ABSTRACT

Title of dissertation: THE PRICE SENSITIVITY OF DEMAND FOR HIGHER EDUCATION AMONG NON-TRADITIONAL STUDENTS

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This dissertation examines the price sensitivity of demand for higher education among non-traditional students in the United States. Chapter 1 discusses the issues related to the demand for higher education. It presents the recent trends and reviews the literature addressing these issues. A major conclusion that emerges from this chapter is that the price sensitivity of demand for higher education appears to depend on the source of the variation in price and the characteristics of the students who face the price change. The baseline estimate for the price sensitivity of demand is that a $1,000 (in year 2000 dollars) decrease in tuition costs should result in a 4 percentage-point increase in enrollment for the traditional 18- to 24-year-old student.

Chapter 2 examines the price sensitivity of demand for higher education for military spouses resulting from variation in tuition due to military-mandated moves across states. The data suggest that a $1,000 (in year 2000 dollars) decrease in the cost of 2-year schools is associated with a 1–1.5 percentage-point increase in the probability of attending college. This estimate is less than half the previous

estimates due to in-state tuition price differences faced by the civilian 18- to 24-year-old population on a percentage-point basis. However, this represents a 7–10 percent increase for this population, and the magnitude of this metric is in line with previous estimates. This suggests tuition assistance can be an effective means of increasing enrollment for military spouses, but other barriers to education for this population may also need to be addressed.

Chapter 3 examines the impact of a change in the tax treatment of savings set aside for higher education by those who decide to suspend their education and enter the workforce. The taxation of these funds appears to have increased the rate at which these funds are included in an employee's initial contract and the quantity of funds allocated. These results are counterintuitive if the tax preference was the primary reason for the savings plan. However, these results suggest the rationale for the savings plan was to offer targeted additional compensation to recruits with greater negotiating power. Taxation of funds previously set aside did not appear to have a statistically significant impact on their utilization. Point estimates of the price sensitivity of demand from changes in the out-of-pocket costs for higher education induced by the taxation of these funds were small and often not statistically significant.

The results from this dissertation show responses to changes in the net cost of college that differ by the source of price variation and the population experiencing them. This is consistent with the previous literature. This dissertation contributes to the literature by providing estimates for the price sensitivity of demand for higher education to previously understudied non-traditional students.

THE PRICE SENSITIVITY OF DEMAND FOR HIGHER EDUCATION AMONG NON-TRADITIONAL STUDENTS

by

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List of Abbreviations

ACS	American Community Survey
AJCA	American Jobs Creation Act of 2004, Public Law 108-357
AOTC	American Opportunity Tax Credit
AP	Advanced Placement
CBA	Collective Bargaining Agreement
CPS	Current Population Survey
CSP	College Scholarship Plan
DCTAG	District of Columbia's Tuition Assistance Grant Program
FAFSA	Free Application for Federal Student Aid
FTE	full-time equivalent
HOPE	Georgia Helping Outstanding Pupils Educationally
HTC	Hope Learning Credit
IPEDS	Integrated Postsecondary Education Data System
LLTC	Lifetime Learning Tax Credit
LPM	Linear Probability Model
MyCAA	Military Spouse Career Advancement Accounts
NLSY	National Longitudinal Survey of Youth
OLS	Ordinary Least Squares
PLUS	Parent Loans for Undergraduate Students
SIPP	Survey of Income and Program Participation
YTV	Year Terminated Variable

Introduction

Chapter 1 focuses on reviewing the issues surrounding the demand for higher education. This includes presenting recent trends in enrollment and price, an overview of the current situation and understanding of non-traditional students, what is known about the returns to higher education, and what is known about how demand is influenced by price. This chapter presents the previous literature necessary to understand the contribution of the next two chapters. One key result of the previous literature is the baseline estimate for the price sensitivity of demand for higher education. Although this estimate differs by the source of variation in price, a $1,000 (in year 2000 dollars) decrease in tuition costs is associated with a 4 percentage-point increase in enrollment for the traditional 18- to 24-year-old student. Given the enrollment rate of this population, this translates into roughly a 9 percent increase.

Chapter 2 examines the price sensitivity of demand for higher education of military spouses, a subpopulation whose price sensitivity has not been examined previously. However, this group has been the focus of several recent initiatives to reduce their higher education costs. By exploiting the variation in price caused by military-mandated moves, this chapter finds that military spouses' college attendance rates respond in a statistically significant way to changes in the cost of

2-year public colleges. The military-mandated moves allow for a unique identification strategy using differences in tuition rates between states to estimate the price sensitivity of demand for higher education. The data suggest that a $1,000 (in year 2000 dollars) decrease in the cost of 2-year schools is associated with a 1–1.5 percentage-point increase in the probability of attending school. This estimate is less than half the previous estimates for a percentage-point based on the civilian 18- to 24-year-old population. However, the population studied had a much lower baseline rate of attendance. The percentage-point increase in attendance translates into a 7 to 10 percent increase, which is in line with previous estimates. These results provide an initial estimate for the price sensitivity of demand for higher education of military spouses, but given the unique circumstances military families face, this estimate likely does not have external validity to non-military spouses.

Chapter 3 examines the question: Do tax breaks for higher education increase college attendance? Settling this question empirically is difficult because eligibility for tax breaks tends to be correlated with other factors that influence education investment decisions. An exogenous shift in tax policy affecting the after-tax price of education could help researchers address this question, and in late 2004, such a change in U.S. tax policy occurred. Data were obtained from firms with a long history of offering delayed compensation in the form of education benefits as part of an initial contract's signing bonus. This chapter examines both the effect of the tax on new savings for college and the use of existing funds following an unexpected change in the tax status of these funds. The analysis indicates that the taxation of funds that can only be used to pay for education *increased* the amount of new money set

aside on both a total and a per semester basis. The change in the treatment of new funds from untaxed to taxed also appears to have *increased* the share of employees who receive funds earmarked for education as part of their initial contract. These results are most consistent with the economic rationale of these funds either being used by employees as a commitment mechanism to return to school or as a means for an employer to selectively offer additional compensation to potential employees with greater negotiating power. This is in contrast to alternative rationales, where the education benefits are primarily used as an insurance policy against being unsuccessful in the industry or as a vehicle for tax avoidance. The analysis of the unexpected tax on the use of funds previously set aside for education finds no statistically significant effect. Finally, estimates of the price sensitivity of demand for higher education of this population are mixed, finding at most a 1 percentage-point decrease in matriculation occurring for each $1,000 (in year 2000 dollars) increase in out-of-pocket costs caused by the tax change, with most specifications and samples finding no statistically significant results. This finding falls in line with recent estimates examining the impact of tax credits for higher education. Initial work suggested sensitivities of around a 2 to 4 percentage-point response to $1,000 (in year 2000 dollars) of tax-based aid for certain groups, but recent work with more detailed data has found almost no impact on college enrollment from the expansion of the higher education tax credits. A tax incentive for those returning to school does not seem to have as much of an impact as an equivalent value change in tuition costs for those attending college immediately after finishing high school.

Chapter 1: REVIEW OF ISSUES RELATED TO THE PRICE SENSITIVITY OF DEMAND FOR HIGHER EDUCATION IN THE UNITED STATES

1.1 Introduction

A student's willingness to pay for higher education is determined by the associated costs and benefits of their competing options as well as the resources available to the student. The primary financial benefit of a college degree is the associated increase in earnings from attending and/or completing college. This chapter reviews the literature estimating the impact of higher education on wages and how that impact has changed over time. The costs of a college degree include both the out-of-pocket expenses and the opportunity cost of a student's time in school when she could otherwise be working and earning a wage. Meanwhile, the price of a college education is driven by the supply and demand for higher education as well as institutional supports such as subsidies from state governments or direct aid and loans from the federal government. This chapter begins with a review of historic trends in these primary factors of demand, supply, and cost. It then provides a discussion of what it means to be a non-traditional student and a snapshot of the distribution

of students across different schools by select characteristics usually used to classify students as traditional or non-traditional.

After chronicling the changing costs and benefits of higher education over time, this chapter then reviews the estimates for the price sensitivity of demand for higher education that result, in part, from these factors. This section is organized by the source of the variation in price from which the sensitivity was estimated. This organization helps point out that the source of price variation appears to matter. Changes in price also appear to affect various subpopulations differently. These observations put the contributions of the second and third chapters, which focus on specific subpopulations of non-traditional students, in context. This overview presents (1) trends in total enrollment and costs, (2) a snapshot of non-traditional students, (3) an overview of federal aid, and (4) a brief discussion on the returns to higher education in the United States. The chapter then reviews (5) estimates of the price sensitivity of demand for higher education.

1.2 Trends in higher education

1.2.1 Enrollment

As the fraction of the population attending college increases, the composition of the average and marginal student can change. This new pool of students may have different preferences for and returns to higher education. This section reports on how the number and composition of those attending college has changed, how the suppliers of higher education have responded, and how the resulting price has

fluctuated over time.

1.2.1.1 Increased Demand

During the early 1980s, some university administrators were concerned with how they would maintain enrollment during a period when the college-aged population was on the decline, and academics predicted severe contraction in enrollment (Dresch, 1983).[1] But those days are long past. The total number of students attending college in the United States has been increasing for decades, and this increase has recently accelerated. The U.S. Department of Education, National Center for Education Statistics (2013), reported that enrollment in degree-granting institutions increased by 11 percent between 1991 and 2001 and then increased by 32 percent from 2001 to 2011. This later increase from 15.9 million to 21.0 million was driven by both a slight increase in the traditional college-aged population of 18- to 24-year-olds and an increase in the share of the relevant population attending college.

Aside from the 21 million enrolled in accredited 2-year colleges, 4-year colleges, and universities in 2011, roughly 572,000 students also attended non-degree-granting, Title IV eligible post-secondary institutions.[2] These statistics come from reporting requirements as part of participation in Title IV and are thus not readily available for non-Title IV institutions. However, some estimates put the size of

[1] An increase in the fraction of the population attending college helped maintain the enrollment numbers when the college-aged population contracted. Despite this increase in the share of the population attending college, a short decrease in enrollment occurred from 10.8 million in 1983 to 10.6 million in 1985.

[2] These are predominantly organized to educate students for occupational, trade, and technical careers, and include institutions that offer programs via distance education. These are typically certificate programs.

the student body at non-Title IV eligible institutions at as large as a third of the for-profit sector (Cellini & Goldin, 2014).

The increase in the share of the traditional and non-traditional college-aged population attending college has been the main factor in increasing total enrollment, as opposed to population growth in these age categories. The percentage of 18- to 24-year-olds enrolled in college rose from 25 percent in 1980 to 36 percent in 2001, and then to 42 percent in 2011. The increase in the enrollment rate was not limited to the traditional college-aged population. From 2000 to 2011, the enrollment rate of students age 25 and over increased faster than the rate at which 18- to 24-year-olds increased enrollment. This increase in the share of the population enrolling in post-secondary institutions is frequently attributed to an increase in the perceived returns to education in the United States spurring demand. The increase in the college wage premium is discussed in more detail later in this chapter, but now I turn to the supply-side response to this increase in demand for higher education.

1.2.1.2 Supply Side Response

Only a fraction of the revenue used to maintain most non-profit post-secondary institutions comes from tuition and fees charged to students.[3] Public institutions rely heavily on subsidies from state and local governments, and these subsidies have not kept pace with the recent increases in the demand for education. Also, private institutions have not necessarily seen a corresponding increase in their non-tuition

[3]For public 2- and 4-year institutions in the 2012-13 academic year the percentage of revenue from tuition and fees was 17 percent and 22 percent, respectively (NCES, 2015).

funding sources. The response to this shortfall of necessary funds has differed by sector and the selectivity of an institution.

As the number of college applicants has grown in recent years, the number of positions available at American 4-year colleges or universities has not kept pace. Bound, Hershbein, and Long (2009) showed that the number of applicants to 4-year schools increased by 44 percent, from 1.19 million in 1992 to 1.71 million in 2004, while the size and number of these schools did not increase proportionally. Instead of increasing quantity to meet demand, selective non-profit 4-year colleges became more selective in whom they admit. As a result, high school seniors responded by improving their credentials. Over the last 20 years, high school students have become more likely to study calculus, take Advanced Placement (AP) courses, and spend resources to prepare for and take the ACT or SAT (Bound, Hershbein, & Long, 2009). This competition makes sense given that the most selective schools, particularly those in the top 1 percent, spend considerably more per student while also providing the largest average subsidy. Students at the top resource-intensive schools end up paying on average the lowest share of student expenditures via tuition and receive by far the best deal in higher education (Hoxby, 2009).

As selective, resource-intensive institutions increased their selectivity instead of increasing their enrollment enough to keep up proportionally with demand, a higher share of post-secondary students were pushed into less resource-intensive institutions (Hoxby, 2009). These lower average resources per student have been blamed for the decrease in the college completion rate (Bound & Turner, 2007; Bound, Lovenheim, & Turner, 2010). Decreased college preparation also has been

cited as a reason for some of the decrease in college completion in these studies, but resources per student has been acknowledged as being the dominant factor. It also appears that male students may be more sensitive to the resource-intensity issue, as a corresponding decrease in female students' completion rate from attending less resource-intensive institutions was not found (Bound, Lovenheim, & Turner, 2010).

This segment of the literature suggests that supply may not be able to respond fully to changes in demand. This contradicts the assumption of perfectly elastic supply often used in modeling the demand for higher education. With an upward-sloping supply curve, one would also expect to see an increase in price as demand increases. In fact, the increase in the cost of higher education is the second major trend discussed in this section.

1.2.2 Tuition Prices

The increase in the real cost of college tuition and fees in the United States is a well-known and well-documented phenomenon. Kane (1999) attributed the rise in tuition prices to increases in the cost of the components to producing education, especially the labor involved, and a reduction in the real subsidies provided by state governments to public institutions of higher education. The reason for inflation appeared to depend in part on sector. Ehrenberg (2012) showed that tuition increases at private 4-year institutions were associated with higher spending per pupil, while at public institutions the tuition increases were attempts to maintain the level of expenditure per pupil in the face of decreasing state support. Meanwhile, others

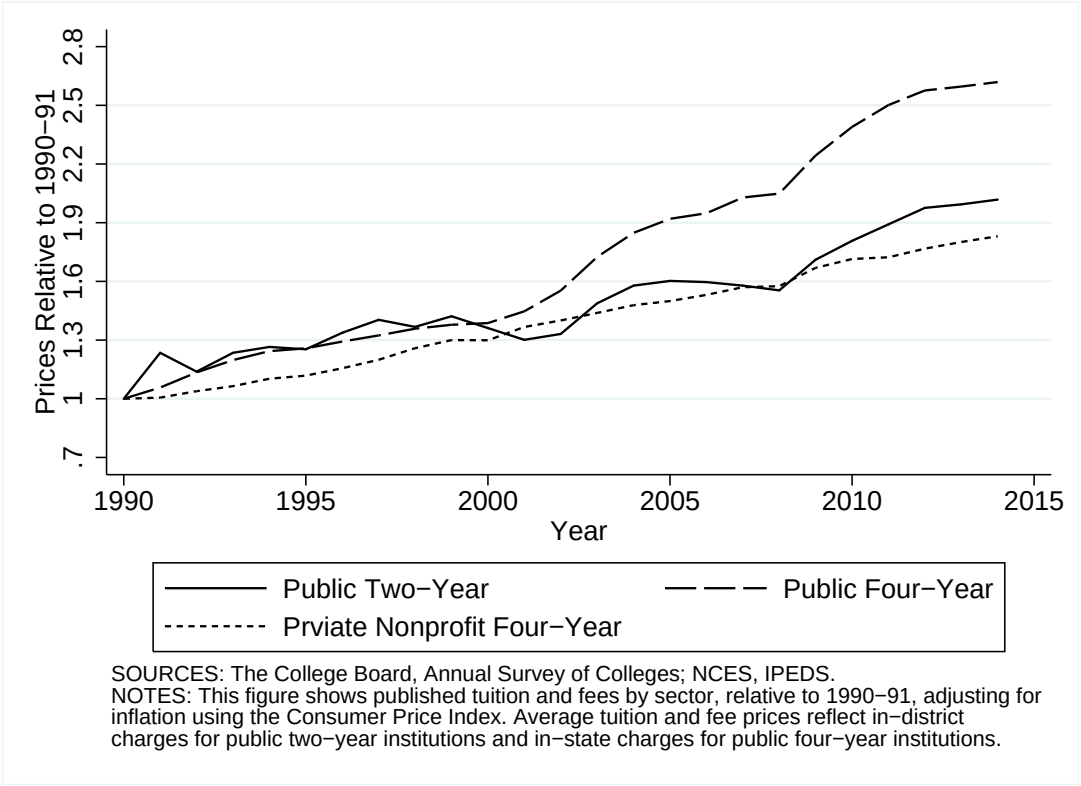
critiqued the increase in the number of non-faculty staff and other potential rent-seeking behavior as a reason for the increase in costs (Vedder, 2004). One such rent-seeking behavior would be the capture of state or federal student aid by the providers of higher education.[4] Cellini and Goldin (2014) found that tuition is 78 percent higher at aid-eligible, sub-baccalaureate for-profit programs than at similar non-aid-eligible for-profit institutions. This suggests there may be some rent-seeking behavior in the form of aid capture, at least in the for-profit sector of higher education, that is raising tuition costs.

It is worth noting that college costs have not increased uniformly by sector. Figure 1.1 shows how the costs of tuition and fees have changed over time for public 4-year, public 2-year, and private non-profit 4-year institutions separately using the 1990-1991 academic year as the base year for each sector. The figure shows that 4-year public institutions, which are both more reliant on state and local government for funding than private non-profit schools and more resource-intensive then their 2-year public counterparts, have increased the most in price relative to their 1990-91 baseline.

A number of studies have documented how increases in the tuition and fees at public institutions of higher education are correlated with decreases in the enrollment rate, holding all else equal (Leslie & Brinkman, 1988; Kane, 1994; Cameron & Heckman, 1998; Kane, 1999). However, as the overall number and percentage of students enrolled in college continues to increase, the question as to the social costs of these higher prices turns to a discussion of either the distributional impacts of

[4]This is often referred to as the Bennett hypothesis.

Figure 1.1: Increases in College Costs by Sector



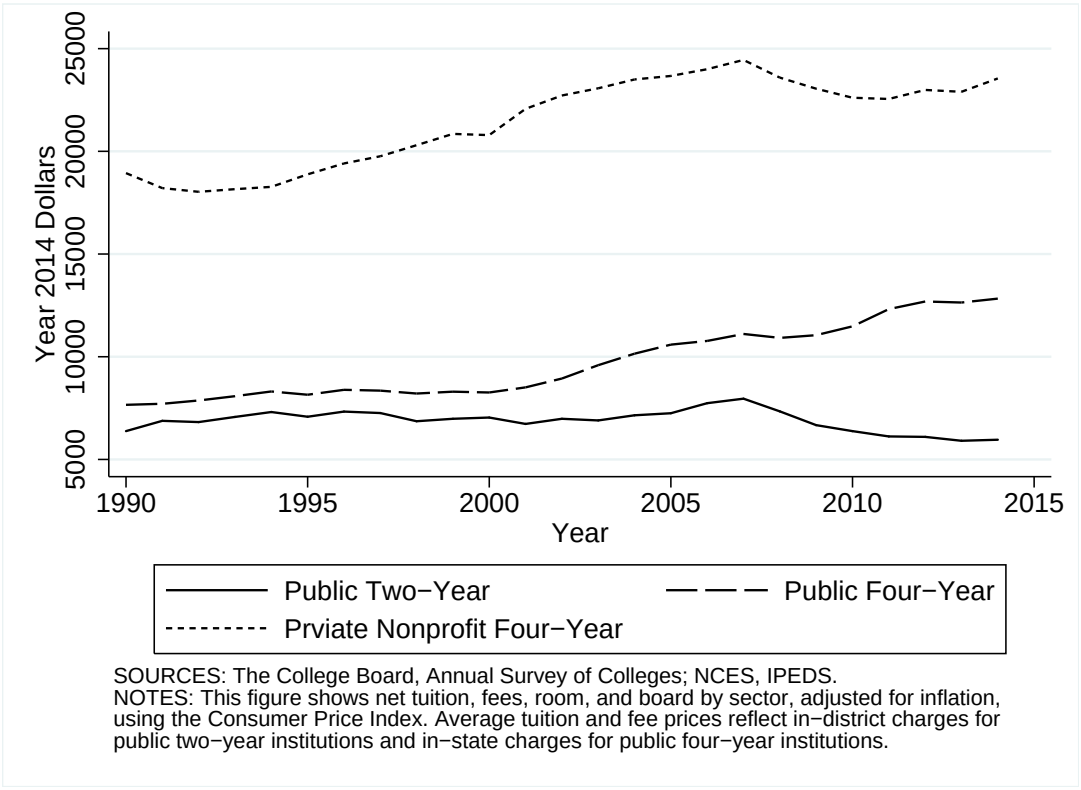
SOURCES: The College Board, Annual Survey of Colleges; NCES, IPEDS.
NOTES: This figure shows published tuition and fees by sector, relative to 1990−91, adjusting for inflation using the Consumer Price Index. Average tuition and fee prices reflect in−district charges for public two−year institutions and in−state charges for public four−year institutions.

these increases in price or how much higher the college attendance and completion rate would be in the absence of these increases in price. On the issue of distributional effects, Kane (1995) found that tuition price increases disproportionately affect the educational attainment of individuals from low-income families regardless of race.

The rise in the sticker price is often covered in the popular press, but it is the net price after accounting for government and institutional aid that reflects true out-of-pocket costs and a student's ability or inability to pay. Figure 1.2 illustrates the trend in net college costs by sector. Net total costs at public 4-year schools have increased steadily since 2000.[5] Meanwhile, the average net price of public 2-year schools has actually decreased over the last decade. The recent expansion

[5]Net tuition and fees at public 4-year schools held steady over the period from 1994 to 2015, but rising room and board costs have helped push up total net costs.

Figure 1.2: Net Tuition, Fees, Room, and Board by Sector



SOURCES: The College Board, Annual Survey of Colleges; NCES, IPEDS.
NOTES: This figure shows net tuition, fees, room, and board by sector, adjusted for inflation, using the Consumer Price Index. Average tuition and fee prices reflect in−district charges for public two−year institutions and in−state charges for public four−year institutions.

of Pell Grant aid appears to have been particularly helpful to holding down net costs at these schools. Both Pell Grant aid and increases in institutional aid at private, non-profit 4-year institutions have helped push down the real net price of these institutions beginning in 2008, after the net price rose in real terms for over a decade. However, data from the last couple of years show a return to increasing real net costs for this sector.

Some might find it curious that certain non-profit 4-year schools would have both rising tuition and lower net costs due in part to increases in institutional aid. Turner (2013) argued that redistribution may be one possible benefit of higher tuition prices if large institutions are able to use the additional funds from tuition paid by students from high-income families to fund more need-based institutional

aid to students from low-income families. She warned that this strategy can only be effective if the colleges and universities can effectively communicate the lower net cost to low-income students from this high-tuition/high-aid strategy. However, recent research has shown that prospective students often overestimate the net price of college they will face; this is particularly true for disadvantaged students (Scott-Clayton, 2013). This calls into question the potential effectiveness of this strategy.

1.2.3 Non-traditional Students

The empirical chapters of this dissertation examine the price sensitivity of demand on two sets of non-traditional students: military spouses and individuals who start a career before potentially returning to school. These two populations may be included in a broad definition of a non-traditional student. To clarify the definition, I will begin with a definition of a "traditional" undergraduate.

The term "traditional" is typically used to refer to an undergraduate who has a high school diploma (as opposed to a GED), enrolls full-time immediately after finishing high school, depends on his parents for financial support, and does not work full-time during the school year. The research on the price sensitivity for higher education has historically focused on the behavior of traditional undergraduates. However, only 27 percent of undergraduates met all of these criteria in 1999-2000 (U.S. Department of Education, 2002).[6] Therefore, extending the estimation of the price sensitivity of demand for higher education to various non-traditional student

[6]This includes undergraduates at all types of post-secondary institutions (less-than-2-year, 2-year, and 4-year).

populations, as this dissertation does, is necessary to fully understand the current higher education landscape. As new legislation targets incentives at particular segments of the non-traditional student population, such as military spouses, it is important to have price sensitivity estimates for these subpopulations to accurately forecast the impact of these proposals.

The definition of a "non-traditional" student varies (Bean & Metzner, 1985; Horn, 1996; Schuetze & Slowey, 2002). However, older, non-continuously educated, independent and/or married, non-resident, and previously or currently in the labor force full-time are common defining characteristics for non-traditional students and subsets of these characteristics apply to each of the samples in the following two chapters. The second chapter consists of a married, non-resident, population and the third chapter focuses on a non-continuously educated population. Horn (1996) defined a non-traditional student as one who has any of the following characteristics:

Delays enrollment;

Attends part-time for at least part of the academic year;

Works full-time (35 hours or more per week) while enrolled;

Is considered financially independent for financial aid eligibility purposes;

Has dependents;

Is married; or

Does not have a high school diploma.

Horn (1996) defined students as "minimally non-traditional" if they have only one non-traditional characteristic, "moderately non-traditional" if they have two or three, and "highly non-traditional" if they have four or more. The samples examined

in the empirical portion of this dissertation would be classified as moderately to highly non-traditional according to Horn's scale. Also of note is that each of the populations examined tend to be dominated by one gender, with the dominant gender switching between the two chapters. As the price paid and the educational outcomes achieved are correlated with the sector of higher education attended, Table 1.1 presents a snapshot of the percent of the student population attending each type of school by gender and key characteristics that help define the samples in the later chapters as non-traditional. This information is for the 2007-08 academic year, which is situated in the middle of the period of observation of the empirical analyses.

Table 1.1: Percentage Distribution of Undergraduates, by Control and Level of Institution and Selected Student Characteristics

	Public			Private nonprofit		For Profit		More
	Less-than-2-year	2-year	4-year	Less-than-4-year	4-year	Less-than-2-year	2-years or more	than one institution
Sex								
Male	0.4	40.6	31.7	0.4	13.3	1.1	5.3	7.3
Female	0.5	39.5	27.4	0.4	12.8	2.7	8.2	8.5
Dependency Status								
Dependent	0.2	32.3	38.2	0.2	16.3	1.3	2.8	8.7
Independent	0.6	48.6	19.2	0.6	9.3	2.9	11.6	7.1
Unmarried, no dependents	0.5	45.1	25.6	0.6	9.2	2.2	9.0	7.8
Married, no dependents	0.6	49.1	21.0	0.4	10.3	1.8	9.1	7.6
Unmarried, with dependents	0.8	49.1	14.2	0.7	7.8	4.9	16.2	6.5
Married, with dependents	0.7	51.9	15.5	0.6	10.3	2.6	11.8	6.6
Age								
18 years or younger	0.2	37.6	33.0	0.2	17.5	1.8	2.9	6.8
19 to 23 years	0.3	32.9	36.8	0.3	14.8	1.7	4.1	9.1
24 to 29 years	0.5	43.3	24.4	0.7	8.7	2.9	11.7	7.7
30 to 39 years	0.7	49.8	16.0	0.7	10.5	2.6	13.2	6.5
40 years or older	0.9	58.4	13.4	0.6	10.2	1.8	8.7	5.9

NOTE: Estimates include students enrolled in Title IV eligible post-secondary institutions in the 50 states, the District of Columbia, and Puerto Rico.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 2010. Table 1.3. Percentage distribution of undergraduates, by control and level of institution and selected student characteristics: 2007-08.

Table 1.1 shows that men are more likely to attend public colleges, while women are slightly more likely to attend for-profit schools. Meanwhile, dependent students attend public and private nonprofit 4-year colleges at a higher rate, while independent students, including married independent students, are more likely to

attend 2-year schools and for-profit schools. A similar pattern is seen when looking at the distribution of undergraduates by age. Students 18 to 24 years old are more likely to attend 4-year schools, while 24- to 40-year-olds attend 2-year public colleges and for-profit colleges at higher rates than their younger counterparts.

1.3 Federal Aid Programs

1.3.1 GI Bills

The original GI Bill is often credited with kick-starting the golden age of federal funding for higher education. The mid-century GI Bills created the largest direct aid program in the history of American higher education. Meanwhile, the Post-9/11 GI Bill provided benefits to over 790,000 recipients in the 2013-2014 academic year, with an average benefit per recipient of $14,107 (College Board, 2014).

The GI Bills have been credited with increasing the post-secondary educational attainment of their corresponding cohorts. The precise effects of the financial incentives, however, have been difficult to measure (Bound & Turner, 2002; Staley, 2003).[7] The reason it is hard to extract a sensitivity or an elasticity of demand estimate from the tuition subsidies is that it is difficult to separate the effect of the subsidy from the effect of military service. For example, while the financial effect may be thought to dominate for the WWII and Korean War cohorts, research has shown that the Vietnam War increased educational attainment among men through both the process of draft avoidance during the war and utilization of GI benefits after

[7]Stanley (2003) attributed the WWII and Korean War GI Bills with increasing post-secondary attainment of eligible cohorts of males by 15 to 20 percent.

the war. Card and Lemieux (2001) estimated that draft avoidance raised college enrollment by 4 to 6 percentage-points and college completion by 2 percentage-points for men born in the 1940s. Bound and Turner (2003) found that the benefits of the GI Bill did not appear to accrue evenly to everyone. Although white men across the country and African-American men outside of the South saw gains in educational attainment associated with the GI Bill, African-American veterans residing in the South saw little improvement. The authors attributed this to a lack of educational choices available to African-American men in that region of the country.

Although parsing out the effect of military service from the subsidy on educational attainment may prove difficult, other research has looked at the combined effect of military service and the GI Bill on educational attainment to estimate the effect of increased educational attainment on the returns to education. Angrist (1993) utilized the 1987 Survey of Veterans to identify the effect of GI benefits on education and earnings. Data from the survey allowed him to see the educational attainment of individuals both before and after service. This enabled him to estimate that educational benefits led to an increase of 1.4 years of schooling, on average. Furthermore, the returns to education were estimated at 4.3 percent per year or 6 percent per veteran who used their educational benefits.[8] Angrist also found that this increase in earnings was limited to those who attended college or graduate school and was not caused by enrollment in non-degree granting training programs. Bennett, Lucchesi, and Vedder (2010) offered a possible explanation for the lack of

[8]In an update using 2000 census data, Angrist and Chen (2011) found returns to a year of school instigated by the Vietnam-era GI Bill to be 7 percent.

return on training. They discussed the history of for-profit schools, which dominated the educational training landscape at the time, and mentioned how these schools were the subject of at least five federal reports investigating widespread accusations of fraud.

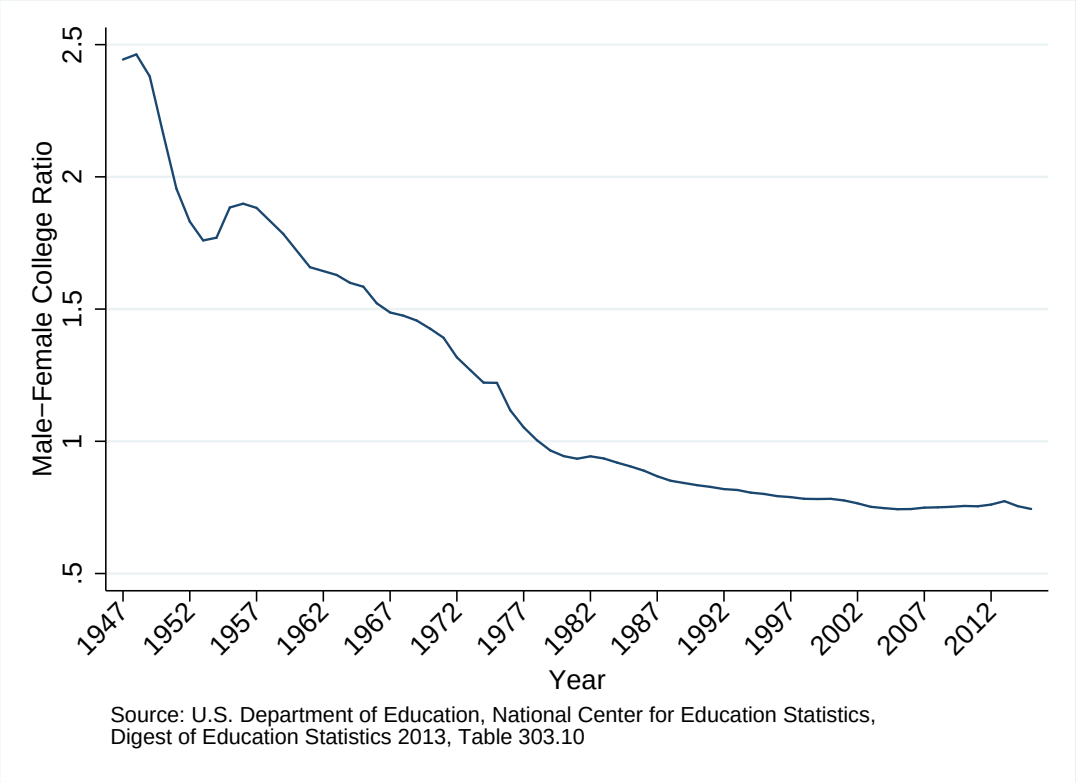
The early GI Bills are also credited with temporarily counteracting the trend of an increasing share of female enrollment in higher education. Figure 1.3 illustrates the ratio of male to female college enrollment totals for each academic year. The ratio fell from 2.5 in the late 1940s to below 1 by 1979. The ratio then continued to drop smoothly and level off at around 0.75 by the early 2000s. The unevenness in the early decline corresponds to cohorts where men came of age during times of war in the United States and later qualified for GI college benefits. Thus, the GI Bill has been credited with causing these deviations from the overall trend (Card & Lemieux, 2001).

There are three reasons why more recent and future iterations of the GI Bill might not have as significant an impact on the gender ratio at American colleges. First, the share of the population participating in the military during the Iraq and Afghanistan conflicts has not been as high as during past conflicts.[9] Second, women have increased as a share of the armed forces and, although still a minority of the service, are also eligible for GI benefits.[10] Finally, the Post-9/11 GI Bill allows for the transfer of educational benefits from a member of the armed services to their

[9]There were over 25 million active duty military personnel in 1945 and roughly 3 million in 1955 and 1970, but less than 1.5 million in 1996. This number has not crossed that threshold since, despite the wars in Iraq and Afghanistan and the rise in the U.S. population from 140 million in 1945 to over 300 million today (Sources: U.S. Census and U.S. Department of Defense).

[10]Women made up less than 2.3 percent of enlisted personnel in 1973 but made up over 14 percent in 2010 (Patten & Parker, 2011).

Figure 1.3: Ratio of Male to Female College Enrollment in the U.S. Over Time



spouse if the individual reenlists for an additional term of service.

The second chapter of this dissertation estimates military spouses' price sensitivity of demand for higher education by utilizing price variation due to military-mandated moves across states. The sample is drawn from the time period before GI benefits were transferable. Military spouses appear to be less price sensitive than their civilian counterparts on a percentage-point basis. This estimate can be used to help project the potential impact of the transferability of the GI Bill. A proper estimate would also require a model of the joint educational and career choices of the members of military family units, and may be a candidate for further research.

The results from research on the early and mid-century GI Bills will help predict how veterans returning from the Iraq and Afghanistan wars will respond to

the educational incentives in the Post-9/11 GI Bill. An interesting wrinkle from other aid programs that might interact with the GI funds is that Title IV eligible institutions now have to follow what is called the "90/10 rule," where no more than 90 percent of the revenue for a Title IV school can come from the federal government. Federal Pell Grants and federal student loans count toward this 90 percent, but GI funds do not. This rule gives schools that are close to this threshold incentive to recruit military veterans aggressively, as one military veteran could allow for as many as nine additional students who fully rely on federal funds to enroll. This may explain why Post-9/11 GI Bill funds are spent in the for-profit sector at a higher rate than funds from any other government source.[11] Forty-two percent of Post-9/11 GI Bill funds are spent in the for-profit sector even though overall the for-profit sector makes up less than 10 percent of the market for higher education.

1.3.2 Pell Grants

The Pell Grant program is the largest source of means-tested financial assistance available to post-secondary students in the United States. Pell Grants (previously called Basic Grants) were enacted in 1972 and were intended to be the foundation on which all other forms of aid would build. There have been periodic expansions of the Pell program, with the most recent expansion coming at the start of the Obama administration.[12]

[11]The flexibility of for-profit online education and willingness of for-profits to set up campuses near military bases and offer schedules that are more convenient for those trying to balance a military career and school likely also play a role in the explanation.

[12]The period between academic years 1995–96 and 2002–03 also saw particularly large increases in the maximum Pell Grant even if the total Pell Grant funds did not increase that much those years.

Several studies examined the difference in the enrollment rates of low-income students before and after the establishment of the Pell program in 1973 (Hansen, 1983; Manski, 1993; Kane, 1994). Using three distinct data sources, none of these three studies found a disproportionate growth in enrollment by low-income 18- to 24-year-olds. This result is both puzzling and disconcerting to the advocates of the program.

One positive result of the program, found by research, came from examining a non-traditional student population: older students. Seftor and Turner (2002) found a large positive response by 25- to 30-year-old students to the introduction of the Pell program. The authors suggested that a possible explanation for the difference in response to this program by older students is that older students may have more experience filling out complex forms (e.g., filing income taxes) and thus may not be as deterred by the complexity of the Pell Grant application. A similar interaction between complexity and experience may explain why although Pell Grant aid does not appear to increase the initial enrollment of low-income 18- to 24-year-olds, Bettinger (2004) found some evidence that Pell Grants might increase persistence in college after the first year.[13] Once someone has paid the cognitive cost of figuring out how to complete an annual Free Application for Federal Student Aid (FAFSA) form, it is likely not as daunting the second time.[14] Therefore, complexity might be a barrier to entry, but once in college, the financial incentive from a Pell Grant to continue college is not as sensitive to the cost of filling out the form again.

[13]The average ages of first-year students in the sample were 18.8 and 21.0 for those attending 4-year and 2-year college, respectively.

[14]The reduction in uncertainty over the amount of aid due to the ability to use the previous year's aid as an estimate for future aid, may alternatively be the mechanism at work.

The complexity that comes with the current application process is due in part to the means-tested nature of the program. One would hope that paying the cost of this added complexity would ensure that low-income students are indeed the beneficiaries of the program. Burman et al. (2005) used a tax simulation model to estimate that 98 percent of Pell funds flow to students in tax units with adjusted gross income of less than $50,000 and over 60 percent of students receiving funds are in households earning less than $20,000.

However, simply because the statutory recipients of Pell Grants are indeed low-income students (also often older and independent) does not mean they enjoy the full value of this aid. As higher education institutions set their price each year and engage in price discrimination by varying the level of institutional aid they offer students, they may be able to capture some of the economic benefits of the Pell Grant program. This is in contrast to the stated intent of the Pell Grant program to be the base on which other grant aid is added. Turner (2014) used both regression kink and regression discontinuity designs to tease apart the two competing desires of institutions to either attract more Pell Grant-eligible students or capture more of the aid themselves. She found through the combination of these two techniques that schools on average enjoy about 12 percent of the economic benefits of Pell Grants, but that the results vary by institution type. Cellini and Goldin (2014) and Singell and Stone (2007) also found evidence of colleges capturing federal aid. The results from Singell and Stone (2007) varied by type of institution as well. They found that private universities increase net and sticker prices nearly dollar for dollar, while public institutions do not appear to change the in-state tuition rate in response to

Pell Grants. Meanwhile, the results from Cellini and Goldin (2014) were focused on for-profit schools and showed these schools as very aggressive and successful at capturing aid.

1.3.3 Tax Benefits

There are a slew of educational incentives in the tax code. Some of the more prominent are the American Opportunity Tax Credit (formerly the Hope Scholarship credit), the Lifetime Learning Credit, deductions for interest on student loans or tuition and fees, and various tax-exempt savings plans. Tax benefits are the most widely enjoyed federal educational benefit. In 2013, 13.8 million Americans received one form of federal education tax benefit or another, with the value of the average benefit being $1,355 (College Board, 2014).

One line of inquiry focuses on showing how most of the benefits of tax-based aid accrue to middle- or high-income households as opposed to low-income households. Burman et al. (2005) described the distributional effects of each of the tax credits and deductions available at the time of publication in 2005. Their microsimulation model estimated that over 60 percent of the tax expenditures from both the Hope credit and the tax deduction for student loan interest payments were distributed to tax units with income above $50,000 a year. The Lifetime Learning credit was slightly less targeted toward middle- and high-income households, with roughly 50 percent enjoyed by those earning more than $50,000. The tax deduction for higher education expenses was the least progressive, with the majority of the

tax expenditure going to tax units earning between $100,000 and $200,000. Similar distributional results were reported by Long (2004), who found that families with incomes between $30,000 and $75,000 benefitted the most from the Hope and Lifetime Learning Tax Credits, in part because insufficient tax liability and interactions with other aid programs limited the benefit to low-income families. Finally, Dynarski (2004b) examined the distributional effects of educational saving incentives. She found the gains from these incentives are heavily skewed toward high-income households.

There is also the issue of economic incidence as opposed to the statutory incidence. Turner (2012) found that tax-based aid crowded out institutional aid roughly dollar for dollar within his sample of 4-year colleges and universities. These are troubling results for those concerned with income inequality, not only because of the immediate issue of a lack of progressivity in these tax benefits, but also for their potential long-term effects on inequality and intergenerational mobility through educational attainment. These long-term effects could manifest themselves if these tax breaks increase the middle- and high-income recipients' willingness to pay. This increase in demand could lead to further increases in tuition faced by all. This price increase could deter some low-income students who do not benefit from the tax breaks. Long (2004) found some suggestive but inconclusive evidence that public institutions raised prices in response to the Hope and Lifetime Learning Tax Credits.

The complexity of having various alternative tax-based aid options appears to lead to sub-optimal decisions by some tax filers. Turner (2011b) found that between

2002 and 2008, one out of four tax returns claiming a educational tax benefit failed to select the tax-minimizing option. He attributed inertia in program selection and a lack of salience of both the federal and state tax implications of various options as the reason why non-tax-minimizing selections are made. Regardless of the reason, a failure to choose the tax-minimizing option will likely mitigate the potential of tax-based student aid to influence educational outcomes.

Evidence on the effect of these programs on educational attainment outcomes has been mixed. Long (2004) was unable to find evidence that these programs increased educational attainment. Meanwhile, Turner (2011a) estimated the price sensitivity of enrollment from $1,000 of tax-based aid increases college enrollment of 18- to 19-year-olds by 3 percentage-points. LaLamia (2012) did not find a response to tax-based aid among adults unless the adults fell short of their own educational expectations from youth. Finally, Bulman and Hoxby (2015) used both regression kink design to examine the response of students from higher income families and simulated instruments, an evaluation similar to difference-in-differences, to evaluate students at various income levels and found no meaningful changes in enrollment or other education outcomes from the expansion of the education tax credits in 2009.

The third chapter of this dissertation adds to the research examining the effect of changes in the tax code on educational outcomes. I use a natural experiment that came about from an unanticipated change in the tax treatment of funds previously set aside for higher education. The data do not indicate a statistically significant change in enrollment or matriculation from the change in the tax treatment of these funds despite the sometimes large economic value of the tax change. Instead, the

only significant response appears to be an increase in the allocation of future funds into the account vehicle that saw a change in its tax status from exempt to non-exempt.

1.3.4 Loans

The Higher Education Act of 1965 created the Stafford loan program, which has long been by far the largest federal student loan program. A student loan program for parents was added in 1980, called the Parent Loans for Undergraduate Students (PLUS) Program. In 1992, Congress created an unsubsidized Stafford program for borrowers ineligible for the means-tested subsidized Stafford loans. These three programs make up over 80 percent of all student loan debt.

There has been much recent discussion in the media on the total amount of student debt overtaking credit card debt in June 2010 and then continuing to grow to over $1 trillion dollars two years later.[15] By 2015, the total outstanding student loan debt in the United States exceeded $1.25 trillion. It is important, however, to understand the composition of this debt when considering its impacts on the higher education landscape. Baum (2013) provided a thorough breakdown of recent trends in the acquisition and repayment of student loans by graduate vs. undergraduate status, federal vs. private loans, and dependent vs. independent individuals. She emphasized that although both the total amount of student loans and the average loan amount per full-time equivalent (FTE) student have increased

[15] See http://topics.nytimes.com/top/reference/timestopics/subjects/s/student_loans/index.html and http://www.forbes.com/sites/halahtouryalai/2014/02/21/1-trillion-student-loan-problem-keeps-getting-worse/.

considerably, most of the increase between 2005 and 2012 was due to the number of individuals taking out student loans rather than an increase in the average balance per borrower. Furthermore, graduate students have seen a larger rise in borrowing per student than undergraduates for the 5 and 10 years prior to 2012, so the overall increase for undergraduates is even less when graduate students are excluded.

Even if the average loan per borrower remains manageable, questions still remain about the distribution of the amount students borrow and whether a subset of students are taking on too much debt. Baum and Steele (2010) reported on the distribution of student debt and the frequency of high debt levels. They found high debt levels to be more common among independent students and dependent students from middle-income families. They also found high debt is more common among African-American Bachelor's degree recipients than among those from other racial/ ethnic groups. Additionally, students who graduated from for-profit institutions are much more likely than similar students in other sectors to have high debt levels.

1.3.4.1 Repayment

The potential threat of increasing student debt is that those taking out the loans may not be making sound investments in their own futures with the access the loans permit. It may be difficult for the individual—let alone the government—to know whether each loan issued will end up improving the life of the borrower and the welfare of society more than the cost of the loan. One signal the government does receive about the quality of the loans it issues after the fact is through the

default rate on student loans. Unfortunately, the fraction of student loan balances delinquent for more than 90 days increased steadily from 6 percent in the first quarter of 2003 to roughly 9 percent by the first quarter of 2012. This delinquency rate then suddenly jumped to 12 percent by the third quarter of 2012 (Dai, 2013). What might be even more disconcerting is the large amount of student loans that are not yet in repayment and thus not eligible to be considered for delinquency. If one only looks at loans in repayment, the delinquency rate as of the fourth quarter of 2012 was over 30 percent (Brown, 2013).

Some researchers have tried to shift the focus of the debate from the volume of debt to the ability to manage it. Dynarski and Kreisman (2013) looked at the moderate median loan amount and the high default rate and concluded the country is facing a repayment crisis, not a debt crisis. They proposed a simplified income-based repayment system to replace the current complex repayment system. This income-based repayment plan, called Loans for Educational Opportunity, would adjust deductions automatically from a borrower's paycheck based on their income, like Social Security. Those who wanted to pay off their loans more aggressively would still have an option to do so, but the new system would be the default option. The authors claimed this system would work efficiently for 98 percent of student loan borrowers and recommended stronger consumer protections for the remaining 2 percent who are currently more than $50,000 in debt. The proposed consumer protections would include allowing private student loans to be dischargeable in bankruptcy and requiring federal student loans to be exhausted before private loans can be issued.

Potentially addressing the repayment issue in a different manner, in 2014 Ore-

gon and Michigan both proposed a "Pay It Forward" program, where students would agree to pay a fixed percentage of their income for a fixed number of years. However, these programs are not mandatory and are likely to suffer from the same adverse selection encountered by a similar program attempted by Yale in the 1970s. Dynarski (2014) suggested some "tweaks" to these current programs to make them more sustainable long-term. These suggestions would make these programs similar to her proposed income-contingent repayment program and would allow borrowers to fully pay their debt plus interest ahead of schedule and then be out of the program for good to ensure that those who expect high incomes after college still participate.

Others also have championed a simplification of the student loan process. Baum and Schwartz (2014) argued that the current set of options creates a "paradox of choice" and that a streamlined set of options would be preferable. This streamlining would include the elimination of the in-school subsidy, thus negating the need for a complicated financial aid determination. They also advocated for private student loans to be dischargeable in bankruptcy and for improvements in distinguishing federal and private student loans in the minds of potential borrowers.

1.3.4.2 Data Availability

There are still several unanswered questions about student loans. Part of the reason is a lack of publicly available data that link together characteristics of the borrower, the school they attended, their loan type and amount, and their repayment history. Dynarski (2015) recently criticized this lack of available data for

researchers, pointing out that the Federal Reserve purchases data from Equifax to track trends in student debt. Meanwhile, the data that are made available from the government are not as detailed or as comprehensive as would be necessary to answer several outstanding questions. However, this is slowly changing. In late 2015, the government released detailed school-level data on student loan repayment that had not previously been made public.

1.3.5 Interactions

It is important to understand not only the role and effect of each of these federal, state, and institutional financial aid programs focused on higher education in isolation, but also how they interact. Marx and Turner (2015) examined the interaction between the federal aid and student loan programs and concluded that the marginal dollar of Pell Grant aid crowds out more than a dollar of student loans. The authors suggested this greater than dollar-for-dollar reduction in loans could be explained by fixed costs to borrowing. This cost argument means that an increase in Pell Grants might push a student below her borrowing threshold altogether. For those who cross this threshold, the lower amount of funds could drive down persistence and educational attainment. This potential decrease in educational attainment for some could explain why there does not appear to be a positive effect on educational attainment from Pell aid overall despite the expectation that increased aid should boost educational attainment.

Other research has focused not on whether an individual attends college but

on which college they attend. Avery and Hoxby (2004) examined the behavioral response of potential students to different financial aid packages, albeit for a non-representative, high-ability group. They found that these students responded to prices; most of these responses are rational, but there are some systematic errors, and these errors are less likely to be made by students from high-income families, particularly if one of the parents went to a selective school. One of the most interesting errors is that students responded to a $1,000 increase in grants, loans, and work-study commitment in almost the exact same way. Given the difference in the economic value of these three items, it appears that even these high-ability students are overvaluing loans and work-study relative to scholarships. This apparent lack of understanding about loans is troubling given the large and growing amount of debt-financed investment in higher education.

1.4 Returns to Higher Education in the United States

Higher educational attainment is associated with greater earnings and lower levels of unemployment. However, the fact that more educated individuals enjoy better economic outcomes could also be due to other factors correlated with college attendance and completion, such as ability or family income. If high-ability individuals who would be paid more anyway are also more likely to go to college, this could bias the estimate of the returns to education if one only looks at wage differences between individuals with different levels of education. Alternatively, if those who benefit the most from college are the ones self-selecting into college, then using the

increase in wages from this group to project what would happen if any high school graduate were to enroll in college would overestimate the returns to education.

To identify causal effects between college and earnings, one would have to find exogenous sources of variation in educational attainment and examine any corresponding increase in wages. Card (1993) used geographic proximity to college and Angrist and Chen (2011) used the Vietnam-era draft lottery to obtain an exogenous increase in educational attainment; both found returns to education higher than simple ordinary least squares (OLS) regressions would predict. Specifically, Card (1993) estimated a return to a year of college to be between 10 and 14 percent, while Angrist and Chen (2011) estimated a 9 percent increase in earning from a year of college.

These estimates served as a baseline for the returns to education for some time.[16] However, these causal estimates are determined by those who switched their education levels, known as "compliers," due to the specific driver of change. The effect is the local average treatment effect, or LATE, and may not apply to other reasons for switching. For a LATE to be useful for policy implications, the driver should be mutable from a policy perspective. Zimmerman (2011) found such an instrument and a rich data set to test it on: a large sample of Florida students at the cusp of academically qualifying for admission at a public 4-year university in Florida. Those who did not meet the eligibility criteria were more likely to attend a community college. Using this instrument, Zimmerman (2011) found the returns to a year of education at a 4-year school to be 8.7 percent. This is in line with prior

[16] Angrist had related versions of this paper with various co-authors circulating for some time.

LATE estimates but has greater external validity given the nature of the instrument. With the returns to education from various LATE estimates confirmed, I now turn to the research focused on examining the changes to the returns to education over time.

Goldin and Katz (2008) took the long view and chronicled the large educational wage differentials starting in 1915 for both a high school and college degree. Both these education premiums shrank from the beginning of their period of observation until 1940 and then held steady through 1980. The big difference between these two premiums came after 1980, when the high school wage premium had anemic growth while the college wage premium increased, coming close to its prior 1915 highs by 2005. Goldin and Katz (2008) went on to show that a simple supply-demand framework where the demand for college workers grew steadily and supply fluctuated could explain the movements of the college wage premium over the entire time frame pretty well. It is this later time frame, from 1980 onward, that will be the primary focus of the rest of this section.

The deviation in the trends in the education wage premium for high school and college since 1980 raises questions on how the other educational attainment categories responded over that time frame. In their examination of the reasons for the increase in U.S. wage inequality over the last four decades, Autor, Katz, and Kearney (2008) presented the real, experience-adjusted earnings of full-time, full-year workers for different levels of educational attainment: high school drop-out, high school graduate, some college, exactly college, and more than college. The authors chronicled a near-uniform climb in log real wage levels from 1963 through 1973 for

five education categories spanning from high school drop-out to those with more than a college degree, with exactly college and more than college growing slightly faster. From 1973 to 1979, real wages leveled off for all five educational attainment categories, but since 1979 real wages for some college, high school graduates, and high school dropouts have all fallen, with high school dropouts falling below their 1963 levels. Meanwhile, wages of those with a college degree but no post-college formal education held at their late 1970s level through the 1980s and early 1990s and rose even higher starting in the late 1990s, while those with more than a college degree experienced steady increases over time. An update of this breakdown in Autor (2014) showed that those with more than a Bachelor's degree have seen a continued increase in their real wages while the wages of those with all other education levels have leveled off or fallen since the start of the Great Recession. Women have seen a similar increase in dispersion of wages by educational attainment, but real wages for women with low education held steady instead of declining.

Not only has the dispersion of earnings by education increased over time, but the dispersion of earnings among those with a college education also appears to be increasing over time. Since 1970, the income distribution has widened among college-educated workers. Card (1995) found not only that the return to a year of college is particularly large for disadvantaged students but also that low-income students had larger returns from attending selective colleges. Hoxby and Long (1999) documented the increasing inequality in wages of college graduates. They found that while college graduates at the 90th percentile of earnings saw their wages increase between 1975 and 1992, those at the 10th percentile saw their wages decline in real

terms. They suggested increasing segregation by selectivity in higher education with more selective schools spending more per student as a possible explanation. The most selective institutions often spend more than three times as much as less selective schools. Hoxby and Long (1999) found that nearly half of the explained growth in this dispersion was due to the increasing concentration of peer and financial resources at more selective colleges and universities relative to other institutions. There is no consensus in this literature, however, because Dale and Krueger (2002) found there was no return to college selectivity for most students when they compared the earnings of students who were admitted to the same colleges but chose to attend different ones. This negative result appeared to hold for the average college student, but Dale and Krueger still found large returns to college selectivity for low-income students.

Part of the mystery over the selectivity of and return to education from a college may be explained by the students at the most selective schools having a higher probability of going on to post-baccalaureate education. Lindley and Machin (2011) showed that much of the variance in the earnings of college graduates could be explained by those college graduates with professional degrees. The ability to go on after college and receive a professional degree or doctorate can therefore be seen as an option value of a college degree.

The returns to education appear substantial and seem to be growing over time. A number of authors have attributed this growth to an increase in the demand for skilled labor outstripping supply (Goldin and Katz, 2008; Autor, 2014). This increased demand for skilled labor driving the returns to higher education may in

turn affect the price sensitivity of demand for higher education.

1.5 Price Sensitivity of Demand for Higher Education

There are many factors that enter into the determination of the price sensitivity of demand for higher education. The ability and willingness of an individual to pay for college will depend on the price she faces, her expected returns from additional schooling, the consumption value of attending college, and her wealth or lack of credit constraints (Becker, 1962 & 1975; Cameron & Taber, 2004). There are also several other factors that relate more to social norms and default conditions that appear to contribute to an individual's decision to continue his or her education (Field, 2009; Pallais, 2015).

The literature estimating the price sensitivity of higher education has been thoroughly developed over the years. Multiple reviews of this literature have been published over time (Leslie & Brinkman, 1988; Heller, 1997; Deming & Dynarski, 2010). This chapter presents a broad review and is organized by the source of variation in price. This organization highlights a puzzle: the effect of a reduction in the cost for college seems to depend on the form of the price reduction. A general pattern emerges in that the changes in net cost that are more easily understood and are known earlier in the application process seem to have the greatest effect.

1.5.1 Changes in List Price

Leslie and Brinkman (1988) summarized 25 studies from the 1970s and 1980s that primarily relied on variation in college cost by state and over time. They concluded that a $100 increase in tuition price (in year 1982-1983 dollars) would result in a 0.7 percentage-point decrease in the matriculation of 18- to 24-year-olds. This translates into a 4 percentage-point decrease for a $1,000 increase in price (in year 2000 dollars).

Following the meta-analysis by Leslie and Brinkman, three additional studies used differences in the tuition rate at public colleges between states and corresponding differences in matriculation rates into college to estimate the price sensitivity of demand for higher education. Kane (1994) and Cameron and Heckman (1998) applied similar identification strategies using data from the October Current Population Survey (CPS) and the National Longitudinal Survey of Youth (NLSY), respectively. Both studies estimated roughly a 4 percentage-point increase in enrollment for a $1,000 per year decrease in price (in year 2000 dollars). These results appear promising, but one criticism of this analysis is possible endogeneity. States that chose to provide greater subsidies to public colleges to lower in-state tuition costs could also invest more in K-12 education, have a more extensive network of community colleges, or have a population that values education more highly and pushes their children to attend college. In response to this criticism, Kane (1999) focused on differences in tuition within states over time and found similar results to his 1994 paper using between-state differences.

Despite the potential endogeneity issues, most studies using this form of variation found the expected sign for the effect for most subgroups with one notable exception. Avery and Hoxby (2004) found that for high-ability students, there was an interestingly heterogeneous response to higher tuition by the selectivity of the school their parents attended. High-ability students whose parents went to low- and medium-selective colleges reduced their probability of attending a school as tuition increased, but students of parents who attended highly selective college were more likely to matriculate as tuition of a school increased. The authors believed this could be due to the tuition prices signaling quality and/or per pupil spending on students.

Although the tuition prices faced by residents of states seldom vary much over time, there is at least one notable exception. Abraham and Clark (2006) studied the impact of the District of Columbia's Tuition Assistance Grant Program (DCTAG), which allows DC residents to attend public colleges and universities throughout the country at considerably lower in-state tuition rates starting in 1999. They found that the percentage of DC residents of high school graduating age enrolling as freshman increased 3.6 percentage points for every $1,000 decrease in out-of-pocket costs (in year 2000 dollars). They also found even greater movement over where the DC residents went to school, with substantial shifts to public 4-year institutions, particularly within neighboring states.

The second chapter of this dissertation also uses variation in tuition costs across states and avoids many of these potential endogeneity issues by focusing on a population whose state of residence is determined by military-mandated moves. Using this identification strategy, I find a 1-1.5 percentage-point increase in college

attendance from a $1,000 decrease in tuition costs (in year 2000 dollar) for both traditional and non-traditional aged students. This result is roughly half the estimated price sensitivity (on a percentage-point basis) from the previous studies and may be due to unique challenges military families face, or might reflect a change in the price sensitivity of demand over time as the returns to college have increased.[17] That said, this result could be used to estimate the expected response of programs aimed at increasing the educational attainment of military families even if they are not necessarily generalizable to the non-military public.

1.5.2 Federal Programs

1.5.2.1 Social Security

To get around the aforementioned endogeneity issues that arise when using cross-state variation in the cost of college, an alternative source of changes in price could be used. A researcher would ideally use some exogenous change in price unrelated to a student's tastes for college. The elimination of the Social Security Student Benefit in 1986, which provided aid to 18- to 22-year-old college students who were children of deceased, retired, or disabled Social Security beneficiaries, provided such an exogenous price change. Dynarski (2003) estimated that a $1,000 (in year 2000 dollars) increase in the out-of-pocket costs of attending college from the elimination of the benefit translated into a 4 percentage-point reduction in college

[17]This result translates into a 7 to 10 percent change in enrollment given the baseline level of 14 percent enrollment in the sample. This percent change in enrollment is consistent with previous estimates, which traditionally examined populations exhibiting 40 to 50 percent enrollment.

attendance by the affected population.

1.5.2.2 GI Bills

Angrist (1993) and Bound and Turner (2002) showed that the GI Bills from the Korean War and World War II increased educational attainment. While these results are important, projecting the estimates from these studies to the current educational environment may be irrelevant given increased returns to education and tuition costs. Also, as discussed earlier, it is difficult to separate the financial impact of the GI Bills from the effect of military service or draft avoidance behavior for a cohort. Thus, any price sensitivity of demand estimates generated from the results of these studies may be both inaccurate and out-of-date.

1.5.2.3 Pell Grants

Several studies have used the establishment of the Pell Grant program in 1973 to obtain an estimate of the price sensitivity of demand. Hansen (1983) examined the rate at which students from low-income and high-income families attended college before and after the program started and found no significant difference. Due to questions on the effect of the selection of particular years to limit the sample and the potential contamination of the sample from the end of the Vietnam War, Kane (1994) reexamined this question, focusing on women, and again found no significant differences in enrollment rates for program-eligible females compared to those ineligible. However, Sefton and Turner (2002) found that non-traditional aged students

did respond positively to Pell Grants. Their results translate into a 0.5 percentage-point increase in matriculation from a $1,000 increase in aid (in year 2000 dollars).

The complexity of the Pell Grant program may be a reason for the lack of an effect on initial enrollment. However, after enrolling and receiving a Pell Grant a student may have a better understanding of the program and be able to more easily estimate the value of further Pell Grants. Therefore, the Pell Grant program could affect persistence even if it does not influence initial enrollment. Manski (1993) questioned whether the additional funds from Pell aid might increase persistence and lead to higher graduation rates but found no disproportionate growth in obtaining a college degree for the eligible "college-aged" population. Bettinger (2004) found some suggestive yet inconclusive evidence that Pell aid increases persistence.

1.5.2.4 Tax-Based Aid

The source of variation in price most relevant to the third chapter of this dissertation is tax-based aid.[18] The literature on the price sensitivity of demand for higher education from tax-based federal student aid is fairly limited, as tax-based aid for higher education in the United States is itself a fairly new concept, beginning in 1998. The Hope Learning Credit (HTC) and Lifetime Learning Tax Credit (LLTC) were both introduced in the Tax Relief Act of 1997.[19] While these programs clearly subsidized the college education of the American middle class, it is less clear how much these tax programs increased college attendance (Long, 2004; Burman et al.,

[18]The variation in chapter 3 is based on the tax-treatment of savings for higher education. Therefore, tax-based aid is similar but not a perfect analog.

[19]The HTC was later modified and renamed the American Opportunity Tax Credit (AOTC) beginning in 2009.

2005).

The first study that attempted to estimate the impact of these tax incentives on college enrollment was that of Long (2004). She used October CPS data from 1990 to 2000 which had family background data that allowed her to estimate eligibility for the tax benefits, but the data were not ideal. The incomplete data created a noisy estimate for tax-based aid. A noisy measure makes it more difficult to find statistically significant results. Long was not able to find an increase in total enrollment, a shift to more 4-year schools, or a shift to more full-time enrollment for either traditional 18- to 24-year-olds or 24- to 40-year-olds. Therefore, it appeared that either the complexity of the aid and the time delay involved in receiving it mitigated its predicted effect, or the measurement error in the income variable and thus the eligibility for the tax credits obfuscated the true impact by biasing the estimates toward zero.

Turner (2011a) used Survey of Income and Program Participation (SIPP) data, which have more precise income information than the October CPS, to estimate the impact of tax-based aid on the college enrollment of 18- to 19-year-olds.[20] Unfortunately, the SIPP does not include variables on tax-based aid or all the variables necessary to calculate their value, but it does allow for a close approximation. Turner found a $1,000 increase in tax-based aid increases full-time enrollment by either 3.2 percentage-points or 2.6 percentage-points depending on whether only cross-sectional variation in award size among eligible youths or difference-in-differences

[20]The SIPP is a nationally representative survey designed to provide accurate and comprehensive information on income and program use.

estimation using both eligible and ineligible youth is used for identification. This translates into an 8.6 percent and 9.9 percent increase in full-time enrollment from a $1,000 increase in tax-based aid. Turner (2011a) also found that tax-based aid increased persistence.

SIPP data allowed for more detailed examination of 18- to 19-year-olds but were not well suited for examining the effect of tax-based aid on the educational outcomes of adults. Given the inherent complexity of tax-based aid in the United States and the results from Sefton and Turner (2002), which could imply adults are more responsive to complex forms of aid, a re-examination of the adult population's response to tax-based aid with an alternative data source to the October CPS was desired. LaLumia (2012) used data from the NLSY79, which have more detailed information on educational attainment and college enrollment than the October CPS. The sample used in her study had an average age of 41, a majority were married, and most had children. Given that the age range started at 33, all were at least "minimally" non-traditional, and most of her sample was "moderately" to "highly" non-traditional. LaLumia had difficulty finding statistically significant impacts of tax-based aid on the college attendance or degree completion for this population and could rule out a effect on attendance larger than 2 percentage-points. One exception was for a subset of adults who failed to meet their education expectation as reported in their youth. For this subset, a $1,000 increase in tax-based aid was associated with a 3.3 percentage point increase in college attendance. The sample in this study had a lower rate of college attendance than samples used in other studies, so a percent change, instead of a percentage-point, is the more appropriate

measure to use to compare against other studies. Although the estimated sensitivity is in line with percentage-point estimates from other populations, the percentage increase this represents is uncharacteristically large. This raises questions about the both the internal and external validity of this result.

The expansion of higher education tax credits with the enactment of the AOTC in 2009 and de-identified data from an IRS database for a more detailed examination of the effects of tax credits on higher education outcomes. Bulman and Hoxby (2015) used these data and both regression kink and simulated instruments to look for a response to the expansion of the tax incentives. The AOTC did not have a statistically significant impact on any of the educational outcomes examined, including total enrollment. Over the wide range of household income and student age categories examined, this study did not find any evidence that tax credits affected educational outcomes. It appears tax credits, at least the expanded credits in the AOTC, did not generate the same magnitude of response as an equivalent change in the net price of higher education from other sources of variation.

1.5.3 Non-Federal Programs

1.5.3.1 State Merit Aid Programs

The most studied state merit program is the Georgia Helping Outstanding Pupils Educationally (HOPE) Program, which also served as the inspiration for the Hope Tax Credit and many similar state programs. The Georgia HOPE Scholarship allowed free attendance at Georgia's public colleges for state residents with at least a

B average in high school. The results from Dynarski (2004a) and Cornwell, Mustard, and Sridhar (2006) suggested that Georgia's program had large impacts on the college attendance rates of children from middle- and high-income families. Using a set of nearby states as a control group, Dynarski found that Georgia's program likely has increased the college attendance rate of all 18- to 19-year-olds by at least 7 percentage points. The results suggest that each $1,000 in aid (in year 1998 dollars) increased the college attendance rate in Georgia by 3.7 to 4.2 percentage points.

Dynarski (2008) found similar results, with women responding more than their male counterparts, when evaluating the first two large-scale merit-aid scholarships in Arkansas and Georgia together. Although decomposing the increase in college completion into the effect on increased initial enrollment and greater persistence is difficult given the available data, Dynarski showed that both initial enrollment and college completion increased and that the private benefits of the program appear to far exceed the costs. However, Sjoquist and Winters (2012b), studying a broader set of similar programs, did not find similar results. Furthermore, when Sjoquist and Winters (2012a) tried to recreate the results from Dynarski (2004a) using the Census 5 percent file instead of the 1 percent file, they did not find statistically significant results.

The merit programs in Georgia and Arkansas are not the only ones to be studied in depth. Under California's Cal Grant program, those who met certain academic and financial need requirements were eligible in 1999 for up to $9,400 per year to attend a private 4-year institution in California or a grant to cover tuition and fees at a California public college. Using regression discontinuity to exploit the

thresholds to qualify for the Cal Grant program, Kane (2003) found that Cal Grant eligibility translated into a 3 to 4 percentage-point increase in enrollment among financial aid applicants.

This result cannot easily be translated into an increase-per-dollar estimate, as the net dollar value of aid is difficult to calculate given limited information on how much Cal Grant assistance may have "crowded out" other forms of aid. Assuming no "crowd-out" produces a lower bound estimate of a 1.2 percentage-point increase in enrollment from $1,000 in Cal Grant funds. When attempting to control for institutional aid crowd-out, Kane estimated that a net $1,000 increase in aid from the Cal Grant program resulted in a 9.2 percentage-point increase in enrollment, an estimate much higher than the rest of the literature has found.

All of the merit scholarships above were studied as quasi-experiments, and the results varied. The STAR project, on the other hand, followed an experimental design and randomly assigned entering first-year undergraduates to one of three treatment groups receiving either additional services, financial incentives, or both. The additional services consisted of a peer-advising service and a supplemental instruction service. The financial incentives ranged from $1,000 to $5,000 dollars for maintaining good grades. Angrist, Lang, and Oreopoulos (2009) reported on the results of the experiment. They found that students offered services without the financial incentives did no better than those in the control group. Women appeared to respond the most to financial incentives with increased GPAs, and these increases continued after the program ended. However, the Angrist, Oreopoulos, and Williams (2014) examination of the Opportunity Knocks program, a program

similar to STAR, was unable to find positive results that persisted after the program had completed.

1.5.3.2 Place-Based Programs

There also has been a recent emergence of place-based scholarship programs that allow for the study of the effect of a sudden change in the expected cost of college on educational outcomes. The most well-known of these programs is the Kalamazoo Promise, which pays a portion of the tuition at any Michigan public college for students graduating from the local school district. The amount of the scholarship depends on how many years the student had gone to the local school. A longer term follow-up of the effects of the Kalamazoo Promise on enrollment, persistence, and completion using difference-in-differences and propensity score matching is due out shortly (Bartik, Hershbein, & Lachowska, 2015). Preliminary results suggest the Kalamazoo Promise increased college enrollment by 7 to 8 percentage points. These increases in enrollment also appear to have translated into statistically significant increases in college completion within 6 years.

In addition to differences in the effect of an additional dollar reduction in net cost by the source of funding, some heterogeneous treatment effects by recipient characteristics have been found. Work by Angrist, Lang, and Oreopoulos (2009) and Dynarski (2008) both suggested greater sensitivity to merit-based tuition supports among women than men. Coupled with the long-term rise in the share of women attending college, this suggests that many of the recent programs may have

been more effective at providing incentives for women than men. Why men remain relatively unresponsive and have fallen behind their female counterparts in college attendance and completion rates remains an area for further research.

1.5.4 Other Sources of Variation

1.5.4.1 Immigration Status

The recent legislative focus on either curtailing or extending in-state tuition benefits to undocumented students has provided additional estimates for the price sensitivity of demand for higher education, at least for this subgroup. Given that undocumented youths have difficulty capitalizing on additional education in the formal labor market and may struggle to fund their education without access to federal student loans or aid, one might expect these students to be more responsive to relatively small changes in the price they face.

Kaushal (2008) and Chin and Juhn (2010) used data from the CPS-ORG and the ACS respectively and changes in state laws allowing in-state tuition to children of undocumented immigrants to estimate the demand response to this change in price. Their results showed a much lower elasticity of demand, if any, for this population due to these policies as compared to responses to tuition changes of native-born Americans.

The estimation strategy used in the aforementioned studies may be problematic. Research has suggested that new immigrants' location choices are unaffected by state subsidies (Kaushal, 2005; Zavodny, 1997), preserving the identifying as-

sumption above. However, measurement error was an issue for both studies as citizenship status is not explicitly asked in the data collected. Conger and Turner (2015) overcame the measurement error problem by obtaining data from a large urban university system that collected data on the immigration status of their students and underwent changes in the tuition rate these students faced. A series of papers from this data source is the most convincing work to date and has shown strong effects of tuition increases causing a reduction in degree completion by undocumented students.

1.5.5 Non-Monetary Sensitivities of Demand

Net tuition and fees are not the only costs students must pay to attend college. The largest cost is likely the opportunity cost of their time. There are also several upfront costs that high school graduates face when applying to a school before they can attend. Whether it is taking the SAT or ACT, writing an application essay, filling out a FAFSA form for aid, or deciding which schools to apply to, there are several cognitive, hassle, and small financial costs that are part of the application process. Although the magnitudes of these costs are small, researchers have found that the elimination or mitigation of these small costs can increase application to and enrollment into college.

I begin with the literature on the costs associated with applying for financial aid. Appling for financial aid includes several small tasks that involve paperwork and uncertainty, and these seemingly low-cost activities may prevent individuals from

applying to college or for financial aid due to inertia or unfamiliarity with the system. Kane (1995) was an early and vocal critic of the complex and backward-looking, means-tested federal financial aid program in which the value of financial assistance is not known with certainty until after acceptance into a college. In 2004, Avery and Kane reported on a survey of student perceptions of college in the Boston area. They found that both low-income students and high-income students in the city perceived college as a sound investment at similar rates. They found some evidence to support the idea that low-income students were disproportionately discouraged by the complexity of the process of applying for financial aid and college admissions, even if they were qualified and enthusiastic about going to college. They concluded that interventions that only present information on tuition, financial aid, and likely wages are unlikely to be successful at decreasing the gap in college attendance by family income. Their results suggest that interventions that also target simplifying or assisting with the application process may be more effective.

One point of note is that the survey was conducted in Boston, an urban area with an uncommonly large number of colleges and universities. Although low-income students in Boston may already be aware of the financial benefits of attending college, that does not mean all low-income students are as aware as their high-income counterparts. Later in this section, I will discuss other research that specifically tries to find, target, and inform isolated, high-achieving, low-income students who the researchers believed would make different choices after receiving additional information.

In 2006, Dynarski and Scott-Clayton published a description of the complexity

of the aid system and argued that this complexity is a serious obstacle to both efficiency and equity in the distribution of student aid. Bettinger et al. (2012) tested this idea by randomly assigning H&R Block tax professionals to help low- to moderate-income families complete the FAFSA. Their analysis suggested that individuals who received assistance with the FAFSA and information about aid were substantially more likely to submit the aid application, enroll in college the following fall, and receive more financial aid than those who only received the personalized information about aid. Specifically, enrollment rates for high school seniors increased by 7 percentage points (or 30 percent) while increasing 20 percent for young adults who had already graduated high school or who had a GED. The program was targeted at households with less than $45,000 dollars in income with a 17- to 30-year-old not already in college, but the effects seem to be driven by families with income less than $22,000.[21]

Aside from applying for financial aid, there are also cognitive costs of deciding which schools to apply to, and schools also often charge an application fee. Carrell and Sacerdote (2013) found that providing high school students with college application guidance and waivers for college application fees increased matriculation into college, particularly for students attending disadvantaged high schools. Hoxby and Turner (2013) found that sending high-achieving, low-income students application fee waivers and information about colleges and optimal application strategies induced them to attend more selective colleges and, given their high academic

[21]For further reading on the political and legislative reaction to this line of research and potential further improvements, one can refer to Dynarski and Wiederspan (2012).

achievement, these more selective colleges were populated with intellectual peers, representing a better school match for these students. Hoxby and Turner (2015) presented information gathered from surveys on the understanding of the aforementioned high-achieving, low-income students on their collegiate options and preferences. They found that universities with a reputation for being a "party school" or known for athletics were unappealing to high-achieving students. Customized information about net cost and colleges' characteristics appeared to have influenced the students' perceptions and resulted in a stronger set of schools selected during the application stage. Hoxby and Turner also found that these high-achieving, low-income students tended to be particularly misinformed about liberal arts colleges.

Even after getting into college, many students are unaware of the full implications of the financial decisions they have made. Akers and Chingos (2014) reported on survey results showing that college freshman often cannot correctly identify the net cost they are paying to attend school or the amount of loans they are taking out. Finally, of those students who had federal student debt, 28 percent did not think they had federal student debt and 14 percent reported not knowing they had any student debt.

A general theme that has emerged from this research is that small fixed costs - financial, cognitive, or informational - seem to have unexpectedly large effects on the rate at which students apply or matriculate to college. These costs also appear to affect low-income students more than their middle- and high-income peers. This might help explain the persistent and growing gap in higher education by family income, which is an area of great policy and academic interest, but is tangential to

the main issues being considered in this dissertation.

1.5.5.1 Credit Constraints

Given the array of federal (and now private) student loans available to potential students, are some students who would otherwise go to college still credit constrained? Shea (2000) examined the effect of "luck" or random changes in parental income on the educational attainment of their children. He generally found negligible effects on the human capital acquisition of the children except for those from low-income families. This result suggests that credit market constraints lead low-income households to make suboptimal investments in their children. However, Cameron and Taber (2004), using NLSY data and a variety of identification strategies, found no evidence that borrowing constraints impeded educational attainment. Cameron and Taber concluded that credit access is not a driver of under-investment in education, given the array of current programs available. Carneiro and Heckman (2002) came to a similar conclusion; they argued that given the array of current loan options, credit constraints were likely not binding in most cases. However, they did identify a group of people (at most 8 percent of the population) who seemed to face short-run credit constraints. But overall, long-run family factors that were correlated with family income, like the home environment or investments in early childhood education, appeared to dominate.

Most of the studies that concluded credit constraints have little effect on college attendance were conducted using data on students who would have been deciding

whether or not to go to college in the 1990s. Belley and Lochner (2007) wondered whether increases in tuition may have made borrowing constraints more binding. They found an increased correlation between college attendance and income in later years, which could reflect a reemergence of credit constraints.

1.6 Conclusion

With growing demand for skills driving the returns to education higher, the benefits from a college degree have increased. Meanwhile, the supply of college instruction, particularly at resource-intensive schools, has not kept pace, thereby escalating the costs of obtaining a college degree. These two factors may cause fluctuations in the price sensitivity of demand for higher education over time. Therefore, estimates for this sensitivity should be updated periodically to check for such fluctuations. Additionally, the sensitivity of demand for higher education appears to vary by the source of aid and the population receiving it.

- Changes in tuition prices appear to generate the largest and most consistent sensitivity estimates.

- Changes in price from the Pell grant program, which is complex, has not been found to increase enrollment except among older, non-traditional students.

- There is some evidence that the Pell grant program increases persistence. Perhaps the experience with the program mitigates some of the issues of its complexity.

- Studies of tax-based aid have struggled to find consistent statistically significant effects on enrollment.

- Many but not all studies of state merit aid and place-based programs find results similar in magnitude to changes in tuition prices, but there is some variation in results by the age and gender of potential students.

As the proportion of non-traditional students attending college grows, research extending estimates for the sensitivity of various non-traditional groups of students becomes more valuable. The next two chapters estimate the price sensitivity of demand for two previously understudied groups of non-traditional students.

Chapter 2: THE PRICE SENSITIVITY OF DEMAND FOR HIGHER EDUCATION AMONG MILITARY SPOUSES

2.1 Introduction

The U.S. government recently passed legislation aimed at improving the educational outcomes of military spouses. The new legislation aims to lower the costs of attending school in all states through direct aid. Congress is also attempting to ease the transition following a cross-state Permanent Change of Station move by mandating that military spouses and dependents qualify for in-state tuition rates immediately upon moving into a state. Prior to July 1, 2009, the exemption of military spouses and dependents from any residency requirements of public institutions of higher education was left to the discretion of the states or in some cases individual institutions.

The expected magnitude of response in college attendance by military spouses to these price changes is uncertain. The existing literature has provided several estimates for the price sensitivity of demand for higher education of civilian 18- to 24-year-olds. These estimates consistently have found that a $1,000 (in year 2000 dollars) decrease in tuition costs is associated with a 3 to 5 percentage-point increase

in attendance.[1] However, there are systematic differences between the military and civilian populations that likely lead to differences in price sensitivity between these populations. For example, military families have to deal with the unique stress of deployment. Military families also move frequently, often over large distances. The distance and frequency of these moves affect the socioeconomic outcomes of military spouses. Military spouses have reported that these frequent moves are an impediment to furthering their education. Due to these differences and recent legislation targeting spouses and dependents of military personnel, it is beneficial to identify the price sensitivity of higher education of this specific group. Fortunately, the frequent moves undertaken by military spouses also allow for a unique identification strategy of their price sensitivity of demand for higher education.

Some previous studies use cross-state variation in the cost of in-state 2- and 4-year public colleges, along with cross-state variation in high school graduates' rate of matriculation to college, to estimate the price sensitivity of demand for higher education. However, this method may be subject to omitted variable bias due to other characteristics of states correlated with both costs at public colleges and the state's matriculation rate. For example, states that provide more funds to subsidize public colleges and universities, resulting in lower tuition costs, may also spend more money on public elementary and secondary education, thus preparing a greater percentage of their population for college. Furthermore, relative tuition costs between states have remained fairly constant over time.[2] As a result, it is difficult

[1]There is some variation in demand sensitivity from other sources of changes in price.

[2]See the Appendix for detailed tuition estimates from 2000 to 2008. It is important to note that there were substantial spikes in college tuition in 2009 due to the financial crisis. However, this date is outside the time frame used for the analysis in this paper.

to control for individual state effects without losing much of the variation in costs. Other researchers have attempted to control for these issues and other omitted variable bias problems by using other variations in costs, such as the introduction or elimination of tax breaks, grants, or scholarships that change the tuition prices paid by particular groups across multiple states. This would allow researchers to control for state-specific effects and mitigate the omitted variable bias.

This paper takes a different methodological approach due to a natural experiment unique to the subpopulation studied. Most military personnel experience a mandated move every 24 to 48 months. These moves are often across state lines, and military personnel have little input into which installation they are assigned to.[3] With the existing variation in tuition costs across states, examining military families experiencing a Permanent Change of Station will constitute a natural experiment. Additionally, four states have changed their laws to exempt military spouses from the residency requirements for in-state tuition during the time period examined. These changes lead to drastic reductions in the cost of attending public colleges, therefore providing additional variations in cost.[4] However, the majority of the variation in cost used to identify the price sensitivity of demand for higher education among military spouses comes from variation between the states rather then within states over time.

The key assumption of this paper is that the cross-state moves by military

[3]The one common exception is if a member of the military has a dependent currently enrolled in his or her senior year of high school. If this is the case, the family is able to delay the move up to a year to allow the child to finish his or her education.

[4]For example, when Virginia changed their policy in 2007, the enrollment-weighted average cost of attending a 4-year public school dropped from $13,899 to $5,676.

families as a result of Permanent Change of Station orders result in exogenous variation in the price military spouses face for higher education. The military requires that enlisted personnel relocate at least once every 3 years, but not more than once a year. Within rank and occupation, the military asserts that all members are equally likely to be relocated to a particular base. If so, military spouses would be moved to high- or low-cost states independent of their socioeconomic characteristics. Lleras-Muney (2010) tested this claim and found that, at least for enlisted servicemen, individual characteristics observed at the time of relocation were uncorrelated with base of relocation. This systematic placement of military personnel is not random assignment, but may be exogenous with respect to the military spouses' educational preferences.

This chapter uses individual-level data matched at the state level with tuition data for the period 2000-2008. I find that military spouses appear to be responsive to changes in the cost of 2-year public institutions, but not to changes in the cost of 4-year colleges. Specifically, a $1,000 decrease in the cost of a 2-year school is associated with a 1–1.5 percentage-point increase in the probability of a military spouse attending college.[5]

[5]Unfortunately, the data do not inform us if the schools being attended are 2-year or 4-year institutions.

2.2 Background and Literature Review

2.2.1 Previous Price Sensitivity Estimates

Several studies provide estimates for the price sensitivity of a year of college education. The price sensitivity appears to vary by the source of variation in price, but sensitivity from a change in the in-state tuition price, the source of variation examined in this chapter, is consistently estimated at around a 4 percentage-point increase in matriculation for a $1,000 decrease in price (in year 2000 dollars). I refer the reader to the first chapter of this dissertation for a detailed review.

There are two other findings from the price sensitivity literature that are relevant to this chapter. The first pertains to which price matters. Kane (1995) used between-state differences in public tuition at 2-year and 4-year colleges and found that the marginal price, the price that determines whether or not someone attends college at all, is that of tuition at a 2-year college and not a 4-year college. Second, given the age range of the population studied here, Seftor and Turner's (2002) results from examining the effect of the Pell Grant program are germane. Seftor and Turner found non-traditional students, defined as 25- to 30-year-olds, had roughly twice the price sensitivity of demand as their younger counterparts from this variation in price. Accordingly, this study looks for heterogeneous responses by age among military spouses.

Prior to this paper, the literature examining the socioeconomic outcomes for military spouses has focused on the work prospects of military spouses based on

different policies or the level of education of the spouse.[6] However, little work has been done examining the responsiveness of military spouses to policies aimed at increasing their educational attainment. Examining military spouses' price sensitivity of demand for college will add to the prior estimates of this sensitivity that traditionally focus on 18- to 24-year-olds without differentiating by marital status or said spouse's membership in the armed forces.[7] It would not be appropriate to extend the estimate of the price sensitivity of other populations to military spouses due to the unique challenges military families face. Thus, the primary addition of this work will be to provide an initial estimate of price sensitivity of demand for college among military spouses.

The importance of the price sensitivity of higher education of this particular group has recently increased due to policy changes in the Post-9/11 GI Bill that was passed in 2002, the National Defense Authorization Act for Fiscal Year 2009, and the Higher Education Opportunity Act of 2008. The Post-9/11 GI Bill allows service members to transfer educational benefits to their spouses if they have served at least 6 years and agree to serve an additional 4 years. On August 1, 2009, the first military personnel who enlisted under the new GI Bill will had served the required 6 years and had the option to transfer benefits upon re-enlistment. Additionally, the National Defense Authorization Act for Fiscal Year 2009 set up Military Spouse Career Advancement Accounts (MyCAA), beginning in 2010. The MyCAA program

[6]The RAND Corporation has published a monograph, "Working Around the Military," which provides a summary of some of the challenges military spouses face in the workforce.

[7]Several studies use an individual's own military service and his corresponding relationship to the draft or eligibility for a GI Bill benefits to examine the relationships between these factors and an individual's own educational outcomes, but not the outcomes of his family members.

provides up to $2,000 a year for up to 2 years to help cover the costs of tuition and fees incurred by military spouses furthering their education.[8] Meanwhile, the Higher Education Opportunity Act of 2008 stipulates that all public institutions that receive federal funding must exempt military spouses from residency requirements for in-state tuition as of July 1, 2009. Furthermore, once a spouse is enrolled and paying in-state tuition, she will continue to pay the in-state tuition rate as long as she remains continuously enrolled at the institution, even if the service member is reassigned outside the state. This law ensures that the military spouses in the handful of states that have not already passed similar legislation will now be eligible for lower in-state rates when moving with their spouses across state lines for military-mandated moves. An accurate measure of the price sensitivity of higher education of military spouses is necessary to understand the extent to which these additional benefits will induce more members of military families to pursue a college degree. This paper aims to estimate this measure and predict whether the policy changes set forth in the Post-9/11 GI Bill and the National Defense Authorization Act for Fiscal Year 2009 will entice more military spouses to further their education.

2.2.2 Tuition Prices Faced by Military Spouses

Before estimating the response of military spouses to the price of higher education, it is important to determine the prices these individuals actually face. As of 2000, 41 states exempted military spouses from the waiting period to qualify for

[8]Initially the cap for the scholarship was $3,000 a year for up to two years, but the program did not have sufficient funds to maintain that funding level. There are also additional eligibility criteria and restrictions on the usage of MyCAA funds which limit the use towards certificates, licenses, or an Associate's degree.

in-state tuition at public colleges upon moving into the state as a result of a Permanent Change of Station. Over the time frame used, 2000-2008, four more states extended this exemption to military spouses.[9,10] Military spouses who attend college tend to do so at public institutions.[11] As a result, the tuition and fees at public institutions in the current state of residence can serve as a fairly accurate measure of the financial cost to attend college as long as the proper rate (in-state/out-of-state) is assigned.

In determining the price faced, it is also important to examine any possible sources of financial aid available specifically to military spouses. If individual states offered scholarships targeted at military spouses, the use of public college tuition and fees would not accurately represent the costs military spouses face. According to the U.S. Department of Defense, there were no regular tuition assistance programs for the spouses or dependents of Army personnel stationed in the United States as of 2007 (Department of Defense, 2007). There was a Spouse Education Assistance Program through the Army Emergency Relief program, but it was only for spouses of soldiers stationed and living in Europe, Japan, and Korea (Department of Defense, 2007). There are some branch-specific scholarships for military spouses, but eligibility for these scholarships does not appear to depend on the state of residence and thus would not affect relative cost differences between states.[12]

The data used for this analysis are from 2000 to 2008, and thus the estimates

[9]Specifically, Georgia in 2003, Virginia in 2006, and Indiana and Kansas in 2007.

[10]Figure B.3 in the Appendix graphically illustrates the legislative landscape on granting in-state tuition to military spouses between 2000 and 2008.

[11]In the sample of military spouses used in this paper, 85 percent of those who attend college report attending a public institution.

[12]Financial Aid Finder, retrieved from: `http://www.financialaidfinder.com`

for the tuition costs faced are not influenced by the Post-9/11 GI bill or the National Defense Authorization Act for Fiscal Year 2009. Data from 2009 onward would have to correct for the eligibility and possible take-up of benefits from these pieces of legislation moving forward. The previous GI Bill had programs that offered financial aid for family members of military personnel who were killed or disabled during service. However, since the data examined are limited to families with an active duty service member currently in the family, this program does not apply to the individuals in this study.[13] As a result, the tuition and fees at public institutions in the current state of residence appear to remain a fairly accurate measure of the financial cost military spouses face in order to attend college.

2.2.3 Characteristics of Military Spouses

Military spouses tend to be more highly educated than their civilian counterparts. Ninety-seven percent of spouses have completed at least a high school education, compared to 84 percent of all adults 25 years or older in the nation.[14] The typical spouse of a service member had at least some college experience (71 percent). Furthermore, the majority of spouses indicated that furthering their education was a goal (78–95 percent depending on branch of service).[15] This evidence suggests that military spouses may have different preferences for education than the

[13]In 2008, the National Military Family Association began awarding scholarships of up to $1,000 to spouses of Uniformed Service members (active duty, National Guard and Reserve, retirees and survivors) to obtain professional certification or to attend post-secondary or graduate school. There were 350 scholarships awarded in 2008 and 293 scholarships awarded in 2009, but as the awards are to be used in the following academic year, none of the observations in this study would have received one of these scholarships yet.

[14]U.S. Census, 2005

[15]2006 Survey of Active Duty Spouses: Fact Sheet

traditional 18- to 24-year-olds who have traditionally been the focus of estimates for the price sensitivity of higher education. Married individuals in general are a selected group even before the added stresses of being married to a spouse with a job in the military.

The U.S. Department of Defense periodically surveys the spouses of military personnel in order to better address their specific needs. The data provided by the 2006 Department of Defense Survey of Active-Duty Spouses also give preliminary insight into the enrollment decisions of military spouses (DMDC, 2007). According to the results of the survey, over 18 percent of military spouses were in school and over half of those not in school expressed a desire for additional education. Of those who were not currently enrolled but expressed a desire to further their education, 80 percent cited the cost of education as a reason for not attending school. This evidence suggests that military spouses will be price sensitive. Family responsibilities were the second most common response, cited by just over 70 percent of respondents. Thus, controlling for household characteristics that increase family responsibilities of military spouses is important when modeling the college attendance decision. Factors that increase family responsibilities include the size of the family, the presence of a newborn, or the deployment of the military service member. Fortunately, data are available to control for the first two factors listed. However, deployment information is not available in the data used in this paper.

There are also unique costs and challenges that military spouses face if they decide to return to school. The frequent moves required by the military make it difficult to finish a degree at one institution. Often when transferring between schools,

not all credits are accepted and courses have to be retaken. Additionally, the degree or certification they are pursuing may not be offered at schools close to their new location. Deployment of the military spouse also leaves the civilian partner as the sole adult in charge of the household, a responsibility civilian spouses do not traditionally face. These differences between military spouses and the civilian population suggest that previous estimates for the price sensitivity of higher education based on the responsiveness of 18- to 24-year-old civilians may not be applicable to military spouses.

2.2.4 Distance to Nearest School

Previous research has found that men who were raised in labor markets with a nearby 4-year college have statistically significant higher levels of education and earnings (Card, 1993). The estimated effect of distance on community college enrollment of adults in urban areas is particularly high (Jepsen & Montgomery, 2009). Given that the distance to an institution of higher education is associated with educational outcomes, one may worry that the distance military spouses have to travel may influence their enrollment rates. Furthermore, if the average distance between a military installation and the closest college campus is correlated with college tuition prices at the state level, then (if not properly controlled for) this correlation may bias the results of this study. Unfortunately, the Census data used in this study only list the state of residence of the respondent and do not identify the military installation or more specific location information of the respondent, which would

be necessary to calculate the distance each military spouse might have to travel to attend the closest 2-year or 4-year school. However, I obtained data that allowed me to estimate the minimum distance a military spouse might have to travel to attend a public college in person.

I started with the five-digit ZIP code for each of the 195 military installations in the 50 states and the District of Columbia large enough to justify an adult education center to service the military personnel on base. I then obtained the five-digit ZIP code from the address of record for each public 2-year and 4-year college campus for the 2008 academic year from the Integrated Postsecondary Education Data System (IPEDS) administered by the National Center for Education Statistics, a part of the Institute for Education Sciences within the U.S. Department of Education. I then calculated the distance from each military installation to the closest 2-year and 4-year public school based on the latitude and longitude of the centroid of each ZIP code.

Based on these calculations, the average distance from one of these 195 military installations to the closest 2-year or 4-year public school was 8.7 miles, with a median distance of just under 12 miles. Furthermore, over 98 percent of these military installations were within 60 miles of a public 2-year or 4-year school. Comparing this to the average distance from home an independent student or a married independent student lives from the school she attends—105 and 114 miles, respectively—it appears that the distance military spouses might have to travel to attend a public institution of higher education should not be an issue.[16] Furthermore, many of the

[16]The source for the average distance traveled by independent students is the Profile of Under-

adult education centers at these military installations allow military spouses to use the services if there is excess capacity after all active duty service personnel have been accommodated.[17] This includes use of the computer centers to facilitate online courses and in-person classes offered on the base itself by some higher education providers.

2.3 Data

This analysis is based on data from two main sources: the U.S. Census and the Integrated Postsecondary Education Data System (IPEDS). Two different U.S. Census surveys are used in this analysis: the annual American Community Survey (ACS) from 2000 to 2008 and the 2000 Decennial Census. The ACS is based on the census long-form survey, with minor modifications to allow the survey to provide annual updates. These sources provide information on the location, income, type, and number of people in the surveyed household, as well as age, gender, race, educational attainment, enrollment status, employment status, industry, occupation, income, fertility, and migration information for each individual.

The primary difference of interest between the two surveys pertains to the migration variables. The ACS records whether a respondent has moved within the last year and, if so, where she resided in the previous year. The decennial survey

graduate Students: 2007–08, produced by the U.S Department of Education. This report also estimates the median distance traveled for all independent and married independent students to be 14 miles, which is more than the median distance from a military installation to a public college reported above.

[17] A military spouse's ability to commute to school with her active duty spouse on his way to work may mitigate the potentially high effect of distance on adult community college enrollment in urban areas found by Jepsen and Montgomery (2009).

reports whether the individual has moved in the last 5 years and, if so, what state she lived in 5 years ago. The decennial survey also measures how long ago an individual moved into their current house, so I can tell if she have moved within the last year. However, if there was more than one move in the last 5 years, it would not be clear whether the most recent move was across state lines. For the purposes of sample selection, only individuals who moved across state lines in the last year were included. I assume that if the respondent moved in the last year and reported residing in a different state 5 years ago, then their last move was across state lines and they are included in the sample. This leaves a possibility for measurement error.[18] Individuals may have simply moved within the state in the last year. Such individuals would be assigned the out-of-state rate if they reside in states that had a 1- or 2-year residency restriction for in-state tuition without a military spouse exemption, even though they would actually be subject to the in-state tuition rate.

IPEDS is compiled by the U.S. Department of Education and managed by the National Center for Educational Statistics. This database provides a wide variety of self-reported information on academic institutions in the United States. For the purpose of this paper, information about tuition, enrollment, location, and sector was extracted for all degree-granting, post-secondary institutions in the United States.[19] With this information, it is possible to calculate the average tuition and fees charged

[18]Removing the 2000 Decennial Census data from the analysis to mitigate this measurement error would come at a high cost. The full implementation of the ACS, sampling 2.9 million housing units annually, did not begin until 2005. From 2000 to 2004, only 740,000 to 900,000 housing units were sampled annually.

[19]The poor quality of IPEDS data is well known. Many colleges and universities place a low priority on accurately fulfilling their reporting requirements, and discrepancies are pervasive. However, these are the best data available and are widely used despite their flaws.

to in-state and out-of-state undergraduate students in each state, weighted by enrollment and calculated by the sector in which the institution participates. The sector variable makes it possible to define a school as public or private and as either a 2-year or 4-year institution. I calculated the enrollment-weighted state averages of tuition and fees at 1,027 2-year and 655 4-year public degree-granting, post-secondary institutions. Both price paid and price published were extracted and used as explanatory variables in separate regressions and are summarized below in Table 2.1.[20] Price paid is the preferred variable for models shown in this chapter, but results using price published are also included in the Appendix. Figures B.4 and B.5 in the Appendix also graphically display the variation in enrollment-weighted state average price paid and average enrollment rates of military spouses in 2008.[21,22]

2.3.1 Sample Restrictions

An individual is categorized as a military spouse if he or she is in a married family household and indicates that his or her spouse is present. Furthermore, an individual's spouse must belong to a military industry. Finally, the individual studied, henceforth known as the military spouse, must not report his or her own industry as military.[23] The sample was then restricted to only include individuals

[20]Table 2.1 reflects the average prices in each state across years, properly assigning in-state and out-of-state prices in each state-year combination and weighting by the sample within each year.

[21]Vermont is the only state without a major military base or installation, so observations were omitted from this state. This unique characteristic of Vermont may explain its status as an outlier in both figures.

[22]Meanwhile, Tables B.9 through B.12 in the Appendix provide the enrollment-weighted average price paid and price published at 2- and 4-year public institutions for each state, year combination.

[23]A military industry code is classified as the industry codes for the five branches of the armed forces or "Armed Forces, branch not specified."

Table 2.1: Mean Price of Tuition and Fees for Military Spouses

State	Sample Size	Percent Enrolled	Two-Year Costs		Four-Year Costs	
			Price Paid	Published Price	Price Paid	Published Price
Alabama	165	17.6%	449	486	3291	3098
Alaska	224	13.8%	2177	2080	3188	2942
Arizona	186	18.3%	1460	1344	2752	2610
Arkansas	31	12.9%	1531	1396	3346	3101
California	772	17.0%	381	386	2898	2797
Colorado	240	14.2%	1783	1798	3289	3017
Connecticut	67	7.5%	5932	5789	12174	12120
Delaware	31	12.9%	1790	1704	5224	4962
District of Columbia	26	23.1%	N/A	N/A	2078	2008
Florida	463	14.5%	1496	1363	2151	1994
Georgia	498	12.9%	2667	2533	7222	6811
Hawaii	369	12.7%	1103	1063	2871	2681
Idaho	25	20.0%	2334	2260	2828	2752
Illinois	98	10.2%	5140	4782	4891	4593
Indiana	24	8.3%	3741	3706	10527	10167
Iowa	19	10.5%	2357	2204	3868	3646
Kansas	144	11.8%	2925	2880	8476	8377
Kentucky	231	13.9%	1577	1441	3493	3183
Louisiana	176	15.3%	982	942	2907	2558
Maine	39	20.5%	2615	2483	4620	4256
Maryland	227	9.7%	4241	4000	4880	4744
Massachusetts	38	7.9%	6928	6918	11475	11429
Michigan	33	21.2%	3478	3141	12121	11820
Minnesota	10	10.0%	2600	2407	4157	3852
Mississippi	94	18.1%	1275	1114	3269	3153
Missouri	119	20.2%	2300	2097	4390	4062
Montana	21	23.8%	2454	2349	3479	3280
Nebraska	53	18.9%	1476	1405	3431	3228
Nevada	98	16.3%	1416	1286	1948	1806
New Hampshire	9	22.2%	4437	4164	6959	6606
New Jersey	69	10.1%	3502	3396	5997	5552
New Mexico	85	15.3%	1048	970	2724	2462
New York	158	13.9%	2836	2775	3883	3797
North Carolina	658	14.7%	975	876	2613	2425
North Dakota	51	13.7%	2216	2100	3219	3002
Ohio	77	14.3%	2561	2559	5309	5073
Oklahoma	135	20.0%	1448	1430	2472	2310
Oregon	21	9.5%	1910	1789	4011	3860
Pennsylvania	38	5.3%	4473	4292	6235	5904
Rhode Island	36	2.8%	1906	1823	4718	4494
South Carolina	213	16.4%	4469	4305	12167	10434
South Dakota	44	11.4%	2855	2578	3836	3589
Tennessee	182	12.6%	1651	1527	3349	3071
Texas	749	14.0%	1522	1450	3216	3006
Utah	43	20.9%	1647	1586	2327	2228
Vermont	5	40.0%	6574	6261	16855	17011
Virginia	720	13.1%	4600	4374	11509	11230
Washington	430	14.7%	1929	1845	3545	3294
West Virginia	20	15.0%	1863	1786	2862	2694
Wisconsin	22	22.7%	2456	2314	3997	3792
Wyoming	38	7.9%	1454	1357	2620	2475

SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.
Notes:
(1) All values begin by calculating the enrollment-weighted average of degree-granting, public institutions within each state and year. The in-state or out-of-state prices are used in accordance with the prices a military spouse who moved into the state as part of a military mandated move within the last year would have faced in each state-year combination. Each value is then indexed to year 2000 dollars using the Bureau of Labor Statistics CPI-U. Finally, the sample-weighted values of each state are reported
(2) The Community College of the District of Columbia was not established until after the time period analyzed. Thus, there were not appropriate 2-year tuition costs for residents of the District of Columbia.

that had moved between states in the past year. This restriction was performed to ensure that individuals had moved at least once and that their current state of residence, and thus the price that they faced to attend college, were exogenous with respect to the educational characteristics of the state they grew up in. If a military spouse had not yet experienced a Permanent Change of Station across state lines, she could still be residing in her home state of record where she received her primary and secondary education. By requiring at least one observable cross-state move, this paper assumes the military has provided a natural experiment, even if the most recent move happens to place the individual back into their original home state of record.

The sample was also restricted to individuals between the ages of 18 and 40 with at least a GED or high school diploma and who had not yet completed a Bachelor's degree. This was to ensure that the individuals were eligible to apply for an undergraduate degree. The price sensitivity for graduate school was not considered in this study. Table 2.1 lists the resulting sample in each state and the share of that sample enrolled in school. To ensure that the cost of tuition might influence the enrollment decision of the military spouse, I removed observations from the state of Vermont, which does not have a major military base or installation. It is likely that military spouses who are enrolled in these schools are there for reasons other than price and distance. Additionally, observations for which the income variable appeared to be an outlier were removed.[24] These sample restrictions resulted in a final sample of 8,252 military spouses. This sample was further separated into

[24]Individuals with negative household income or household income above $300,000 were removed.

two age groups: 18- to 24-year-olds, the age group traditionally studied, and 25- to 40-year-olds, resulting in 2,969 and 5,319 observations respectively. For each sample individual, I calculated the enrollment-weighted average cost of tuition and fees for 2- and 4-year degree-granting, public institutions in her current state of residence. Each individual was assigned either the average in-state or out-of-state rate based on the residency requirements for the state and year corresponding to the observation.[25] All tuition and income variables were indexed to year 2000 dollars using the Consumer Price Index-Urban.

2.3.2 Summary Statistics

Table 2.2 presents the summary statistics of the variables of interest for military spouses 18 to 24 years old, broken out by school attendance. This table shows that for the younger military spouses, those who decided to attend school faced slightly lower costs to attend a 2- or 4-year public school. However, these differences were not statistically significant at the $\alpha = 0.05$ level. Those 18- to 24-year-olds not in school faced a lower average unemployment rate, 4.37 percent as compared to the 4.61 percent for those who decided to attend school. This difference is statistically significant at the 99 percent confidence level and has a t-statistic of 4.23. Those in school were also 10 percentage-points more likely to have previously obtained an Associate's degree. This difference is statistically significant, with a t-statistic of 5.70.

[25] All states except for Tennessee have at least a 1-year residency restriction for civilians, while the residency requirements for spouses and dependents of military personnel have changed over time. Table B.13 in the Appendix illustrates the state-year combinations for which military spouses immediately qualified for in-state tuition rates.

Table 2.2: Summary Statistics for 18- to 24-year-old Military Spouses

Variable	Not in School Mean	Std. Dev.	N	In School Mean	Std. Dev.	N
Two-Year Costs	2047	1415.95	2438	1946	1354.99	531
Four-Year Costs	4569	3083.12	2444	4405	2960.26	534
Other Household Income	23650	16859.78	2444	23310	10941.95	534
Age	21.64	1.742	2444	21.60	1.763	534
Male	4.6 %	0.210	2444	4.7 %	0.211	534
White	89.6 %	0.305	2444	91.6 %	0.278	534
Unemployment Rate	4.37 %	0.011	2444	4.61 %	0.012	534
Associate's Degree	7.4 %	0.263	2444	17.2 %	0.378	534
Newborn	22.9 %	0.420	2444	10.9 %	0.311	534
Number of Children Under 5	0.665	0.754	2444	0.451	0.671	534
Looking for Work	15.9 %	0.366	2444	16.1 %	0.368	534
Married to an Officer	2.6 %	0.160	2444	3.4 %	0.181	534
Spouse– High School Graduate	46.9 %	0.499	2444	33.5 %	0.473	534
Spouse– Some College	45.3 %	0.498	2444	55.1 %	0.498	534
Spouse– College Degree	5.1 %	0.220	2444	8.4 %	0.278	534
Spouse– Graduate Degree	0.5 %	0.067	2444	1.1 %	0.106	534
Enrolled in a Public Institution	N/A	N/A	2444	86.1 %	0.346	534

NOTE: Table is restricted to individuals with at least a GED and less than a Bachelor's degree.
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Those not in school also had significantly higher rates of a newborn child in the household, as well as a higher average total number of children under age 5 in the household. These differences have t-statistics of 7.54 and 6.52 respectively. Those not in school were more likely to have a spouse with a high school education as their final educational attainment and less likely to have a spouse with some college or a college degree. These differences have t-statistics of 5.87, 4.12, and 2.57 respectively. Finally, of those in school, 18- to 24-year-old military spouses attend public, degree-granting institutions more than 86 percent of the time. This high rate of attendance at public institutions by military spouses validates the use of the average enrollment-weighted cost of tuition and fees at public institutions as the primary measures for tuition costs.

Table 2.3 presents the summary statistics of the variables of interest for military spouses 25 to 40 years old, broken out by school attendance. This table shows that for older military spouses, those who decided to attend school faced slightly lower costs to attend a 2- or 4-year public college. Those not in school faced an average cost at a 2-year public school of $2,141, as opposed to $1,966 for those who attended college. The $175 difference is statistically significant, with a t-statistic of 3.03. Those not in school faced an average cost at a 4-year public school of $4,635, as opposed to $4,372 for those who attended college. This $263 difference is also statistically significant, with a t-statistic of 2.14. Those in school were also, on average, a year younger. This difference is statistically significant, with a t-statistic of 5.51. Within the the 25- to 40-year-old sample, 18.9 percent of those not in school had an Associate's degree, compared to 30.2 percent of those in school. This difference is statistically significant, with a t-statistic of 6.03. As was the case with the younger sample, those not in school in this age group had a newborn child in the household at significantly higher rates, as well as a higher average total number of children under age 5 in the household. These differences have t-statistics of 2.90 and 4.47 respectively. Greater family obligations appear to be correlated with lower school attendance. Those not in school were more likely to have a spouse with a high school education as their final educational attainment and less likely to have a spouse with some college. These differences have t-statistics of 4.56 and 3.60 respectively. The differences between the rates of those with a spouse with a college or graduate degree were not statistically significant. Finally, those in this age group

who are in school attend public institutions more than 83 percent of the time.[26]

Table 2.3: Summary Statistics for 25- to 40-year-old Military Spouses

	Not in School			In School		
Variable	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**	**N**
Two-Year Costs	2141	1473.57	4657	1966	1381.01	662
Four-Year Costs	4635	3171.13	4671	4372	2936.85	665
Other Household Income	35763	20966.82	4671	35109	18789.50	665
Age	31.35	4.394	4671	30.39	4.182	665
Male	6.9 %	0.253	4671	9.5 %	0.293	665
White	87.9 %	0.326	4671	88.4 %	0.320	665
Unemployment Rate	4.29 %	0.011	4671	4.35 %	0.011	665
Associate's Degree	18.9 %	0.391	4671	30.2 %	0.460	665
Newborn	12.4 %	0.330	4671	8.9 %	0.285	665
Number of Children Under 5	0.657	0.756	4671	0.523	0.718	665
Looking for Work	9.8 %	0.297	4671	9.9 %	0.299	665
Married to an Officer	4.3 %	0.204	4671	3 %	0.171	665
Spouse– High School Graduate	20.7 %	0.406	4671	14 %	0.347	665
Spouse– Some College	56.6 %	0.496	4671	63.8 %	0.481	665
Spouse– College Degree	13.9 %	0.346	4671	14 %	0.347	665
Spouse– Graduate Degree	7.4 %	0.262	4671	7.2 %	0.259	665
Enrolled in a Public Institution	N/A	N/A	4671	83.2 %	0.375	665

NOTE: Table is restricted to individuals with at least a GED and less than a Bachelor's degree.
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

2.4 Empirical Strategy

The empirical strategy in this chapter is designed to utilize the variation across states in the cost of 2- and 4-year public institutions to identify the price sensitivity for higher education of military spouses.

To investigate the impact of changes in costs for military spouses on their college attendance rates, I run Ordinary Least Squares regressions, exploiting the variation in costs at 2- and 4-year public colleges across states.

[26]The school characteristics data from the Census only provides information on whether a school attended is public or private. As the sample is limited to those with at least a high school diploma or GED but who have yet to complete a Bachelor's degree, the school can be assumed to be post-secondary. However, the rate of attendance at 2-year vs. 4-year schools for this sample cannot be determined directly from these data.

The model takes the following form:

$$(1)Attendance_{ist} = \alpha + \beta_1(2 - YearCosts)_{st} + \beta_2(4 - YearCosts)_{st} + \beta_3 X_i$$

$$+\beta_4(UnemploymentRate)_{st} + \beta_5 Z_i + \beta_6 M_i + \tau_t + \varsigma_s + \varepsilon_{ist}$$

In this model, $Attendance_{ist}$ is an indicator of whether an individual i is currently attending school in state s in year t. The regressors of interest are $2 - YearCosts_{st}$ and $4 - YearCosts_{st}$, which are the enrollment-weighted average prices paid by full-time undergraduates at public institutions in state s in year t.[27] All dollar values are adjusted to year 2000 dollars using the Bureau of Labor Statistics' Consumer Price Index-Urban and divided by 1,000.[28]

The vector X_i consists of demographic controls for age, gender, race, and household income not attributed to the military spouse.[29] This income variable measures the income support the individual has to draw upon when deciding whether or not to attend college. I control for age and its square. Indicator variables are also included, measuring if the spouse is male or white to control for gender and race. The yearly average of the unemployment rate in state s and year t was also included as a control for labor demand. A strong labor market could indicate higher forgone earnings while an individual attends college, thus discouraging enrollment.

[27]Price published instead of price paid is substituted into the regression, and the tables showing those results are included in Tables B.19 through B.23.

[28]Using the log of dollar values instead of the level in thousands does not appear to have much impact on our primary regressors of interest. The tables presenting the results with those specifications are located in Tables B.24 through B.33.

[29]To calculate this variable, an individual's reported income was subtracted from total household income and divided by 1,000.

The vector Z_i consists of controls that are possibly endogenous and are included in only certain specifications of the model. These controls include an indicator variable for having a newborn child under the age of 1 in the household. An indicator variable measuring if the individual reports that they are currently searching for work and a discrete variable measuring the number of children under age 5 in the household are also included. These variables control for family responsibilities that may place time constraints on the military spouse, reducing their college attendance rates.

Vector M_i consists of a series of indicator variables that control for the educational attainment and officer status of the military spouse. Relocation to a particular base may be independent of individual characteristics after controlling for rank and occupation. However, exact rank or occupation within the military is not specified in Census data. Only the distinction between an officer and an enlisted individual is available to distinguish rank. Specific Military Occupational Specialty (MOS) is not available, but most MOSs have educational requirements. Educational attainment indicator variables are included to mitigate the absence of MOS data. Finally, τ_t is a binary indicator for the year and ς_s is a binary indicator that captures fixed effects associated with state s; these indicators are included in certain specification of the model. Unfortunately, because the average costs of college in individual states do not change much over time, the inclusion of this variable will eliminate most of the variation in the data, as seen in previous studies. An advantage of the identification strategy is the movement of the spouses into states is assumed to be exogenous with respect to their preferences for higher education. Therefore, the pre-

ferred specification of the model does not include state fixed effects, but the results of the regressions including state fixed effects are shown to illustrate the advantage of this identification strategy and what the results would be if the between state variation in price was not used and only the variation over time, particularly from those states that changed the residency requirements for military spouses during the period of observation, was available for identification. In all specifications the standard errors are clustered at the state*year level.

The identifying assumption of equation (1) is that the average costs of higher education in each state during this time period are not correlated with other state-level characteristics that are not controlled for in the regression but that might affect the college enrollment decision of military spouses. A possible source of omitted variable bias would be different deployment rates for service members stationed in different states. Additionally, the average distance between the bases to which active-duty military members are assigned and the public colleges in the state could be a concern in specification of the model in which ς_s is not included. Unfortunately, data limitations do not allow for the identification of military families for which a spouse is deployed or the specific military installation or location within a state an individual is assigned to in order to measure the distance to local colleges.

2.5 Results

Table 2.4 displays the estimation results using the full sample.[30] Column 1 displays the results of estimating attendance as a function of only the 2- and 4-year enrollment-weighted average price paid at public institutions. The cost at 4-year schools does not enter the model with statistical significance, but the estimated coefficient on 2-year costs suggests that military spouses are responsive to this price. Note that this finding matches the finding of Kane (1995) that the price which determines whether or not someone attends college at all is that of tuition at a 2-year college rather than a 4-year college. This is especially true because this sample contains non-traditional students, a population that is targeted by 2-year institutions. All other regressions control for the state unemployment rate and the demographic characteristics of age, age^2, gender, race, and other household income.

Column 2 adds the aforementioned unemployment rate and demographic characteristics as independent variables. The coefficient estimate on 2-year costs is now -0.012 instead of -0.014 and is still statistically significant at the 0.05 level instead of the 0.01 level. A Chi-Square test concludes that there is no statistically significant difference between these coefficient estimates on 2-year costs. The coefficient estimate on 4-year costs still lacks statistical significance.

The specification reported in column 3 adds having a newborn, looking for work, and counting the number of children under age 5 as independent variables.

[30]Tables reporting the estimated coefficients for the collapsed variables and specifications using price published instead of price paid or the log of monetary variables instead of the level are included in Tables B.19 through B.33.

Table 2.4: Price Sensitivity of Military Spouses for Price Paid for College Tuition, 18- to 40-year-olds

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.014**	-0.012*	-0.013*	-0.014**	-0.013**	-0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.015)
Four-Year Costs	0.003	0.004	0.004	0.004	0.003	-0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)
Additional Controls						
Unemployment Rate		X	X	X	X	X
Demographic Variables		X	X	X	X	X
Familial Responsibilities			X	X	X	X
Spousal Characteristics				X	X	X
Year					X	X
State						X
N	8288	8288	8288	8288	8288	8288
Adj. R^2	0.001	0.010	0.020	0.027	0.029	0.029

Standard errors in parentheses. The standard errors are clustered at the state*year level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
NOTE: Demographic Variables consist of Age, Age^2, Male, White, and Other Household Income. Familial Responsibilities consist of Having a Newborn, Number of Children Under Age 5, and Looking for Work. Spousal Characteristics consist of Officer, Spouse–High School Grad, Spouse–Some College, Spouse–College Degree, and Spouse–Graduate Degree.
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Column 4 adds the indicator variables for whether the spouse serving in the military is an officer as well as that spouse's educational attainment grouped into high school graduate, some college, college graduate, and graduate degree. Column 5 adds year fixed effects. Again, in each of the specifications, including the preferred specification in column 5, the data demonstrate that school attendance is negatively related to the cost of 2-year colleges and not responsive in a statistically significant way to the cost of 4-year colleges. These specifications yield estimates that a $1,000 (in year 2000 dollars) increase in the costs of 2-year public colleges is associated with a 1.3 to 1.4 percentage-point decrease in attendance. Given the low attendance rate of the sample, 14 percent, this translates to roughly a 9 percent change, which is line with previous estimates for a similar change in direct costs.[31]

Column 6 adds state fixed effects into the model. This estimation controls for differences across states that are not explicitly captured by the regressors of the model. However, as the 2- and 4-year cost variables do not change much for individual states over time, the inclusion of these fixed effects eliminates most of the variation in the cost variables. In this specification, the coefficient estimate on 2-year costs is now -0.003 and is not statistically significant. The coefficient estimate on 4-year costs still does not enter the model with statistical significance.

[31]To further translate this estimate into an elasticity term may add unnecessary complication. To do so would first involve a definition of total cost. Whether this should include only the relevant tuition costs or also the cost of forgone earnings is unclear. The results from Kane (1995) imply an elasticity of demand of -0.2 with respect to tuition prices alone, but of -3.9 if including the cost of 9 months of forgone earnings. Meanwhile, results from Kane (1999) which incorporate the opportunity costs of lost wages imply an elasticity of roughly -1. Furthermore, calculating the opportunity costs of forgone earnings, given the unique characteristics of military spouses and the uncertain labor market conditions around military installations, would be unlikely to produce reliable estimates given available data.

This specification shows the advantage of the identification strategy that leverages exogenous variation in state tuition costs, thereby allowing the preferred model specification to forgo the inclusion of state fixed effects.

Table 2.5 displays the estimation results broken out by the 18- to 24-year-old and 25- to 40-year-old samples. The coefficient estimates for the specifications presented in columns 1 through 5 for each age subgroup are nearly identical to those of the full 18- to 40-year-old sample. The coefficient estimates on 2-year costs for the larger, 25- to 40-year-old sample presented in bottom panel of Table 2.5 remain statistically significant at the 0.05 level in the specifications presented in columns 1–5. However, for the smaller, 18- to 24-year-old sample presented in the top panel of Table 2.5, the coefficient estimates on 2-year costs no longer enter into the model with statistical significance. This is most likely due to the reduced sample size, which would increase the standard errors. Thus, if the sample were larger, I would expect their estimates to be statistically significant because the coefficient estimate remains the same as in the full sample. It is also interesting that the point estimates for the price sensitivity for the two different age groups are almost the same. With fewer years to use their education, the cost-benefit calculation would be different for an older individual, yet the point estimates for the price sensitivity are almost the same.

Table 2.6 presents the results of a specification check of the model. If an individual already has an Associate's degree, then she may be less interested in attending a 2-year school because she already has the training needed for a positive gain in the labor market. It is possible that an individual with an Associate's

Table 2.5: Price Sensitivity of Military Spouses for Price Paid for College Tuition, by Age Group

	(1)	(2)	(3)	(4)	(5)	(6)
18- to 24-year-olds (N= 2969)						
Two-Year Costs	-0.012	-0.012	-0.012	-0.014	-0.013	-0.013
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.027)
Four-Year Costs	0.002	0.006	0.006	0.007	0.004	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.012)
25- to 40-year-olds (N= 5319)						
Two-Year Costs	-0.013*	-0.013*	-0.013*	-0.014*	-0.014*	-0.000
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.019)
Four-Year Costs	0.002	0.003	0.003	0.003	0.002	-0.008
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.008)
Additional Controls						
Unemployment Rate		X	X	X	X	X
Demographic Variables		X	X	X	X	X
Familial Responsibilities			X	X	X	X
Spousal Characteristics				X	X	X
Year					X	X
State						X

Standard errors are in parentheses. The standard errors are clustered at the state*year level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
NOTE: Demographic Variables consist of Age, Age^2, Male, White, and Other Household Income. Familial Responsibilities consist of Having a Newborn, Number of Children Under Age 5, and Looking for Work. Spousal Characteristics consist of Officer, Spouse–High School Grad, Spouse–Some College, Spouse–College Degree, and Spouse–Graduate Degree.
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

degree may be taking courses simply for consumption or working towards a second Associate's degree in a different field, but it seems more likely that an individual who completed an Associate's degree would primarily be interested in a 4-year school to obtain a Bachelor's degree if she were to continue her education.[32] The top panel of Table 2.6 shows the various model specifications for all 18- to 40-year-olds who have not yet obtained an Associate's degree. In columns 1–5 the coefficient estimates for both cost variables are similar to those seen in our full sample in Table 2.4. Additionally, the coefficient estimate on 2-year costs enters in the model with statistical significance, which indicates that those without an Associate's degree are responsive to the costs of 2-year schools. Column 6 includes state fixed effects. As before, in this specification, the coefficient estimate on 2-year costs does not enter into the model with statistical significance, but unlike in the model containing the full sample, the coefficient estimate remains close to those appearing in columns 1–5. Meanwhile, the coefficient on 4-year costs is estimated as an imprecise zero.

The bottom panel of Table 2.6 displays the estimation results using the sample of military spouses who have already obtained an Associate's degree. With a much smaller sample size, the standard errors have increased across all specifications. The coefficient estimates on 2-year costs do not enter the model with statistical significance in any specification, but the coefficients are larger. Meanwhile, the point estimates for the 4-year costs have remained statistically insignificant, except in column 6. In this specification, where state fixed effects are included, the coefficient

[32]Kane (1995) used the enrollment rates of 18- to 19-year-olds as his outcome of interest when determining 2-year public tuition costs were driving college attendance and did not examine the effect of 2-year public tuition costs on those with an Associate's degree.

Table 2.6: Price Sensitivity of Military Spouses for Price Paid for College Tuition, by Educational Attainment

	(1)	(2)	(3)	(4)	(5)	(6)
Associate's = No (N= 6938)						
Two-Year Costs	-0.013*	-0.010*	-0.011*	-0.012*	-0.012*	-0.014
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.016)
Four-Year Costs	0.003	0.004	0.004	0.004	0.003	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.007)
Associate's = Yes (N= 1350)						
Two-Year Costs	-0.018	-0.018	-0.019	-0.019	-0.019	0.059
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.045)
Four-Year Costs	0.001	0.001	0.000	0.001	-0.002	-0.045*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.019)
Additional Controls						
Unemployment Rate		X	X	X	X	X
Demographic Variables		X	X	X	X	X
Familial Responsibilities			X	X	X	X
Spousal Characteristics				X	X	X
Year					X	X
State						X

Standard errors in parentheses. The standard errors are clustered at the state*year level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
NOTE: Demographic Variables consist of Age, Age^2, Male, White, and Other Household Income. Familial Responsibilities consist of Newborn, Number of Children Under Age 5, and Looking for Work. Spousal Characteristics consist of Officer, Spouse–High School Grad, Spouse–Some College, Spouse–College Degree, and Spouse–Graduate Degree.
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

estimate on 4-year costs enters into the model negatively and with statistical significance. The estimated coefficient of -0.045 is in line with prior estimates of the civilian population.[33] This is the only instance in which military spouses appear to be responsive to 4-year costs. Further investigation with variation in costs not tied to individual states may assist in unraveling these anomalies.

Given the apparent importance of the cost at 2-year public schools in determining enrollment rates for military spouses, an estimate of the share of military spouses that are students who are enrolled within a 2-year institution would be of interest. Unfortunately, the school characteristics data from the Census only provides information on whether a school is public or private. The rate of attendance of military spouses at 2-year vs. 4-year schools is not available from this source. However, a program started in 2009 that offers military spouses tuition assistance does track the schools the recipients of these funds attend.

The MyCAA program provides up to $4,000 of tuition assistance to eligible military spouses over 2 years. To be eligible one must be married to an active duty service member in one of the lower pay grades.[34] The spouse must be able to start and complete their program within 3 years. The funds can only be used towards a certification, a license, or an Associate's degree, but does not limit the spouse from attending a 4-year school. Data from fiscal year 2011 through 2013 of the program show 14.4 percent of MyCAA scholarships recipients attended community

[33]In this instance the percentage-point change from a $1,000 change in direct cost would be accurate, but the percent change would be uncharacteristically high given the low rate of college attendance among this population.

[34]Specifically, grades E1–E5, W1–W2, and O1–O2, including the spouses of activated Guard and Reserve members within those ranks.

colleges.[35] Unfortunately, given the eligibility and use restrictions on the program, these data may not be representative of the types of schools the overall military spouse population attends. The one check available from the Census data compares the rate of public school to private school attendance. The Census data from 2000 to 2008 reported military spouses attended public college in over 80 percent of cases, but only 37 percent of MyCAA awardees from 2011 to 2013 attended public institutions. This calls into question the extent to which the MyCAA sample is representative of military spouses.

2.5.1 Conclusion

This paper offers an initial estimate of the price sensitivity of higher education among military spouses. It uses the variation across states in the costs of 2- and 4-year public colleges to estimate this sensitivity. This analysis is based on Census and IPEDS data from 2000 to 2008.

I find that a $1,000 (in year 2000 dollars) increase in the costs of 2-year public colleges is associated with a 1.0 to 1.5 percentage-point decrease in attendance by military spouses. This figure implies a price sensitivity less than half that of the civilian 18- to 24-year-old population as defined as a percentage-point change. However, this translates into a 7 to 10 percent change in enrollment given the baseline level of 14 percent enrollment. This percent change in enrollment is consistent with previous estimates which traditionally examined populations exhibiting 40 to

[35] During the same time period 59.8 percent of MyCAA recipients attended 4-year schools while 25.9 percent attended "Other" forms of schools.

50 percent enrollment. This response is robust to various model specification.[36]

The primary advantage of this paper is its ability to examine the price sensitivity of demand for higher education by leveraging exogenous variation in tuition costs from military-mandated moves. This negates many of the potential omitted variable bias issues in previous research that called for the inclusion of state fixed effects, a control that could not be included without eliminating much of the variation in price needed for identification and was often omitted in the previous literature.[37] This paper shows the challenge of trying to identify the effects of tuition changes on enrollment relying only on within-state variation after including state fixed effects. However, the strength of the identification strategy is also tied to this paper's greatest weakness: the unique characteristics and challenges faced by military spouses, including the military-mandated moves, make the external validity of these results to other populations suspect.

Some additional points should be kept in mind when interpreting the results. First, the analysis has identified average effects but, due to data limitations, cannot sufficiently examine the heterogeneity of responses by military spouses. With additional data, breaking out the sample by branch of military service or additional demographic variables may be of interest, along with re-examining the effect on 18- to 24-year-old military spouses, or those who have already attained an Associate's

[36]Aside from the inclusion of state fixed effects, which is unnecessary given the process by which residency is determined for this sample and is instead done to illustrate the advantage of the identification strategy.

[37]Kane (1999) included a section leveraging over a decade's worth of data to examine the effect of within-state variation in tuition and included state fixed effects. That section found similar estimates for the effect of tuition changes on enrollment, but this example was not representative of the identification strategy commonly used in the literature.

degree separately but with larger sample sizes. Second, there are aspects of military life for which control variables were not available that may affect the decision to attend school. Specifically, no variable for whether the military member was currently deployed was available, and it is possible that deployment rate could vary by state and may even be correlated with state tuition costs. Finally, the tuition and location variables used were noisy. Data limitations precluded being able to determine which installation the military household was assigned to or which school was attended. This resulted in having to assign the enrollment-weighted state average cost to each individual within the state. With more detailed information, assigning the correct price faced and the distance required to travel may generate more accurate and efficient estimates. Despite these limitations, this paper provides an initial estimate of the price sensitivity of demand for higher education of military spouses.

Further research should leverage data sources that are specifically designed for and focus on military spouses. The Survey of Active Duty Spouses conducted by the Defense Manpower Data Center could be a vehicle for this further research, but the detailed address information necessary to leverage this resource is not currently made available to the public, and some additional refinements to the survey to focus on education costs faced or aid received would be beneficial.

Chapter 3: ESTIMATING THE IMPACT OF TAXING COLLEGE SAVINGS PLANS OF NON-TRADITIONAL STUDENTS

3.1 Introduction

The federal government spends nearly $40 billion through tax expenditures on higher education each year.[1,2] Tax expenditure on higher education subsidizes those who would have gone to college even in the absence of the subsidy and potentially incentivizes those at the margin to enroll and therefore increase college attendance. Considering how much money is spent on higher education through the tax code, it is important to evaluate the effects of these measures.

This chapter examines the effect of a change in the tax incentives for educational savings on a traditionally understudied group, those who return to school after participating in the labor market. The literature on the price sensitivity of demand for higher education in the United States shows that sensitivity appears to differ by the source of variation in price and by the characteristics of the students.

[1]The tax benefits (i.e., credits, exemptions, and deductions) in 2012 totaled over $33.2 billion, and the refundable portion of a higher education tax credit accounted for an additional $6.6 billion.

[2]These tax expenditures include the Hope Tax Credit, the American Opportunity Tax Credit, the Lifetime Learning Tax Credit, Section 529 College Saving Plans, Coverdell Educational IRA accounts, and finally the tax code's provision for the deductibility of interest expenses on student loans and the exclusion of scholarship and fellowship income from taxable income.

Previous work on the price sensitivity of higher education due to changes in the tax code have been limited and mixed. Turner (2011a) found that a $1,000 (in year 2000 dollars) increase in tax-based federal student aid increased enrollment for 18- to 19-year-olds by 3 percentage-points. However, LaLumia (2012) found only limited evidence of any effect of the Lifetime Learning tax credit or the tuition deduction on adult college attendance or degree completion. The one exception were a statistically significant impact was detected was for those in the cohort whose educational attainment in adulthood fell short of their initial expectations. That select group appeared to respond to the tax incentives. Finally, using more detailed data, Bulman and Hoxby (2015) did not detect any statistically significant responses to expansion of higher education tax credits from the enactment of the American Opportunity Tax Credit (AOTC).

These results measuring the tax-based aid sensitivity of demand for higher education seem slightly at odds with the prior literature on the price sensitivity of higher education with respect to the interaction of the magnitude of the response with the age of the student for a complex form of aid. That literature found the more opaque or complex the form of aid, the smaller the apparent impact of an equivalent dollar value reduction in net price. It also found that the response of adults was less mitigated than that of the young to more opaque forms of financial aid.[3] One proposed explanation is that older students have more experience filling out complex government forms, such as those for income taxes, and are therefore less

[3]Several studies of the introduction of the Pell grant program failed to find a corresponding increase in enrollment of the 18- to 24-year-old population, but Seftor and Turner (2002) found a large positive response in matriculation by 25- to 30-year-old students to the introduction of the Pell program.

deterred by the complexity of means-tested financial aid. Therefore, it is curious that for such a complex form of aid as that administered through the tax code, Turner (2011a) found an impact on the young almost as large as that seen due to changes in tuition price, while LaLumia (2012) found almost no effect for adults.[4] Finally, Bulman and Hoxby (2015) did not find any statistically significant impacts for any age group or income level. It is therefore unclear how much of an effect, if any, to expect from the change in the tax treatment of savings set aside for higher education by individuals who interrupt their education with some time in the labor force.

I obtained data from a network of firms that have a long-standing program that offers delayed compensation which employees can only use for continuing their own education. The firms call this pool of delayed compensation their College Scholarship Plan (CSP). The CSP funds are only available as part of an employee's initial contract and represent a form of signing bonus.

A law passed in late 2004 changed the tax status of delayed compensation allocated after January 5, 2005. However, the firms and their employees were not aware of the implications of the law changing the tax status of CSP funds until 2007. This means the terms of the contracts signed in 2005 and 2006 were not influenced by the tax change. For these two cohorts, the tax change could only influence the decision of whether to use the funds after 2007. However, employees who signed after 2007—and were aware of the tax change at signing—could modify their compensation packages in response to the tax change.

[4]Data quality and measurement error may explain this issue.

This chapter investigates both the changes in the composition of compensation packages for new employees who signed after the tax was announced and the change in the usage rate of CSP funds by those surprised by the tax. Additionally, this chapter calculates the sensitivity of demand for higher education to variations in out-of-pocket costs from the interaction of the amount of CSP funds allocated and the change in the tax status of those funds. This paper tests the hypothesis that those who have already chosen to set aside funds for college will have a lower-than-average sensitivity of demand, and that the change in the tax status of these funds will decrease future allocations towards savings for college.

3.2 Background

3.2.1 Structure of Initial Contracts

The firms are in an industry that uses highly skilled physical labor to generate considerable revenue. The firms require new employees to sign initial contracts that last several years and include a non-compete clause giving whichever firm hires them exclusive rights over the employees' labor within the industry. An employee's pay in those initial years is determined on an industry-wide basis by the employee's tenure and the level to which the employee has advanced within the firm. Most pay during the period examined was between $550 and $2,500 a month unless the employee reaches the top tier in the industry, in which case the employee's salary jumps to a minimum of almost half a million dollars a year. However, less than 10 percent of all employees who sign with a firm make it to this level. After the initial contract

is fulfilled, an employee earns the right under the collective bargaining agreement (CBA) between the firms and the union to negotiate and sign with any firm within the industry. At this stage, if the employee has reached the top tier, his annual salary can be in the millions of dollars.[5]

To compensate an employee for the acceptance of the non-compete clause, initial contracts typically include a signing bonus. These signing bonuses can be quite large. It is customary for those who have not yet finished a college degree and who are valued enough by a firm to receive a signing bonus to take a portion of their signing bonus as CSP funds. These funds can only be distributed to cover tuition and living expenses if the employee returns to college. The CSP funds are negotiated for a set number of semesters with an allowance per semester for living expenses and tuition. If tuition and living expenses are less than the amount set aside in the CSP for a particular semester, then the firm keeps the balance. Also, if CSP funds are not used within a certain time period, the employee forfeits those funds. Typically, remaining funds are forfeited if the employee has not either worked for the firm or attended college at least part-time within the past 2 years.

3.2.2 Rationale for CSP program

There are several possible reasons for the existence of the CSP program. The reasons are not mutually exclusive, but the anticipated reaction of participants in the CSP program to the changes in the tax treatment differ by rationale. By

[5]All employees in the sample are male, so I will use the masculine pronoun when referring to an employee without bias.

examining how the volume and value of CSP contracts react to the tax, evidence of the dominant rationale(s) for the CSP contracts may be found. There are four main reasons why an employee would forgo a larger cash signing bonus for CSP funds. First, CSP funds historically had a tax advantage.[6] If this were the only reason for CSPs, then the change in tax status would mark the end of the CSP program.

Second, CSP funds could be seen as an insurance policy by the employee. If an employee signs with a firm, he is hoping he will be part of the roughly 10 percent that get promoted to the top tier, after which time he may earn enough money that he never needs to work again, let alone invest in marketable skills such as a college degree. However, if he is part of the 90 percent who do not reach the top tier, he will be let go by his firm after a few years without great wealth.[7] New employees may recognize the benefit of setting aside funds to pay for education to help transition to a new career if they are unsuccessful with the firm. Furthermore, from the employer's perspective, since not every employee uses all of their CSP money, a firm knows a dollar in CSP funds does not cost them the same in expectation as a dollar of signing bonus. For example, if a firm expects that only half of all CSP funds will ever be used, an employee may face the choice between receiving $100,000 cash compensation or compensation consisting of $80,000 cash and $40,000 in CSP funds.[8] Therefore, if an employee only plans to return to college if he fails to advance

[6]If a firm was willing to pay an employee a $100,000 signing bonus and the employee planned to eventually attend or go back to college and did not receive CSP funds, then all of the employee's education purchases would be with post-tax dollars. However, if an employee anticipated spending $40,000 in educational expenses, he could take $60,000 cash in the signing bonus and $40,000 in CSP funds and only need to pay tax on $60,000 instead of the full $100,000.

[7]The average and median career lengths of all employees who signed between 1990 and 2000 are 3.70 and 2.89 years respectively.

[8]This example of 50 percent expected use matches the historic CSP usage data from contracts

to the top tier, he can shift additional funds into that possible future state by trading signing bonus funds for more than dollar-for-dollar CSP funds in his initial contract. The historic tax advantage would only have added to the favorability of the terms of this insurance contract. Given this rationale, economic theory would predict that the elimination of the tax benefit may reduce—but likely not eliminate—the volume and value of CSP contracts.

CSP funds could also serve as a commitment mechanism for the employee to attend college after his time in the industry. A potential employee may recognize that an opportunity within this industry is preferable to attending college directly after graduation. He may also recognize that if he does not succeed, attending college would be his best option. The prospective employee may also anticipate the future temptation to stay in the labor force and continue earning money. By accepting CSP funds, an employee commits to continuing his education because he only receives those funds while enrolled at least half-time in an undergraduate institution. Thus, if an employee is concerned about having time-varying preferences, then accepting CSP funds when signing an initial contract could act as a commitment mechanism to return to school. Given this rationale, the tax wedge announced in 2007 should translate into fewer employees opting for CSPs, but those who do would increase their CSP funds to maintain the post-tax value of the commitment incentive.

An additional rationale for the program is that CSP funds allow a firm to selectively provide additional compensation to potential employees with greater negotiating power. The set of skills the firms value often has little economic value

offered between 1990 and 2000.

outside the industry. Through the CBA with the union, the firms are given considerable strength in negotiating contracts with new employees for 1 full year. A firm has near monopsony power once all the firms within the industry agree not to compete against one another. Even with the large signing bonuses, new employees are offered compensation far below their expected marginal value to a firm because their economic value outside the industry is usually much lower. Often, an employee's best outside option is to wait a year to see if he is offered a better deal during the next hiring season. Potential employees who are offered contracts within the industry coming directly from high school or after their junior year of college are often simultaneously in possession of or have been offered an alternative scholarship from an academic institution.[9] This gives those potential employees greater bargaining power than other recruits who have already finished college. CSP funds could be a targeted response by the firms to this leverage. This rationale sets up CSP funds as an addition to cash signing bonuses, not as a trade-off in exchange for less cash at signing.[10] Economic theory predicts that CSP funds per contract should increase in response to the tax in order to maintain the same level of post-tax compensation to nullify the outside option. The number of CSP contracts would not be greatly affected by the tax given this rationale.

[9]These scholarships become void and an individual becomes ineligible for any similar future scholarships if he ever signs with a firm within the industry.

[10]Quote from industry recruiter: "As time has passed, the number of (employees) who have received CSPs has increased. It has gotten to the point where the general consensus is that the CSP is now just a 'throw-in.' All the CFOs believe that the CSP should lower the (employee's) signing bonus, but that does not happen often in practice."

3.2.3 Major Changes in the Industry

A series of important events affected how this industry recruits its employees and who is recruited. It is important to understand these events and how they affect the employers' preferences, the decisions prospective employees make and the resultant employee pool. What follows is a selection and interpretation of the important events that shaped the industry in ways that are pertinent to this chapter. This section discusses how those events break down the recent timeline of the industry into periods in which similar decisions were made by both sides of the recruitment transaction. It is this breakdown which guides sample selection, specifically the years included in the pre-tax control group, in order to best identify the effect of the tax change.

3.2.3.1 Changes to the Evaluation of Talent

For quite some time it has been informally understood by industry participants that employees recruited out of high school were much less likely to reach the top level of the firm and be as productive as similarly ranked employees selected with some college experience. However, this fact had not historically been used to drive the hiring decisions by firms within the industry.

During the 2002 hiring season, one firm allowed this observation to drive its hiring during that recruitment year. In that same year, the firm had a much larger number of positions to fill than usual. College applicants were heavily favored, as the firm felt it could project the value of college applicants with greater certainty

than it could project that of high school applicants. The firm believed this allowed it to obtain a pool of employees with similar or higher expected value with much lower risk.[11] The firm also used a modified measure of performance that was widely ignored by other firms to rank both existing employees and potential recruits. The firm implementing the two new strategies greatly exceeded expectations in 2002.

Shortly before the hiring season in 2003, a report was published in which the two major strategies employed by the aforementioned firm were discussed and credited, in part, for the firm's success the previous year. This report was widely circulated and the two strategies openly debated for the months leading up to, during, and following the 2003 hiring season.[12]

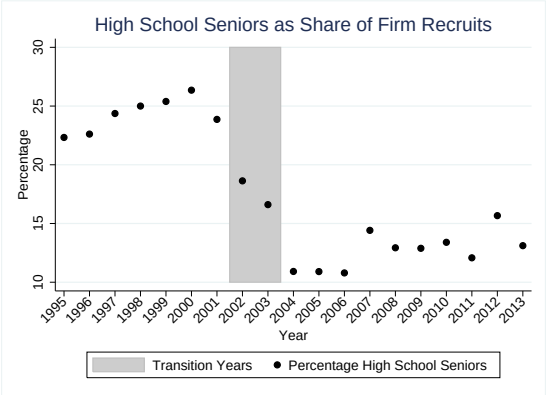
Initially, some firms openly disagreed with the soundness of the strategies. However, continued success by the few firms that implemented these strategies through 2003 proved an effective argument for their merits. For this chapter, I treat both the 2002 and 2003 recruitment seasons as transition periods for the industry, which stabilized by 2004. Figure 3.1a shows the percentage of individuals offered initial contracts from all firms who were high school seniors by year recruited. The figure illustrates the decline in the share of high school seniors from historic levels during the transition years of 2002 and 2003. Figure 3.1b shows that the rate of the remaining high school seniors receiving a CSP increased to nearly 100 percent after the transition period ended. This change in the share of new employees and the rate of CSP award for recruits who were high school graduates at signing is why

[11]This information is from a 2003 book on the industry; citation omitted to maintain the anonymity of the data source.

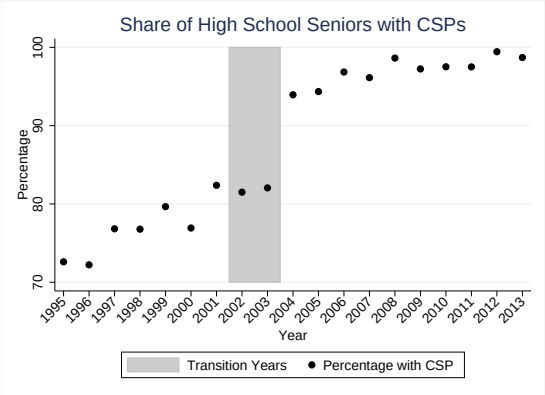
[12]This information is from a 2003 book on the industry; citation omitted to maintain the anonymity of the data source.

Figure 3.1: Trends in Recruitment of and CSP Rates for High School Seniors

(a) Change in Recruitment Pattern



(b) Increase in Rate of CSP



Source: Author's tabulation of data provided by the firms who wish to remain unidentified.

the pre-2004 cohorts are excluded from the pre-tax control group.

3.2.3.2 Collective Bargaining Agreements

The firms' top tier employees are unionized, requiring the firms to periodically negotiate industry-wide CBAs that determine not only compensation guidelines for current employees, but also the manner in which the firms can recruit, sign, and pay new employees. Each CBA is typically a 5-year contract. Many rules in the CBA vary by the educational attainment of the recruit. For example, the length in years of an employee's initial contract before the employee can negotiate freely with other firms differs by that employee's education level. CBAs were signed in 1990, 1997, 2002, 2006, and 2011.

There are two major ways a CBA can affect the recruitment of new employees. First and foremost, it can change the rules and terms under which potential employees can be recruited and what contract they can be offered. Second, even

if the CBA does not change these rules, the threat of a strike or an actual strike could impact the pool of new hires. To eliminate potential bias in the sample, this analysis only examines employees who signed under the same or very similar CBAs and whose decision to sign was not influenced by a potential strike.

The CBA reached at the end of 2006 did not create much uncertainty through the threat of a strike, as it was signed long before the 2007 hiring season began and it did not substantively change the rules governing the recruitment of new employees. However, the 2011 CBA drastically changed the rules governing the recruitment of employees starting in 2012. Therefore, the 2011 recruitment class serves as a logical end point to the timeframe of the analysis on the effects of the tax changes on the recruitment and selection of new employees.

3.2.3.3 Changes to the Tax Treatment of CSP Funds

The change to the tax code examined in this chapter is the American Jobs Creation Act of 2004, Public Law 108-357 (AJCA). The AJCA changed the tax treatment of many forms of delayed compensation. After passage, some funds that were traditionally not taxed either in the year they were earned or in the year they were later received became subject to tax in the year they were received. The new law applies to amounts deferred after January 5, 2005. Compensation deferred before 2005 but received afterward is subject to special grandfather provisions. These amounts would only be subject to the new rules if the deferred compensation is "materially modified" after October 3, 2004.

The firms initially thought that only delayed compensation not related to education was subject to these new rules and that the CSP program would be found exempt.[13] As a result, employees who signed initial contracts that included CSP funds in 2005 and 2006 did so believing the money for tuition, fees, and books would be tax free, but those funds—if used—are in fact subject to taxes. On June 6, 2007, the industry informed all employees who signed contracts as of January 5, 2005, of the changes in the tax treatment of their CSP funds. Additionally, the industry informed all new recruits of the tax status of any new CSP funds moving forward. Consequently, the CSP funds from all contracts signed after 2004 are subject to taxation, but only those who signed after June 6, 2007, knew about the tax when negotiating their contract.

To summarize, employees recruited prior to 2004 are excluded from the analysis due to the major reform in the industry occurring in 2002 and 2003. Those recruited in 2004 who signed their initial contract before January 5, 2005, are part of the pre-tax control group. Those who signed between January 5, 2005, and June 6, 2007, are the "unknowingly taxed" group. Finally, those who signed after June 6, 2007, but before the reforms of the 2011 CBA are part of the "knowingly taxed" group. Those recruited after 2011 are excluded from the analysis.

[13]There is an exemption for some forms of educational assistance, but the CSP program did not meet all of the final requirements.

3.3 Data and Descriptive Statistics

3.3.1 Data Description

This analysis is based on data from firms that wish to remain anonymous and is augmented with Consumer Price Index data from the Bureau of Labor Statistics to adjust dollar values over time. Data were made available on employees who were offered contracts from 1990 to 2013. Firms take turns selecting domestically recruited employees and thereby ranking them as they enter the firm. The data contain this ranking, year of ranking, date of birth, race, primary language, and highest education level attained at the time they were ranked. These data are available for each individual offered an employment contract.

Foreign-born employees are subject to a different recruitment process, seldom receive a CSP, and are excluded from this analysis.[14] Additionally, employees with educational attainment levels less than a high school senior or with this information missing from their records are excluded from the analysis as they are few in number, are typically outliers on other variables, and have unique barriers to overcome before they can use any CSP funds.[15]

For those who signed with a firm, the firms provided additional data on when the employees signed with the firm, when and why they left the firm, how high in the firm the employees advanced, and the composition of the initial signing bonuses. Of those who received CSP funds in their initial contract, data on the amount per

[14]This eliminated 1,701 employees from the data, 135 of which had a CSP.

[15]Those with educational attainment missing or less than a high school senior combined for only 67 employees, 40 of which had a CSP.

academic period and number of periods employees can receive funds are available. Additionally, invoice records tell when and how much employees use their CSP funds.

Data and analysis from the Tax Policy Center and the National Center for Educational Statistics are used to convert the value of the CSP and the tax status of those funds into an implied out-of-pocket cost for a semester of college. This out-of-pocket cost is then used to calculate estimates for the price sensitivity of demand.

3.3.2 Descriptive Statistics

Tables 3.1 and 3.2 present the summary statistics for those who signed in 2004 before the tax change, in 2005 and 2006 after the tax change was in effect but before the change was announced, and in 2007 through 2011 after the tax was announced.[16] Table 3.1 provides this information for all employees, while Table 3.2 consists of summary statistics on only those employees that signed an initial contract that included a CSP. Pairwise t-tests are performed to determine if the differences between the values from 2004 and the values from 2005 and 2006 are statistically significant. The differences between 2004 through 2006 and 2007 through 2011 are also tested for statistical significance.

Table 3.1 presents the summary statistics for all employees who signed with

[16]The recruiting process for domestic hires occurs in June of each year, but in the past employees were allowed several months to decide on an offer from the firm. Some employees recruited in 2004 did not actually sign their initial contracts until after January 5, 2005. Thus they were assigned to the "unknowingly taxed" group. As a result, Tables 3.1 and 3.2 are not strictly organized by year recruited because they are organized by date signed and tax status. The first two tables in the appendix show the summary statistics tables organized by year recruited. These tables show that the differences between 2004 and 2005 and 2006 are not as stark as shown below. Thus the assumption that the industry stabilized by 2004 looks more plausible.

the firm in the given tax cohorts. The average signing bonus increased from $140,560 (year 2000 dollars) in 2004 before the tax change to $158,530 (year 2000 dollars) for the 2007-2011 cohort who knew about the tax change. Although there may appear to be a trend over time, the differences in the values are not statistically significant at the $\alpha = 0.05$ level for either t-test.

Table 3.1: Summary Statistics for All Employees by Tax Status

	Untaxed 2004		Unknowingly Taxed 2005 - 2006		Knowingly Taxed 2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	140.56	333.89	151.18	370.52	158.53	435.64
Age When Recruited by Firm	21.28	1.50	21.01	1.60	21.19	1.52
Fraction High School Seniors	0.17	0.37	0.15	0.35	0.17	0.37
Fraction From Junior College	0.10	0.30	0.19	0.39	0.11	0.31
Fraction College Fr. or So.	0.01	0.12	0.01	0.09	0.01	0.11
Fraction 4-Year College Juniors	0.31	0.46	0.29	0.45	0.33	0.47
Fraction 4-Year College Seniors	0.41	0.49	0.36	0.48	0.38	0.49
Fraction With a CSP	0.55	0.50	0.61	0.49	0.62	0.49
Observations	798		1714		4582	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically who signed with the firm between 2004 and 2011 with at least a high school degree.
(1) All monetary values are indexed to year 2000 dollars.

The average age of an employee who signs with the firm in the baseline group is 21.28 and drops to 21.01 in the second cohort before rising again to 21.19 in the third cohort. Both the difference between the first and second cohort and the difference between the third and the first two cohorts combined are statistically significant at the $\alpha = 0.01$ level with t-statistics of 4.0863 and -2.5191, respectively. It appears there was a drop in the average age of employees between 2004 and 2007. This variable is accounted for in the regression analyses.

This drop in age can be attributed to the changes in the educational attainment of recruits. Those who were recruited from junior colleges increased from 10 percent for the baseline period to 19 percent for the "unknowingly taxed" cohort, before dropping back down to 11 percent for the third cohort. These statistically significant

changes were paired with decreases in the number of recruits who had 4-year college senior listed as their educational attainment at the time of signing from 41 percent in the first cohort to only 36 percent in the second cohort. A statistically significant increase in the fraction of recruits joining the firm after their junior year in college in the third cohort to 33 percent coincides with the decline of recruits from junior colleges in that cohort.

It appears that after the firms stabilized their preferences for high school seniors in 2004 at a new lower level, the high school seniors who previously would have signed with a firm instead entered both junior colleges and 4-year colleges. Those high school seniors who entered a junior college were eligible to sign with a firm in 2005 and 2006 and apparently did so, replacing the marginal college junior or senior. Meanwhile, those displaced high school seniors from 2004 who entered a 4-year college were not eligible to sign with a firm until 2007, their junior year. This delayed stabilization of the other educational attainment levels is justification for examining only those who signed out of high school from 2004 through 2011 as a separate subgroup. It also justifies educational attainment at signing as an important control variable included in the regression analysis when examining samples including all educational attainment levels.

Finally, the percentage of employees who signed an initial contract with a CSP rose from 55 percent in the first cohort to 61 percent and 62 percent in the second and third cohorts. This change over baseline is statistically significant in both cases. The analysis of the composition of compensation packages includes a linear time trend to adjust for this pattern of increased CSP inclusion over time. This difference may

also be explained by the change in the composition of the educational attainment of new employees over time.

Table 3.2 presents the summary statistics for selected characteristics of employees who had a CSP as part of their initial contract. These data are presented by cohorts grouped by tax status. The differences in the average signing bonuses shown in Table 3.2 are not statistically significant. The difference in age when recruited by the three cohorts is statistically significant, first falling and then rising. This is likely due to the statistically significant increase and then decrease in the share from junior college recruits at the expense of the share of 4-year college juniors. This mirrors the pattern seen in employees both with and without CSPs.

Table 3.2: Summary Statistics for Employees With CSPs by Tax Status

	Untaxed 2004		Unknowingly Taxed 2005 - 2006		Knowingly Taxed 2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	245.93	416.02	237.63	444.61	249.41	529.70
Age When Recruited by Firm	20.47	1.44	20.27	1.48	20.48	1.41
Fraction High School Seniors	0.28	0.45	0.23	0.42	0.26	0.44
Fraction From Junior College	0.14	0.35	0.26	0.44	0.15	0.36
Fraction College Fr. or So.	0.02	0.13	0.01	0.11	0.02	0.14
Fraction 4-Year College Juniors	0.48	0.50	0.43	0.50	0.49	0.50
Fraction 4-Year College Seniors	0.08	0.27	0.07	0.25	0.07	0.26
Number of Semesters in CSP	4.46	2.46	4.47	2.31	4.29	2.44
CSP Funds Per Semester[1]	$6,931.92	$4,394.98	$6,683.32	$4,127.82	$8,744.81	$5,386.51
Total Value of CSP[1]	$30,860.53	$28,676.77	$28,978.98	$23,654.71	$37,385.71	$32,828.58
Proportion of Signing Bonus Taken as CSP Funds	0.28	0.22	0.26	0.19	0.29	0.20
Observations	441		1040		2840	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically, who signed with the firm between 2004 and 2011, with at least a high school degree, and had a CSP included in their initial contract. The total value of a CSP is calculated by the amount of money available per semester, multiplied by the number of semesters specified in the contract. The proportion of the signing bonus taken in CSP funds is equal to the total value of CSP funds divided by the sum of CSP funds and the cash signing bonus.
(1) All monetary values are indexed to year 2000 dollars.

The average number of semesters provided for by the CSPs did not have a statistically significant difference between the first and second cohorts, but the third cohort experienced a significant decline. This is paired with a large and statistically significant increase in the funds allocated per semester in the CSPs from an average of $6,757 for the entire period before the tax was known to $8,745 per semester after

the tax was announced. No statistically significant change is seen in this value after the tax was in effect but before it was known.

The total value of a CSP is calculated by multiplying the funds per academic period by the number of periods the CSP is available according to the initial contract. This value increased from an average of $29,539 per CSP contract for the first two cohorts to $37,385 for the third cohort. Again, no statistically significant change was seen in this variable after the tax was in effect but before it was known. This increase in funds after the tax was announced suggests that the CSP acts more like a commitment mechanism or as compensation for increased negotiating power than as a mechanism for tax avoidance or as an insurance policy against not making the top level within the firm.

The rank an employee is assigned the year he is recruited by the firm is a fair proxy for the value and thus negotiating power of this individual. Individuals with higher or lower rank may respond differently when made aware of the change to the tax code. This potential cross-sectional variation in the response to the tax change is explored in two ways. First, I interact the primary explanatory variable with the rank variable. Second, I segment the employee population into groups based on their rank to examine any non-monotonic interactions between rank and the response to the tax change. Based off of conversations with industry experts, the employees were broken into four rank groups. Those assigned a rank of 1 to 90 in the year they were recruited are in the top-ranked group with the most negotiating power, those ranked 91 to 300 are assigned to the second-ranked group, those ranked 301 to 600 are in the third, and those ranked above 600 make up the forth-ranked group.

Tables C.36 through C.43 in the appendix present the summary statistics for the different cohorts by each of these rank groups. They show that the likelihood of having a CSP included in their initial contract, as well as the amount of the cash signing bonus, CSP funds per semester, and total CSP funds all decline uniformly as the rank group decreases, as one would expect. Of note is that 99 percent of those in the top-ranked group already have a CSP included in their initial contract, leaving little room for improvement. The share of signing bonus taken in the form of CSP funds for those with a CSP increased from roughly 7 percent for the top-ranked group to over 40 percent for the fourth-ranked group.

The demographic characteristics of age and educational attainment also vary by rank group. The top-ranked group is a year younger on average than the entire employee pool and has a disproportionate number of high school juniors and 4-year college juniors. These two educational attainment categories make up less than half of all those recruited, but more than 90 percent of those in the top-ranked group. The other major demographic pattern of note by rank group is that the increase in recruits from junior colleges seen in the 2005 and 2006 cohorts was concentrated in the third- and fourth-ranked groups.

3.4 Empirical Framework

This chapter first examines some of the ways new employees may have responded to the tax through changes in their initial contracts. These potential responses include: whether a CSP is included in the initial contract, changes in the

amount of CSP funds per semester, or changes in the total value of the CSP. Regression analysis estimates the response after the tax was announced in 2007 while controlling for other factors that changed over time.[17] Next, I examine changes in the usage rate of CSP funds due to the unexpected taxation of funds allocated in 2005 and 2006. Finally, I construct an estimate for the expected out-of-pocket costs of attending college based on the characteristics of each employee's initial contract and when he left employment with the firm to yield estimates of the sensitivity of demand for higher education.

In each of the first two models, the primary explanatory variables of interest are essentially year indicator variables. Interpreting the coefficients of these variables as causal estimates of the effect of the change in the tax treatment requires certain assumptions, specifically that there are no other factors that changed over time that affect the outcomes of interest, that are not controlled for by other variables in the regression.

The background section describes major changes to the industry that could affect the outcomes of interest including changes to the evaluation of talent and new collective bargaining agreements. The section also describes the censoring of the window of observation to mitigate these potential threats to the assumptions of the model. However, the censoring does not appear to have resulted in a complete absence of statistically significant differences in observable characteristics between employees selected in the different time periods. Including these observed variables

[17] I also use regression analysis to confirm the true level of information diffusion, by performing a falsification test, examining whether there was a change that occurred between contracts signed before and after January 5, 2005.

as controls should alleviate the direct threat of these factors, but there is the concern that unobserved differences may also bias the results.

The most significant event that roughly coincides with the change in the tax treatment of CSP funds that may affect the outcomes of interest and that does not have readily available controls is the Great Recession beginning in 2008. This event threatens the identification strategy and may bias the coefficients for the variables of interest. An attempt to forecast the direction of the potential bias will be made for the outcome of each model separately.

3.4.1 Effect of Tax Change on Compensation Package

To explore the effect of the knowledge of the tax change on the initial contract, I compare the contracts of those who signed with the firm from 2004 through 2006 to those who signed in 2007 through 2011. Analysis of the contracts signed in 2004 against those signed in 2005 and 2006 is also performed in order to check if there was any anticipatory behavior or early information diffusion about the tax change.

3.4.1.1 Sample Selection

All employees with at least a high school degree recruited domestically between 2004 and 2011 are included in the analysis of whether an initial contract included a CSP, but only the subset of employees who had a CSP as part of their initial contract are included in the analysis of the other compensation package characteristics.

3.4.1.2 Econometric Models

To investigate the impact of the knowledge of the tax change on selected characteristics of the initial contract, I run Ordinary Least Squares (OLS) regressions. The model is a straightforward pre-post specification taking the following form:

$$(1) \qquad y_{icft} = \beta_0 + \beta_1 Tax_c + \beta_2 X_i + \beta_3 Year_t + \gamma_f + \epsilon_{icft}$$

In this model, y_{icft} is the outcome of interest for an individual i in tax cohort c who signed an initial contract with firm f in recruitment year t. The outcomes of interest include: an indicator variable of whether CSP funds are included in the initial contract, the natural log of CSP funds per semester, the natural log of the total value of CSP funds, and the share of compensation packages delivered in the CSP.[18] The regressor of interest, Tax_c, is an indicator variable equal to one if the individual was in the cohort that knew their CSP funds would be taxed and zero otherwise. The knowledge of the tax would make the value of CSP funds decrease. The expected direction and magnitude of the effect of knowledge of the tax on the various outcomes of interest would depend on the dominant rationale for the CSP, as addressed previously.

The vector X_i consists of controls including race, age and level of educational attainment at signing, and the rank of the employee in the year he signed. The race variable is an indicator variable equal to one if the employee is White. The

[18] Both CSP funds per semester and the total value of CSP funds are indexed to year 2000 dollars using the CPI-U index.

educational attainment variables are a set of indicator variables for whether the employee's highest educational attainment level at signing is junior college, some 4-year college, 4-year college junior, or 4-year college senior/graduate, with high school senior as the reference category.[19]

The rank value assigned to an employee during the annual recruitment process is an interesting control variable. The rank is associated with the perceived skill within the industry and the expected value an employee can bring to the firm that offers the individual a contract. The lower a recruit's rank score, the higher his perceived value and the stronger his negotiating position.[20] If negotiating power is the driving force for the terms of CSP contracts, then this greater negotiating power would make an employee more likely to receive a CSP, have more CSP funds per semester, and have more total CSP funds. The effect of rank on the share of the compensation package delivered in CSP funds is unclear, as increases in both forms of compensation—cash and CSP funds—would be expected with lower rank.[21] The low-ranked employees are also more likely to make the highest level in the firm and not need funds set aside for retraining after their tenure with the firm is over. If an insurance contract is the dominant motivation for a CSP, then a lower rank score would make the employee less likely to be released before making the top tier within the firm and therefore the employee would have a lower demand for CSP funds as an insurance policy. It follows that lower ranked employees would be associated

[19]The "some 4-year college" variable includes 4-year college freshmen and sophomores.

[20]I follow the industry convention that the first recruit selected, with a rank score of 1, has the lowest ranking or rank score.

[21]However, since CSP funds can only be spent on college, the total potential useful value of CSP funds is capped. Thus top-ranked employees who max out their CSPs and receive all additional funds as cash would be expected to have a lower share of their compensation in their CSP.

with fewer CSP contracts, less CSP funds per semester, lower total CSP value, and a smaller share of total compensation taken in the form of CSP funds. Given the varying association this variable can have with the outcomes of interest, the coefficient for this variable is shown and analyzed in the results.

The regression model also includes controls for firm fixed effects, γ_f. The firm that selects an employee may have different preferences for offering a CSP or the level of funds included in a CSP. Firm fixed effects control for the possibility that firms with stronger preferences for offering CSPs may make up a larger or smaller share of the contracts offered in any particular year. Year fixed effects would harm the identification strategy because there is hardly any variation in the knowledge of tax status within each recruitment year. However, a linear time trend is included as a control in the model.

3.4.1.3 Estimation Results

Table 3.3 indicates that the knowledge of the end of the tax break *increased* the rate at which CSP funds were awarded, the amount of CSP funds per semester, the total CSP award, and CSP funds' share of total compensation. These results are inconsistent with the "tax avoidance" and "insurance policy" rationales for the CSP program.

The increase in total CSP funds, CSP funds per semester, and CSP funds as a share of total compensation after 2007 is consistent with the commitment mechanism rationale, but the increase in the share of contracts that include CSP funds

Table 3.3: OLS Regressions of Compensation Package Characteristics on Knowledge of Tax at Signing, 2004-2011

	CSP Funds Included in Initial Contract	Log of CSP Funds Per Semester	Log of Total Value of CSP Funds	CSP as Share of Total Signing Bonus
2004-2006 vs 2007-2011				
Elimination of Tax Break	0.0553***	0.0752**	0.0758**	0.0275***
Known at Signing	(0.0128)	(0.0320)	(0.0337)	(0.00874)
Rank in the Year	-0.0197***	-0.0458***	-0.0604***	0.0362***
Contract Was Offered (x 100)	(0.000943)	(0.00239)	(0.00252)	(0.000654)
N	7094	4321	4321	4321
2004 vs 2005-2006				
Elimination of Tax Break	0.00880	-0.000820	-0.00310	-0.0370***
Unknown at Signing	(0.0129)	(0.0317)	(0.0334)	(0.00882)
Rank in the Year	-0.0222***	-0.0439***	-0.0607***	0.0368***
Contract Was Offered (x 100)	(0.00180)	(0.00443)	(0.00467)	(0.00123)
N	2507	1478	1478	1478

Notes: The regression of whether CSP funds were included in the initial contract is run on all domestically recruited employees who signed contracts and had at least a high school degree when joining the firm. The sample for the other three regressions is a subset of the first including only those who signed an initial contract with a CSP. In each model controls for age at signing, race, educational attainment at signing, rank, and fixed effects for the firm who signed the employee are included. For the regressions using the full sample through 2011, a linear year trend is included and the key outcome variable is an indicator variable equal to 1 if CSP funds were known to be taxed at signing and 0 otherwise. For the regressions using the sample through 2006, a linear year trend is not included given the short time frame of the sample, and the key outcome variable is an indicator variable equal to 1 if CSP funds were subject to taxation (albeit unknowingly) at signing and 0 otherwise.
Standard errors in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$

is inconsistent with that rationale. Economic theory would predict the taxation of CSP funds drives out the marginal employee wishing to commit to returning to college. Recruits would either go directly into college instead of signing with the firm or would sign with the firm but take the full amount of CSP funds as cash. However, it is possible that there was an overall increase in demand for college and CSP funds over time and the linear time trend does not fully account for this impact.[22]

The rationale that CSP funds are a means for a firm to target additional compensation to individuals with a stronger negotiating position is consistent with the results pertaining to the characteristics of the CSP contracts. If a firm uses the CSP to compensate recruits who have the outside option of attending college

[22]The appendix has figures that illustrate the change in each of the four outcomes. Each of these graphs shows a stark change beginning in 2007, making the misspecification of the year effects less likely.

on a university scholarship, then the firm would need to provide additional funds after 2007 to maintain the after-tax value of that compensation. Additionally, if it is shown that the end of the tax break for CSP funds means that CSP funds are used less frequently, then each CSP dollar is less costly for a firm to offer. This could explain the increase in the rate at which employees receive CSP funds. If CSP funds are less costly, the firm may be more willing to offer CSP funds as targeted compensation to the marginal employee.

The sign on the coefficient for the rank variable is suggestive of which rationale is dominant. Employees with a lower rank value are more likely to make the top level in the firm, and thus would be less likely to use the CSP as an insurance contract or commitment mechanism. Therefore, we would expect employees with lower rank to receive fewer CSPs if their primary rationale is as insurance or commitment. However, the coefficient on the rank variable is negative and statistically significant for the outcomes of whether a CSP is awarded, the amount of CSP funds per semester, and the total value of the CSP. This implies that employees with higher expected value and greater negotiating power are more likely to have a CSP plan and have more CSP funds per contract, suggesting targeted compensation as the dominant rationale for CSPs. The coefficient on rank in the regression for the share of the total signing bonus made up by CSP funds is positive and significant. This is not inconsistent with the theory that negotiating power drives the CSP contract. Due to the in-kind nature of the CSP compensation, only so much money can be of use in that contract vehicle. However, there is no limit to the desirability of additional cash compensation. Thus, once enough CSP funds to pay for college have been

allocated, employees with extremely high negotiating power associated with a very low rank value will demand additional compensation in the form of cash, pushing down CSP's share of total compensation.

The bottom half of Table 3.3 indicates that the unknown end of the tax break on CSP funds in 2005 did not have an effect on the rate at which CSP funds were included in an initial contract, the amount of CSP funds awarded per semester, or the average total value of a CSP award before the change was announced in 2007. The rank variable continues to have a negative and statistically significant coefficient for the first three regressions, while the CSP's share of the total signing bonus appears to be higher for employees with a high rank value as before in the full sample. This result was unanticipated, but may be explained by changes to the cash signing bonus. The regressions in the bottom half of Table 3.3 do not include a year trend; however, including the trend does not change the results in any meaningful way.

Each of the outcomes of interest in this section may have been affected by the Great Recession. However, as the Great Recession weakened the demand for labor, the potential bias from this event on the coefficient of interest for the first three outcomes would be negative. As the coefficients for the variable of interest for each of these three outcomes are positive, the conclusions of this section are reinforced by the potential bias that may be present if the assumptions required to interpret the coefficients as causal estimates are violated by the timing of the Great Recession.

The impact of a weaker economy on the share of an initial signing bonus taken in the form of CSP funds is unclear. A weaker economy and labor market

should mean less negotiating power for the potential employee along all forms of compensation including both cash signing bonus and CSP funds. As it is not clear whether the affect of a weaker economy would be greater in percentage terms on the cash compensation or CSP funds, it is difficult to forecast the sign of this potential bias on the outcome of the share of signing bonus taken as CSP funds.

3.4.1.4 Heterogeneity of Responses to Tax

Given the impact of rank on the outcomes of interest and to further explore the rationale for CSP funds, this section examines the effect of the interaction between the rank of employees and the change in the tax code on the characteristics of employee compensation packages. This cross-sectional variation in the response to the tax change is explored in two ways: (1) by interacting the primary explanatory variable with the rank variable and (2) by segmenting the employee population into groups based on their rank to look for any non-monotonic interactions between rank and the tax change. Following conversations with industry experts on what may be meaningful rank thresholds, the employees were broken into four rank groups. The first 90 employees recruited in any given year, with corresponding ranks of 1 through 90, are assigned to the top-ranked group. This group is labeled rank group 1 in Table 3.5 and is believed to have the most negotiating power. Those with ranks of 91 through 300 are assigned to the second-ranked group. The third group is composed of employees ranked 301 to 600 in the year they were recruited. Those ranked above 600 make up the forth-ranked group. A brief description of the

characteristics of each group is included in the summary statistics section of this chapter.

Table 3.4 shows the results when a variable interacting rank with the key tax variables for each sample is included in the model for each compensation package characteristic outcome. For the 2004–2011 sample, the coefficients for the original tax variable for the first three outcomes maintain their sign and statistical significance while the interaction terms are not statistically significant at the 0.05 level. The estimates for coefficient of the tax variable for the the first three outcomes using the 2004–2006 sample remain not statistically significant when the interaction term is added to the specification of each model. Furthermore, none of the coefficients for the interaction term are statistically significant for the first three outcomes in this sample. The inclusion of the interaction term changes the results for the fourth outcome, the share of the signing bonus taken as CSP funds, in both samples. The interaction term is positive and statistically significant in the 2004–2011 sample, but negative and statistically significant in the 2004–2006 sample. As the 2004–2006 sample was included as a check on the assumptions of the model, perhaps these results indicate some other factor related to rank, which has not been fully controlled for in the model, is biasing the results for this outcome.

As for the first three outcomes, it may be the case that the impact of the tax change did differ by rank but not in a monotonic way. As seen in the summary statistics, those in the first-tanked group almost all had CSP funds as part of their initial contract, and the average CSP funds per semester of that group was over $9,000. Therefore, although the change in the tax code appeared to increase these

Table 3.4: OLS Regressions of Compensation Package Characteristics on Knowledge of Tax at Signing Interacted with Rank, 2004-2011

	CSP Funds Included in Initial Contract	Log of CSP Funds Per Semester	Log of Total Value of CSP Funds	CSP as Share of Total Signing Bonus
2004-2006 vs 2007-2011				
Elimination of Tax Break	0.0379**	0.112***	0.0979**	0.0163
Known at Signing	(0.0161)	(0.0380)	(0.0400)	(0.0104)
Rank in the Year	-0.0218***	-0.0398***	-0.0568***	0.0344***
Contract Was Offered (x 100)	(0.00154)	(0.00407)	(0.00428)	(0.00111)
Interaction of Rank (x 100) with	0.00320*	-0.00882*	-0.00525	0.00266**
Elimination of Tax Break	(0.00181)	(0.00488)	(0.00513)	(0.00133)
Known at Signing				
N	7094	4321	4321	4321
2004 vs 2005-2006				
Elimination of Tax Break	-0.00651	-0.0413	-0.0385	0.0259**
Unknown at Signing	(0.0226)	(0.0476)	(0.0502)	(0.0131)
Rank in the Year	-0.0243***	-0.0517***	-0.0674***	0.0488***
Contract Was Offered (x 100)	(0.00308)	(0.00813)	(0.00857)	(0.00223)
Interaction of Rank (x 100) with	0.00291	0.0107	0.00932	-0.0166***
Elimination of Tax Break	(0.00352)	(0.00935)	(0.00986)	(0.00256)
Unknown at Signing				
N	2507	1478	1478	1478

Notes: The regression of whether CSP funds were included in the initial contract is run on all domestically recruited employees who signed contracts and had at least a high school degree when joining the firm. The sample for the other three regressions is a subset of the first including only those who signed an initial contract with a CSP. In each model controls for age at signing, race, educational attainment at signing, rank, and fixed effects for the firm who signed the employee are included. For the regressions using the full sample through 2011, a linear year trend is included and the key outcome variable is an indicator variable equal to 1 if CSP funds were known to be taxed at signing and 0 otherwise. The interaction term for this sample multiplies the rank variable by the "Known at Signing" tax variable. For the regressions using the sample through 2006, a linear year trend is not included given the short timeframe of the sample, and the key outcome variable is an indicator variable equal to 1 if CSP funds were subject to taxation (albeit unknowingly) at signing and 0 otherwise. The interaction term for this sample multiplies the rank variable by the "Unknown at Signing" tax variable.
Standard errors in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$

outcome measures, there might not have been as much room to grow in the top-ranked group, which was close to being maxed out already. Therefore, there could be non-monotonic impacts of the tax by rank that are masked within the simple interaction term. To examine this possibility, I break out the sample by rank group and run the original model on each sample separately.

Table 3.5 shows the results of the original model for each outcome (without the interaction term), for both the entire sample and each rank group separately. Two patterns emerge from this table. First, all rank groups, besides rank group 1, which was already receiving CSP funds in 99 percent of initial contracts before the tax change, saw an increase in the share of their initial contracts that included CSP funds following the announcement of the tax change. Second, the majority of the impact for the other outcomes appear to be driven primarily by rank group 2.

The rationale where the purpose of CSP funds is to offer additional compensation to recruits with more negotiating power can explain this second pattern, where overall results appear to be driven by the second rank group. After the change in the tax treatment is announced, those with more leverage demand additional compensation so that their after-tax compensation remains the same. However, if those from rank group 1 are already maximizing the potential useful value of their CSP funds, then there would be no point in increasing the money in the CSP portion of their signing bonus. They may instead demand more cash to offset the tax on their CSP funds. That would leave those in rank group 2 with the combination of (1) room in the CSP portion of their signing bonus to grow and (2) strong leverage to demand such an increase. Therefore, the results by rank group reinforce the conclu-

Table 3.5: OLS Regressions of Compensation Package Characteristics on Knowledge of Tax at Signing by Rank Group, 2004-2011

	CSP Funds Included in Initial Contract	Log of CSP Funds Per Semester	Log of Total Value of CSP Funds	CSP as Share of Total Signing Bonus
Full 2004-2006 vs 2007-2011				
Elimination of Tax Break Known at Signing	0.0553***	0.0752**	0.0758**	0.0275***
	(0.0128)	(0.0320)	(0.0337)	(0.00874)
N	7094	4321	4321	4321
Rank Group 1				
Elimination of Tax Break Known at Signing	0.0104	0.0562	0.0521	0.00863
	(0.0203)	(0.0740)	(0.0750)	(0.00546)
N	675	662	662	662
Rank Group 2				
Elimination of Tax Break Known at Signing	0.0417*	0.262***	0.262***	0.0296***
	(0.0246)	(0.0569)	(0.0573)	(0.00952)
N	1471	1268	1268	1268
Rank Group 3				
Elimination of Tax Break Known at Signing	0.0755***	0.00760	0.0152	-0.000983
	(0.0271)	(0.0594)	(0.0631)	(0.0167)
N	1799	1157	1157	1157
Rank Group 4				
Elimination of Tax Break Known at Signing	0.0635***	0.00541	0.0321	0.0407*
	(0.0206)	(0.0637)	(0.0679)	(0.0209)
N	3149	1234	1234	1234

Notes: The regression of whether CSP funds were included in the initial contract is run on all domestically recruited employees who signed contracts and had at least a high school degree when joining the firm. The sample for the other three regressions is a subset of the first including only those who signed an initial contract with a CSP. In each model controls for age at signing, race, educational attainment at signing, rank, and fixed effects for the firm who signed the employee are included. All regressions shown use the full sample through 2011 and include a linear year trend. The key outcome variable is an indicator variable equal to 1 if CSP funds were known to be taxed at signing and 0 otherwise. Rank Group 1 includes only those ranked in the top 90 for the year they were recruited. Rank Group 2 includes those selected between 91 and 300 in their recruitment year. Rank Group 3 includes those between 301 and 600, and Rank Group 4 includes those selected after the first 600 in a given year.
Standard errors in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$

sion that the rationale for the CSP funds is to offer targeted compensation to those with more negotiating power.

3.4.2 Effect of Tax on CSP Usage

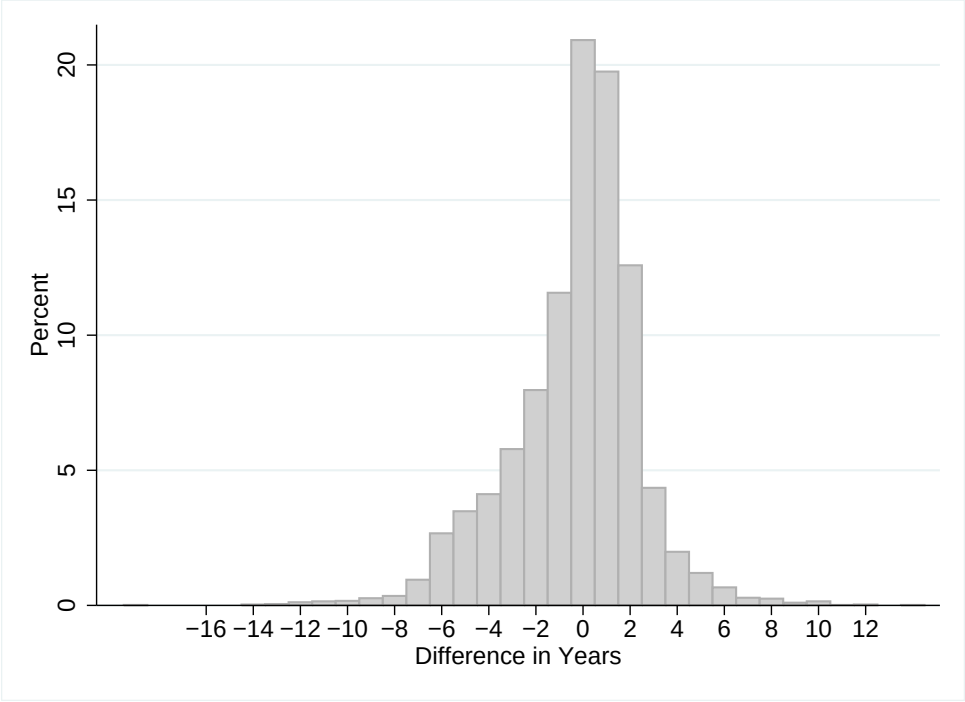
3.4.2.1 Sample Selection

Given that CSP funds are typically available for initial use up to 2 years after termination and given that the average career length is around 3 years, many CSP contracts signed before 2012 are still active.[23] Furthermore, many employees wait until after termination from employment with the firm to start using their CSP funds. Thus the timing of termination is a sensitive predictor of when CSP funds are first used. Those who signed CSP contracts as part of their initial contract in 2004 had a longer time to use their CSP funds than those who signed once the tax was in effect due to right censoring. To compare like samples, earlier cohorts are pared down to resemble the information available for later cohorts. This rephrasing of the question of "has the CSP ever been used" to "has the CSP been used by a certain cut-off" requires selecting a cut-off.

I considered age, time since signing the initial contract, and time since being released by the firm as potential cut-offs. Of these, I use the cut-off of 2 years after being released by the firm, because only this outcome has a clear break point in the timing of CSP usage. That break point is around the second or third year after termination and was expected given the way the CSP contracts are typically

[23]The distribution of career length is not symmetric, having a long right tail.

Figure 3.2: Histogram of the Difference Between the Date CSP Funds Were First Used and an Employee's Termination Date



Source: Author's tabulation of data provided by the firms who wish to remain unidentified.

written. Figure 3.2 illustrates this break. The histograms for the alternative cut-offs are included in the appendix.

In simple regressions using the date education funds are first used as the outcome variable and either the date an employee was terminated (if available), the date he signed, or his date of birth as the explanatory variable, I found that the termination date had a slightly higher R-squared when using the full sample.

I compare those who signed in 2005 and 2006 and thus were affected by the end of the tax break to those who signed in 2004. Given this sample, the maximum window of observation is determined by the last year included in the "unknowingly taxed" cohort. If the 2006 recruitment cohort is included, then that cohort had 7

years after signing to start using their CSP funds at the time of data extraction. To provide a 2-year post-termination window of observation, the sample is limited to those who left the firm within 5 years. I assign all cohorts the same cut-off to allow for comparison of similar samples. The outcome variable is equal to one if CSP funds were first used either before termination or within 2 years of termination.

The indicator variable for those with CSP funds subject to taxation has a slightly muddled interpretation without further sample restriction. The indicator variable is equal to one if the contract was signed after January 5, 2005. However, those who signed after January 5, 2005, but used their CSP before the announcement in 2007 did so without knowledge of the tax. This means individuals who used their CSP early could not have been influenced by the tax change because they did not know about it. Only those who did not use their CSP before June 6, 2007, could be prevented from ever doing so because of the tax.[24] This may bias the estimate of the impact of the tax on CSP usage.

Obtaining an unbiased estimate of the effect of the tax on usage for those who signed in 2005 and 2006 requires separate sample restrictions for each treatment cohort. To examine the effect of the tax on those who signed in 2006, all those who used their CSP in the first year after signing in both 2004 and 2006 are eliminated from the sample. Similarly, to estimate the effect of the tax on those who signed in 2005, the analysis limits the sample to those who did not use their CSP funds within 2 years of signing their contract. However, if only employees from 2004 and

[24]For those who learned about the tax change in 2007 who had already started using their CSP funds, knowledge of the tax may cause them to be less likely to continue using their CSP and perhaps cause them to be be less likely to complete their degree, but these questions are outside the scope of this chapter.

2005 are analyzed, then an additional year of observation is available for the full sample. Accordingly, employees who were terminated in their sixth year with the firm can be included while still allowing a 2-year run-off post-termination before the data extraction date. I examine the impact using the full 2004 through 2006 sample under two conditions. In one sample I exclude anyone who started using their CSP funds within 2 years of signing an initial contract. In the other, I increase my sample by including all employees who were terminated within 5 years of signing with a firm, acknowledging the potential mitigation of the estimate of the coefficient through measurement error.

Employees who reach the top level within the firm before leaving the firm are excluded from the analysis. The rationale is that earnings for those rare few who reach the top level are so large that upon leaving the firm those individuals may not need to invest in marketable skills to sustain the standard of living they desire. Their view of college may change from an investment to a consumption good.

3.4.2.2 Econometric Model

I perform OLS analysis to examine if there is any statistically significant effect of the tax change on the likelihood of using CSP funds to attend college. An indicator variable for those who were affected by the tax change who did not know about the loss of the tax benefit when signing their initial contract is included as the primary explanatory variable in the model. The model takes the following form:

$$(2) \qquad y_{icft} = \beta_0 + \beta_1 Tax_c + \beta_2 X_i + \gamma_f + \epsilon_{icft}$$

In this Linear Probability Model (LPM), y_{icft} is an indicator if an individual i from tax cohort c who signed an initial contract with firm f in recruitment year t used their CSP funds before the cut-off date of the sample. The regressor of interest, Tax_c, is an indicator variable equal to one if the individual was in a cohort who thought they had the tax break but later found out they did not, and zero otherwise. The knowledge of the tax would make the value of CSP funds decrease. The expected sign of the tax coefficient is negative.

The vector X_i consists of controls including the rank of the employee in the year they signed, race, the level of educational attainment of the employee at signing, age at signing, the natural log of the cash signing bonus, and the natural log of CSP funds per semester. The race variable is an indicator variable equal to one if the employee is White. The educational attainment variables are a set of indicator variables for each categorical response.

The rank assigned is associated with perceived skill, and the earlier analysis finds that a lower rank number is predictive of higher CSP funds per semester. A low rank from being selected earlier is also positively correlated with a larger cash signing bonus. However, I do not have a prediction for how an employee's rank in the year they were recruited affects CSP usage when controlling for these other factors.

The log of the cash signing bonus proxies as a control for income. Actual household wealth is not available, but the larger the signing bonus, the more likely the employee has the resources to overcome credit constraints imposed by the tax. The coefficient for the log of CSP funds per semester is expected to be non-negative,

as larger values reduce the probability of credit constraints deterring matriculation.

The regression model also includes controls for firm fixed effects, γ_f. The firm that selects an employee may have a work culture that either encourages or discourages college attendance. Firm fixed effects control for the possibility that firms with different cultures may make up larger or smaller shares of the contracts offered in any particular year.

The identification assumption is that the usage rate of CSP funds would not be systematically correlated with signing after January 5, 2005, in the absence of the change in tax treatment of CSP funds. As the key independent variable is essentially a year indicator, any other shift that influences the employees' tastes for college over time may add bias to the estimate.

The greatest potential shift in the preferences for college may come from the different alternative opportunities available to those who were terminated in different years. Attending college might have appeared more attractive to those terminated after the Great Recession began as the opportunity cost of forgone earnings of attending college likely decreased for those facing a more difficult job market. Those recruited and signed in 2005 and 2006 are more likely to have their careers with the firm last until after the start of the recession and therefore may have been more likely to attend school even with the knowledge that their CSP funds would be taxed. This could counteract the expected impact of the tax and positively bias the results for the coefficient on the tax variable towards zero.

Given the employee is seldom the one who decides when their career is over with the firm and the length of an individual's career varies, individuals recruited in

different years can be terminated in the same year and face the same macroeconomic impacts on their opportunity costs of attending school. Therefore, models specifications including year terminated fixed effects or the unemployment rate when they were terminated will be examined in addition to the specification above.

3.4.2.3 Estimation Results

The first column of Table 3.6 examines the effect of the tax on the cohorts that signed in 2005 against those who signed in 2004 where the sample is restricted to those terminated within the first 6 years of employment and who did not use their CSP in the first 2 years after signing. The only statistically significant predictor of CSP usage is the log of CSP funds per semester, and the coefficient has the expected sign. The coefficient for the effect of the unexpected loss of the tax break for CSP funds is negative, as expected, but not statistically significant. Similar results are found using the 2006 cohort as the treatment group where the employees are only included in the sample if they left the firm within 5 years of signing but are excluded if they started using their CSP funds within the first 2 years after signing. The same holds true for the combined 2005 and 2006 treatment group under both sample restriction criteria.

These results suggest that the taxation of CSP funds does not have a measurable impact on the rate at which employees use those funds for college. Meanwhile, the positive and statistically significant coefficient for the amount of CSP funds available per semester suggests that the out-of-pocket costs faced by the employee

Table 3.6: Linear Probability Model of CSP Usage on Tax Status of Funds, 2004-2006

	Initial CSP Usage Rate			
Treatment Group	2005	2006	2005 and 2006	
Exclusion Criteria	6,2	5,1	5,2	5,0
CSP Funds Taxed	-0.00664	-0.00974	-0.0310	-0.0193
	(0.0459)	(0.0451)	(0.0414)	(0.0357)
Natural Log of Cash	0.0390*	0.00604	0.0316	0.00563
Signing Bonus[1]	(0.0237)	(0.0233)	(0.0202)	(0.0176)
Natural Log of CSP	0.128***	0.0845*	0.0963**	0.114***
Funds Per Semester[1]	(0.0466)	(0.0449)	(0.0383)	(0.0326)
Ranking in the Year	0.00803	0.00247	0.00557	0.00693
Contract Was Offered (x 100)	(0.00842)	(0.00831)	(0.00712)	(0.00631)
R^2	0.155	0.103	0.121	0.107
N	520	544	727	886

Notes: All regressions include race, age and educational attainment at signing, firm fixed effects, and the variables for which coefficients are reported. Given the limited number of years in each sample and the correlation between year and the treatment, neither year fixed effect nor a linear time trend are included as controls. All regressions use the 2004 recruitment class as the control group while the treatment cohorts are listed in the associated column. All regressions exclude foreign recruits, employees who reached the top level within the firm, and employees who did not include a CSP as part of their initial contract. The additional exclusion criteria are indicated in each column. The first number in the pair reports the number of years before which an employee had to be terminated to be included in the sample, while the second number reports the number of years after signing where if the employee first used their CSP funds before that date they were excluded from the analysis. The key outcome of interest is an indicator variable that is equal to one if CSP funds were subject to taxation and zero otherwise.
Standard errors in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$
(1) All monetary values are indexed to year 2000 dollars.

are negatively correlated with college attendance. However, this correlation can be driven by those with a stronger preference for college negotiating for more money in their CSP at signing.[25]

3.4.2.4 Heterogeneity of Responses to Tax

Alternative model specifications leveraging the fact that employees were recruited in different years and thus were subject to different tax rules but were released in the same year and thus faced similar macroeconomic conditions also failed to find a statistically significant impact from the change in the tax treatment of CSP funds. These specifications included year terminated fixed effects or the unemployment rate in the year terminated.

Models examining potential cross-section variation in response to the tax change on CSP usage were also explored. To examine variation by rank, one specification interacted the tax variable with the rank variable, and another segmented the population by rank group, running the original four models on each group. Neither effort discovered a statistically significant coefficient on the tax variable. The same held when segmenting the population by educational attainment at signing and running on each group.

[25]There is no meaningful difference in the results if each sample is further restricted to only include employees who were high school seniors when recruited.

3.4.3 Implied Price Sensitivity of Demand

This section calculates an estimate for the price sensitivity of demand for higher education using an estimate for the out-of-pocket price faced by each individual. The estimate of an employee's expected out-of-pocket cost per year of college is a function of the total tuition and fees cost of college attendance, the funds per semester in an employee's CSP contract, and the tax status of the CSP funds.[26]

To obtain an estimate of the out-of-pocket costs faced by the employee, I begin with the average cost of tuition, fees, room, and board at a 2- or 4-year institution in the United States for the year an employee was terminated.[27] Then the after-tax value of an employee's CSP funds per semester is subtracted from the average cost of attending college in the year terminated. The resulting number is the estimated out-of-pocket cost for an employee attending college.

To estimate the effective marginal tax rate on CSP funds, additional assumptions are necessary given data limitations. The income bracket, marital status, and state of residence are unknown for most employees in the data set. As a result, the estimate for the effective marginal tax faced by employees who signed after January 5, 2005, can only be a rough approximation of the true effective marginal tax rate they face. Estimates of the effective marginal tax rate during this period were gathered from analysis by the Tax Policy Center (2007). These estimates take into account federal and state individual income taxes and the federal payroll tax, and

[26]Forgone earnings are an important opportunity cost of college attendance but do not factor into the out-of-pocket cost calculation in this section.

[27]The national average is used because the state of residence of the employee is frequently unknown.

are available by earning decile. I use the median effective marginal tax rate on earnings in the third decile of all earners for each year. The third decile is used due to the below-average expected income of the individuals in my sample given their young age. With estimates for the education costs per semester and the effective marginal tax rates per year, the projected out-of-pocket cost of a semester is calculated for each employee as:

$$OutOfPocketCosts_i = CostPerSemester_t - (1 - (I_c * Rate_t)) * CSPFunds_i$$

Where $CostPerSemester_t$ is the national average cost of a semester of college in the year the employee was terminated, I_c is an indicator variable for whether CSP funds were subject to taxation,[28] $Rate_t$ is an estimate of effective marginal tax rate, and $CSPFunds_i$ are the CSP funds per semester of the employee.

This specification of out-of-pocket costs exploits variation in the financial impact of the tax due to the tax change and variations in the amount of CSP funds per semester to help estimate a price sensitivity of demand for higher education. The main sources of variation in the $OutOfPocketCosts_i$ variable is from the CSP funds per semester of the employee, $CSPFunds_i$. When a simple regression is run with $OutOfPocketCosts_i$ on the left-hand side and $CSPFunds_i$ on the right-hand side, the R-squared ranges between 0.83 and 0.87 depending on the sample. R-squared increased by an additional 0.1 to 0.13 when a variable representing the estimate of the value of the taxes due from the use of CSP funds, if any, is included. This can

[28]Employees who signed in 2005 and 2006 have their tax status assigned according to the information available to the employee on the day of their termination. So if an employee who signed in 2005 was terminated in 2006, the out-of-pocket cost they expected to pay if they attended college does not include the taxation on CSP funds. This more accurately reflects the information set at the time the decision was likely made, even if unexpected back taxes would eventually be due.

be interpreted to mean that 10 to 13 percent of the variation in the out-of-pocket costs variable is due to the change in the tax code.[29]

In the previous section, the impact of the tax was modeled as uniform across all employees with a CSP. However, even if two employees faced the same tax rate, the increase in out-of-pocket cost would be larger for the employee who negotiated more CSP funds per semester in their initial contract. Meanwhile, including CSP funds per semester for both those whose funds are taxed and those whose funds are not taxed controls for the correlation between CSP funds and an employee's preference for higher education. The residual variation in the $OutOfPocketCosts_i$ variable, primarily from the estimate of the taxes due, will be used to identify the impact of prices on demand for college.

3.4.3.1 Sample Selection

I include domestically recruited employees who signed in 2004 or later with a CSP in their initial contract and who were terminated by 2011 in this analysis. As in the previous section, I exclude employees who reach the highest level in the firm because their increased wealth from reaching the top tier may change their motivation for attending college from an investment to purely consumption. I present results for four different samples. There may be reactions to the announcement of the tax that are unobserved, so those who signed in 2004–2006 are examined separately to look at those who could not modify their initial contract or change their decision to

[29] When the variable representing the value of the taxes due is included by itself in the simple regression, the R-squared value ranges from 0.25 to 0.29. However, as the value of the CSP funds per semester is a component in the estimate for taxes due, then including this variable by itself likely results in an overestimate of this variable's effect on the variation in out-of-pocket costs.

join the firm based on the knowledge of the tax change. The examination of this subgroup is an attempt to mitigate potential omitted variable bias. High school seniors are the traditional group studied in the literature. They are examined in isolation for both the full sample and the 2004-2006 cohort subsample to compare the results of this chapter to historical estimates and to check for potential heterogeneous treatment effects by educational attainment at signing. It is conceivable that the closer one is to finishing a degree, the less price sensitive he or she is for any one year of college. Therefore, high school seniors could be the most price-sensitive subgroup.

3.4.3.2 Econometric Model

I estimate a linear probability model with OLS to calculate the price sensitivity of demand for higher education. This modeling is consistent with the existing literature and allows for comparison of the results with estimates from previous studies. The specification of the econometric model is:

$$(3) \qquad CSPUsed_{ift} = \beta_0 + \beta_1 OutOfPocketCosts_i + \beta_2 X_i + \beta_3 T_t + \gamma_f + \epsilon_{ift}$$

In this Linear Probability Model (LPM), $CSPUsed_{ift}$ is an indicator variable equal to one if an individual i who signed an initial contract with firm f and was released by the firm in year t has used their CSP funds within the window of observation. The definition of the primary independent variable of interest, $OutOfPocketCosts_i$, is provided above. The out-of-pocket costs are indexed to

year 2000 dollars, and per semester costs were doubled and then divided by 1,000 to allow for comparison with results from earlier academic work.

X_i includes controls for individual-level characteristics of the employee. These controls include the natural log of the signing bonus, the natural log of CSP funds per semester, the employee's ranking in the year they signed, and indicator variables for his educational attainment at signing and race.

The major difficulty with this analysis is the potential endogeneity of the out-of-pocket price for college with respect to preferences for education. Individuals who value education may be more likely to negotiate for a CSP and/or for more funds in their CSP than those with a lower desire to return to school. CSP funds per semester themselves may be a function of both preferences for education and the negotiating power of the employee at signing. The rank of the employee in the year signed and the natural log of the cash signing bonus attempt to control for the negotiating power of the employee, allowing the residual variance in CSP funds per semester to hopefully capture and control for the preference for education more precisely. Accordingly, CSP funds per semester, rank, and the value of the cash signing bonus are included in all regressions. The variation in the out-of-pocket costs coming from the interaction of the tax status with the CSP funds allocated per semester is what identifies the estimated price sensitivity in the model.

Meanwhile, T_t includes variables determined by the year an employee was terminated. This set of controls includes the age of the employee when they are terminated and the national unemployment rate in the year the employee was ter-

minated.[30] Economic theory predicts a high unemployment rate in the year an employee was terminated would make them more likely to use their CSP funds, because a higher unemployment rate would translate into a lower opportunity cost of returning to school from forgone wages. The age at termination controls for an employee's potential aversion to returning to school due to feeling out of place because he is older than the regular college population. Also, an older CSP holder's potential returns to education would be limited by the number of working years available post-graduation.

The appropriateness of these two variables depends on the assumption that termination from the firm is an event which triggers the decision by the employee of whether or not to even use their CSP funds. This is observably true for many employees, but not all; therefore, specifications excluding these year terminated variables (YTV) are performed to examine the results without relying on this assumption.

3.4.3.3 Estimation Results

The price sensitivity of demand results consistently fail to find a statistically significant relationship between college attendance and the variation in out-of-pocket costs created by the interaction between the amount of CSP funds allocated and the change in their tax status. This result holds across various samples and model specifications. This is consistent with the findings of Bulman and Hoxby (2015). The one exception is the model with the full sample where all the cohorts from 2004

[30] Although some employees use their CSP before being terminated, the most common year to start using a CSP is the year terminated. That is why the age and unemployment rate in the year terminated, as opposed to some other year, such as year signed, were used.

through 2011 are eligible, employees of all educational attainment levels are included, and the specification does not include controls whose values are determined by the year an employee is terminated. Table 3.7 presents the results of estimating Equation (3). Column 1 reports the results for the most inclusive sample but without controls for labor market conditions or age in the year an employee was terminated. This sparse specification yields a point estimate on β_1 of -0.0118, which is statistically significant at the 1 percent level.

This estimate implies a 1 percentage-point reduction in the use of CSP funds for a $1,000 (year 2000 dollars) increase in out-of-pocket costs. This estimate implies a much lower sensitivity of demand than the 3 percentage-point increase in college attendance from $1,000 in tax-based aid found in previous studies of 18- to 19-year-olds (Turner, 2011) or adults whose educational attainment fell short of early life educational expectations (LaLumia, 2012).[31] Furthermore, this result does not hold in any other sample or specification of the model. In all other samples and model specifications, the point estimate on β_1 is still negative, often smaller in magnitude, and never statistically significant.[32]

There are several possible explanations for the deviation of this result from the existing literature. These possible explanations include: measurement error from the crudeness of the out-of-pocket cost estimate; uncertainty, confusion, or a

[31] LaLumia did not find a statistically significant result for the entire adult population, only those who fell short of their original education expectations, but those who set aside money for further education can certainly be said to have an expectation to eventually achieve more education.

[32] This result is in line with main result from LaLumia (2012), which also found no effect on adult education from college aid through the tax code for the general adult population. However, as the population LaLumia studied was in their 30s and 40s, while the population is this study is closer in age to that of Turner (2011), the absence of a statistically significant result was unexpected.

Table 3.7: OLS Regressions Estimating the Sensitivity of Demand, 2004-2011

	2004-2011				2004-2006			
	All		HS Seniors		All		HS Seniors	
	No YTVs (1)	YTVs (2)	No YTVs (3)	YTVs (4)	No YTVs (5)	YTVs (6)	No YTVs (7)	YTVs (8)
Out-of-Pocket Costs[1]	-0.0118***	-0.00647	-0.0156	-0.00364	-0.00644	-0.00167	-0.0146	-0.00549
	(0.00419)	(0.00458)	(0.0112)	(0.0124)	(0.00516)	(0.00570)	(0.0128)	(0.0145)
Natural Log of CSP	-0.0468	0.00821	0.109	0.221*	0.0527	0.0990	0.0786	0.160
Funds Per Semester[1]	(0.0446)	(0.0484)	(0.115)	(0.124)	(0.0569)	(0.0612)	(0.146)	(0.158)
Natural Log of	0.0205	0.0233*	-0.0446	-0.0456	0.0144	0.0217	0.0363	0.0505
the Signing Bonus[1]	(0.0132)	(0.0134)	(0.0394)	(0.0399)	(0.0163)	(0.0167)	(0.0486)	(0.0502)
Rank in the Year	0.00732*	0.00920**	0.0166	0.0233**	0.00817	0.00765	0.0389**	0.0381**
Contract Was Offered (x 100)	(0.00443)	(0.00449)	(0.0111)	(0.0111)	(0.00583)	(0.00589)	(0.0150)	(0.0151)
Education Dummies	Yes	Yes	No	No	Yes	Yes	No	No
Termination Year Variables	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.080	0.086	0.153	0.182	0.104	0.108	0.255	0.263
N	1611	1611	322	322	967	967	213	213

The Out-of-Pocket Costs variable is calculate by taking the average annual college tuition and fees in the year an employee was terminated and subtracting the after-tax value of two semesters' worth of CSP funds. This value is then divided by $1,000 to more readily compare the value of the point estimate to those from the existing literature. All regressions include control variables for race and indicator variables for the firm that initially signed the employee. Indicator variables for educational attainment are included in any regression that did not have a sample limited to only employees who were in high school when recruited by the firm. Termination year variables include the age of an employee and the national unemployment rate in the year the employee was terminated. These variables are included in the specification with YTV in the column label. The sample for columns (1) through (4) consists of employees signed between 2004 and 2011. Employees recruited from overseas, who advanced to the top level of the firm, or who were not terminated by the end of 2011 are not included in the analysis. The sample for columns (5) through (8) is similar but only includes employees who signed before 2007 as opposed to 2011.
Standard errors in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$

lack of salience of the true after-tax price at the time when the decision was made; a truly different sensitivity of demand for these non-traditional students; or a sense of commitment given that some funds have already been set aside for education. Each of these reasons may explain the low price sensitivity of demand estimate. Data limitations, particularly not knowing the state of residence upon termination or variation in the tax status of CSP funds within cohorts, hinder the parsing out of the potential reasons.

Also of note: this model specification yields a coefficient on the natural log of CSP funds per semester that is similar in magnitude and sign to the results from estimating Equation (2), but is seldom statistically significant. One possible explanation is that the definition of out-of-pocket costs may rely too heavily on the value of CSP funds per semester for its own variation. With near or almost

perfect collinearity, an increase in the standard errors of the collinear parameters is expected and would increase the probability of making a type II error of accepting the null hypothesis when it is false for both variables. This could explain the lack of statistical significance for the point estimate of β_1.

The coefficient for the variable controlling for the rank of an employee at signing was consistently positive and was statistically significant in over half of the various model specifications and sample selection combinations. The coefficients associated with the rank variable were largest for the sample of high school seniors who all signed before the tax was announced. Thus the youngest group was more likely to return to school after termination if their prospects with the firm were worse. With a worse rank, they likely had a lower expectation of success with the firm and a higher expectation of furthering their education. This result mirrors that of LaLumia (2012), who found higher expectation of educational attainment at a younger age was associated with the decision to return to school.

3.4.3.4 Heterogeneity of Responses by Rank

Given the apparent effect of rank on CSP usage, this section investigates potential heterogeneous effects of the change in the tax code by rank. This is done by segmenting the population and running each model specification by rank group.[33]

Table 3.8 shows the results of the sensitivity of demand regressions by rank group. Certain subgroups suffer from small sample size, but a general story does

[33] A model interacting the Out-of-Pocket Costs variable with the Rank variable was also explored. This interaction variable was not statistically significant at the 0.05 level in any specification and the inclusion of this variable did not meaningfully change the coefficient on the Out-of-Pocket Costs variable itself.

appear to emerge. Those from rank group 4 consistently have large negative coefficients for the Out-of-Pocket Costs variable. The coefficient for the 2004–2011 sample including all educational attainment levels has a larger magnitude than that of the full sample including all rank groups and is statistically significant at the 0.05 level. As with the contract characteristics outcomes, rank group 2 also has a statistically significant outcome when using the 2004–2011 sample including all educational attainment levels. Rank group 1 has the smallest sample size and does not exhibit a statistically significant result, and the sign on the coefficient fluctuates by specification and sample. Meanwhile, the coefficients for rank group 3 are inconsistent with the rest of the sample. The overall conclusion is those who had the weakest negotiating position, were offered the lowest average cash signing bonuses, and were likely the ones most expecting to fail with the firm are those who appear to be the most sensitive to the change in the out-of-pocket costs due to the taxation of CSP funds.

Table 3.8: OLS Regressions Estimating the Sensitivity of Demand by Rank Group, 2004-2011

	2004-2011				2004-2006			
	All		HS Seniors		All		HS Seniors	
	No YTVs (1)	YTVs (2)	No YTVs (3)	YTVs (4)	No YTVs (5)	YTVs (6)	No YTVs (7)	YTVs (8)
Full Sample								
Out-of-Pocket Costs[1]	-0.0118***	-0.00647	-0.0156	-0.00364	-0.00644	-0.00167	-0.0146	-0.00549
	(0.00419)	(0.00458)	(0.0112)	(0.0124)	(0.00516)	(0.00570)	(0.0128)	(0.0145)
N	1611	1611	322	322	967	967	213	213
Rank Group 1								
Out-of-Pocket Costs[1]	-0.0235	-0.0162	0.0874	0.0413	-0.00991	-0.00855	0.0608	0.128
	(0.0226)	(0.0258)	(0.0860)	(0.0910)	(0.0213)	(0.0238)	(0.0937)	(0.0750)
N	92	92	39	39	76	76	32	32
Rank Group 2								
Out-of-Pocket Costs[1]	-0.0186**	-0.0127	-0.0160	-0.00769	-0.0125	-0.0104	-0.0156	-0.00983
	(0.00816)	(0.00910)	(0.0210)	(0.0233)	(0.00912)	(0.0102)	(0.0230)	(0.0267)
N	380	380	97	97	277	277	75	75
Rank Group 3								
Out-of-Pocket Costs[1]	0.000719	0.00874	-0.00893	0.0109	0.0162	0.0312**	0.0412	0.0326
	(0.00885)	(0.00975)	(0.0267)	(0.0366)	(0.0122)	(0.0136)	(0.0396)	(0.0501)
N	499	499	99	99	297	297	65	65
Rank Group 4								
Out-of-Pocket Costs[1]	-0.0174**	-0.0128*	-0.0666*	-0.0533	-0.0158	-0.0127	-0.0306	-0.0610
	(0.00719)	(0.00775)	(0.0339)	(0.0397)	(0.0111)	(0.0121)	(0.0704)	(0.0839)
N	640	640	87	87	317	317	41	41
Education Dummies	Yes	Yes	No	No	Yes	Yes	No	No
Termination Year Variables	No	Yes	No	Yes	No	Yes	No	Yes

The Out-of-Pocket Costs variable is calculate by taking the average annual college tuition and fees in the year an employee was terminated and subtracting the after-tax value of two semesters' worth of CSP funds. This value is then divided by $1,000 to more readily compare the value of the point estimate to those from the existing literature. All regressions include control variables for race and indicator variables for the firm that initially signed the employee. Indicator variables for educational attainment are included in any regression that did not have a sample limited to only employees who were in high school when recruited by the firm. Termination year variables include the age of an employee and the national unemployment rate in the year the employee was terminated. These variables are included in the specification with YTV in the column label. The sample for columns (1) through (4) consists of employees signed between 2004 and 2011. Employees recruited from overseas, who advanced to the top level of the firm, or who were not terminated by the end of 2011 are not included in the analysis. The sample for columns (5) through (8) is similar but only includes employees who signed before 2007 as opposed to 2011. The rank groups are determined by the same 90/300/600 splits used in the rest of the chapter.
Standard errors in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$

3.5 Conclusion

This chapter examines the effect of an unexpected loss of an exemption from taxes on savings set aside for college on both future savings for education and further college attendance. The analysis indicates that the knowledge of the tax on CSP funds *increased* the amount of money set aside on both a total and a per semester basis. These results suggest that the primary justification for the CSP program is not as an insurance policy or a vehicle for tax avoidance, but as either a means by which firms can target additional compensation to employees with higher expected value and greater negotiating power or a commitment mechanism to return to school. The change in the treatment of funds from untaxed to taxed also appears to have *increased* the share of employees who receive a CSP as part of their initial contract. This result suggests the dominant rationale for CSPs is targeted compensation, rather than a commitment mechanism to return to school. The results analyzing the effect of the tax on CSP usage are insufficient to reject the hypothesis that taxation of CSP funds do not affect CSP usage rates. This evidence is fairly robust to model specification and sample selection.

The estimated sensitivity of demand for higher education of these non-traditional students is lower than the traditional estimate of 3 to 5 percentage-points per $1,000 (year 2000 dollars) change in tuition or the 2 to 3 percentage-points per $1,000 (year 2000 dollars) change in tax-based aid found by Turner (2011a). However, these results are consistent with the work of Long (2004) and Bulman and Hoxby (2015), who did not find statistically significant impacts on education outcomes associated

with tax-based aid. Several possibilities including data limitations, the source of variation, and different preferences for education by this population could explain this result. If the result is not population specific but instead due to the source of variation in price, then the continuation of tax incentives that encourage saving for college would appear to be a less effective means of raising the matriculation rate into college than lowering the cost of college directly through subsidies to universities.

B.6 Appendix B

Table B.9: Price Paid by Military Spouses at 2-Year Public Institutions

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	Number of Schools
Alabama	304	352	2057	2341	2532	446	428	444	463	27
Alaska	2028	2009	2022	2142	2113	2319	2735	2902	2922	2
Arizona	935	2899	3244	3250	3337	3420	3580	3649	1297	21
Arkansas	1399	1480	1688	1776	1757	1759	1785	1757	1879	22
California	316	303	298	449	660	636	575	490	468	113
Colorado	1770	1738	1745	1764	1770	1856	1810	1793	1834	15
Connecticut	5460	5589	5630	6404	6529	6684	6787	7046	7127	12
Delaware	1680	1740	1784	1852	1900	1978	2012	2065	2146	3
District of Columbia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
Florida	1431	1426	1430	1526	1595	1651	1716	1553	1685	20
Georgia	3057	2967	3007	3114	1279	1401	1417	1518	1490	48
Hawaii	1069	1034	1018	1043	1070	1082	1186	1299	1405	6
Idaho	2269	2283	2369	2428	2517	2511	2516	2536	2542	3
Illinois	5130	4768	4896	4870	5259	5002	5087	5254	5553	48
Indiana	3705	3896	4258	4376	4477	4574	4625	4688	2343	14
Iowa	2144	2290	2444	2517	2638	2702	2686	2710	2736	16
Kansas	2966	2814	3048	3109	3122	3106	3056	3023	1787	24
Kentucky	1212	1337	1699	2125	2291	2090	2240	2299	2343	16
Louisiana	844	908	911	1101	1249	1319	1310	1350	1338	34
Maine	2614	2572	2622	2576	2554	2689	2595	2714	2618	7
Maryland	4209	3911	3989	4324	4503	4370	4400	4397	4310	16
Massachusetts	6968	7219	7209	7244	7193	7062	6851	6376	6661	16
Michigan	3375	3278	3244	3382	3466	3723	3730	3796	3853	30
Minnesota	2520	2680	2921	3218	3496	3581	3678	3749	3678	31
Mississippi	1170	1358	1410	1287	1361	1462	1451	1431	1414	15
Missouri	2090	2066	2409	2546	2718	2794	2669	2885	2877	21
Montana	2312	2372	2495	2704	2668	2732	2734	2810	2771	12
Nebraska	1407	1436	1481	1548	1605	1670	1687	1758	1763	8
Nevada	1395	1392	1411	1429	1447	1450	1442	1462	1535	1
New Hampshire	3949	4162	4248	4488	4857	5079	4741	4943	4788	7
New Jersey	3432	3414	3439	3582	3662	3743	3853	3865	3922	19
New Mexico	1002	993	995	1021	1113	1213	1236	1226	1196	20
New York	2801	2572	2787	2841	2891	2909	2924	2940	2921	35
North Carolina	902	984	1056	1085	1137	1146	1107	1144	1120	59
North Dakota	1925	1938	2135	2361	2776	2883	3140	3217	3247	6
Ohio	2405	2422	2634	2770	2899	2977	2976	2879	2741	30
Oklahoma	1292	1199	1285	1595	1668	1842	1909	1958	2023	12
Oregon	1650	1690	1882	2291	2378	2382	2478	2440	2377	17
Pennsylvania	4389	4378	4288	4422	4730	4956	4951	4940	4869	21
Rhode	1806	1793	1913	1971	2102	2182	2286	2360	2471	1
South Carolina	3786	4185	4646	5312	5433	5483	5551	5622	5669	20
South Dakota	2868	2883	3012	2635	2618	2820	3019	3080	3138	5
Tennessee	1440	1593	1663	1930	2010	2115	2122	2182	2221	13
Texas	1361	1403	1469	1612	1644	1768	1864	1886	1911	64
Utah	1588	1646	1735	1832	1916	1982	1931	2019	2071	7
Vermont	5764	5805	6615	6632	6816	6999	7070	7248	7412	1
Virginia	4799	4678	5071	5483	5501	5469	5834	2061	2130	24
Washington	1764	1825	1987	2062	2145	2228	2243	2269	2260	30
West Virginia	1671	1616	1651	2653	2679	2216	2268	2232	2218	11
Wisconsin	2292	2224	2477	2397	2540	2605	2676	2736	2770	17
Wyoming	1432	1437	1478	1496	1522	1560	1543	1587	1601	7

SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008.
Notes:
(1) All values represent an enrollment-weighted average of degree-granting, public institutions within each state. Each value is then indexed to year 2000 dollars using the Bureau of Labor Statistics CPI-U.
(2) The Community College of the District of Columbia was not established until after the time period analyzed. Thus, there were no appropriate 2-year tuition costs for residents of the District of Columbia.

Table B.10: Published Price for Military Spouses at 2-Year Public Institutions

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	Number of Schools
Alabama	271	271	1819	342	2039	2138	376	390	417	27
Alaska	1994	1914	1924	1875	1804	1899	2323	2394	2480	2
Arizona	891	762	2767	3004	2972	2998	3015	3120	1069	21
Arkansas	1286	1311	1381	1428	1637	1604	1550	1585	1555	22
California	327	304	292	285	416	591	556	513	435	113
Colorado	1834	1640	1610	1598	1650	1602	1655	1594	1593	15
Connecticut	5460	5454	5487	6067	6098	6188	6205	6427	6423	12
Delaware	1616	1585	1666	1654	1693	1724	1743	1788	1795	3
District of Columbia	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
Florida	1295	1279	1323	1285	1372	1370	1390	1451	1349	20
Georgia	2907	2853	2801	2814	1142	1133	1211	1247	1320	48
Hawaii	1052	1008	990	944	953	961	953	1055	1129	6
Idaho	2209	2143	2179	2197	2231	2262	2221	2234	2178	3
Illinois	4699	4776	4593	4549	4550	4754	4428	4585	4607	48
Indiana	3705	3635	3730	3976	4020	4024	4028	4111	2032	14
Iowa	2015	1975	2145	2208	2281	2346	2360	2333	2353	16
Kansas	2936	2734	2723	2753	2829	2817	2746	2733	1583	24
Kentucky	1126	1146	1349	1532	1911	2066	1838	1984	1998	16
Louisiana	813	885	900	975	1056	1109	1145	1154	1158	34
Maine	2431	2539	2527	2393	2333	2282	2327	2319	2387	7
Maryland	3908	3832	3856	3803	3941	3899	3892	3903	3822	16
Massachusetts	7020	6919	6545	6711	6575	6377	6139	5647	5792	16
Michigan	2999	2943	3056	2864	3084	3066	3172	3302	3267	30
Minnesota	2353	2373	2554	2700	2911	3136	3146	3264	3251	31
Mississippi	978	988	1147	1192	1178	1214	1266	1260	1223	15
Missouri	1882	1881	1915	2175	2292	2427	2373	2356	2512	21
Montana	2229	2110	2215	2480	2607	2505	2400	2435	2378	12
Nebraska	1350	1326	1366	1369	1401	1429	1456	1493	1523	8
Nevada	1230	1316	1333	1308	1306	1300	1277	1282	1271	1
New Hampshire	3662	3700	3938	3879	4036	4366	4257	4224	4260	7
New Jersey	3360	3202	3215	3163	3230	3248	3259	3351	3356	19
New Mexico	926	926	943	933	928	1000	1034	1048	1055	20
New York	2753	2635	2542	2587	2590	2609	2567	2588	2571	35
North Carolina	781	844	928	972	971	1007	1000	967	989	59
North Dakota	1909	1837	1873	1998	2160	2477	2502	2628	2772	6
Ohio	2495	2204	2253	2348	2443	2536	2537	2546	2433	30
Oklahoma	1333	1153	1250	1290	1449	1603	1630	1687	1686	12
Oregon	1505	1525	1577	1723	2077	2175	2156	2170	2063	17
Pennsylvania	4217	4106	4070	3980	4040	4288	4357	4363	4177	21
Rhode Island	1746	1704	1716	1774	1802	1889	1922	2032	2051	1
South Carolina	3702	3813	3948	4327	4866	4881	4829	4946	4887	20
South Dakota	2484	2483	2506	2406	2449	2401	2471	2495	2685	5
Tennessee	1320	1358	1515	1542	1764	1802	1863	1879	1912	13
Texas	1298	1280	1346	1393	1497	1539	1615	1668	1658	64
Utah	1537	1499	1576	1609	1674	1727	1685	1736	1782	7
Vermont	5510	5438	5558	6135	6061	6126	6165	6284	6299	1
Virginia	4614	4498	4484	4668	4979	4902	4854	1664	1682	24
Washington	1689	1656	1735	1815	1886	1932	1959	2013	2004	30
West Virginia	1655	1573	1553	1742	1848	1916	1948	1959	1938	11
Wisconsin	2145	2125	2149	2142	2165	2271	2299	2373	2394	17
Wyoming	1314	1331	1376	1363	1367	1368	1377	1381	1379	7

SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008.
Notes:
(1) All values represent an enrollment-weighted average of degree-granting, public institutions within each state. Each value is then indexed to year 2000 dollars using the Bureau of Labor Statistics CPI-U.
(2) The Community College of the District of Columbia was not established until after the time period analyzed. Thus, there were no appropriate 2-year tuition costs for residents of the District of Columbia.

Table B.11: Price Paid by Military Spouses at 4-Year Public Institutions

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	Number of Schools
Alabama	2999	3151	3345	3692	3986	4019	3981	4032	4390	14
Alaska	2940	2961	3004	3182	3430	3581	3763	3937	4003	3
Arizona	2347	2406	2458	3335	3709	3917	3991	4125	4471	3
Arkansas	2988	3231	3499	3723	3896	4074	4177	4487	4590	11
California	2503	2570	2573	3422	3810	3813	3711	3957	4138	36
Colorado	2970	3039	3129	3137	3273	3740	3742	4123	4307	13
Connecticut	11587	11186	11681	12432	13133	13295	13378	13393	13466	11
Delaware	4755	4863	5138	5711	6035	6248	6312	6483	6644	2
District of Columbia	2070	2002	1966	1925	1883	1828	2272	2604	2511	2
Florida	2034	2110	2128	2196	2349	2401	2402	2342	2524	20
Georgia	8484	8418	8811	9347	2883	3012	3074	3228	3344	26
Hawaii	2692	2671	2691	2724	2761	2766	3243	3719	4122	4
Idaho	2612	2748	2875	3082	3259	3457	3534	3632	3685	4
Illinois	4129	4362	4836	5177	5832	6252	6756	7359	7809	12
Indiana	10553	10527	11290	12077	12461	12627	12725	13022	5452	15
Iowa	3160	3359	3936	4641	4918	4963	5125	5158	5146	3
Kansas	8261	8189	8773	9232	9766	9996	9945	10322	4512	8
Kentucky	2924	3081	3238	3594	4102	4534	4949	5245	5458	8
Louisiana	2836	2724	2713	2946	3190	3235	3190	3161	3244	17
Maine	4238	4590	4360	4631	5020	5254	5504	5933	6327	8
Maryland	4533	4638	4946	5527	5722	5814	5645	5574	5453	14
Massachusetts	11053	10690	11860	11520	12939	12832	12677	12839	12699	14
Michigan	11176	11343	12133	12280	12693	13428	13725	14492	15000	15
Minnesota	4000	4337	4785	5353	5938	6143	6330	6330	6563	11
Mississippi	2929	3301	3525	3486	3623	3688	3790	3948	3958	9
Missouri	3964	4035	4427	5016	5327	5134	5395	5510	5538	13
Montana	3082	3358	3734	3865	4103	4369	4573	4490	4364	6
Nebraska	3093	3091	3486	3926	4242	4299	4398	4555	4682	7
Nevada	1826	1829	1854	1924	2049	2132	2175	2301	2603	6
New Hampshire	6308	6354	6642	6915	7182	7407	7597	7879	8068	5
New Jersey	5542	5820	6314	6779	7232	7616	7919	7635	7930	14
New Mexico	2545	2655	2760	2833	3111	3249	3333	3400	3486	8
New York	3758	3666	3684	4423	4346	4277	4147	4074	3974	45
North Carolina	2257	2509	2886	2977	3207	3194	3421	3556	3491	16
North Dakota	2819	2918	3112	3428	3924	4210	4405	4518	4577	8
Ohio	4572	4770	5412	5902	6996	7241	7433	6599	6355	31
Oklahoma	2097	2143	2305	2757	2977	3272	3442	3639	3938	17
Oregon	3636	3727	3812	4335	4686	4711	4753	4926	5037	9
Pennsylvania	5908	6091	6703	7065	7562	7694	7737	7954	8092	44
Rhode Island	4448	4494	4774	4955	5275	5522	5642	5854	6063	2
South Carolina	11074	11407	12806	14487	13065	13309	13627	14254	14619	13
South Dakota	3520	3603	3799	4049	4207	4303	4291	4590	4608	7
Tennessee	2940	3220	3400	3756	3919	4206	4258	4446	4541	9
Texas	2665	2738	2987	3171	3871	4054	4280	4487	4718	45
Utah	2193	2276	2469	2686	2885	3034	3185	3334	3362	7
Vermont	16328	16092	16420	16497	16783	16930	17003	17650	18067	5
Virginia	11982	11774	12572	13390	13571	13705	13899	5676	5901	15
Washington	3168	3238	3602	3807	3971	4108	4239	4375	4475	13
West Virginia	2594	2560	2754	2951	3248	3371	3456	3601	3731	12
Wisconsin	3284	3425	3608	4137	4571	4749	4877	5045	5153	14
Wyoming	2575	2714	2847	2873	2476	2538	2511	2480	2445	1

SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008.
Notes:
(1) All values represent an enrollment-weighted average of degree-granting, public institutions within each state. Each value is then indexed to year 2000 dollars using the Bureau of Labor Statistics CPI-U.
(2) The Community College of the District of Columbia was not established until after the time period analyzed. Thus, there were no appropriate 2-year tuition costs for residents of the District of Columbia.

Table B.12: Published Price for Military Spouses at 4-Year Public Institutions

State	2000	2001	2002	2003	2004	2005	2006	2007	2008	Number of Schools
Alabama	2803	2995	3176	3285	3621	3959	3906	3847	3938	14
Alaska	2793	2626	2909	2940	3113	3003	3272	3477	3600	3
Arizona	2262	2257	2364	2406	3260	3601	3774	3888	3993	3
Arkansas	2772	2840	3177	3415	3621	3805	3962	4258	4324	11
California	2494	2421	2524	2609	3346	3526	3674	3606	3833	36
Colorado	2760	2771	2838	2951	3175	3116	3581	3646	3988	13
Connecticut	11218	11018	11305	11864	12818	13716	13847	14272	14393	11
Delaware	4598	4598	4777	5084	5543	5812	5974	6144	6267	2
District of Columbia	2070	2002	1966	1925	1883	1828	1762	1791	2511	2
Florida	1890	1887	2017	2053	2149	2212	2259	2265	2196	20
Georgia	7987	8191	8449	8835	2736	2787	2891	2997	3254	26
Hawaii	2575	2500	2534	2616	2697	2713	2696	3138	3540	4
Idaho	2588	2688	2859	3007	3016	3164	3331	3443	3500	4
Illinois	3993	4022	4319	4827	5133	5698	6035	6650	7175	12
Indiana	10106	10152	10618	11708	12662	13013	13200	13460	5220	15
Iowa	2998	3056	3300	3854	4541	4775	4781	4993	4973	3
Kansas	8064	8299	8385	8824	9679	10199	10403	10584	4245	8
Kentucky	2713	2790	2970	3159	3500	4011	4368	4812	5061	8
Louisiana	2327	2535	2592	2577	2881	3078	3074	3071	3057	17
Maine	3884	4028	4221	4435	4684	4867	5055	5371	5745	8
Maryland	4491	4356	4653	4722	5236	5463	5570	5520	5378	14
Massachusetts	10894	10699	10899	10905	12008	13449	13432	13556	13580	14
Michigan	10737	10744	11332	12107	12966	13154	13955	14653	15569	15
Minnesota	3750	3868	4260	4711	5223	5822	5919	6114	6092	11
Mississippi	2873	2864	3248	3453	3415	3521	3555	3688	3976	9
Missouri	3620	3713	3826	4275	4817	5119	5132	5243	5263	13
Montana	2930	2943	3251	3620	3756	3901	4178	4339	4267	6
Nebraska	2938	2884	3019	3424	3846	4134	4214	4327	4435	7
Nevada	1674	1776	1818	1839	1899	2005	2072	2138	2391	6
New Hampshire	6069	6097	6240	6500	6763	6973	7136	7396	7597	5
New Jersey	5143	5387	5713	6177	6640	7001	7344	7145	7374	14
New Mexico	2264	2461	2607	2701	2767	2960	3127	3232	3273	8
New York	3666	3607	3599	3598	4266	4174	4087	4020	3956	45
North Carolina	2068	2218	2471	2822	2916	3127	3118	3370	3456	16
North Dakota	2702	2737	2867	3062	3354	3809	4047	4289	4335	8
Ohio	4356	4415	4679	5319	5812	6794	6992	7220	6391	31
Oklahoma	2001	1943	2044	2164	2852	3069	3263	3437	3642	17
Oregon	3538	3481	3662	3691	4198	4504	4485	4564	4729	9
Pennsylvania	5600	5665	5936	6564	6997	7341	7415	7564	7673	44
Rhode Island	4268	4301	4415	4674	4848	5121	5321	5524	5662	2
South Carolina	8457	8605	9287	10608	11981	12955	13799	14456	15074	13
South Dakota	3275	3401	3536	3699	3955	4076	4055	4304	4321	7
Tennessee	2681	2843	3163	3331	3661	3790	4052	4134	4287	9
Texas	2494	2632	2745	2956	3194	3800	4010	4223	4454	45
Utah	2114	2124	2236	2440	2628	2801	2927	3119	3175	7
Vermont	15834	15819	16202	16494	17055	17480	17620	18219	18726	5
Virginia	11623	11580	11810	12643	13629	14083	14302	5325	5460	15
Washington	2929	2934	3062	3486	3696	3834	3990	4149	4232	13
West Virginia	2453	2469	2514	2703	2900	3164	3264	3395	3462	12
Wisconsin	3188	3175	3347	3525	4048	4441	4576	4721	4862	14
Wyoming	2416	2490	2666	2787	2353	2403	2446	2915	2692	1

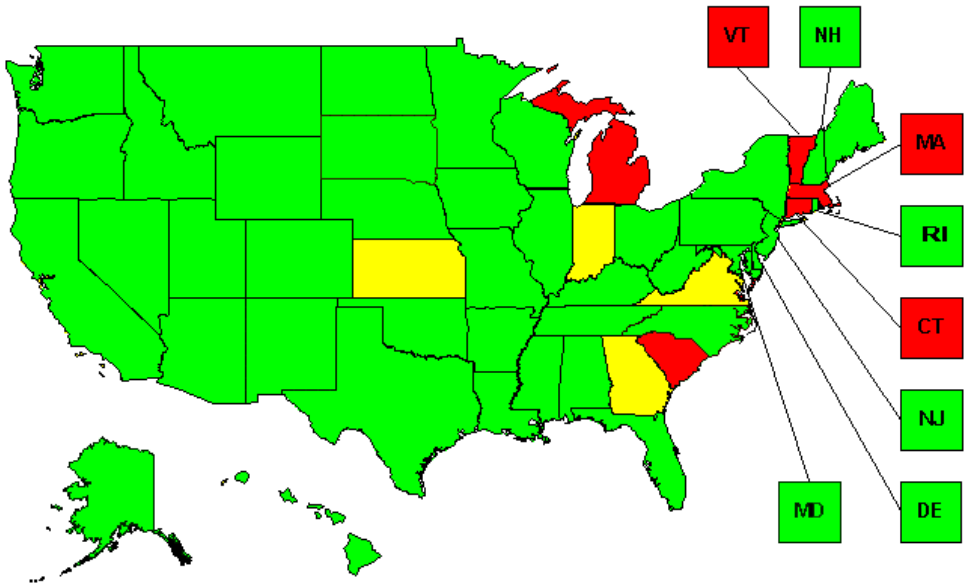
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008.
Notes:
(1) All values represent an enrollment-weighted average of degree-granting, public institutions within each state. Each value is then indexed to year 2000 dollars using the Bureau of Labor Statistics CPI-U.
(2) The Community College of the District of Columbia was not established until after the time period analyzed. Thus, there were no appropriate 2-year tuition costs for residents of the District of Columbia.

Table B.13: Military Spouses Exempted From Residency Requirements (2000-2008)

State	Always	Never	Sometimes	Year Began	State	Always	Never	Sometimes	Year Began
Alabama	X				Montana	X			
Alaska	X				Nebraska	X			
Arizona	X				Nevada	X			
Arkansas	X				New Hampshire	X			
California	X				New Jersey	X			
Colorado	X				New Mexico	X			
Connecticut		X			New York	X			
Delaware	X				North Carolina	X			
District of Columbia	X				North Dakota	X			
Florida	X				Ohio	X			
Georgia			X	2004	Oklahoma	X			
Hawaii	X				Oregon	X			
Idaho	X				Pennsylvania	X			
Illinois	X				Rhode Island	X			
Indiana			X	2008	South Carolina		X		
Iowa	X				South Dakota	X			
Kansas			X	2008	Tennessee	X			
Kentucky	X				Texas	X			
Louisiana	X				Utah	X			
Maine	X				Vermont		X		
Maryland	X				Virginia			X	2007
Massachusetts		X			Washington	X			
Michigan		X			West Virginia	X			
Minnesota	X				Wisconsin	X			
Mississippi	X				Wyoming	X			
Missouri	X								

Note: All states receiving federal funds for education are required to charge military spouses in-state tuition rates as of 2010.
SOURCE: Department of Defence, In-State Tuition State-By-State Summary, https://www.hrc.army.mil/SITE/Education/InState/index.htm

Figure B.3: In-State Tuition 2000-2008



Green: In-state rates apply
Yellow: State law changed during time period
Red: Out-of-state rates apply

Figure B.4: Mean Cost of Tuition and Fees Paid (2008)

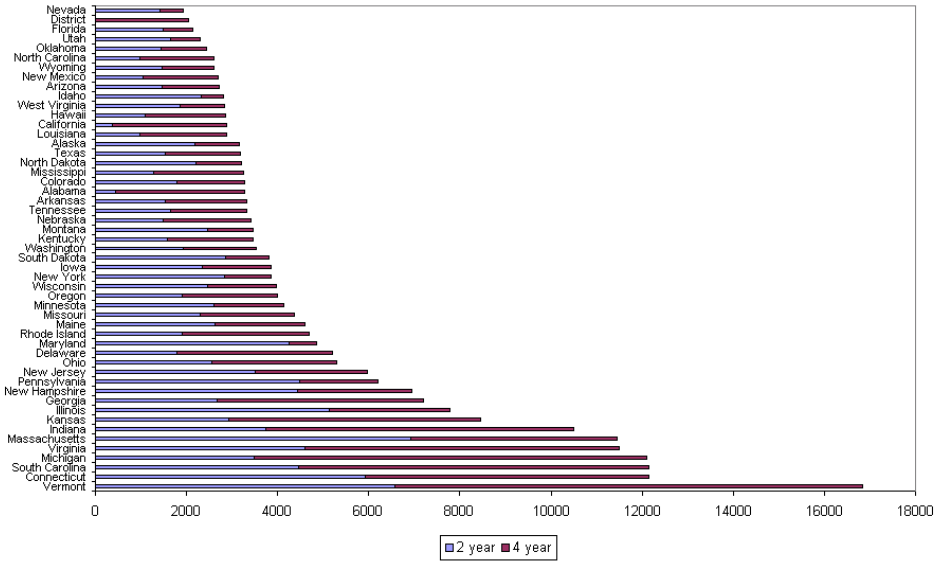


Figure B.5: Enrollment Rates of Military Spouses (2008)

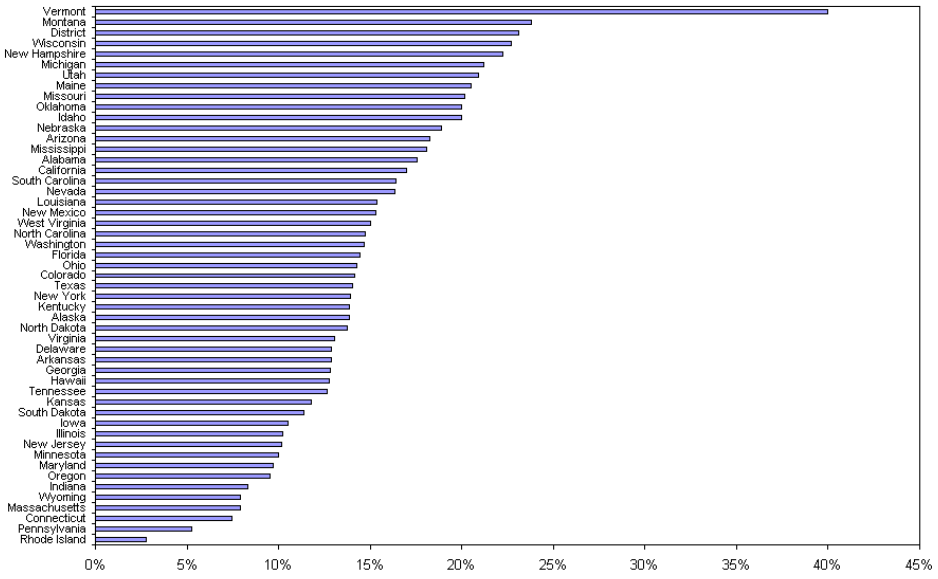


Table B.14: Effects of Average Price Paid on Attendance of 18- to 40-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.014**	-0.012*	-0.013*	-0.014**	-0.013**	-0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.015)
Four-Year Costs	0.003	0.004	0.004	0.004	0.003	-0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)
Other Household Income		0.000	0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age		-0.004	0.007	-0.001	-0.000	-0.001
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age^2		-0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.031	0.028	0.024	0.025	0.024
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
White		0.012	0.012	0.011	0.009	0.008
		(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Unemployment Rate		0.012**	0.012**	0.012**	0.003	0.015
		(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Newborn			-0.041***	-0.041***	-0.040***	-0.040**
			(0.012)	(0.012)	(0.012)	(0.012)
Number of Children Under 5			-0.036***	-0.035***	-0.036***	-0.036***
			(0.006)	(0.006)	(0.006)	(0.006)
Looking for Work			-0.004	-0.002	-0.005	-0.005
			(0.012)	(0.012)	(0.012)	(0.012)
Officer				-0.017	-0.013	-0.012
				(0.021)	(0.021)	(0.021)
Spouse- High School				-0.014	-0.017	-0.014
				(0.031)	(0.031)	(0.031)
Spouse- Some College				0.051	0.048	0.051
				(0.031)	(0.031)	(0.031)
Spouse- College Degree				0.059	0.056	0.057
				(0.032)	(0.032)	(0.032)
Spouse- Graduate Degree				0.071*	0.069*	0.072*
				(0.035)	(0.035)	(0.035)
Additional Controls						
Year					X	X
State						X
N	8288	8288	8288	8288	8288	8288
Adj. R^2	0.001	0.010	0.020	0.027	0.029	0.029

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.15: Effects of Average Price Paid on Attendance of 18- to 24-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.012	-0.012	-0.012	-0.014	-0.013	-0.013
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.027)
Four-Year Costs	0.002	0.006	0.006	0.007	0.004	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.012)
Other Household Income		-0.000	-0.000	-0.001	-0.001	-0.001*
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age		-0.040	-0.020	-0.036	-0.027	-0.029
		(0.100)	(0.099)	(0.099)	(0.099)	(0.099)
Age^2		0.001	0.001	0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male		0.002	-0.007	-0.001	0.006	0.001
		(0.034)	(0.034)	(0.033)	(0.033)	(0.034)
White		0.028	0.025	0.024	0.023	0.021
		(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Unemployment Rate		0.027***	0.026***	0.026***	0.013	0.033*
		(0.007)	(0.006)	(0.006)	(0.008)	(0.016)
Newborn			-0.069***	-0.075***	-0.076***	-0.072***
			(0.021)	(0.021)	(0.021)	(0.021)
Number of Children Under 5			-0.036**	-0.028*	-0.027*	-0.030*
			(0.012)	(0.012)	(0.012)	(0.012)
Looking for Work			-0.003	-0.000	-0.005	-0.002
			(0.019)	(0.019)	(0.019)	(0.019)
Officer				0.019	0.022	0.029
				(0.043)	(0.043)	(0.043)
Spouse- High School				-0.033	-0.030	-0.032
				(0.049)	(0.049)	(0.049)
Spouse- Some College				0.044	0.046	0.044
				(0.049)	(0.049)	(0.049)
Spouse- College Degree				0.098	0.103	0.099
				(0.056)	(0.056)	(0.056)
Spouse- Graduate Degree				0.210*	0.222*	0.206
				(0.106)	(0.106)	(0.107)
Additional Controls						
Year					X	X
State						X
N	2969	2969	2969	2969	2969	2969
Adj. R^2	0.000	0.005	0.020	0.031	0.035	0.037

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.16: Effects of Average Price Paid on Attendance of 25- to 40-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.013*	-0.013*	-0.013*	-0.014*	-0.014*	-0.000
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.019)
Four-Year Costs	0.002	0.003	0.003	0.003	0.002	-0.008
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.008)
Other Household Income		0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age		-0.008	-0.006	-0.008	-0.006	-0.004
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Age^2		0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.042*	0.041*	0.036*	0.036*	0.036*
		(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
White		0.004	0.004	0.003	0.002	0.003
		(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Unemployment Rate		0.002	0.003	0.002	-0.004	0.000
		(0.004)	(0.004)	(0.004)	(0.006)	(0.010)
Newborn			-0.016	-0.014	-0.014	-0.013
			(0.016)	(0.016)	(0.016)	(0.016)
Number of Children Under 5			-0.036***	-0.037***	-0.038***	-0.037***
			(0.007)	(0.007)	(0.007)	(0.007)
Looking for Work			-0.005	-0.004	-0.006	-0.006
			(0.015)	(0.015)	(0.015)	(0.015)
Officer				-0.032	-0.028	-0.030
				(0.023)	(0.023)	(0.023)
Spouse- High School				0.002	-0.003	0.003
				(0.041)	(0.041)	(0.041)
Spouse- Some College				0.056	0.050	0.057
				(0.040)	(0.040)	(0.040)
Spouse- College Degree				0.051	0.045	0.050
				(0.041)	(0.041)	(0.041)
Spouse- Graduate Degree				0.063	0.059	0.065
				(0.043)	(0.043)	(0.043)
Additional Controls						
Year					X	X
State						X
N	5319	5319	5319	5319	5319	5319
Adj. R^2	0.001	0.006	0.013	0.017	0.019	0.018

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.17: Effects of Average Price Paid on Attendance of 18- to 40-year-old Military Spouses Who Do Not Have an Associate's Degree

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.013*	-0.010*	-0.011*	-0.012*	-0.012*	-0.014
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.016)
Four-Year Costs	0.003	0.004	0.004	0.004	0.003	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.007)
Other Household Income		0.000	0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age		-0.013	-0.004	-0.010	-0.010	-0.011
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age^2		0.000	-0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.033*	0.031	0.026	0.027	0.025
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
White		-0.000	0.001	-0.001	-0.002	-0.002
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Unemployment Rate		0.013***	0.014***	0.013***	0.007	0.021*
		(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Newborn			-0.045***	-0.046***	-0.044***	-0.043***
			(0.013)	(0.013)	(0.013)	(0.013)
Number of Children Under 5			-0.029***	-0.029***	-0.030***	-0.029***
			(0.006)	(0.006)	(0.006)	(0.006)
Looking for Work			-0.004	-0.002	-0.004	-0.004
			(0.012)	(0.012)	(0.012)	(0.012)
Officer				-0.014	-0.012	-0.010
				(0.022)	(0.022)	(0.023)
Spouse- High School				-0.019	-0.020	-0.017
				(0.032)	(0.032)	(0.032)
Spouse- Some College				0.041	0.039	0.041
				(0.032)	(0.032)	(0.032)
Spouse- College Degree				0.056	0.053	0.055
				(0.034)	(0.034)	(0.034)
Spouse- Graduate Degree				0.069	0.067	0.071
				(0.037)	(0.037)	(0.037)
Additional Controls						
Year					X	X
State						X
N	6938	6938	6938	6938	6938	6938
Adj. R^2	0.001	0.010	0.019	0.025	0.028	0.027

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.18: Effects of Average Price Paid on Attendance of 18- to 40-year-old Military Spouses Who Have an Associate's Degree

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.018	-0.018	-0.019	-0.019	-0.019	0.059
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.045)
Four-Year Costs	0.001	0.001	0.000	0.001	-0.002	-0.045*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.019)
Other Household Income		-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age		-0.044	-0.025	-0.028	-0.029	-0.031
		(0.023)	(0.024)	(0.024)	(0.024)	(0.024)
Age^2		0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.039	0.035	0.040	0.039	0.043
		(0.050)	(0.049)	(0.050)	(0.050)	(0.051)
White		0.079*	0.074*	0.074*	0.072*	0.067
		(0.034)	(0.034)	(0.034)	(0.034)	(0.035)
Unemployment Rate		-0.009	-0.009	-0.009	-0.018	-0.017
		(0.010)	(0.010)	(0.010)	(0.013)	(0.024)
Newborn			-0.022	-0.017	-0.020	-0.019
			(0.038)	(0.038)	(0.038)	(0.039)
Number of Children Under 5			-0.048**	-0.049**	-0.045*	-0.054**
			(0.018)	(0.018)	(0.018)	(0.018)
Looking for Work			0.005	0.003	0.002	0.009
			(0.036)	(0.036)	(0.036)	(0.037)
Officer				-0.024	-0.016	-0.021
				(0.050)	(0.050)	(0.051)
Spouse- High School				0.027	0.019	0.031
				(0.099)	(0.099)	(0.100)
Spouse- Some College				0.090	0.082	0.091
				(0.096)	(0.096)	(0.097)
Spouse- College Degree				0.036	0.028	0.035
				(0.097)	(0.097)	(0.098)
Spouse- Graduate Degree				0.062	0.055	0.068
				(0.100)	(0.100)	(0.101)
Additional Controls						
Year					X	X
State						X
N	1350	1350	1350	1350	1350	1350
Adj. R^2	0.001	0.040	0.047	0.048	0.057	0.058

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.19: Effects of Average Published Price on Attendance of 18- to 40-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.015**	-0.013*	-0.014*	-0.015**	-0.015**	-0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.017)
Four-Year Costs	0.003	0.004	0.004	0.005	0.003	-0.004
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.007)
Other Household Income		0.000	0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age		-0.004	0.007	-0.001	-0.000	-0.001
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age^2		-0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.031	0.028	0.024	0.025	0.024
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
White		0.012	0.012	0.011	0.009	0.008
		(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Unemployment Rate		0.012**	0.012**	0.012**	0.004	0.015
		(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Newborn			-0.041***	-0.041***	-0.041***	-0.040**
			(0.012)	(0.012)	(0.012)	(0.012)
Number of Children Under 5			-0.036***	-0.035***	-0.036***	-0.036***
			(0.006)	(0.006)	(0.006)	(0.006)
Looking for Work			-0.005	-0.002	-0.005	-0.005
			(0.012)	(0.012)	(0.012)	(0.012)
Officer				-0.017	-0.013	-0.012
				(0.021)	(0.020)	(0.021)
Spouse- High School				-0.014	-0.017	-0.014
				(0.031)	(0.031)	(0.031)
Spouse- Some College				0.051	0.048	0.051
				(0.031)	(0.031)	(0.031)
Spouse- College Degree				0.059	0.055	0.057
				(0.032)	(0.032)	(0.032)
Spouse- Graduate Degree				0.071*	0.069*	0.073*
				(0.035)	(0.035)	(0.035)
Additional Controls						
Year					X	X
State						X
N	8288	8288	8288	8288	8288	8288
Adj. R^2	0.001	0.011	0.020	0.027	0.029	0.029

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.20: Effects of Average Published Price on Attendance of 18- to 24-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.013	-0.013	-0.013	-0.015	-0.015	-0.024
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.029)
Four-Year Costs	0.002	0.006	0.006	0.007	0.005	0.004
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.013)
Other Household Income		-0.000	-0.000	-0.001	-0.001	-0.001*
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age		-0.039	-0.019	-0.036	-0.026	-0.028
		(0.100)	(0.099)	(0.099)	(0.099)	(0.099)
Age^2		0.001	0.000	0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male		0.002	-0.007	-0.001	0.006	0.001
		(0.034)	(0.034)	(0.033)	(0.033)	(0.034)
White		0.028	0.025	0.024	0.023	0.022
		(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Unemployment Rate		0.027***	0.026***	0.026***	0.013	0.033*
		(0.007)	(0.007)	(0.007)	(0.008)	(0.016)
Newborn			-0.069***	-0.076***	-0.076***	-0.072***
			(0.021)	(0.021)	(0.021)	(0.021)
Number of Children Under 5			-0.036**	-0.028*	-0.027*	-0.030*
			(0.012)	(0.012)	(0.012)	(0.012)
Looking for Work			-0.004	-0.000	-0.005	-0.003
			(0.019)	(0.019)	(0.019)	(0.019)
Officer				0.019	0.021	0.028
				(0.043)	(0.043)	(0.043)
Spouse- High School				-0.033	-0.031	-0.032
				(0.049)	(0.049)	(0.049)
Spouse- Some College				0.044	0.045	0.044
				(0.049)	(0.049)	(0.049)
Spouse- college Degree				0.098	0.103	0.099
				(0.056)	(0.056)	(0.056)
Spouse- Graduate Degree				0.210*	0.221*	0.206
				(0.106)	(0.106)	(0.107)
Additional Controls						
Year					X	X
State						X
N	2969	2969	2969	2969	2969	2969
Adj. R^2	0.000	0.005	0.020	0.031	0.035	0.037

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.21: Effects of Average Published Price on Attendance of 25- to 40-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.014*	-0.014*	-0.015*	-0.015*	-0.015*	-0.000
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.021)
Four-Year Costs	0.003	0.003	0.003	0.004	0.003	-0.008
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.009)
Other Household Income		0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age		-0.008	-0.006	-0.008	-0.006	-0.004
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Age^2		0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.043*	0.041*	0.037*	0.036*	0.036*
		(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
White		0.004	0.004	0.003	0.002	0.003
		(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Unemployment Rate		0.002	0.002	0.002	-0.004	0.000
		(0.004)	(0.004)	(0.004)	(0.006)	(0.010)
Newborn			-0.016	-0.014	-0.014	-0.013
			(0.016)	(0.016)	(0.016)	(0.016)
Number of Children Under 5			-0.036***	-0.037***	-0.038***	-0.037***
			(0.007)	(0.007)	(0.007)	(0.007)
Looking for Work			-0.005	-0.004	-0.006	-0.006
			(0.015)	(0.015)	(0.015)	(0.015)
Officer				-0.032	-0.028	-0.030
				(0.023)	(0.023)	(0.023)
Spouse- High School				0.002	-0.003	0.003
				(0.041)	(0.041)	(0.041)
Spouse- Some College				0.056	0.050	0.057
				(0.040)	(0.040)	(0.040)
Spouse- College Degree				0.051	0.045	0.050
				(0.041)	(0.041)	(0.041)
Spouse- Graduate Degree				0.063	0.059	0.065
				(0.043)	(0.043)	(0.043)
Additional Controls						
Year					X	X
State						X
N	5319	5319	5319	5319	5319	5319
Adj. R^2	0.001	0.007	0.013	0.017	0.019	0.018

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.22: Effects of Average Published Price on Attendance of 18- to 40-year-old Military Spouses Who Do Not Have an Associate's Degree

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.013*	-0.010	-0.011*	-0.012*	-0.012*	-0.012
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.018)
Four-Year Costs	0.003	0.004	0.004	0.004	0.003	0.000
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.008)
Other Household Income		0.000	0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age		-0.013	-0.004	-0.010	-0.010	-0.011
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age^2		0.000	-0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.033*	0.031	0.026	0.027	0.025
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
White		-0.000	0.001	-0.001	-0.002	-0.002
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Unemployment Rate		0.014***	0.014***	0.013***	0.007	0.021*
		(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Newborn			-0.045***	-0.046***	-0.044***	-0.043***
			(0.013)	(0.013)	(0.013)	(0.013)
Number of Children Under 5			-0.029***	-0.029***	-0.029***	-0.029***
			(0.006)	(0.006)	(0.006)	(0.006)
Looking for Work			-0.004	-0.002	-0.004	-0.004
			(0.012)	(0.012)	(0.012)	(0.012)
Officer				-0.015	-0.012	-0.010
				(0.022)	(0.022)	(0.023)
Spouse- High School				-0.019	-0.020	-0.017
				(0.032)	(0.032)	(0.032)
Spouse- Some College				0.041	0.039	0.041
				(0.032)	(0.032)	(0.032)
Spouse- College Degree				0.056	0.053	0.055
				(0.034)	(0.034)	(0.034)
Spouse- Graduate Degree				0.069	0.067	0.071
				(0.037)	(0.037)	(0.037)
Additional Controls						
Year					X	X
State						X
N	6938	6938	6938	6938	6938	6938
Adj. R^2	0.001	0.010	0.019	0.025	0.028	0.027

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.23: Effects of Average Published Price on Attendance of 18- to 40-year-old Military Spouses Who Have an Associate's Degree

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.026	-0.026	-0.027	-0.027	-0.028	0.028
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.050)
Four-Year Costs	0.004	0.003	0.003	0.004	0.001	-0.033
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.022)
Other Household Income		-0.000	-0.000	-0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age		-0.043	-0.025	-0.028	-0.029	-0.032
		(0.023)	(0.024)	(0.024)	(0.024)	(0.024)
Age^2		0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.039	0.035	0.041	0.040	0.042
		(0.050)	(0.049)	(0.050)	(0.050)	(0.051)
White		0.080*	0.074*	0.075*	0.073*	0.067
		(0.034)	(0.034)	(0.034)	(0.034)	(0.035)
Unemployment Rate		-0.010	-0.010	-0.009	-0.018	-0.016
		(0.010)	(0.010)	(0.010)	(0.013)	(0.024)
Newborn			-0.022	-0.016	-0.020	-0.020
			(0.038)	(0.038)	(0.038)	(0.039)
Number of Children Under 5			-0.049**	-0.049**	-0.045*	-0.054**
			(0.018)	(0.018)	(0.018)	(0.018)
Looking for Work			0.005	0.003	0.002	0.008
			(0.036)	(0.036)	(0.036)	(0.037)
Officer				-0.024	-0.016	-0.021
				(0.050)	(0.050)	(0.051)
Spouse- High School				0.028	0.020	0.034
				(0.099)	(0.099)	(0.100)
Spouse- Some College				0.091	0.084	0.092
				(0.096)	(0.096)	(0.097)
Spouse- College Degree				0.038	0.030	0.036
				(0.097)	(0.097)	(0.098)
Spouse- Graduate Degree				0.063	0.057	0.069
				(0.100)	(0.100)	(0.102)
Additional Controls						
Year					X	X
State						X
N	1350	1350	1350	1350	1350	1350
Adj. R^2	0.002	0.041	0.048	0.049	0.058	0.056

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.24: Effects of Log of Average Price Paid on Attendance of 18- to 40-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.018*	-0.015	-0.015*	-0.016*	-0.017*	0.003
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.035)
Four-Year Costs	0.004	0.008	0.010	0.011	0.001	-0.044
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.037)
Other Household Income		0.014	0.015	0.006	0.001	0.003
		(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Age		-0.005	0.005	-0.001	-0.000	-0.001
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age^2		-0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.036*	0.033*	0.028	0.028	0.028
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
White		0.013	0.013	0.012	0.011	0.009
		(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Unemployment Rate		0.011**	0.011**	0.011**	0.002	0.014
		(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Newborn			-0.042***	-0.042***	-0.041***	-0.040**
			(0.012)	(0.012)	(0.012)	(0.012)
Number of Children Under 5			-0.036***	-0.035***	-0.035***	-0.036***
			(0.006)	(0.006)	(0.006)	(0.006)
Looking for Work			-0.003	-0.001	-0.004	-0.004
			(0.012)	(0.012)	(0.012)	(0.012)
Officer				-0.016	-0.012	-0.012
				(0.021)	(0.021)	(0.021)
Spouse- High School				-0.009	-0.011	-0.008
				(0.031)	(0.031)	(0.031)
Spouse- Some College				0.056	0.054	0.057
				(0.030)	(0.030)	(0.031)
Spouse- College Degree				0.059	0.057	0.058
				(0.032)	(0.032)	(0.032)
Spouse- Graduate Degree				0.069*	0.068	0.070*
				(0.035)	(0.035)	(0.035)
Additional Controls						
Year					X	X
State						X
N	8288	8242	8242	8242	8242	8242
Adj. R^2	0.001	0.011	0.021	0.027	0.029	0.029

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.25: Effects of Log of Average Price Paid on Attendance of 18- to 24-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.018	-0.011	-0.010	-0.013	-0.015	-0.029
	(0.014)	(0.015)	(0.014)	(0.014)	(0.014)	(0.059)
Four-Year Costs	0.009	0.018	0.015	0.019	0.004	-0.011
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.064)
Other Household Income		0.006	0.007	-0.004	-0.013	-0.011
		(0.015)	(0.014)	(0.015)	(0.015)	(0.015)
Age		-0.039	-0.020	-0.036	-0.028	-0.032
		(0.100)	(0.100)	(0.099)	(0.099)	(0.100)
Age^2		0.001	0.000	0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male		0.006	-0.004	0.002	0.008	0.004
		(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
White		0.031	0.028	0.027	0.026	0.024
		(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Unemployment Rate		0.026***	0.025***	0.024***	0.011	0.032*
		(0.006)	(0.006)	(0.006)	(0.008)	(0.016)
Newborn			-0.070***	-0.077***	-0.077***	-0.072***
			(0.021)	(0.021)	(0.021)	(0.021)
Number of Children Under 5			-0.037**	-0.029*	-0.027*	-0.030*
			(0.012)	(0.012)	(0.012)	(0.012)
Looking for Work			-0.002	0.001	-0.004	-0.002
			(0.019)	(0.019)	(0.019)	(0.019)
Officer				0.021	0.024	0.031
				(0.043)	(0.043)	(0.043)
Spouse- High School				-0.024	-0.020	-0.021
				(0.049)	(0.049)	(0.049)
Spouse- Some College				0.053	0.057	0.055
				(0.049)	(0.048)	(0.049)
Spouse- College Degree				0.102	0.109	0.105
				(0.056)	(0.056)	(0.056)
Spouse- Graduate Degree				0.211*	0.224*	0.206
				(0.106)	(0.106)	(0.107)
Additional Controls						
Year					X	X
State						X
N	2969	2952	2952	2952	2952	2952
Adj. R^2	-0.000	0.004	0.020	0.030	0.035	0.036

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.26: Effects of Log of Average Price Paid on Attendance of 25- to 40-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.017	-0.017	-0.018*	-0.018*	-0.019*	0.006
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.045)
Four-Year Costs	0.001	0.003	0.005	0.006	-0.003	-0.051
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.046)
Other Household Income		0.018	0.018	0.015	0.011	0.012
		(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
Age		-0.007	-0.005	-0.007	-0.004	-0.002
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Age^2		0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.048**	0.047**	0.041*	0.041*	0.041*
		(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
White		0.004	0.004	0.003	0.002	0.003
		(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Unemployment Rate		0.002	0.003	0.002	-0.005	-0.001
		(0.004)	(0.004)	(0.004)	(0.005)	(0.010)
Newborn			-0.016	-0.014	-0.014	-0.014
			(0.016)	(0.016)	(0.016)	(0.016)
Number of Children Under 5			-0.035***	-0.036***	-0.037***	-0.037***
			(0.007)	(0.007)	(0.007)	(0.007)
Looking for Work			-0.003	-0.003	-0.005	-0.005
			(0.015)	(0.015)	(0.015)	(0.015)
Officer				-0.031	-0.027	-0.030
				(0.023)	(0.023)	(0.023)
Spouse- High School				0.007	0.002	0.007
				(0.041)	(0.041)	(0.041)
Spouse- Some College				0.060	0.055	0.060
				(0.040)	(0.040)	(0.040)
Spouse- College Degree				0.050	0.045	0.050
				(0.041)	(0.041)	(0.041)
Spouse- Graduate Degree				0.061	0.057	0.064
				(0.043)	(0.043)	(0.043)
Additional Controls						
Year					X	X
State						X
N	5319	5290	5290	5290	5290	5290
Adj. R^2	0.001	0.007	0.014	0.017	0.019	0.018

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.27: Effects of Log of Average Price Paid on Attendance of 18- to 40-year-old Military Spouses Who Do Not Have an Associate's Degree

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.019*	-0.014	-0.014	-0.015	-0.016*	-0.056
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.038)
Four-Year Costs	0.007	0.011	0.013	0.013	0.006	0.023
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.040)
Other Household Income		0.015	0.016*	0.007	0.002	0.003
		(0.008)	(0.008)	(0.009)	(0.009)	(0.009)
Age		-0.014	-0.005	-0.011	-0.010	-0.011
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age^2		0.000	-0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.037*	0.035*	0.029	0.030	0.028
		(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
White		0.001	0.002	0.000	-0.001	-0.001
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Unemployment Rate		0.013***	0.013***	0.013***	0.006	0.021*
		(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Newborn			-0.046***	-0.046***	-0.045***	-0.044***
			(0.013)	(0.013)	(0.013)	(0.013)
Number of Children Under 5			-0.029***	-0.029***	-0.029***	-0.029***
			(0.006)	(0.006)	(0.006)	(0.006)
Looking for Work			-0.002	-0.001	-0.003	-0.003
			(0.012)	(0.012)	(0.012)	(0.012)
Officer				-0.014	-0.011	-0.009
				(0.022)	(0.022)	(0.023)
Spouse- High School				-0.014	-0.014	-0.012
				(0.032)	(0.032)	(0.032)
Spouse- Some College				0.045	0.044	0.046
				(0.032)	(0.031)	(0.032)
Spouse- College Degree				0.055	0.053	0.055
				(0.034)	(0.034)	(0.034)
Spouse- Graduate Degree				0.066	0.064	0.067
				(0.037)	(0.037)	(0.037)
Additional Controls						
Year					X	X
State						X
N	6938	6899	6899	6899	6899	6899
Adj. R^2	0.001	0.011	0.020	0.025	0.028	0.028

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.28: Effects of Log of Average Price Paid on Attendance of 18- to 40-year-old Military Spouses Who Have an Associate's Degree

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.018	-0.023	-0.024	-0.026	-0.026	0.251**
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.094)
Four-Year Costs	-0.014	-0.014	-0.016	-0.014	-0.034	-0.372***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.031)	(0.101)
Other Household Income		-0.015	-0.018	-0.004	-0.007	0.008
		(0.023)	(0.023)	(0.026)	(0.026)	(0.027)
Age		-0.040	-0.023	-0.027	-0.027	-0.029
		(0.023)	(0.024)	(0.024)	(0.024)	(0.025)
Age^2		0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.047	0.041	0.049	0.048	0.057
		(0.050)	(0.050)	(0.051)	(0.051)	(0.052)
White		0.079*	0.074*	0.075*	0.073*	0.065
		(0.034)	(0.034)	(0.035)	(0.034)	(0.035)
Unemployment Rate		-0.009	-0.009	-0.009	-0.020	-0.020
		(0.010)	(0.010)	(0.010)	(0.013)	(0.024)
Newborn			-0.024	-0.019	-0.022	-0.019
			(0.038)	(0.038)	(0.038)	(0.039)
Number of Children Under 5			-0.047**	-0.047**	-0.043*	-0.050**
			(0.018)	(0.018)	(0.018)	(0.018)
Looking for Work			0.006	0.003	0.002	0.008
			(0.036)	(0.036)	(0.036)	(0.037)
Officer				-0.024	-0.016	-0.023
				(0.050)	(0.050)	(0.051)
Spouse- High School				0.031	0.025	0.051
				(0.098)	(0.098)	(0.099)
Spouse- Some College				0.095	0.090	0.108
				(0.096)	(0.095)	(0.096)
Spouse- College Degree				0.040	0.034	0.048
				(0.097)	(0.097)	(0.098)
Spouse- Graduate Degree				0.065	0.060	0.079
				(0.100)	(0.100)	(0.101)
Additional Controls						
Year					X	X
State						X
N	1350	1343	1343	1343	1343	1343
Adj. R^2	0.001	0.040	0.046	0.047	0.057	0.062

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.29: Effects of Log of Average Published Price on Attendance of 18- to 40-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.019*	-0.016*	-0.016*	-0.017*	-0.019*	-0.011
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.033)
Four-Year Costs	0.005	0.009	0.010	0.012	0.002	-0.029
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.037)
Other Household Income		0.014	0.015	0.006	0.001	0.003
		(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Age		-0.005	0.005	-0.001	-0.000	-0.001
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age^2		-0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.036*	0.033*	0.028	0.028	0.028
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
White		0.013	0.013	0.012	0.011	0.009
		(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Unemployment Rate		0.011**	0.011**	0.011**	0.002	0.014
		(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Newborn			-0.042***	-0.042***	-0.041***	-0.040**
			(0.012)	(0.012)	(0.012)	(0.012)
Number of Children Under 5			-0.036***	-0.035***	-0.035***	-0.036***
			(0.006)	(0.006)	(0.006)	(0.006)
Looking for Work			-0.003	-0.001	-0.004	-0.004
			(0.012)	(0.012)	(0.012)	(0.012)
Officer				-0.016	-0.012	-0.012
				(0.021)	(0.021)	(0.021)
Spouse- High School				-0.009	-0.011	-0.008
				(0.031)	(0.031)	(0.031)
Spouse- Some College				0.056	0.054	0.057
				(0.030)	(0.030)	(0.031)
Spouse- College Degree				0.059	0.057	0.058
				(0.032)	(0.032)	(0.032)
Spouse- Graduate Degree				0.069*	0.068	0.070*
				(0.035)	(0.035)	(0.035)
Additional Controls						
Year					X	X
State						X
N	8288	8242	8242	8242	8242	8242
Adj. R^2	0.001	0.011	0.021	0.027	0.030	0.029

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.30: Effects of Log of Average Published Price on Attendance of 18- to 24-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.016	-0.010	-0.008	-0.011	-0.014	-0.018
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.059)
Four-Year Costs	0.007	0.017	0.014	0.018	0.003	-0.013
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.065)
Other Household Income		0.006	0.007	-0.004	-0.013	-0.011
		(0.015)	(0.014)	(0.015)	(0.015)	(0.015)
Age		-0.039	-0.020	-0.036	-0.028	-0.030
		(0.100)	(0.100)	(0.099)	(0.099)	(0.100)
Age^2		0.001	0.000	0.001	0.001	0.001
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male		0.006	-0.004	0.002	0.008	0.004
		(0.034)	(0.034)	(0.034)	(0.034)	(0.034)
White		0.031	0.028	0.027	0.026	0.024
		(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Unemployment Rate		0.026***	0.025***	0.024***	0.012	0.033*
		(0.006)	(0.006)	(0.006)	(0.008)	(0.016)
Newborn			-0.070***	-0.077***	-0.077***	-0.072***
			(0.021)	(0.021)	(0.021)	(0.021)
Number of Children Under 5			-0.037**	-0.028*	-0.027*	-0.030*
			(0.012)	(0.012)	(0.012)	(0.012)
Looking for Work			-0.003	0.000	-0.004	-0.002
			(0.019)	(0.019)	(0.019)	(0.019)
Officer				0.021	0.024	0.031
				(0.043)	(0.043)	(0.043)
Spouse- High School				-0.024	-0.020	-0.021
				(0.049)	(0.049)	(0.049)
Spouse- Some College				0.053	0.057	0.056
				(0.049)	(0.048)	(0.049)
Spouse- College Degree				0.102	0.109	0.105
				(0.056)	(0.056)	(0.056)
Spouse- Graduate Degree				0.211*	0.224*	0.207
				(0.106)	(0.106)	(0.107)
Additional Controls						
Year					X	X
State						X
N	2969	2952	2952	2952	2952	2952
Adj. R^2	-0.000	0.004	0.019	0.030	0.035	0.036

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.31: Effects of Log of Average Published Price on Attendance of 25- to 40-year-old Military Spouses

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.019*	-0.020*	-0.020*	-0.020*	-0.022*	-0.023
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.041)
Four-Year Costs	0.003	0.005	0.007	0.007	-0.000	-0.026
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.045)
Other Household Income		0.018	0.019*	0.015	0.011	0.012
		(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
Age		-0.007	-0.005	-0.007	-0.004	-0.002
		(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Age^2		0.000	-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.049**	0.047**	0.042*	0.041*	0.041*
		(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
White		0.004	0.005	0.003	0.002	0.003
		(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Unemployment Rate		0.002	0.002	0.002	-0.005	-0.001
		(0.004)	(0.004)	(0.004)	(0.005)	(0.010)
Newborn			-0.016	-0.014	-0.014	-0.014
			(0.016)	(0.016)	(0.016)	(0.016)
Number of Children Under 5			-0.035***	-0.036***	-0.037***	-0.037***
			(0.007)	(0.007)	(0.007)	(0.007)
Looking for Work			-0.003	-0.003	-0.005	-0.006
			(0.015)	(0.015)	(0.015)	(0.015)
Officer				-0.031	-0.027	-0.030
				(0.023)	(0.023)	(0.023)
Spouse- High School				0.007	0.002	0.007
				(0.041)	(0.041)	(0.041)
Spouse- Some College				0.060	0.055	0.060
				(0.040)	(0.040)	(0.040)
Spouse- College Degree				0.050	0.045	0.050
				(0.041)	(0.041)	(0.041)
Spouse- Graduate Degree				0.061	0.057	0.064
				(0.043)	(0.043)	(0.043)
Additional Controls						
Year					X	X
State						X
N	5319	5290	5290	5290	5290	5290
Adj. R^2	0.001	0.007	0.014	0.017	0.019	0.018

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.32: Effects of Log of Average Published Price on Attendance of 18- to 40-year-old Military Spouses Who Do Not Have an Associate's Degree

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.019*	-0.014	-0.014	-0.015	-0.016*	-0.054
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.035)
Four-Year Costs	0.007	0.011	0.012	0.013	0.006	0.024
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.039)
Other Household Income		0.015	0.016*	0.007	0.002	0.003
		(0.008)	(0.008)	(0.009)	(0.009)	(0.009)
Age		-0.014	-0.005	-0.011	-0.010	-0.011
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Age^2		0.000	-0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.037*	0.035*	0.029	0.030	0.029
		(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
White		0.001	0.002	0.000	-0.001	-0.001
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Unemployment Rate		0.013***	0.013***	0.013***	0.006	0.020*
		(0.004)	(0.004)	(0.004)	(0.005)	(0.009)
Newborn			-0.046***	-0.046***	-0.045***	-0.044***
			(0.013)	(0.013)	(0.013)	(0.013)
Number of Children Under 5			-0.029***	-0.029***	-0.029***	-0.029***
			(0.006)	(0.006)	(0.006)	(0.006)
Looking for Work			-0.002	-0.001	-0.003	-0.003
			(0.012)	(0.012)	(0.012)	(0.012)
Officer				-0.014	-0.011	-0.009
				(0.022)	(0.022)	(0.023)
Spouse- High School				-0.014	-0.014	-0.012
				(0.032)	(0.032)	(0.032)
Spouse- Some College				0.045	0.044	0.046
				(0.032)	(0.031)	(0.032)
Spouse- College Degree				0.055	0.053	0.055
				(0.034)	(0.034)	(0.034)
Spouse- Graduate Degree				0.066	0.064	0.068
				(0.037)	(0.037)	(0.037)
Additional Controls						
Year					X	X
State						X
N	6938	6899	6899	6899	6899	6899
Adj. R^2	0.001	0.011	0.020	0.025	0.028	0.028

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

Table B.33: Effects of Log of Average Published Price on Attendance of 18- to 40-year-old Military Spouses Who Have an Associate's Degree

	(1)	(2)	(3)	(4)	(5)	(6)
Two-Year Costs	-0.025	-0.030	-0.031	-0.033	-0.033	0.216*
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.096)
Four-Year Costs	-0.007	-0.007	-0.008	-0.006	-0.026	-0.337**
	(0.030)	(0.030)	(0.030)	(0.030)	(0.031)	(0.107)
Other Household Income		-0.015	-0.018	-0.004	-0.007	0.008
		(0.023)	(0.023)	(0.026)	(0.026)	(0.027)
Age		-0.040	-0.022	-0.027	-0.027	-0.031
		(0.023)	(0.024)	(0.024)	(0.024)	(0.025)
Age^2		0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male		0.047	0.041	0.049	0.048	0.055
		(0.050)	(0.050)	(0.051)	(0.051)	(0.052)
White		0.079*	0.074*	0.075*	0.073*	0.066
		(0.034)	(0.034)	(0.035)	(0.034)	(0.035)
Unemployment Rate		-0.010	-0.010	-0.009	-0.020	-0.020
		(0.010)	(0.010)	(0.010)	(0.013)	(0.024)
Newborn			-0.024	-0.018	-0.021	-0.019
			(0.038)	(0.038)	(0.038)	(0.039)
Number of Children Under 5			-0.047**	-0.047**	-0.044*	-0.051**
			(0.018)	(0.018)	(0.018)	(0.018)
Looking for Work			0.006	0.003	0.002	0.010
			(0.036)	(0.036)	(0.036)	(0.037)
Officer				-0.025	-0.016	-0.022
				(0.050)	(0.050)	(0.051)
Spouse- High School				0.031	0.026	0.052
				(0.098)	(0.098)	(0.099)
Spouse- Some College				0.096	0.092	0.108
				(0.096)	(0.095)	(0.097)
Spouse- College Degree				0.042	0.035	0.048
				(0.097)	(0.097)	(0.098)
Spouse- Graduate Degree				0.066	0.061	0.079
				(0.100)	(0.100)	(0.101)
Additional Controls						
Year					X	X
State						X
N	1350	1343	1343	1343	1343	1343
Adj. R^2	0.001	0.040	0.046	0.048	0.057	0.060

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
SOURCE: Author's calculations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2000-2008, U.S. Census Bureau, Integrated Public Use Microdata Series (IPUMS), 2000 5% sample and 2000-2008 ACS samples and U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index and Unemployment Data.

C.7 Appendix C

Tables C.34 and C.35 provide summary statistics for the cohorts organized by year recruited. These tables vary slightly from the summary statistics in the main body of the report, which are broken out by tax status, because those who were recruited in 2004 but waited until after January 5, 2005, to sign their initial contract are in the "taxed but did not know at time of signing" group. These tables show that the differences between 2004 and 2005 and 2006 are not as stark, supporting the assumption that the industry stabilized by 2004. However, this does not strengthen the assumption that there were no unobserved differences between the baseline group and the group that was taxed but did not know about it when they signed with the firm.

Table C.34: Summary Statistics for All Employees by Year Recruited

	2004		2005 - 2006		2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	142.57	349.59	150.50	364.59	158.52	435.45
Age When Recruited by Firm	21.17	1.55	21.06	1.59	21.19	1.52
Fraction High School Seniors	0.15	0.36	0.15	0.36	0.17	0.37
Fraction From Junior College	0.15	0.36	0.17	0.37	0.11	0.31
Fraction College Fr. or So.	0.01	0.11	0.01	0.09	0.01	0.11
Fraction 4-Year College Junior	0.29	0.45	0.30	0.46	0.33	0.47
Fraction 4-Year College Senior	0.39	0.49	0.37	0.48	0.38	0.49
Fraction With a CSP	0.57	0.50	0.60	0.49	0.62	0.49
Observations	854		1653		4587	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically who signed with the firm between 2004 and 2011 with at least a high school degree.
(1) All monetary values are indexed to year 2000 dollars.

Table C.35: Summary Statistics for Employees With CSPs by Year Recruited

	2004		2005 - 2006		2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	237.05	416.71	241.59	446.03	249.40	529.47
Age When Recruited by Firm	20.37	1.45	20.32	1.48	20.48	1.41
Fraction High School Senior	0.26	0.44	0.24	0.43	0.26	0.44
Fraction From Junior College	0.22	0.41	0.23	0.42	0.16	0.36
Fraction College Fr. or So.	0.02	0.13	0.01	0.11	0.02	0.14
Fraction 4-Year College Juniors	0.44	0.50	0.45	0.50	0.49	0.50
Fraction 4-Year College Seniors	0.07	0.26	0.07	0.26	0.07	0.26
Number of Semesters in CSP	4.49	2.38	4.45	2.34	4.29	2.44
CSP Funds Per Semester[1]	6753.61	4303.41	6757.84	4168.21	8743.17	5384.64
Total Value of CSP[1]	30175.34	27682.77	29219.97	24029.98	37380.44	32813.00
Proportion of Signing Bonus Taken as CSP Funds	0.29	0.22	0.26	0.19	0.29	0.20
Observations	485		993		2843	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically, who signed with the firm between 2004 and 2011, with at least a high school degree, and had a CSP included in their initial contract. The total value of a CSP is calculated by the amount of money available per semester, multiplied by the number of semesters specified in the contract. The proportion of the signing bonus taken is CSP funds is equal to the total value of CSP funds divided by the sum of CSP funds and the cash signing bonus.
(1) All monetary values are indexed to year 2000 dollars.

Tables C.36 through C.43 provide summary statistics for the cohorts organized by rank group and tax status.

Table C.36: Summary Statistics for Employees in Rank Group 1 by Tax Status

	2004		2005 - 2006		2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	875.59	556.88	957.55	741.50	1044.66	1006.00
Age When Recruited by Firm	20.23	1.40	20.15	1.49	19.94	1.50
Fraction High School Seniors	0.36	0.48	0.40	0.49	0.46	0.50
Fraction From Junior College	0.05	0.22	0.03	0.18	0.03	0.16
Fraction College Fr. or So.	0.02	0.15	0.00	0.00	0.02	0.13
Fraction 4-Year College Junior	0.54	0.50	0.53	0.50	0.47	0.50
Fraction 4-Year College Senior	0.02	0.15	0.03	0.17	0.03	0.17
Fraction With a CSP	0.99	0.11	0.97	0.18	0.99	0.12
Observations	83		172		420	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically who signed with the firm between 2004 and 2011 with at least a high school degree who were ranked 90 of higher in the year they were recruited.
(1) All monetary values are indexed to year 2000 dollars.

Table C.37: Summary Statistics for Employees in Rank Group 2 by Tax Status

	2004		2005 - 2006		2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	147.71	182.15	143.55	121.91	192.57	215.43
Age When Recruited by Firm	20.76	1.59	20.75	1.57	20.62	1.44
Fraction High School Seniors	0.27	0.45	0.24	0.43	0.24	0.43
Fraction From Junior College	0.10	0.30	0.09	0.29	0.11	0.31
Fraction College Fr. or So.	0.01	0.10	0.01	0.11	0.02	0.13
Fraction 4-Year College Junior	0.39	0.49	0.42	0.49	0.48	0.50
Fraction 4-Year College Senior	0.23	0.42	0.23	0.42	0.15	0.36
Fraction With a CSP	0.81	0.39	0.82	0.38	0.89	0.31
Observations	185		379		907	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically who signed with the firm between 2004 and 2011 with at least a high school degree who were ranked between 90 and 300 in the year they were recruited.
(1) All monetary values are indexed to year 2000 dollars.

Table C.38: Summary Statistics for Employees in Rank Group 3 by Tax Status

	2004		2005 - 2006		2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	40.90	148.09	49.52	110.34	62.85	115.68
Age When Recruited by Firm	21.41	1.39	21.10	1.52	21.15	1.44
Fraction High School Seniors	0.12	0.33	0.13	0.34	0.16	0.37
Fraction From Junior College	0.10	0.31	0.18	0.39	0.12	0.33
Fraction College Fr. or So.	0.01	0.12	0.01	0.09	0.01	0.10
Fraction 4-Year College Junior	0.34	0.47	0.30	0.46	0.35	0.48
Fraction 4-Year College Senior	0.42	0.50	0.38	0.49	0.36	0.48
Fraction With a CSP	0.55	0.50	0.60	0.49	0.68	0.47
Observations	220		441		1138	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically who signed with the firm between 2004 and 2011 with at least a high school degree who were ranked between 301 and 600 in the year they were recruited.
(1) All monetary values are indexed to year 2000 dollars.

Table C.39: Summary Statistics for Employees in Rank Group 4 by Tax Status

	2004		2005 - 2006		2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	10.22	26.09	25.18	56.46	19.57	52.99
Age When Recruited by Firm	21.77	1.30	21.29	1.61	21.71	1.36
Fraction High School Seniors	0.08	0.27	0.04	0.21	0.08	0.27
Fraction From Junior College	0.11	0.32	0.28	0.45	0.12	0.33
Fraction College Fr. or So.	0.01	0.11	0.01	0.09	0.01	0.11
Fraction 4-Year College Junior	0.17	0.37	0.16	0.37	0.22	0.42
Fraction 4-Year College Senior	0.63	0.48	0.50	0.50	0.56	0.50
Fraction With a CSP	0.28	0.45	0.41	0.49	0.40	0.49
Observations	310		722		2117	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically who signed with the firm between 2004 and 2011 with at least a high school degree who were ranked below 600 in the year they were recruited.
(1) All monetary values are indexed to year 2000 dollars.

Table C.40: Summary Statistics for Employees With CSPs in Rank Group 1 by Tax Status

	Untaxed 2004		Unknowingly Taxed 2005 - 2006		Knowingly Taxed 2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	870.70	558.51	961.26	733.05	1045.57	1007.75
Age When Recruited by Firm	20.25	1.39	20.13	1.47	19.95	1.50
Fraction High School Seniors	0.35	0.48	0.40	0.49	0.45	0.50
Fraction From Junior College	0.05	0.22	0.04	0.19	0.03	0.16
Fraction College Fr. or So.	0.02	0.16	0.00	0.00	0.02	0.13
Fraction 4-Year College Juniors	0.55	0.50	0.54	0.50	0.48	0.50
Fraction 4-Year College Seniors	0.02	0.16	0.02	0.13	0.03	0.16
Number of Semesters in CSP	5.11	2.36	5.17	2.44	5.28	2.60
CSP Funds Per Semester[1]	$9,123.99	$4,448.86	$9,513.52	$4,776.41	$12,222.25	$6,415.07
Total Value of CSP[1]	$45,277.29	$3,0852.68	$47,762.34	$32,276.03	$63,889.84	$44,033.32
Proportion of Signing Bonus Taken as CSP Funds	0.06	0.03	0.06	0.05	0.08	0.06
Observations	82		166		414	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically, who signed with the firm between 2004 and 2011, with at least a high school degree, who were ranked in the top 90 the year they were recruited, and had a CSP included in their initial contract. The total value of a CSP is calculated by the amount of money available per semester, multiplied by the number of semesters specified in the contract. The proportion of the signing bonus taken in CSP funds is equal to the total value of CSP funds divided by the sum of CSP funds and the cash signing bonus.
(1) All monetary values are indexed to year 2000 dollars.

Table C.41: Summary Statistics for Employees With CSPs in Rank Group 2 by Tax Status

	Untaxed 2004		Unknowingly Taxed 2005 - 2006		Knowingly Taxed 2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	172.39	192.82	162.84	123.69	208.91	222.05
Age When Recruited by Firm	20.40	1.53	20.48	1.49	20.42	1.37
Fraction High School Seniors	0.33	0.47	0.28	0.45	0.27	0.45
Fraction From Junior College	0.11	0.32	0.09	0.29	0.12	0.33
Fraction College Fr. or So.	0.01	0.12	0.02	0.13	0.02	0.14
Fraction 4-Year College Juniors	0.47	0.50	0.50	0.50	0.53	0.50
Fraction 4-Year College Seniors	0.07	0.26	0.11	0.32	0.06	0.24
Number of Semesters in CSP	4.70	2.49	4.45	2.46	4.43	2.38
CSP Funds Per Semester[1]	$7,459.03	$4,933.12	$7,359.13	$4,248.49	$9,782.07	$5,300.94
Total Value of CSP[1]	$33,275.96	$31,200.40	$31,431.50	$23,447.61	$41,956.58	$31,487.63
Proportion of Signing Bonus Taken as CSP Funds	0.19	0.11	0.18	0.10	0.20	0.10
Observations	150		311		807	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically, who signed with the firm between 2004 and 2011, with at least a high school degree, were ranked between 91 and 300 in the year they were recruited, and had a CSP included in their initial contract. The total value of a CSP is calculated by the amount of money available per semester, multiplied by the number of semesters specified in the contract. The proportion of the signing bonus taken in CSP funds is equal to the total value of CSP funds divided by the sum of CSP funds and the cash signing bonus.
(1) All monetary values are indexed to year 2000 dollars.

Table C.42: Summary Statistics for Employees With CSPs in Rank Group 3 by Tax Status

	Untaxed 2004		Unknowingly Taxed 2005 - 2006		Knowingly Taxed 2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	70.33	194.17	76.52	134.98	89.27	132.40
Age When Recruited by Firm	20.74	1.36	20.43	1.47	20.61	1.38
Fraction High School Seniors 0.20	0.41	0.20	0.40	0.23	0.42	
Fraction From Junior College	0.14	0.35	0.27	0.44	0.16	0.37
Fraction College Fr. or So.	0.01	0.09	0.01	0.09	0.01	0.12
Fraction 4-Year College Juniors	0.53	0.50	0.44	0.50	0.50	0.50
Fraction 4-Year College Seniors	0.11	0.32	0.08	0.27	0.09	0.29
Number of Semesters in CSP	3.83	2.35	4.21	2.33	4.05	2.39
CSP Funds Per Semester[1]	$6,065.14	$3,553.98	$5,908.18	$3,547.78	$7,732.03	$4,450.30
Total Value of CSP[1]	$24,344.02	$25,834.78	$23,118.39	$18,340.38	$30,472.09	$25,217.70
Proportion of Signing Bonus Taken as CSP Funds	0.37	0.17	0.33	0.17	0.32	0.16
Observations	122		265		770	

SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically, who signed with the firm between 2004 and 2011, with at least a high school degree, were ranked between 301 and 600 in the year they were recruited, and had a CSP included in their initial contract. The total value of a CSP is calculated by the amount of money available per semester, multiplied by the number of semesters specified in the contract. The proportion of the signing bonus taken in CSP funds is equal to the total value of CSP funds divided by the sum of CSP funds and the cash signing bonus.
(1) All monetary values are indexed to year 2000 dollars.

Table C.43: Summary Statistics for Employees With CSPs in Rank Group 4 by Tax Status

	Untaxed 2004		Unknowingly Taxed 2005 - 2006		Knowingly Taxed 2007 - 2011	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Signing Bonus in $1,000s[1]	30.09	41.63	55.87	77.43	44.93	76.36
Age When Recruited by Firm	20.44	1.42	20.01	1.42	20.66	1.37
Fraction High School Seniors	0.24	0.43	0.10	0.31	0.19	0.39
Fraction From Junior College	0.29	0.46	0.55	0.50	0.24	0.43
Fraction College Fr. or So.	0.03	0.18	0.02	0.13	0.02	0.16
Fraction 4-Year College Juniors	0.36	0.48	0.29	0.45	0.46	0.50
Fraction 4-Year College Seniors	0.08	0.27	0.04	0.20	0.08	0.28
Number of Semesters in CSP	4.32	2.47	4.32	1.95	3.90	2.31
CSP Funds Per Semester[1]	$5,172.48	$3,314.48	$5,090.77	$2,978.06	$6,981.67	$4,631.93
Total Value of CSP[1]	$22,245.90	$18,480.95	$21,167.85	$14,509.02	$26,386.99	$24,846.35
Proportion of Signing Bonus Taken as CSP Funds	0.54	0.21	0.39	0.20	0.46	0.21
Observations	87		298		849	

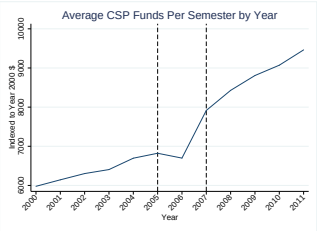
SOURCE: Author's calculations of firm data and the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. Sample includes all employees recruited domestically, who signed with the firm between 2004 and 2011, with at least a high school degree, were ranked below the top 600 in the year they were recruited, and had a CSP included in their initial contract. The total value of a CSP is calculated by the amount of money available per semester, multiplied by the number of semesters specified in the contract. The proportion of the signing bonus taken in CSP funds is equal to the total value of CSP funds divided by the sum of CSP funds and the cash signing bonus.
(1) All monetary values are indexed to year 2000 dollars.

The panels in Figure C.6 show changes in the share of initial contracts that include CSP funds and the characteristics of the CSP funds over time. There does not appear to be much action on the year 2005 line break, which is included to check if there was any leakage of the information of the loss of the tax break before the announcement in 2007. However, the line break in 2007 shows a dramatic increase in the share of contracts with a CSP. This initial uptick dissipates over time. The change in the rate of growth in CSP funds per semester and the total value of CSP funds in Figures C.6b and C.6c, respectively, do appear distinct and sustained.

Figure C.6: Trends in CSP Contracts With Break Lines in 2005 and 2007

(a) Trends in Share With CSP Funds

(b) Trends in CSP Funds per Semester



(c) Trends in CSP Total Value

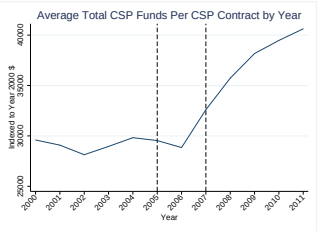
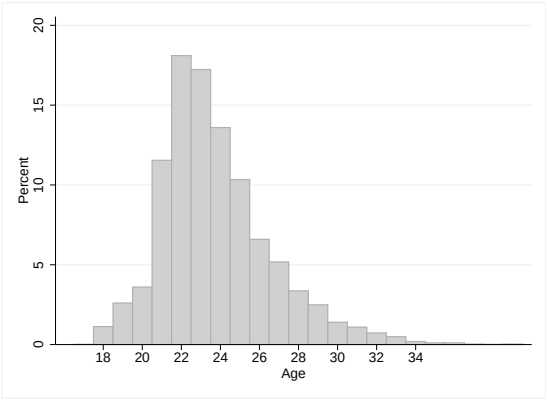
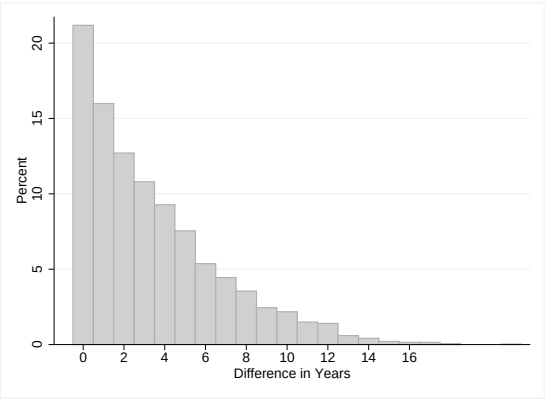


Figure C.7: Histograms of Alternative Cut-offs

(a) Age CSP Funds Were First Used



(b) Years After Signing CSP First Used



Figures C.7a and C.7b show the lack of a clear break point if the age when an employee first uses their CSP or the time from signing an initial contract is considered as a cut-off for the outcome of interest when examining CSP usage.

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