The Economics of BA Ambivalence:

The Case of California Higher Education

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Abstract. Using data from California’s higher education systems, this paper estimates individuals’ and society’s economic returns to a Bachelor’s (BA) degree and evaluates the quality of a beginning a BA program as an investment. We adjust for a fuller range of factors than are typically considered in prior evaluations including non-completion, time-to-degree, accelerating marginal income taxes, and risk. Although each of these adjustments reduces the estimated return to a beginning BA program, we find doing so generally remains a good investment for individuals and society. However, rising tuition and the widening distribution of earnings among those who begin BA programs has increased the risk individuals do not recoup their investments.

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The most fundamental question about the next generation evokes the most unease. Asked if today’s children will have more opportunities than older Americans, only 32 percent said yes. In the four times the Heartland Monitor has tested that question since 2009, no more than one-third of Americans have ever said they expect the next generation to enjoy greater opportunities...

Those anxious responses partly reflect an ambivalence, especially among blue-collar whites, about the economic value of a college education. Although studies show that workers with college degrees earn significantly more money over their lifetimes than those without one, just 38 percent of those polled said they viewed a college education as a “ticket to the middle class,” while 54 percent said it was “an economic burden that is often too expensive and requires taking on debt to pay for.” Three-fifths of both whites with college degrees and minorities (with and without degrees) saw such education as a source of advancement, but whites without a college degree split in half on whether the benefits of college justified the cost.

Ron Brownstein (2012)

In January 2013, Moody’s Investor Services reported that half of all surveyed colleges and universities anticipated enrollment declines among their full-time students (Martin 2013). Potentially widespread enrollment declines are one outcome of the ambivalence described in the Brownstein quote.

As Brownstein suggests, most economic studies continue to estimate a high rate of return to a Bachelor’s (BA) degree (Barrow and Rouse 2005; Avery and Turner 2012; Greenstone and Looney 2012). A corollary of this view is that recent cuts in state funding for higher education reduce economic opportunity and the economy’s ability to compete for the jobs of the future (Webley 2012; Quinterno 2012).

There are, however, other economists and analysts who argue that the economic return to a BA has been significantly overstated (Vedder 2004; Lerman 2007; Altucher 2010;
Harrington and Sum 2010). Anecdotes of students with little prospect of recovering from debt burdens are increasingly highlighted by the news media.\(^2\)

In this paper, we develop simplified models of the University of California (UC) and California State University (CSU) systems to show that these opposing positions each capture part of the truth. When properly measured, the economic return to pursuing a BA remains well above the interest rate on student loans for the average student admitted to either system. At the same time, rising tuition, the recession, and generally stagnant earnings make pursuing a BA increasingly risky such that a growing fraction of BA graduates may not recoup their investment. While pursuing a BA is generally a good investment, the wide variation in returns highlights the importance of risk reducing measures including income-contingent repayment plans.

We refer to the “properly measured” economic return because most published studies estimating a high economic return to a BA share three best-case assumptions that simplify calculations but bias estimates upward:

- The typical published estimate of the return to a BA assumes a student enrolls in college and graduates with a BA in four years. In practice, many students take longer than four years or drop out without a degree.
- The typical published estimate is based on pre-tax earnings,\(^3\) while progressive tax brackets will disproportionately affect higher-earning college graduates and reduce the return to a BA as the individual sees it.
- The typical published estimate reports a single rate of economic return as if that rate were certain. In fact, the rate can vary widely depending on the individual’s ability,

\(^2\) For example, see columns by Steinberg 2010, Samuelson 2012, Zimmerman 2012.
\(^3\) An exception is Heckman et al. 2008.
whether the individual actually graduates, variation in post-college earnings and the state of the economy when the individual graduates (Beaudry et al. 2013). These factors make pursuing a BA a risky investment with some chance that a student will earn too little to comfortably manage his/her loans.

We ask whether correcting for these factors reduces the return on a BA enough to make college a bad investment. The answer will vary by institution since different institutions have different tuitions, dropout rates etc. For purposes of this paper, we focus on higher education in California.

I. Public Higher Education in California

By the early 1920s, California had established the components that would eventually become its current higher education system, components that were integrated into a tri-partite structure in the 1960 California Master Plan for Higher Education (Douglass, 2000). The University of California System (UC), the state’s research campuses, were charged with educating the top 12.5 percent of California high school graduates. The California State University System (CSU), formerly the state college system, was charged with educating the top 33 percent of high school graduates. The California Community Colleges were generally open enrollment.4

Prior to the Master Plan, the UC and CSU systems had drawn from a somewhat larger fraction of high school seniors but admission was not guaranteed. The Master Plan was a step toward guaranteed admission for students who met stated criteria so criteria were tightened to limit costs. When the Master Plan was passed, neither the original or revised

4 We do not directly discuss the 112 campuses of the California Community College (CCC) system in detail but we take account of the system’s role in generating BA’s by educating students who transfer into four-year state institutions for their final two years.
criteria had their basis in “any assessment of the future economic labor needs of the state or acceptable rates of socioeconomic mobility.”

When the Master Plan was passed, fewer than 10 percent of California residents ages 25 and older had a BA. The college earnings premium at age 40—the earnings gap between 40-year-old men with a high school diploma and 40-year-old men with a BA—stood at 35 percent, a sign of strong demand for college graduates. Conversely, socioeconomic mobility did not require extensive legislature attention since wages for all educational groups were rising. In 1960, an average blue-collar worker was earning more (adjusted for inflation) than most managers had earned in the late 1940s and a son would earn more than his father even if the two men had the same years of schooling.

Over the life of the Master Plan, demand has continued to shift toward college graduates but broad-based wage growth has disappeared. Both patterns are illustrated in Figure 1’s comparison of age earnings profiles for working individuals in 1990 (smooth line and dot line) and 2010 (dashed lines). After dipping sharply in the 1970s (Freeman, 1976) the college earnings premium for 40-year-old men increased from 17 percent in 1980 to 43 percent in 2010. But across all ages, California men with a BA in 2005-10 earned

6 We define a working individual as one who earned at least $1,000 (2010 dollars) over the year. Like every definition of a worker, this definition represents a compromise. Some persons, ages 25-65, earn less than $1,000 or have no earnings at all either by choice (raising children, retirement), or disability, or inability to find work. We cannot distinguish among these situations in our data and so we exclude all these persons. Defining workers in this way understates college-high school earnings differences since male high school graduates are more likely than male college graduates to drop out of the labor force as discouraged workers (e.g. Autor and Wasserman 2013).
7 Writing in the mid-1970s, Freeman (1976) correctly argued that a BA was no longer a good investment. By 1985, it was clear that Freeman had written during unusual economic conditions that were soon reversed. See Levy (1998) for a full discussion.
virtually the same amount as their 1990 counterparts while California men with a high school diploma earned 9 percent less than their counterparts.

In the absence of general wage growth, higher education came into demand as the main vehicle of upward mobility. As Figure 1 shows, however, the college-high school earnings premium has remained high in recent years because high school earnings are falling, not because college earnings are rising. We return to this point below.

[Figure 1 about here]

The state responded to increased demand for higher education with moderate relative expansion. Since 1980, the fraction of California high school graduates who become freshmen in the UC and CSU systems has risen unevenly from 15 percent in 1980 to 21 percent in 2007, and has contracted modestly since then. Relative to high school graduates, the numbers of UC and CSU BA’s awarded (including BA’s to out-of-state students and junior college transfers) has risen from 23 percent in 1980 to a peak of 33 percent in the early 1990s before settling into a range between 25 percent and 30 percent.

Although California is a net importer of college graduates, the state’s supply of college graduates has declined compared to other states. When the Master Plan was developed in

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9 Between 1980 and 2010, a growing fraction of all 19-22 year-olds attained a high school diploma or GED. Since the system has kept up with the increase high school graduates, it has more than kept up with the increase in the young adult population. Among college graduates in their late 20’s, roughly 30 percent were educated outside the state, an in-migration rate equal to the national average. Among college graduates who were educated in California, roughly 85 percent were still in California in their late 20’s, the highest retention rate among all states. (Source: Authors’ tabulations of the 2000 Census)
1960, California ranked eighth in the nation for the percent of 25-34 year olds with a BA or higher (20 percent). In 2009, California ranked twenty-third in the nation on this measure (31 percent).\textsuperscript{11} Within both California and the nation, the growing fraction of the labor force with BA’s has not been enough to keep the college earnings premium from rising.

Other factors constant, a rising college premium would increase the economic return to pursuing a BA. Tuition is one factor that has not been constant. Figure 2 shows the sharp tuition increases in both the UC and CSU systems and illustrates three points:\textsuperscript{12}

[Figure 2 about here]

- The cost of instruction per full time equivalent (FTE) student is significantly higher in the UC system than in the CSU system – roughly twice as high since 2000.
- In both systems, tuition and fees have been rising faster than the cost of instruction. In the UC system cost of instruction per student rose by a total 17 percent between 1987 and 2011 while UC tuition and fees rose by 348 percent. Over the same years, CSU cost of instruction per FTE student declined by 9 ½ percent while tuition and fees increased by 336 percent.
- The UC and CSU systems have been raising tuition largely to compensate for declining state support. Over the period for which we have complete data, tuition and fees rose from roughly 10 percent of the cost of instruction in 1987 to 40 percent of the cost of instruction in 2010-11 in both the UC and CSU systems.\textsuperscript{13}

\textsuperscript{11} See Johnson and Sengupta (2009).
\textsuperscript{12} These cost estimates are taken from the Delta Cost Project: \url{http://www.deltacostproject.org}.
\textsuperscript{13} Percentage for 2010-11 uses 2010-11 tuition and the 2009-10 instructional expenditure per student.
On first approximation, the economic return to pursuing a BA is the outcome of a race between a rising college earnings premium and rising tuition. Other factors are also involved – e.g. changes in the probability that an entering freshman completes a degree rather than dropping out. We turn to all of these factors in the next section.

Because the UC and CSU systems educate a relatively large share of California’s BA graduates (about 70 percent), and because tuition and graduation statistics are readily available, they offer a realistic basis for estimating the returns to beginning a BA program. At the same time, tuitions in both systems for in-state students are well below the average tuition charged by private and non-profit institutions and are roughly in line with in-state tuition in other public institutions. If pursuing a BA’s in the UC or CSU systems is a bad investment, it is likely a bad investment in many other institutions.

II. Estimating the Individual’s Economic Return to Pursuing a BA

Figure 3 illustrates, in the decision facing a high school senior who has been admitted to the UC or CSU systems and is deciding whether to pursue a BA.

In this simplified analysis, the high school senior follows one of three paths:

- **Path A:** The senior foregoes college and works until age 65 at the after-tax earnings of a high school graduate. In calculating the IRR, Path A is the baseline against which college attendance is compared.

- **Path B:** The senior pursues a BA but drops out after “M” years (Probability = $P_{\text{drop out}}$) without earning a degree. She then works until age 65 at the after-tax earnings

14 In particular, our analysis does not include the possibility of going to community college with the potential of transferring to a four-year college. It also ignores the choice of major.
of persons with “some college”. The costs of this path include M years of tuition and foregone earnings and the benefits are the annual after-tax earnings for persons with “some college.”

- Path C: The student completes a BA (Probability = \( P_{\text{completion}} \)) in N years. She then works until age 65 at the after tax earnings of a college graduate (with no graduate school). The costs of this path include N years of tuition and foregone earnings while the benefits are annual college earnings after taxes.

In this formulation, the benefit from pursuing a BA is the expected value of two streams - Path C if the student completes a degree (weighted by the probability of completion) and Path B if the student (weighted by the probability of dropping out). The student compares the benefit against the stream of earnings from going directly to work. The Net Present Value of pursuing a BA degree rather than going directly to work can be written as:

\[
(1) \quad \text{NPV}(BA) = (P_{\text{completion}}) \times \text{NPV}(\text{Path C}) + (P_{\text{drop out}}) \times \text{NPV}(\text{Path B}) - \text{NPV}(\text{Path A})
\]

Where NPV refers to a path’s Net Present Value, the discounted sum of future benefits and costs.

The individual’s IRR from pursuing a BA is the value of the discount rate that sets the Net Present Value (Equation 1) equal to zero - the interest rate that makes the investment in college just break even.

III. The Data
IRR estimates depend on expected future earnings. We assume that the high school senior’s evaluation of the future earnings is formed by contemporary median earnings of workers of different ages.\(^{15}\)

This requires specifying whose earnings we count in calculating the median – in particular, how we count persons who have no earnings during the year because they can’t find work or they are unable to work or they are voluntarily out of the labor force.\(^{16}\) In the calculations that follow, we use the median earnings of Californians who have at least $1,000 of earnings during the year – the same assumptions used for the age-earnings profiles in Figure 1.\(^{17}\) For 1980, 1990 and 2000, the U.S. Decennial Census provides sufficient data to estimate age-earnings profiles for the California labor market. After 2000, we are forced to rely on the American Community Survey (ACS), a smaller sample, and so we estimate age-earnings profiles on ACS from 2005-2010, a period that covers both pre-recession and recession observations. To calculate differences in UC and CSU earnings, we use a payscale.com salary survey that estimates that UC graduates earn 10 percent more than CSU graduates. We incorporate this difference into our calculations.\(^{18}\)

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\(^{15}\) For example an 18-year-old female who making her college decision in 2010 would assume that if she obtained a Bachelor’s degree, her earnings at age 30 would be the same as the median earnings of 30-year-old women with a BA in the year 2010. This is equivalent to assuming there will be no economy-wide wage growth that would cause age-earnings profiles to shift up. Based on the last two decades of data, this is a reasonable assumption for college graduate earnings and a mildly optimistic assumption for high school graduates whose earnings have fallen since 1990 (Figure 1).

\(^{16}\) The data sets we use do not permit easily distinguishing among these groups.

\(^{17}\) We smooth the age earnings profiles by estimating quadratic quantile earnings functions on median earnings.

\(^{18}\) The survey was performed by Payscale.com (http://www.payscale.com/college-salary-report-2013/west-coast-schools) based on currently employed workers with a bachelor’s degree (no graduate work.) The earnings difference likely reflects both UC’s higher admission standards and greater resources per student. Figure 1’s age-earnings profiles are based on Census data and so are representative of all bachelors’ degree
Other variables necessary to calculate the IRR are taken from reports of the UC and CSU systems and are detailed in Table 1. To simplify calculations, we equate the probability of dropping out to the probability of not earning a bachelor’s degree within six years. Table 1 shows the longer completion times and significantly higher dropout probabilities in the CSU system.

IV. The Individual’s IRR of Pursuing a BA

Table 2 contains estimates of the Individual real IRR for the UC and CSU systems.

Real IRRs are based on in constant 2010 dollars. Student loan interest rates, like other commercial interest rates, are adjusted for expected inflation. Correspondingly, Table 2 also includes the nominal IRR - the real IRR plus the expected annual rate of inflation over the life of the investment – to permit comparisons with student loan interest rates.

holders in the California labor market. Estimating an individual’s IRR also requires estimating the individual’s foregone earnings while in college. For students of a specific age (18, 19, etc.) and gender in a specific year (1980, 1990), we define foregone earnings as the difference between the median earnings of high school graduates who are not in school and the median (part time) earnings of students who are in college. In this calculation, Median earnings of high school graduates are estimated on California data but median earnings of students while in college are estimated on national data because the number of observations in California is too small.

For students entering the CSU system in 2000, the ten-year completion rate was about 9 percent higher than the six year completion rate. Our calculations also ignore a 5 percent difference between the drop out probability of men (higher) and women. See http://www.asd.calstate.edu/csrde/ftf/2009htm/sys.htm

Inflation fell sharply between 1980 and 2010. While the nominal IRR’s are fairly constant, they reflect shifting combination of a falling inflation correction and (more important) a rising real IRR.
Unsurprisingly, our estimated IRR’s, adjusted for the probability of dropping out, taking more than four years and taxes are lower than most published estimates.  

To summarize the table:

• In each year, the UC system has a higher IRR than the CSU system for both men and for women.
• In each year and within each system, women have a higher IRR than men.
• Over time, real IRR’s grow significantly from 1980 through 2000. They decline after 2000 but remain at fairly high levels. This pattern holds for both men and women within each system.

To understand the CSU’s lower IRR, recall that the CSU system has both lower admission standards and lower instructional expenditure per student than the UC system. In our simplified model, these factors are captured in CSU’s significantly higher dropout rate, its longer time to complete a bachelor’s degree (for those who complete) and the survey suggesting that CSU graduates with a bachelor’s degree earn 10 percent less than UC graduates. CSU’s relatively low tuition is not large enough to offset these factors.

The higher IRR for women reflects the relatively higher labor force participation among women with bachelor’s degrees. Since 1980, the gap between college and high school hourly wages widened for both women and men but the gap in annual earnings widened faster for women because of the large increase in hours worked among college educated women.

As one example, Greenstone and Looney (2012) estimate a real IRR for the average U.S. college student without these corrections and show a real IRR of roughly 16 percent, two to three percentage points higher than Table 2’s estimated IRR’s for women and four to seven percentage points higher than Table 2’s estimated IRR’s for men.
The third pattern in the table is the rise in the individual’s IRR through 2000 and its subsequent moderate decline. The economic return to college depends on multiple factors but the dropout rate and time to earn a BA have remained fairly constant within each system. As a result, changes in a system’s IRR are largely the result of the widening college earnings premium (a positive effect) and rising tuition (a negative effect). Between 1980 and 2000, UC tuition and fees more than doubled from $1,963 to $4,479 and CSU tuition and fees quadrupled from $437 to $1,865 (all figures in 2010 dollars). Nonetheless, the college earnings premium expanded so rapidly that the individual’s real IRR grew substantially for both systems.

Between 2000 and 2010, this dynamic reversed as the college earnings premium grew more slowly while tuition increased sharply. The real IRR for pursuing a bachelor’s degree declined by 7 percentage points for UC women and 2-4 percentage points for all other groups.

Should the high school senior pursue a BA? At this point, we postpone the issue of risk. If returns were certain, the student should pursue a BA if the nominal IRR exceeded the interest rate the senior would pay on student loans. To illustrate this comparison, Table 2 shows the 1980 cap on PLUS loans and the unsubsidized Stafford Loan interest rate for 1990-2010.\(^{22}\)

In 1980 the nominal IRR for an 18-year-old male considering the CSU system was 13 percent, while the interest rate at which the student could have borrowed was 14 percent.\(^{23}\)

\(^{22}\) The Stafford Loan program was initiated in 1988. PLUS loans are loans secured by the dependent student’s parents. On the history of both Stafford and pre-Stafford Interest rates, see [http://www.finaid.org/loans/historicalrates.phtml](http://www.finaid.org/loans/historicalrates.phtml).

\(^{23}\) The very high 1980 interest rate reflected Paul Volcker’s very tight money policy to break the 1970’s inflation. See Levy (1998) for details.
The young man could have attained higher lifetime income by going directly to work. By 1990, the widening college wage premium reversed this relationship making college a good investment for the average young man in the CSU system, a situation that continued through 2005-10. For young women considering the CSU system and young men and women considering the UC system, investing in college was a good investment in each of the four years.

This picture has one caveat. For all groups in Table 2, the declining return to college after 2000 narrowed the gap between the return to college and the student loan rate. Attending either the UC or CSU system remained, on average, a good investment for admitted students but returns declined between 2000 and 2010.

Finally, a low IRR for freshmen in the less selective CSU system would be a sign too many students were attending college. The data show this IRR was low in 1980 but not today (Table 2). In 1980, male freshmen in the CSU system had a real IRR of 4.2 percent\textsuperscript{24} despite the system’s low tuition. By 2000, the real IRR for male CSU freshman had increased to 11.3 percent declining to a still high 9.2 percent in 2010. Women in the CSU system had a real IRR of 16.4 percent in 2000, declining to 13.1 percent in 2010. CSU’s high drop-out rate suggests a very inefficient system but even with these inefficiencies, the 2010 nominal IRR’s – 10.6 percent for men and 14.5 percent for women – were well above the interest rate on student loans indicating that pursuing a BA was a good investment for the average high school senior admitted to the CSU system.

\section*{V. Society’s IRR for the Individual’s Pursuit of a BA}

\textsuperscript{24} The 1980 nominal IRR is much higher (13.1 percent) than the real IRR (4.2 percent) reflecting rapid consumer price inflation during the late 1970s and 1980.
Table 3 contains estimates of society’s real IRR when an individual pursues a Bachelor’s degree. Unlike the individual’s IRR, the social IRR includes the full cost of instruction (rather than just the individual’s tuition), and pre-tax earnings (rather than the individual’s post-tax earnings). The result is a measure of return based on all resources consumed and produced by the college investment – the IRR from society’s perspective – rather than resources consumed and produced as seen by the individual.

Judging the pursuit of a BA from society’s perspective also requires a change in investment standard. From society’s perspective, the individual’s pursuit of a BA is a good investment if the social IRR exceeds the rate at which “society” can borrow. We approximate this borrowing rate by an average interest rate paid on 20-year state and local bonds.\(^{25}\)

Moving from the individual’s IRR to society’s IRR involves two opposing effects. Substituting full costs of instruction for tuition lowers the estimated IRR. Substituting pre-tax earnings for after-tax earnings raises the estimated IRR. The negative effect dominates and across all groups and an high school senior pursuing a BA generates a real IRR for society in 2010 averaging 9.3 percent, about three percentage points less than the real IRR seen by the individual.

Despite this lower IRR, the individual’s pursuit of a BA is a good investment from a social perspective. In recent years, interest rates on municipal bonds – society’s borrowing rate – average 2-3 percentage points less than interest rates on student loans. As a result, the pattern in Table 3 is similar to the pattern in Table 2. Men entering the CSU system

\(^{25}\) Data taken from the Federal Reserve Board of Governors at http://www.federalreserve.gov/releases/h15/data.htm
were not good investments for society in 1980 or 1990 but became good investments in 2000 and 2005-10. Women entering the CSU system and men and women entering the UC system were good investments in society in each of the four years.26

Since tuition covers only part of the cost of instruction, it is possible for college to be a good investment for students but a bad investment for society. The evidence presented beginning in 1980 suggests this was never the case for men in the UC system or women in either system and is no longer the case for anyone (Table 3).

VI. Ability Bias

The UC system admits students in the top eighth of their high school graduating class. The CSU system admits students in the top third. Given this selectivity, students who attend college might have had high earnings even if they hadn’t attended college. This “ability bias” causes IRR estimates to overstate the causal effect of college on future earnings.

The best known attempts to estimate the extent of ability bias suggest it is negligible (e.g. Card 1999).27 Rather than imposing an assumption regarding what percent of the college earnings premium must be attributed to the individual ability, we examine what this share must be for college to no longer be a good investment – for the IRR to pursuing a BA to be reduced to the interest rate charged by student loans.

[Table 4 about here]

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26 Recall that the individual IRR declined sharply between 2000 and 2010 in large part due to the rapid rise in tuition. The social IRR is based on the full cost of instruction per student – not just tuition. Unlike tuition, the cost of instruction per student was relatively constant during the period, which helps to explain why the social IRR did not rise.

27 Nonetheless, conversations with California legislative staff in Spring 2012 suggest they believe the bias is large and that published estimates of the IRR of a bachelor’s degree are significantly overstated.
Table 4 shows estimates of these percentages for men and women in both the UC and CSU systems between 1980 and 2005-10. Consider the data for 2005-10. In 2010, the unsubsidized Stafford loan rate was 6.8 percent. Males entering the CSU system faced a nominal IRR of 10.6 percent - roughly four percentage points above Stafford loan rate. This is a fairly moderate gap and if at least 36 percent of this gap reflected individual ability – a plausible fraction – attending CSU (as currently configured) would not be a good investment for the average person in this group. By contrast, women entering the CSU system faced a nominal rate of return of 13.1 percent, more than six percentage points above the Stafford loan rate, and so at least 76 percent of the college earnings premium would have to be attributed to ability—a number much higher than typical estimates—for CSU to be a bad investment for the average woman in this group.

[Table 5 about here]

Table 5 contains parallel calculations focusing on the required attribution of the college premium to ability for college to be a bad investment for society. While society’s IRR is lower than the individual’s IRR, the interest rate for state and local bonds is lower than the interest rate on student loans and so the numbers in Tables 4 and 5 are fairly similar.

[Table 6 about here]

To summarize, the numbers in Tables 5 and 6 indicate that for most groups – men in the CSU system are the exception - something over 60 percent of the wage gap must reflect individual ability for college to be a bad investment for either the individual or society.

The Individual’s Risk of Pursuing a BA

28 We return to the issue of configuration in the concluding section.
Most published estimates of the return to pursuing a BA ignore the investment’s risk. They instead assume that students graduate on time and earn the average of individuals with of the same age and education. However, a significant fraction of freshman leave an institution without a BA, many of those who earn a BA take more than four years to do so, and students who do earn a degree face a wide distribution of post-college earnings. Given these uncertainties, we examine the proposition that while the mean economic return on pursuing a BA exceeds the interest rate on student loans, the investment’s risk has increased as tuitions have grown and some younger workers’ wages have suffered in the recent recession (Beaudry et al. 2013).

To construct a measure of risk, we start by following Avery and Turner’s conclusion that monthly student loan repayments in the range of 10-11 percent of monthly income should be “manageable” (2012, pp. 186-7). Extending this definition, we denote student loan repayments in excess of 15 percent of income as financial distress.

To illustrate how risk has changed, we first consider the case of a 30-year-old who enrolled in college upon graduating high school and borrowed full tuition. Specifically:

- Whether the individual actually completed a BA, he/she borrowed funds equal to full tuition (but no living costs) for each year she was in college.
- While the individual was in college, his/her student loans accrued no interest. Upon graduation, the loans accrued interest at the unsubsidized student loan rate in force at that time.
- Once out of college, the individual repaid student loans using the ten year schedule required by the Stafford Student Loan program.
Our measure of risk is then the probability that this 30-year old individual has a loan repayment that exceeds 15 percent of her earnings – a probability we estimate based on variation in earnings among 30-year olds in the year the woman turns 30.

Table 6 contains estimates of this measure for men and women in both the UC and CSU systems between 1980 and 2010.\(^\text{29}\) For intuition, consider a 30-year-old man in 1990 who had borrowed five years of tuition to earn a BA at a CSU campus (for the moment we ignore the possibility that the individual dropped out). He would have left college with total debt about $6,500 (in 2010 dollars). Assuming the individual was repaying this loan over 10 years, he would have been facing loan repayments of about $73 per month. By our 15 percent criteria, the individual would have had to be earning at least $426 per month – roughly $3.00 per hour in fulltime work - to avoid financial distress. Given the earnings distributions of 30 year-old male college graduates in 1990, there was virtually no chance for a working male college graduate to have earnings this low and so the risk of experiencing financial distress was essentially zero. Adding the possibility of dropping out of college does not change the conclusion: the lower earnings of college dropouts are largely offset by their fewer years of tuition debt.

For students in the CSU system, the risk of financial distress remained at zero in 2000 but by 2010, the combination of increased tuition and deteriorating wages for young BA’s increased the probability of financial distress at age 30 to 10 – 11 percent.

The UC system with substantially higher tuition had zero risk of financial distress through 1990 but the risk rose significantly beginning in 2000. In 2010, under our

\(^{29}\) The details of the estimate are explained in Appendix A.
simplified example, the probability of being in financial distress at age 30 was 38 percent for UC male freshman and 55 percent for UC female freshman.

The scenario in Table 6 - borrowing all tuition - is an extreme assumption. *The Project on Student Debt* indicates that in 2011, 52 percent of graduating seniors at the University of California, Davis had debt averaging $18,386, a little less than two years tuition. In 2010, a student graduating with a debt of this size would have had an estimated probability of financial distress at age 30 of 5.4% for men and 12.1% for women. Both probabilities are significantly higher than in earlier years and both are high enough to attract a student’s attention.

Both the risk probabilities in Table 6 and the risk probabilities for the UC Davis graduate illustrate an important point: the risk of investing in a BA can increase (and almost certainly has increased) even though the IRR of investing in a BA remains high. Recall that our estimates of the individual’s IRR (Table 2) are based on each group’s median earnings (as are virtually all published estimates). Recessions, however, affect individuals unequally and so the hardest hit college graduates have very low earnings even as the median college graduate’s earnings have fallen less dramatically. Data on the distribution of usual weekly earnings indicate that between 2000 and 2010, median weekly earnings among 25-34 year old men with a BA fell by 7 percent (adjusted for inflation) while earnings of men at the 25th percentile of the distribution fell by 13 percent and earnings of men at the 10th percentile fell by 17 percent. Thus modest changes in median earnings obscure a growing number of recent college graduates with low earnings who may have trouble repaying loans.
At first glance, any fall in the median earnings of college graduates appears incompatible with the still-high IRR to pursuing a BA. Recall, however, that in recent years, the college earnings premium and IRR have remained high because high school graduates’ earnings were falling, not because college graduates’ earnings were rising (e.g. Figure 1). Because of declining earnings among high school graduates, pursuing a BA remains a good investment for the average admitted student despite rising tuition. But the absence of growth in college graduates’ earnings combined with rising tuition means the investment carries increased risk of financial distress.\(^\text{30}\)

VII. Conclusion

This paper began with a quote reporting public ambivalence over the value of a college education and broad skepticism that college is a still “ticket to the middle class.” Public ambivalence mirrors an academic debate over the economic return to a BA – whether published estimates are exaggerated and whether the U.S. is already producing too many college graduates.

To summarize our findings:

\begin{itemize}
  \item On average, the BA is a good investment for the average student in both systems.
\end{itemize}

Tuition and fees have risen sharply in both the UC and CSU systems but the college earnings premium in the California labor market rose even faster until the early 2000’s reflecting growing demand for more educated labor. As a result, the individual’s nominal IRR of investing in a BA rose sharply until 2000. After 2000, the IRR fell moderately but still exceeds the interest rate of unsubsidized Stafford

\(^{30}\) For similar reasons, the probability of financial distress is higher for women than for men despite the fact that women have the higher IRR. Women’s higher IRR reflects the large earnings gap between women college graduates and women high school graduates. But women’s earnings are lower than men’s earnings and so women potentially have greater difficulty than men in paying off student loans.
loans after accounting for taxes, the probability of taking more than four years to complete a degree and the probability of dropping out with no degree.

- **Returns Justify Society’s Investment.** From society’s perspective, an individual pursuing a BA in the UC or CSU system currently generates a nominal IRR well above the interest rate on municipal bonds, one proxy for society’s borrowing costs.

- **Returns are Likely Robust to Ability Bias.** For most of the groups we examine, student ability would have to account for about 60 percent of the college-high school wage premium - a very high fraction - to make college a bad investment – the exception is men in the CSU system where the fraction is about 40%.

- **However, from the Individual’s Perspective, BA Investments are Increasingly Risky.** While the IRR to pursing a BA remains a good investment on average, the probability of having student loan problems by age 30 has increased significantly since 2000 as tuitions have risen sharply and a growing fraction of recent college graduates experience very low earnings.

Given this increased risk, it is not surprising that many families regard college with greater ambivalence – particularly families who cannot afford to help heavily indebted children. Our findings also underscore why the BA is losing its status as “a ticket to the middle class,” - i.e. a guaranteed result. The BA’s risk removes any guarantee while stagnant wages for college graduates have not kept pace with the growing cost of middle-class fixtures including purchasing healthcare, educating one’s children and saving for increasing years of retirement.\(^{31}\)

---

\(^{31}\) See, for example, Munnell, et al. 2009. Calculations by Anthony Webb and Francesca Golub-Sass at the Boston College Center for Retirement Research indicate that among household heads with at least one year of college, the percent who reached age 65 with
A number of policy levers may help students understand the value of their college
degree and reduce the risk of their investments. One is better advising on choice of college
major and postgraduate education. Our data sources -the Census and ACS – do not include
information on college major but previous research suggests choice of major has an
important impact on subsequent earnings (e.g. Rumberger and Thomas 1993; Arcidiacono
2004). More recent research suggests students underestimate earnings differences by major,
and providing students with the correct information can cause some students to change
their choice of major (Zafar and Wiswall 2013).

A second mechanism for reducing student risk involves better advising on options for
financing a student’s education. In 2009, the federal government introduced a variety of
income-based and income contingent student repayment plans. These plans reduce current
loan repayments (and the corresponding risk of financial distress or default) while
extending the repayment period beyond the standard ten years. However, many students
who would benefit from this program do not enroll (Chopra 2013). Here too, better
advising including at the point where the high school senior is considering college could
reduce both the perceived and actual risk of the college investment.

College remains a good investment for both individuals and the state but it is a
“stepping stone” to the middle class – not a ticket. As such, it deserves the scrutiny an
individual would give to any risky investment.

potentially inadequate retirement resources rose from 28 percent in 1983 to 44 percent
in 2007.
References


Project on Student Debt: http://projectonstudentdebt.org/


TABLE 1. Parameter Values for IRR Calculations (both males and females)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Six Year Graduation Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California</td>
<td>65%</td>
<td>75%</td>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>California State University</td>
<td>40%</td>
<td>42%</td>
<td>48%</td>
<td>48%</td>
</tr>
<tr>
<td><strong>Drop Out Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California</td>
<td>35%</td>
<td>25%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>California State University</td>
<td>60%</td>
<td>58%</td>
<td>52%</td>
<td>52%</td>
</tr>
<tr>
<td><strong>Median Years to Completion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University of California</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>California State University</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td><strong>Years Attended by Drop-Outs</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
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<td></td>
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<tr>
<td>University of California</td>
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<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>California State University</td>
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<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Average Tax Rate</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>20%</td>
<td>18%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Some College</td>
<td>22%</td>
<td>20%</td>
<td>20%</td>
<td>17%</td>
</tr>
<tr>
<td>Bachelor's Degree</td>
<td>23%</td>
<td>23%</td>
<td>23%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Source: Data come from the UC Accountability Reports and CSU Statistical Reports.
Notes:
<sup>1</sup> Data was not available; this is an assumed value.
<sup>2</sup> Approximated using the NBER TaxSim Model, using earnings of median earner by year and level of education.
TABLE 2. The Individual's IRR of Pursuing a Bachelor's Degree

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th></th>
<th></th>
<th></th>
<th>Women</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CSU System IRR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Return</td>
<td>4.2%</td>
<td>4.0%</td>
<td>11.3%</td>
<td>9.2%</td>
<td>9.9%</td>
<td>12.2%</td>
<td>16.4%</td>
<td>13.1%</td>
</tr>
<tr>
<td>Nominal Return</td>
<td>13.0%</td>
<td>10.2%</td>
<td>13.7%</td>
<td>10.6%</td>
<td>18.7%</td>
<td>18.4%</td>
<td>18.9%</td>
<td>14.5%</td>
</tr>
<tr>
<td><strong>UC System IRR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Return</td>
<td>10.4%</td>
<td>11.8%</td>
<td>16.3%</td>
<td>12.7%</td>
<td>11.3%</td>
<td>14.5%</td>
<td>20.7%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Nominal Return</td>
<td>18.0%</td>
<td>18.0%</td>
<td>18.8%</td>
<td>14.1%</td>
<td>20.1%</td>
<td>20.7%</td>
<td>23.2%</td>
<td>15.8%</td>
</tr>
<tr>
<td><strong>Unsubsidized</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stafford Rate</td>
<td>14%</td>
<td>8.0%</td>
<td>8.2%</td>
<td>6.8%</td>
<td>14%*</td>
<td>8.0%</td>
<td>8.2%</td>
<td>6.8%</td>
</tr>
</tbody>
</table>
### TABLE 3. The Social IRR of Pursuing a Bachelor's Degree

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CSU System IRR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Return</td>
<td>-2.3%</td>
<td>-4.9%</td>
</tr>
<tr>
<td>Nominal Return</td>
<td>6.5%</td>
<td>1.4%</td>
</tr>
<tr>
<td><strong>UC System IRR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Return</td>
<td>3.1%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Nominal Return</td>
<td>11.9%</td>
<td>11.4%</td>
</tr>
<tr>
<td><strong>Both Systems</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal Interest Rate on 20 Year Municipal Bond</td>
<td>7.4%</td>
<td>7.2%</td>
</tr>
<tr>
<td>Nominal Interest Rate on Stafford Loans</td>
<td>14%*</td>
<td>8.0%</td>
</tr>
</tbody>
</table>
**TABLE 4. Percentage of College Premium Attributed to Ability for College to be Poor Individual Investment**

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th></th>
<th>Women</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CSU System</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal IRR</td>
<td>13.00%</td>
<td>10.20%</td>
<td>13.70%</td>
<td>10.60%</td>
</tr>
<tr>
<td>Percent of BA Premium</td>
<td>NA*</td>
<td>25.00%</td>
<td>48.00%</td>
<td>36.00%</td>
</tr>
<tr>
<td>Due to Ability to Make BA a Bad Investment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSU System</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal IRR</td>
<td>18.00%</td>
<td>18.00%</td>
<td>18.80%</td>
<td>14.10%</td>
</tr>
<tr>
<td>Percent of BA Premium</td>
<td>52.00%</td>
<td>75.00%</td>
<td>67.00%</td>
<td>56.00%</td>
</tr>
<tr>
<td>Due to Ability to Make BA a Bad Investment</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* CSU Men in 1980 represented a bad investment even if 100% of the education premium was attributed to college.
### TABLE 5. Percent of College Premium Due to Ability for College to be a Bad Social Investment

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th></th>
<th></th>
<th></th>
<th>Women</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CSU System</td>
<td>Nominal Social IRR</td>
<td>6.50%</td>
<td>1.40%</td>
<td>9.50%</td>
<td>8.50%</td>
<td>11.20%</td>
<td>14.00%</td>
<td>13.30%</td>
</tr>
<tr>
<td></td>
<td>State/Local Bond</td>
<td>7.40%</td>
<td>7.20%</td>
<td>6.10%</td>
<td>3.80%</td>
<td>7.40%</td>
<td>7.20%</td>
<td>6.10%</td>
</tr>
<tr>
<td></td>
<td>Nominal Interest Rate</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percent of BA Premium</td>
<td>NA</td>
<td>NA</td>
<td>40%</td>
<td>53%</td>
<td>50%</td>
<td>72%</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>Due to Ability to Make BA a Bad</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Investment</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UC System</td>
<td>Nominal Social IRR</td>
<td>11.90%</td>
<td>11.40%</td>
<td>11.40%</td>
<td>10.50%</td>
<td>12.10%</td>
<td>13.40%</td>
<td>13.70%</td>
</tr>
<tr>
<td></td>
<td>State/Local Bond</td>
<td>7.4%*</td>
<td>7.20%</td>
<td>6.10%</td>
<td>3.80%</td>
<td>7.4%*</td>
<td>7.20%</td>
<td>6.10%</td>
</tr>
<tr>
<td></td>
<td>Nominal Interest Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percent of BA Premium</td>
<td>70%</td>
<td>55%</td>
<td>47%</td>
<td>60%</td>
<td>65%</td>
<td>68%</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>Due to Ability to Make BA a Bad</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Investment</td>
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<td></td>
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</tr>
</tbody>
</table>
Table 6. The Probability of Entering Financial Distress

<table>
<thead>
<tr>
<th></th>
<th>Year Entering College (Men)</th>
<th>Year Entering College (Women)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSU System</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>UC System</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Note. We define financial distress as having student loan repayments in excess of 15% of income at age 30.
Figure 1. 1990 and 2010 California Male Age Earnings Profiles by Education (2010 Dollars)
Figure 2. Tuition and Fees, Cost of Instruction: UC and CSU Systems (2010 Dollars)
Figure 3. The Decision to Pursue a Bachelor’s Degree

Path C

Start College?

Path A

Path B

"College Graduate"

"College Dropout"

Pay no tuition

N years’ tuition and foregone earnings

(65 - N - 18) Years at After Tax, Bachelor’s Degree Wages

M years’ tuition and foregone earnings (note: M < N)

(65 - M - 18) Years at After Tax, "Some College" Wages

Work for

Work for

Work for

(65 - 18) Years at After Tax, HS Graduate Wages
Appendix A

Benefits to a Having a BA Not Considered in the Analysis

By focusing our analysis on the college earnings premium, we have excluded from consideration other monetary and non-monetary benefits to receiving a BA that been discussed in the literature.

For example, earning a BA is associated with lower rates of incarceration as well as lower rates of receiving welfare, Supplemental Security Income, Food Stamps, etc. (Hout et. al. 2005). The savings from reduced likelihood of incarceration belongs in society’s IRR because the provision and operation of jails consumes resources. Due to data limitations, we are not able to include these (relatively small) savings in our estimate.32

We also non-pecuniary benefits of a college education potentially including those aspects of improved social skills not captured in wages. We do not adjust for the health and longevity benefits prior research attributes to BA attainment (Lleras-Muney 2005; Heckman, Humphries, Urzua, and Veramendz 2011). We do not adjust for how BA attainment is associated with higher spousal earnings (Goldin 1997). We do not adjust for the “option” value of a college education as a stepping-stone to graduate degrees, which is almost certainly rising in value (Lindley and Machin 2011).

We have focused on the college earnings premium in the hope of providing an accurate analysis that may help students and policy makers evaluate the current merit of a BA as an

32 Savings from reduced receipt of Food Stamps and other benefit programs do not belong in society’s IRR because these items represent transfers of resources from one person to another rather than resources consumed (i.e. prison guard salaries). These savings are important in a calculation of California’s IRR but due to data limitations, we do not calculate the state’s IRR in this paper. Hout et. al. (2005) contains an extensive discussion of California’s return on its higher education investment.
economic investment. Because of these omitted benefits, the true IRR is likely higher than our estimated values.
Appendix B

Estimating the Risk of Investing in a BA

As noted in the text, we define economic distress as a condition in which the required loan payment exceeds 15 percent of income. Because of the data requirements of this exercise, our measure of income is weekly earnings as reported in the Current Population Survey Monthly Outgoing Rotation Group (MORG) files – files that give us sufficient number of individual observations for our purposes.\(^{33}\)

For each year we examine, we use these data to estimate a log-normal distribution of weekly earnings for four groups: 25-34 year-old men with a BA, 25-34 year-old men with “Some College”, 25-34 year-old women with a BA and 25-34 year-old women with “Some College”. In all cases, we restrict our sample to individuals with at least $50 of earnings per week, a rough equivalent to the sample restriction of at least $1,000 per year that we impose on annual data used in all other estimations. We use the earnings distributions of persons ages 25-34 as a rough approximation to an individual’s earnings at age 30.

Our risk scenario assumes that an individual has borrowed full tuition for each year in college. Correspondingly, for each year and university system, we compute two debt burdens – one assuming the student dropped out which is based on two years of tuition, and a second based assuming the student graduates which is based on the median number of years required to earn a BA in that system in that year. We then convert each debt burden to an equivalent weekly payment assuming the student is paying off the loan in ten years (the current standard repayment schedule) at the interest rate in effect when the student is in colleges.

\(^{33}\) Though not all of these individual observations will be from California.
Combining these numbers for a given year, system and gender, we calculate the probability that, for example, a male who dropped out of the CSU system in the 1980s, will at age 30, have weekly earnings that fall below (weekly loan payment/.15), and a parallel probability assuming the man earned a BA.

These conditional probabilities of financial distress are then weighted by the probability of dropping out and the probability of graduating, respectively, to determine the overall risk of being in financial distress at age 30.