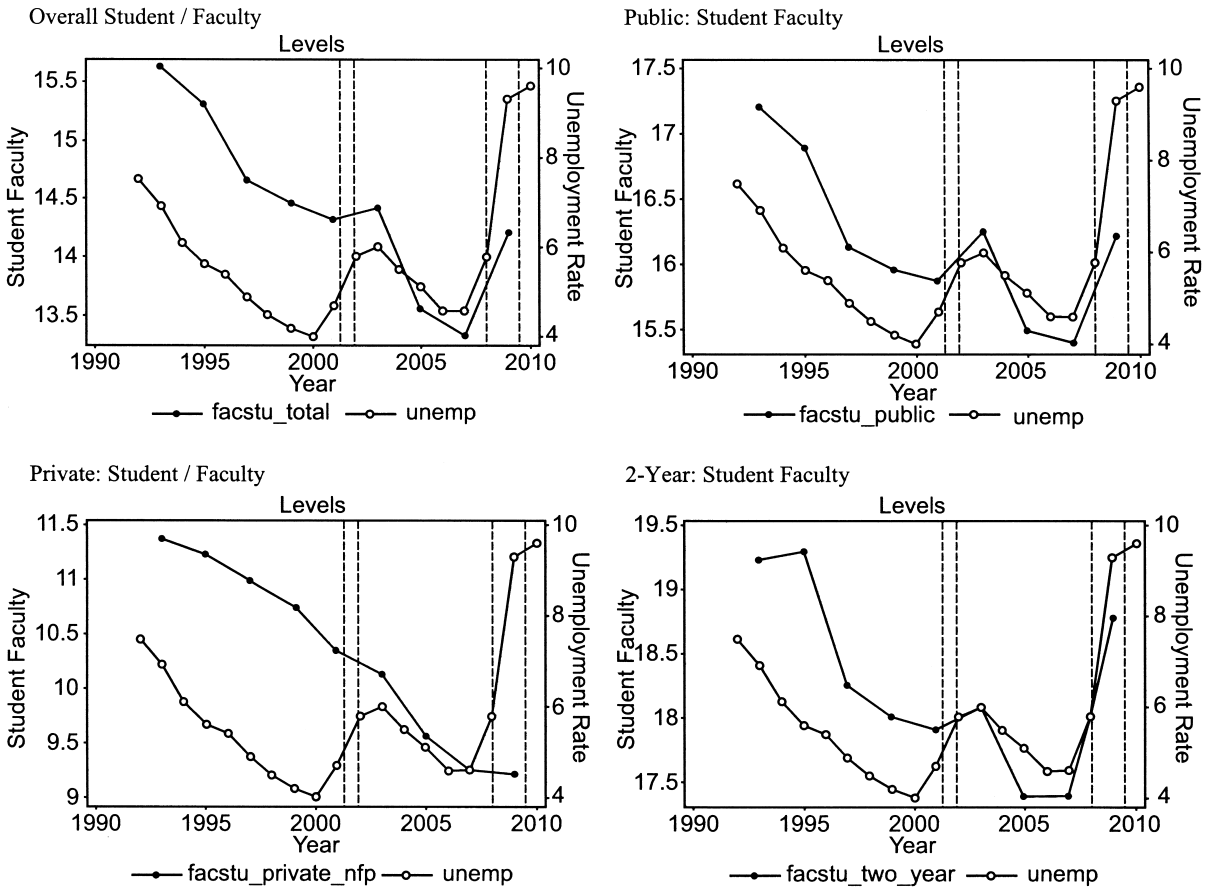


Fig. 6.5 Overall student-faculty ratios, 1990–2010

Table 6.3 **Job postings by discipline, selected fields**

	Economics		English		Foreign language		Sociology	
Academic yr. beginning	4-year	Univ. w/ grad. programs	Asst. professor	Instructor	Asst. professor	Instructor	All academic	Assistant professor
2000	277	650	1025	143	791	201		
2001	274	657	1006	123	739	183		
2002	266	632	963	113	765	171		
2003	218	635	865	103	667	192		
2004	229	643	956	136	689	210		
2005	301	720	914	125	686	219		
2006	264	770	1005	130	791	301	1,086	610
2007	315	959	990	178	779	320		
2008	287	1034	714	158	635	194	499	345
2009	198	949	562	157	452	220	351	214
2010	208	1112	643	120	503	218	482	303
2011	218	1199	640	138	509	251	551	354

Sources: Author's tabulations from professional societies including the American Economics Association, the MLA, and the American Sociology Association.

tions that institutions and departments have relied increasingly on instructors and other nontenure-track appointments when they are unable to gain authorization for permanent hires.

In economics, academic postings outside of research universities dropped from 315 in 2007 to 287 in 2008 and then further to 198 in 2009; by 2011 there was some rebound (to 218 postings), though this was nevertheless 31 percent below the 2007 level. Job postings at the research universities with graduate programs in economics exhibited a much more muted response to the fiscal crisis: they declined relatively modestly between 2008 and 2009 (from 1,034 to 949) and finished 2011 with a level of posting above that observed in 2007. These data suggest that the greatest sustained impact of the pull back in junior hiring has occurred outside the research sector.

6.2.3 Salaries

The measurement of how faculty wages and compensation respond to cyclical changes is dramatically complicated by the compositional changes in staffing associated with economic downturns. Averages—at the national level or even by type of institution—present a mix of changes in composition by rank, field of study, and institutional type. Delayed hiring combined with limited hiring at the junior level push average salaries up, even when changes in real wages to individuals have been minimal. While there is some evidence of increased stratification in salaries by type of institution and discipline over the long horizon (Johnson and Turner 2009), it is difficult to discern recession-induced changes in available data.

6.3 Modeling Stratification and Understanding Changing Academic Employment Relations

Because colleges and universities differ markedly in revenue sources and student demand, we investigate the extent to which there are substantial differences in faculty labor-market adjustments in response to the Great Recession. We begin by documenting the sizable differences in employment changes by public-private status and by institutional type. We present these results both graphically and in a simple regression context to illustrate the magnitude of differences by sector.

For this analysis, we focus on four-year-degree-granting institutions in the public and private nonprofit sectors. While interesting in their own right, we set aside the analysis of for-profit institutions and community colleges as these institutions have few tenured faculty and are most likely to draw faculty from professionals in the local labor markets.

6.3.1 Evidence: Primary Data Sources

The data available for this inquiry come from two institutional surveys of colleges and universities. The annual administrative surveys of the Depart-

ment of Education under the heading of the Integrated Postsecondary Data System (IPEDS) contain modules for the mandatory collection of data on staffing, enrollment, and finances. These data are collected on an annual basis, though the timing of data collection produces some unfortunate lags for this analysis; for example, fall 2010 is the most recent year of enrollment observed, while data on staffing is available only through academic year 2009/10.[9]

A second source of data is the annual surveys conducted by the American Association of University Professors (AAUP). This resource records full-time instructional staff. The data provide a full representation of the four-year institutions from the public and nonprofit sectors. The AAUP data have an advantage over the IPEDS data in that they provide coverage through 2011/12 in faculty counts, as well as distinguishing rank and salary by rank. Overall, one should view the data from IPEDS and AAUP data as complements not substitutes.

In addition, limited data on salaries and new hires by field among AAU institutions are also available for 2007–2011. These data afford a more detailed look at the hiring and compensation behavior among top research universities, though disclosure requirements do not permit the identification of specific private institutions to the researcher. As a result, while private-public aggregate comparisons are feasible within this interval, it is not possible to control in an econometric sense for fixed differences between the private institutions or for differences in the impact of the financial crisis.

The data available from these sources are somewhat short of the ideal data set that one would use to study many of the significant questions about academic labor markets. One shortcoming of both the AAUP and IPEDS data sets is that they do not record academic labor market outcomes by field of study. To the extent that faculty labor markets really operate at a disciplinary level (economists do not compete for the same jobs as engineers or English professors), it would be ideal to have counts for a wide range of institutions by discipline as well as rank and institution. What is more, systematic study of behaviors like retirement or attrition from the profession really requires access to unit-record data. While public institutions do place baseline salary information in the public domain as required by most state public information requirements, private institutions do not as a matter of practice share such information on a regular basis. There are surely large gains to be achieved for the research community and policymakers in higher education to making at least some of these data available to researchers in a restricted form.

6.3.2 Empirical Strategy

With more than a thousand four-year colleges and universities in the United States, the aim of this chapter is to identify the main labor market

9. In conducting the analysis we make use of the data assembled across surveys in the Delta Cost Project, allowing for institutionally consistent longitudinal analyses.

adjustments to the fiscal crisis and, in turn, the extent to which institutional fiscal circumstances contribute to the observed academic labor market outcomes. The analysis focuses on the period from 2006 to 2011, with years referring to the academic year beginning in the indicated fall (2006 is the 2006/7 academic year). As a starting point, we consider the basic empirical link between type of institution and faculty outcomes in a regression format:

$$Y_{it} = \alpha_i + \sum_{t=2007}^{2011} \delta_t + \sum_{t=2007}^{2011} \gamma_t D_i + \epsilon_{it},$$

where Y is an outcome such as faculty staffing in a given category (such as assistant professors) in year t for institution i. We are interested in, first, the evolution of the year-specific fixed effects and secondly, the extent to which these vary with institution categorization (D), which includes public-private control, Carnegie rank, and so forth. To make meaningful comparisons among institutions, we control for institutional fixed effects (α). Thus, the measured δ and γ parameters capture the average year-specific difference from the baseline year (2006). We focus on three primary outcome measures: counts of faculty by rank (available from 2006–2011), student-faculty ratios (available from 2006–2010),[10] and faculty salaries. (Faculty salary analysis using AAUP data are not reported in this draft. In the main, preliminary results indicate minimal real changes on the salary margin outside of research universities.)

6.3.3 Results

To begin, we present graphical results comparing faculty staffing by public-private control status for different rank levels—full professor, associate professor, assistant professor, and instructor. (In all cases, AAUP data are limited to full-time instructional personnel so these data do not record changes in the use of part-time staff; data from the IPEDS files provides some limited information on this staffing outcome.) Figure 6.6 illustrates the average trend in faculty by rank, with counts at public institutions shown on the left axis (black circles) and private institutions on the right axis (empty circles).[11] For all faculty categories, there is a broad upward trend in hiring from 2006–2008. After 2008, there is an unambiguous slowing of growth and—in some cases—decline in employment levels. For the "assistant professor" and "instructor" categories, the post-2008 decline is evident, likely reflecting institutional capacity to shift hiring in these headings relatively quickly. Examination of the full professor and assistant professor ranks

10. The most recent year of enrollment released by the Department of Education covers fall 2010.

11. Vertical lines indicate the "timing" of the recession recorded by NBER as the end of 2007 to mid 2009. What is clear from even the most basic consideration of the data is that the substantive impact of the financial crisis on the faculty labor market becomes apparent in these faculty counts somewhat later—with 2009 as the first year in which real effects are evident.

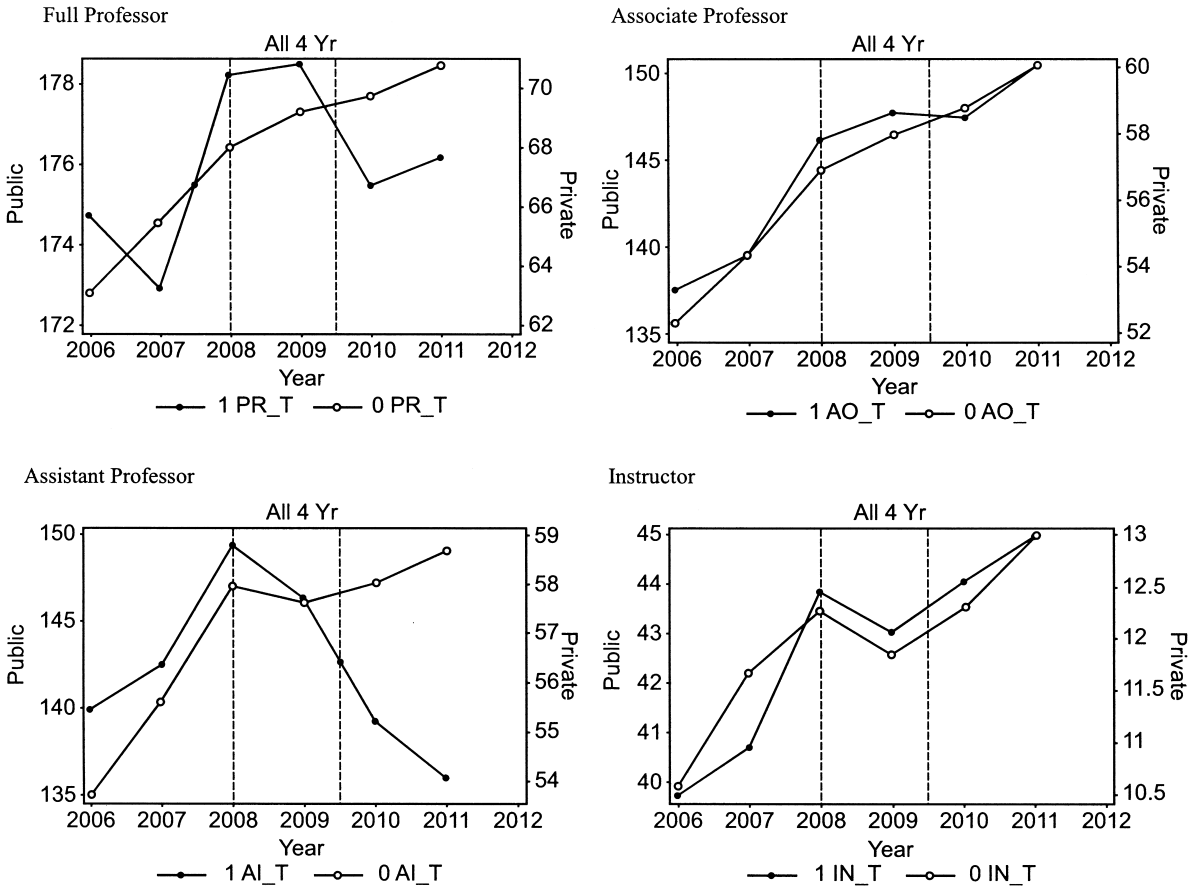


Fig. 6.6 Trends in average institutional full-time instructional faculty by rank, four-year institutions, 2006–2011

reveals a sharp divergence between public and private institutions in employment patterns. For public institutions we see an unambiguous decline, while for private institutions the height of the fiscal crisis is reflected in more of a plateau; the result is a relative widening of the staffing gap between public and private institutions, which is most evident at the junior faculty level.

Focusing on comparisons within broad Carnegie type, figures 6.7 and 6.8 illustrate hiring patterns at the full professor and assistant professor level. At the full professor level, private research universities demonstrate persistent increases in staffing while there is an unambiguous decline in senior appointments at public universities, with much of this decline taking hold in 2010 and 2011. At the junior level in figure 6.8, the persistent decline in hiring among public institutions from the peak in 2008 is clearly evident; the magnitude of these changes are also notable with declines from 9–11 percent in annual hiring.

While hiring levels tell part of the story, student-faculty measures provide a fuller indicator of the extent to which colleges and universities adjust to the pressures of the financial crisis by decreasing resources per student. Figure 6.9 shows the changes in student-faculty ratios, with increases indicating fewer resources per student; to ease comparison, the series for public (black circles) and private (empty circles) are indexed to the base of 2008. Across Carnegie classifications, the major "takeaway" is the divergence between public and private institutions in resources per student. Note that while we are only able to compute the student-faculty ratios to 2010, an expectation based on the hiring trends is that student-faculty ratios will continue on an upward trajectory.

Regression analysis presented in tables 6.4 through 6.7 serves to quantify these graphical presentations. A first question is whether there is an overall difference between the post-2008 years of observation and the pre-2008 years. In addition, we investigate whether there are differences between public and private institutions in these adjustments. First, in table 6.4, public institutions demonstrate a relative reduction of hiring at the full and assistant levels, with these differences particularly marked after 2010. These hiring trends are also evident across institution types and table 6.5 repeats this analysis, distinguishing research extensive (RS1) and research intensive (RS2) from other four-year, degree-granting institutions. Here, the private-public distinction is particularly evident at the senior and junior faculty levels, with relatively modest differences in the associate category. What is particularly noteworthy is that while private institutions appear to add senior faculty at a striking rate by 2011, public universities are actually shedding senior faculty. While we can make some inferences about junior hiring from the assistant professor category in table 6.6, a better source of information is the AAU Data Exchange, which records information on new hires. While new hires remain somewhat below levels in the 2007 base year, the decline in hiring (measured on a per-department basis) is more than

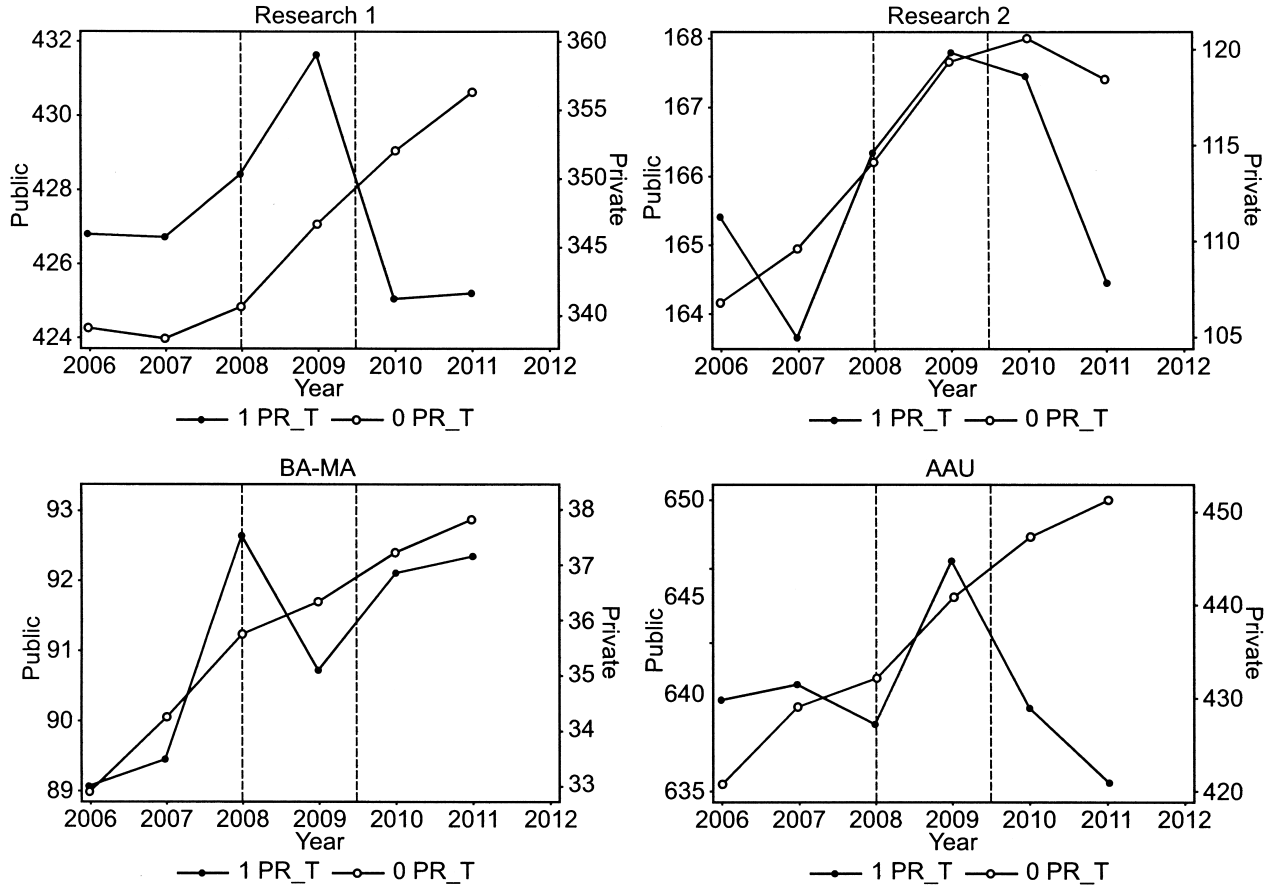


Fig. 6.7 Trends in average number of full professors by institution type, 2006–2011

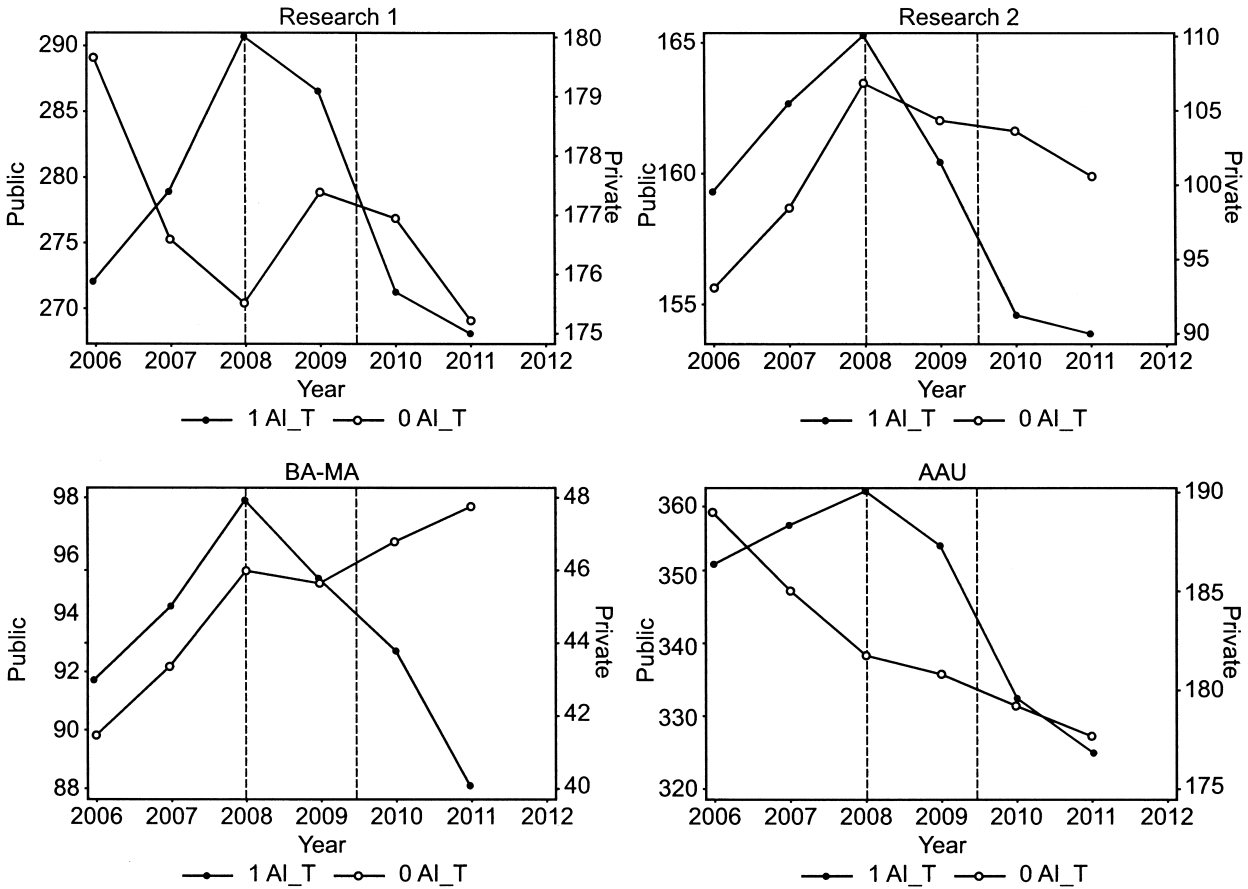


Fig. 6.8 Trends in average number of assistant professors by institution type, 2006–2011

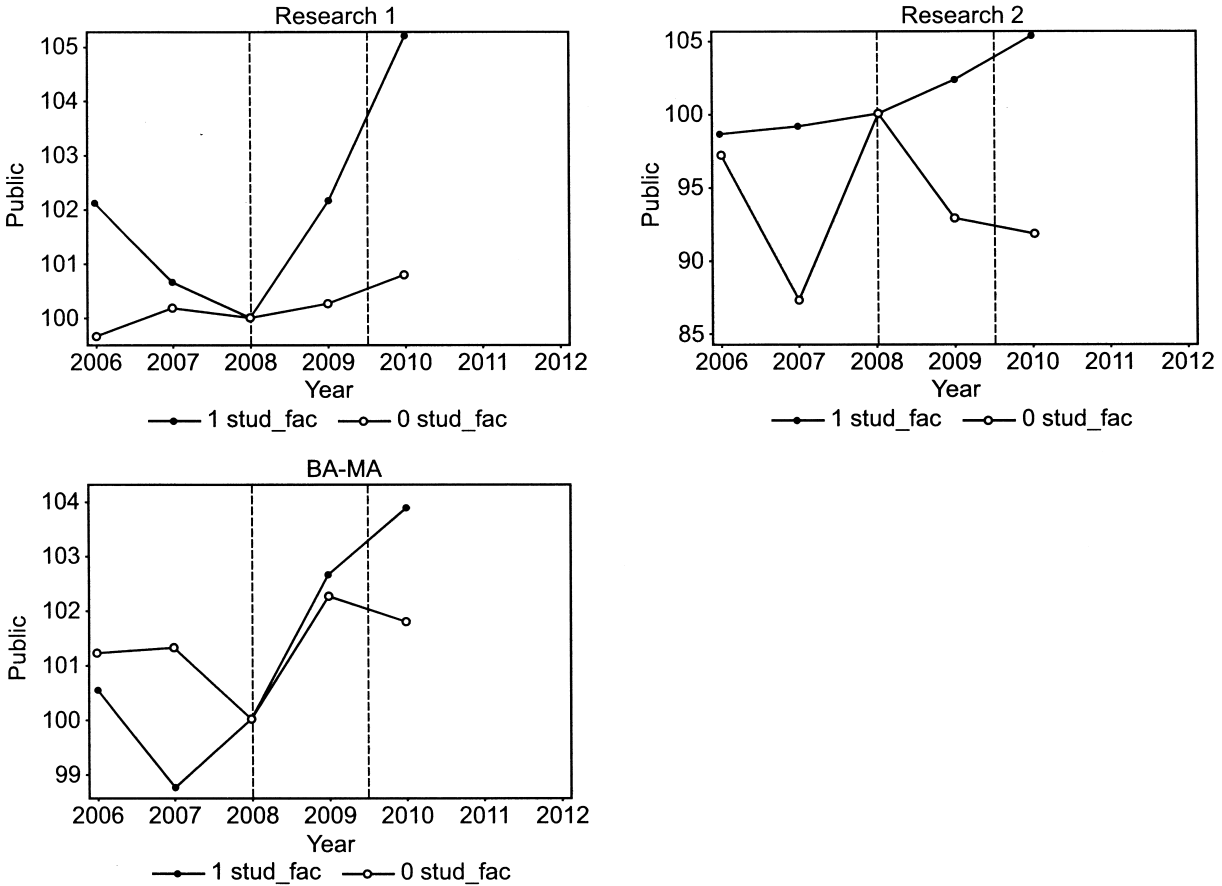


Fig. 6.9 Trends in average student-faculty ratios by institution type, 2006–2011 (indexed, base year = 2008)

Table 6.4 **Fixed-effect regressions of log faculty counts on Great Recession indicators, 2006–2011**

	ln (full prof.)		ln (assoc. prof.)		ln (asst. prof.)		ln (all faculty)	
Great R (2009–2010)	0.0275*** (0.00376)	0.0380*** (0.00485)	0.0283*** (0.00461)	0.0252*** (0.00642)	–0.00289 (0.00527)	0.0104 (0.00674)	0.0198*** (0.00249)	0.0249*** (0.00284)
Post-GR (2011)	0.0416*** (0.00547)	0.0668*** (0.00739)	0.0534*** (0.00665)	0.0503*** (0.00956)	–0.0174** (0.00795)	0.0180* (0.0101)	0.0332*** (0.00342)	0.0491*** (0.00424)
GR x public		–0.0213*** (0.00751)		0.00626 (0.00922)		–0.0269** (0.0105)		–0.0104** (0.00500)
Post GR x public		–0.0510*** (0.0109)		0.00629 (0.0133)		–0.0716*** (0.0158)		–0.0321*** (0.00680)
Constant	3.928*** (0.00246)	3.928*** (0.00245)	3.930*** (0.00299)	3.930*** (0.00299)	4.012*** (0.00349)	4.012*** (0.00347)	5.251*** (0.00162)	5.251*** (0.00161)
Observations	5,695	5,695	5,714	5,714	5,714	5,714	5,726	5,726
R-squared	0.028	0.037	0.030	0.030	0.002	0.012	0.042	0.051
Number of unitid.	1,291	1,291	1,295	1,295	1,296	1,296	1,300	1,300

Source: AAUP faculty salary survey, counts of full-time faculty. All regressions include institution fixed effects.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 6.5 **Fixed-effect regressions of log faculty counts on Great Recession indicators by Carnegie type, 2006–2011**

	ln (full professor)			ln (assoc. professor)			ln (asst. professor)		
	RS 1	RS 2	Oth. BA-MA	RS 1	RS 2	Oth. BA-MA	RS 1	RS 2	Oth. BA-MA
Great R (2009–2010)	0.0245*** (0.00660)	0.0225** (0.0109)	0.0490*** (0.00718)	0.0212 (0.0197)	0.0539*** (0.0163)	0.0114 (0.00885)	0.0141 (0.0143)	–0.0196 (0.0283)	0.0203** (0.00887)
Post-GR (2011)	0.0479*** (0.00819)	0.0244 (0.0224)	0.0918*** (0.0107)	0.0182 (0.0452)	0.0746*** (0.0212)	0.0420*** (0.0131)	–0.00457 (0.0233)	–0.0374 (0.0366)	0.0379*** (0.0135)
GR x public	–0.0201** (0.00993)	0.000686 (0.0139)	–0.0324*** (0.0103)	0.0110 (0.0212)	–0.0135 (0.0196)	0.0177 (0.0117)	–0.0424** (0.0184)	0.00190 (0.0335)	–0.0479*** (0.0135)
Post GR x public	–0.0528*** (0.0120)	–0.00366 (0.0255)	–0.0694*** (0.0146)	0.0335 (0.0463)	–0.00398 (0.0273)	0.00203 (0.0173)	–0.0663** (0.0289)	0.00107 (0.0489)	–0.112*** (0.0202)
Constant	5.844*** (0.00340)	4.863*** (0.00455)	3.657*** (0.00333)	5.473*** (0.00627)	4.857*** (0.00596)	3.780*** (0.00390)	5.406*** (0.00614)	4.820*** (0.0104)	3.918*** (0.00444)
Observations	735	433	3,078	735	433	3,079	735	433	3,079
R-squared	0.057	0.040	0.070	0.034	0.170	0.024	0.063	0.016	0.030
Number of unitid.	148	95	704	148	95	705	148	95	705

Source: AAUP faculty salary survey, counts of full-time faculty. All regressions include institution fixed effects.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 6.6 Regression of new hires on Great Recession indicators, 2007–2011

	New hires	
	(1)	(2)
Public	0.349***	0.349***
	(0.0244)	(0.0244)
Yr. dummy 2009	–0.0393	
	(0.0260)	
Yr. dummy 2010	–0.0693***	
	(0.0255)	
Yr. dummy 2011	–0.0302	
	(0.0255)	
Yr. d 2009 x public	–0.0722**	
	(0.0343)	
Yr. d 2010 x public	–0.122***	
	(0.0337)	
Yr. d 2011 x public	–0.146***	
	(0.0338)	
Post-2008		–0.0454**
		(0.0213)
Post-2008 x public		–0.114***
		(0.0279)
Department FE	X	X
Observations	5,743	5,743
R-squared	0.135	0.132

Source: AAU faculty salary survey.
***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

twice as large for public institutions as private institutions. To this end, the data suggest that no sustained recovery has taken place in the junior faculty market.

To capture the effects of faculty staffing changes on resources per student, table 6.7 presents the parallel regressions of student-faculty ratios on period fixed-effects indicators. What is apparent is a sharp increase in student-faculty ratios (about 5.6 percent) for students at public institutions, with a more modest (less than 1 percent) change at private institutions. As such, these results provide quite robust evidence of the increased public-private stratification in faculty staffing associated with the financial crisis. What further analysis will explore is the extent to which this dynamic varies systematically with more detailed data on revenue structures (such as reliance on tuition, state appropriations, and endowment in advance of the fiscal crisis) as well as whether differences in state appropriations shocks impact hiring.

Table 6.7 **Fixed-effect regressions of student-faculty ratios on Great Recession indicators by Carnegie type, 2006–2011**

	ln (student/faculty)			
	Overall	RS 1	RS 2	Oth. BA-MA
Great Rec.	0.00322	0.00602	0.0245	0.0116**
(AY 2009/10)	(0.00406)	(0.00830)	(0.0200)	(0.00567)
GR x public	0.0537***	0.0292***	0.0171	0.0323***
	(0.00639)	(0.0109)	(0.0214)	(0.00752)
Constant	3.196***	3.058***	3.192***	3.224***
	(0.00151)	(0.00276)	(0.00425)	(0.00190)
Observations	4,582	588	347	2,464
R-squared	0.078	0.109	0.107	0.050
N of unitid	1,287	148	95	697

Source: AAUP faculty salary survey, counts of full-time faculty. All regressions include institution fixed effects. Student faculty ratios are calculated using data on "fall enrollment" from IPEDS.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

While data on salaries are very limited, we are able to use limited data on salaries by field for AAU universities (essentially limiting this part of the analysis to research universities). The question at hand is whether salaries change differentially by public-private sector over the recession years, relative to the baseline of 2008. In table 6.8, we regress log salary (separately by rank) measured at the level of field and university on indicator variables for public control, year of observation, and the interaction of year and public status. Results show that, first, salaries are somewhat lower at public universities than private in the baseline, with the gap widening from 8.4 percent at the assistant level to about 17.8 percent at the full professor level. Moreover, while faculty at private universities see modest increases in salaries post-2008, salary growth at public universities lags appreciably, pointing to increased stratification in compensation as well as staffing levels.

6.4 Implications in the Short Term and the Long Term

Because faculty are an input to the educational production function, changes in staffing and the faculty labor market may be expected to impact student outcomes. There are good reasons to expect that the increased student-faculty ratios that have emerged from the Great Recession, particularly at public institutions outside the most research-intensive sectors, may have a direct impact on collegiate attainment and graduation rates, even as it is too early to measure these effects directly. While estimates of the direct effect of changes

Table 6.8 **Regression of faculty salary levels on Great Recession indicators, 2007–2011**

	Ln asst. salary		Ln assoc. salary		Ln full salary	
	(1)	(2)	(3)	(4)	(5)	(6)
Public	–0.0846***	–0.0846***	–0.116***	–0.116***	–0.178***	–0.178***
	(0.00662)	(0.00662)	(0.00785)	(0.00785)	(0.00925)	(0.00924)
Yr. dummy 2009	0.0419***		0.0325***		0.0444***	
	(0.00759)		(0.00925)		(0.0110)	
Yr. dummy 2010	0.0414***		0.0238**		0.0371***	
	(0.00803)		(0.00984)		(0.0118)	
Yr. dummy 2011	0.0476***		0.0287***		0.0437***	
	(0.00770)		(0.00943)		(0.0114)	
Yr. d 2009 x public	–0.0141		–0.0132		–0.0168	
	(0.00891)		(0.0110)		(0.0128)	
Yr. d 2010 x public	–0.0194**		–0.0168		–0.0246*	
	(0.00927)		(0.0114)		(0.0135)	
Yr. d 2011 x public	–0.0163*		–0.0160		–0.0146	
	(0.00907)		(0.0111)		(0.0132)	
Post-2008		0.0437***		0.0285***		0.0419***
		(0.00640)		(0.00769)		(0.00927)
Post-2008 x public		–0.0167**		–0.0155*		–0.0189*
		(0.00751)		(0.00907)		(0.0107)
Department FE	X	X	X	X	X	X
Observations	5,285	5,285	5,341	5,341	5,653	5,653
R-squared	0.720	0.720	0.572	0.571	0.512	0.511

Source: AAU faculty salary survey.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

in academic resources on attainment are necessarily difficult, credible estimates from Bound, Lovenheim, and Turner (2010) point to the importance of resources per student in determining collegiate completion.[12]

Yet, evidence to date does not suggest that the cyclical downturn will be quickly reversed and, indeed, the evidence suggests that in the public sector many of the resource cuts that have impacted faculty hiring are likely to be permanent not transitory. How the faculty market adjusts to the continued period of fiscal retrenchment will ultimately affect the long-term prosperity of US higher education. While differentiation and stratification are predictable—and some would argue desirable—features of US higher education, the severe budget constraints in the market may limit the capacity of all but a few institutions to make the faculty investments needed to ensure long-term viability. Under present circumstances, the question of whether faculty who are able to generate credible outside offers (conditional on productivity) benefit disproportionately, resulting in widening salary differences tied to race and family circumstances.

Finally, with the employment effects of the Great Recession concentrated in the junior market and among new hires, the long-term "prospects for faculty in the arts and sciences" appear much dimmer than would be projected based on demographics and student demand. To the extent that the public not only shoulders some of the costs of graduate education, but also harvests some of the benefits in terms of research advances, there is a potentially large social cost to the persistence of an anemic job market. As Shirley Tilghman noted "The thing that will have the longest-term negative impact on colleges and universities is if we can't figure out how to continue the careers of young people just coming out of grad school" (Riley 2011).

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12. Of course, it will be several years before researchers are able to measure the link between the Great Recession and college completion and, even at this point, it will be difficult to untangle the extent to which any change in attainment reflects adjustments in selection or changes in student effort.

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