Total student loan debt rose to over $800 billion in June 2010, overtaking total credit card debt outstanding for the first time. By the time this article sees print, the continually updated Student Loan Debt Clock (at [http://www.finaid.org/loans/studentloandebtclock.phtml](http://www.finaid.org/loans/studentloandebtclock.phtml)) will show an accumulated total of roughly $1 trillion. New federal student loans for higher education amounted to $97 billion in 2009–2010: $66.8 billion to undergraduates and $31 billion to graduate students. Borrowing to finance educational expenditures has been increasing—more than quadrupling in real dollars since the early 1990s—as shown in Figure 1. The sheer magnitude of these figures has led to increased public commentary on the level of student borrowing.

On the one side, it has become fashionable to suggest that we are in the midst of an “education bubble” (for example, Schumpeter Blog 2011). As Surowiecki (2011) summarizes, “[Y]ou can’t flip a college degree the way you can flip a stock, or even a home. But what bubble believers are really saying is that young people today are radically overestimating the economic value of going to college, and that many of them would be better off doing something else with their time and money.” Similarly, Kamenetz (2006) argues that a combination of wage declines in entry-level jobs and increases in college tuition have placed many high school graduates in a no-win position, pressuring them to take on unmanageable levels of financial risk in the form of student loans. Of course, the depressed job market during the

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Christopher Avery and Sarah Turner

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Christopher Avery is Roy E. Larsen Professor of Public Policy and Management, Kennedy School of Public Policy, Harvard University, Cambridge, Massachusetts. Sarah Turner is University Professor of Economics and Education, University of Virginia, Charlottesville, Virginia. Their e-mail addresses are {chris_avery@harvard.edu} and {sturner@virginia.edu}.

† To access the Appendices, visit [http://dx.doi.org/10.1257/jep.26.1.165](http://dx.doi.org/10.1257/jep.26.1.165). doi=10.1257/jep.26.1.165
Great Recession and its aftermath has only strengthened such concerns, and added others. Rothstein and Rouse (2011) provide evidence that high debt burdens make students less likely to choose a lower-paying career, like becoming a teacher. Gicheva (2011) suggests that additional student debt of $10,000 decreases the long-term probability of marriage by 7 percentage points. A 2010 poll found that 85 percent of college graduates were planning to move back home after graduation (Dickler 2010). Newspaper stories tell of students who finish their undergraduate degree with $100,000 or more in debt (Leiber 2010).

On the other side, the earnings premium for a college degree relative to a high school degree nearly doubled in the last three decades (Goldin and Katz 2008). Further, there is no particular evidence this earnings premium has declined as a result of the Great Recession, as the alternative to a weak labor market for college graduates today is a much weaker labor market for those without a college degree. In November 2011, data from the Bureau of Labor Statistics website shows that the unemployment rate for college graduates (including those with advanced degrees) was 4.4 percent, while high school graduates faced an unemployment rate of 8.5 percent and those with collegiate attainment less than a BA faced an
unemployment rate of 7.6 percent. While the fraction of college-educated workers in the labor force has increased considerably in recent decades, current projections suggest the education level of the labor force will increase little, if at all, in the early twenty-first century (Ellwood 2001; see also Goldin and Katz 2008).

Concurrent with the recent and dramatic increase in the college earnings premium, overall undergraduate enrollment in college has increased from 10.5 million in 1980 to 17.6 million in 2009, while the annual volume of federal loans has increased more rapidly from 2.3 million loans in 1980 to 10.9 million loans in 2009 (Institute of Education Sciences 2010; see data at http://www2.ed.gov/finaid/prof/resources/data/opeloanvol.html). In theory, federal student loans can help to overcome a problem of social underinvestment in capital markets that was described by Milton Friedman in his 1962 Capitalism and Freedom:

This underinvestment in human capital presumably reflects an imperfection in the capital market: investment in human beings cannot be financed on the same terms or with the same ease as investment in physical capital. It is easy to see why there would be such a difference. If a fixed money loan is made to finance investment in physical capital, the lender can get some security for his loan in the form of a mortgage or residual claim to the physical asset itself, and he can count on realizing at least part of his investment in case of necessity by selling the physical asset. If he makes a comparable loan to increase the earning power of a human being, he clearly cannot get any comparable security; in a non-slave state, the individual embodying the investment cannot be bought and sold. But even if he could, the security would not be comparable. The productivity of the physical capital does not—or at least generally does not—depend on the co-operativeness of the original borrower.

In this perspective, student loans can potentially improve the efficiency of the economy by raising the supply of college-educated workers in the labor market. Moreover, because credit constraints are most likely to affect students from low-income families, student loans can reduce both educational and income inequality among those in the same generation and between generations. Higher levels of federal student loans may also reduce supply constraints generated by declining state-level support for public colleges and universities, reducing the extent to which collegiate attainment is deterred by insufficient educational offerings.

So are college students borrowing too much or too little? The question turns on the source of the college wage premium and on the magnitude of that wage premium for the marginal college student. The college experience provides graduates with skills and social networks, and a college degree may serve as a signal of ability to employers. These factors suggest a causal link between collegiate attainment

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1 Our focus in this analysis is on student borrowing among undergraduates in the United States. We note that loan funding is also an important source of funding in graduate programs, particularly in professional fields, though this is not the focus of our analysis.
and future wages. But it is also possible that students who choose to go to college would still be unusually successful if they entered the workforce directly upon high school graduation—that is, the college wage premium could result primarily from self-selection.

At the individual level, the choice of how much to borrow requires substantial information about expected collegiate attainment and the future path of earnings under alternative educational attainment scenarios. The connection between educational attainment and career success has been sufficiently well-publicized that even disadvantaged students from urban public schools tend to produce relatively accurate estimates of average wages at age 25 for those with and without a college degree (Avery and Kane 2004; Rouse 2004; see also Dominitz and Manski 1996). Yet, it is far from clear that young people are able to estimate their own future earnings accurately and take into account the extent to which there may be systematic differences between expectations and realizations. Manski (1993) emphasizes the importance of understanding how youth form expectations about future earnings and whether they condition on ability, in predicting their educational attainment and their own returns to education. Moreover, on the cost side, researchers have documented that students often misunderstand financial aid packages, fail to understand the much greater cost of consumer loans (such as credit card debt) relative to student loans, and miscalculate the trade-off between academic study and market work (Long 2004; Burdman 2005; Somers, Woodhouse, and Cofer 2004; King 2002; St. John 2004; Warwick and Mansfield 2000). Information constraints may lead to underborrowing if students do not avail themselves of borrowing opportunities, or to overborrowing if students overestimate the return to education.

Our focus in this paper is to move the discussion of student loans away from anecdote and to establish a framework for considering the use of student loans in the optimal financing of collegiate investments. We begin by providing a brief summary of the institutional framework and broad trends associated with U.S. student lending. The next section turns to the consideration of an analytic framework for determining how much a student should be willing to borrow and how this sum has likely changed over time. We will emphasize considerations of uncertainty and heterogeneity: even if the return to college is favorable on average, it need not be favorable for all agents. In our terminology, uncertainty is unknown, while heterogeneity represents difference among agents in their personal returns to college—including nonmonetary returns—that are known (or knowable) to them. We then look to available—albeit limited—evidence to assess which types of students are likely to be borrowing too much or too little.

Borrowing for College

Federal Student Lending Programs

There are currently four major federal sources of loans for higher education: subsidized Stafford loans, the unsubsidized Stafford loans, the Parent Loans for
Undergraduates (PLUS) program, and the Perkins loans program. We provide a brief overview of these programs, along with a comparison to private sector loans for higher education.

The Higher Education Act of 1965 created the Stafford loan program, which has long been by far the largest federal student loan program. Federal student loans were initially means tested and have traditionally featured favorable terms for students from poor families through the subsidized Stafford Loan program. These loans offer three substantive advantages over private market loans: 1) subsidized interest rates; 2) deferral of repayment while student is enrolled at least half-time in college; and 3) subsidies for interest payments while a student is enrolled at least half-time in college. These subsidized Stafford loans rose from about $15 billion in 1990 to $20 billion in 2000, before jumping to $35 billion in 2009 (all in constant 2009 dollars).

In 1992, Congress created an unsubsidized Stafford program for borrowers ineligible for the means-tested subsidized Stafford loans. In 2011–12, for example, subsidized Stafford loans carry an interest rate of 3.4 percent, but the unsubsidized Stafford loans carry an interest rate of 6.8 percent. Annual new loans in the unsubsidized Stafford program had already reached $15 billion by 2000, but since then have leaped to almost $45 billion in 2009. In addition, the federal government introduced a student loan program for parents in 1980 called Parent Loans for Undergraduate Students Program (PLUS). This program loaned about $2 billion in 1990 and $5 billion in 2000, before rising to $12 billion in 2009.

Finally, the 1958 National Defense Education Act created the National Defense Student Loan Program (NDSL) which is now known as the Federal Perkins Loan Program. Perkins loan funds have been distributed by the federal government to collegiate institutions, with institutions in turn allocating funds on the basis of financial need. In the 2009–10 academic year, about 520,000 students from 1,800 institutions received Perkins loans, averaging $2,125, so total spending on the program is a little over $1 billion. The Perkins program is set to expire in 2012, limiting new loans to any funds available from repayments.

Overall, in 2009, subsidized Stafford loans accounted for about 43 percent of federal loan volume, with unsubsidized Stafford loans accounting for 40 percent and PLUS loans for 16 percent. However, it is naturally important to remember that federal lending for higher education is not a comprehensive measure of total lending for that purpose. For example, the growth in federal student loans may overstate the true increase in borrowing for students to attend college if the increase in Stafford loans supplanted other types of loans—like home equity loans in some cases—used previously to pay for college costs.

Starting in the mid-1990s, there has also been a dramatic increase in private sector loans that can be explicitly linked to higher education, driven in part by increased demand for such loans and in part by financial services sector innovations such as greater securitization of student loans through asset-backed securities. While private sector loans were about $1.5 billion (constant 2009 dollars) in 1995–96, they grew to $21.8 billion by 2007–2008, representing about 20 percent of all loan funds...
distributed (College Board 2010a). Because these loans generally carry somewhat higher interest rates than federal loans, students typically take these loans after exhausting other sources of credit. Mazzeo (2007) reviewed private student loan offerings and noted that many of these loans are marketed as supplements to Stafford loans. Mazzeo also suggests that some parents may prefer private lending options over PLUS loans, because the private loans are made in the student’s name. Because private lenders have a greater capacity to discriminate among borrowers by their choice of collegiate investments, higher-ability students and students enrolled in the most remunerative degree programs will be offered more credit by private lenders (Lochner and Monge-Naranjo 2011). In the wake of the financial crisis of 2008 and 2009—and its effects on the market for securitized loans in general—private sector student loans have returned to their historical level of about 7 percent of the market.

Shifting from borrowing to repayment, conventional student loans carry monthly payments over a 10-year horizon. With federal loans, students can choose from among alternative repayment options, which may increase the duration of the loan to 25 years, and graduated payments, with payments increasing every two years (see Krueger and Bowen, 1993, for discussion of income-contingent repayment plans).

### Student Borrowing

To be eligible for federal loan options, a student must complete the Free Application for Federal Student Aid (FAFSA) form (available at [http://federalstudentaid.ed.gov](http://federalstudentaid.ed.gov)). This application qualifies students for federal student aid programs authorized under Title IV of the Higher Education Act, including both direct loan programs and Pell grants. Eligibility for student loans is restricted to U.S. citizens, permanent residents, and eligible noncitizens (like those granted asylum) with high school degrees or who have passed the General Educational Development (GED) test. Eligibility for subsidized government loans is further restricted to students with demonstrated unmet financial need—or those students for whom cost of attendance minus grant aid minus the “Expected Family Contribution” (calculated through analysis of income and assets) is positive. This level of unmet need serves as a cap on the amount that a student will be permitted to borrow through federal loan programs and is the total cost of attendance less any grant aid (federal, state, or institutional). Economic models predict that students will exhaust borrowing from the lowest cost of capital first (subsidized loans, if the student is eligible), followed by unsubsidized government loans and private loans, though such a pattern does not always hold in the data.

Table 1 provides summary statistics for undergraduate borrowing from federal programs over the past 20 years. During this time, the total volume of federal loans has expanded several-fold, but average loan levels per student borrower were largely constant in real terms. That is, the increase in loans disbursed by the federal government is largely due to an expansion in the number of borrowers over time. In addition to an increase in the number of students enrolling in college over time, the proportion...
of undergraduates who take out student loans has increased, rising from about 19 percent in 1989–90 to about 35 percent in 2007–2008. As shown in Table 1, this increase in borrowing has been somewhat larger among dependent undergraduate students than independent students.

Students who begin at two-year public institutions are the least likely to borrow (about 10 percent in 2007–2008) and borrow the lowest average amounts (conditional on borrowing at all). Students at for-profit institutions are the most likely to borrow (88 percent).

This variation in borrowing by type of institution is a function of both the revenue structure of colleges and universities and the extent to which institutions draw students with a high degree of financial need. For-profit institutions depend largely on student tuition and fees and receive about three-quarters of their funding through federal Title IV loans and grants (as Deming, Goldin, and Katz discuss in their paper in this symposium).

There is a structural reason that average federal loan levels per student have been fairly constant in real terms over time: borrowing under the federal loan programs is limited by both cost of attendance (less grant aid) and nominal loan limits associated with the Stafford, Perkins, and PLUS program. For the Stafford program, annual loan limits are defined in terms of year of study and independent status, rising from $3,500 per year for first-year undergraduates to $8,500 for graduate students. The loan limits associated with the Stafford program bind in many cases, with borrowers

Table 1
Percentage of All Undergraduate Borrowing, by Student and Institution Characteristics

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>19%</td>
<td>19%</td>
<td>25%</td>
<td>27%</td>
<td>32%</td>
<td>35%</td>
</tr>
<tr>
<td>Type of institution</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public 4-year</td>
<td>19%</td>
<td>23%</td>
<td>37%</td>
<td>39%</td>
<td>43%</td>
<td>41%</td>
</tr>
<tr>
<td>Private nonprofit 4-year</td>
<td>31%</td>
<td>34%</td>
<td>47%</td>
<td>49%</td>
<td>53%</td>
<td>54%</td>
</tr>
<tr>
<td>Public 2-year</td>
<td>4%</td>
<td>6%</td>
<td>4%</td>
<td>5%</td>
<td>8%</td>
<td>10%</td>
</tr>
<tr>
<td>For-profit</td>
<td>63%</td>
<td>47%</td>
<td>59%</td>
<td>74%</td>
<td>76%</td>
<td>88%</td>
</tr>
<tr>
<td>Dependency status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependent</td>
<td>18%</td>
<td>20%</td>
<td>31%</td>
<td>34%</td>
<td>36%</td>
<td>36%</td>
</tr>
<tr>
<td>Independent</td>
<td>19%</td>
<td>17%</td>
<td>19%</td>
<td>21%</td>
<td>28%</td>
<td>33%</td>
</tr>
</tbody>
</table>


Note: This table includes both subsidized and unsubsidized borrowing from the Stafford program.

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For purposes of financial aid awards, an independent student is a student who meets any one of the following: at least 24 years old; married; a graduate or professional student; a veteran; an orphan; a ward of the court; or someone with legal dependents other than a spouse.
often clustered at the maximum loan level. For two decades from 1987 to 2007, loan limits remained fixed in nominal terms: for example, first-year students were limited to borrowing $2,625 from the subsidized Stafford program. In addition to annual limits, there are lifetime limits on subsidized Stafford ($23,000) and unsubsidized Stafford ($31,000 for dependents and $57,500 for independent). With rapid increases in college costs during the 1990s and unchanging loan limits, the share of undergraduate borrowers reaching loan limits increased from 1989–90 until 2007 when loan limits were increased. In 1989–90, 42 percent of subsidized Stafford borrowers were at the maximum, while 17.8 percent of all Stafford borrowers were at the maximum; by 2003–2004, these numbers had risen to 50.3 and 50.6 percent for subsidized Stafford borrowers and all student borrowers, respectively. With Stafford loan limits raised in 2007, the percentage at the maximum for subsidized and unsubsidized Stafford loans fell to 42.4 and 44.1 percent, respectively, in 2007–2008 (Wei 2010).

**College as an Investment**

The decision as to whether to invest in one’s human capital in the form of education requires that an individual compare the present discounted value of benefits—among which are the gains in future earnings as a result of education—to the present discounted value of costs, including tuition, fees, and foregone wages. In this section, we consider the question of the extent to which the monetary returns from college have exceeded the costs over recent decades for an average student. (For discussion of the nonmonetary returns to college—for example, conditioning on wage levels, the extent to which higher educational attainment predicts higher job satisfaction, see the article by Oreopoulos and Salvanes in the Winter 2011 issue of this journal.) In the next section, we focus on uncertainty and heterogeneity across students.

Suppose that two students graduate from high school simultaneously in June 2009, and that one completes college in four years and subsequently earns wages equal to the average for college graduates at each age, while the other enters the job market immediately and earns wages equal to the average for high school graduates at each age. Based on data from the 2009 Current Population Survey, the gap in average earnings between college graduates and high school graduates starts at $7,000 at age 22 ($28,200 for college graduates versus $21,000 for high school graduates), grows steadily from age 22 to 42 and then levels off at later ages. Though at the point of college graduation the fictitious college graduate would be more than $100,000 behind the high school graduate in the present discounted value of net income, the college graduate overtakes the high school graduate at age 34.

---

3 With well-functioning capital markets and full opportunities to borrow, the human capital investment decision of how much education to acquire is separable from the consumption and savings choice at each moment in time conditional on expected lifetime earnings (for a formal demonstration, see Lochner and Monge-Naranjo 2011).
With this example, we want to emphasize that we are not making a causal statement about the magnitude of the returns to education. Such a comparison would rest critically on the assumption that the counterfactual wage distribution for someone earning the average college wage is the average wage of high school graduates. However, at least some of the characteristics that lead a person to select college may also be relevant to their income-earning abilities after college, and observed wages will reflect selection into different levels of education. In addition, changes in earnings streams over time may reflect compositional shifts in the characteristics of individuals with different levels of educational attainment. Later in the paper, we will delve further into these issues of heterogeneity and their implications for the choices of individuals.

In a present discounted value calculation with a 3 percent yearly discount rate, by age 64 the college graduate would have compiled a total of approximately $1.2 million in earnings net of tuition at age 64 as opposed to approximately $780,000 in total earnings for the high school graduate. Of course, this calculation of the average lifetime benefit to a college degree requires a number of assumptions: the discount rate, years of work, growth rate of earnings over the life course, labor force participation, and so forth. But, given the large difference in outcomes between the two fictitious students in this example, the qualitative comparison between them is clearly robust to plausible changes in underlying assumptions. In particular, the comparison is robust to adjustments for the effect of self-selection. For instance, if we assume that half of the difference in wages between a college graduate and a high school graduate is due to self-selection, then the lifetime earnings for the college graduate decline to $925,000 and the college graduate would not overtake the high school graduate until age 42. The present discounted value only becomes the same for the high school graduate and the college graduate if we attribute about 75 percent of the difference in observed earnings to self-selection. This seems like an implausibly large effect given the connection between college graduation and many lucrative career paths.

Figure 2 compares the average lifetime earnings for a college graduate relative to a high school graduate for men and women from 1965 to 2008. The annual values reflect what a man or woman would expect to earn working full time, full year over a career of 42 years, with a discount rate of 3 percent, assuming the college graduate delayed the start of earnings for four years while in school. We calculate the expectation formed in any given year by assuming that the future high school and college graduates will have the future earnings at each age equal to the average earnings of high school and college graduates (respectively) presently observed at each age: thus, the expectation in, say, 1980 is formed based on data across ages for 1980, and so on for each year. The present discounted value of earnings for high school graduates has remained mostly flat (particularly for men). At the same time, the present discounted value of the earnings for a college graduate have risen.

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4 The average yearly earnings at age 22 are $21,000 for a high school graduate and $28,000 for a college graduate; attributing half of this difference to self-selection corresponds to a predicted wage of $24,500 for someone who is switched from being a high school graduate to a college graduate.
Figure 2
Trends in the Present Discounted Value (PDV) of High School and College Earnings Net of Tuition

Notes: Expected earnings are calculated from the March Current Population Survey files for full-time, full-year workers using sample weights, assuming 42 years of work experience per person. Results for college-educated workers are net of four years of tuition and fees associated with appropriate year-specific values for public universities.
markedly between 1981 and 2008, rising from $1.2 to $1.5 million for men and from $720,000 to $1.1 million for women.

Figure 3 makes clear that the lifetime earnings increment, on average, of a college degree receipt relative to a high school degree has grown markedly over the last three decades for men and women. These earnings increments are shown in comparison to the discounted value of tuition expenditures over four years (the on-time degree completion for a full-time student) over time in recent years. Thus, even as the present discounted value of tuition for four years at a private college (which would be the most expensive option) has increased over the interval from

These estimates are similar in spirit to Census Bureau estimates produced in Day and Newburger (2002); our estimates of the total value of lifetime earnings to different educational credentials is somewhat lower owing to discounting annual earnings and subtracting expected direct costs of educational investments.

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**Figure 3**

Present Discounted Value of College Degree Net of Tuition, 1965–2010

*Source:* These calculations are based on data from the March Current Population Survey files for full-time, full-year workers using sample weights.

*Notes:* College–High school difference represents the difference between the present discounted value of the average expected earnings of a college graduate (assuming that earnings begin four years after college entrance and the student pays tuition for four years) and the stream of earnings for a high school graduate. See Figure 2 for earnings calculations.
about $50,000 to $122,000 (all in constant 2008 dollars), average benefits of college completion in terms of future earnings have increased more rapidly. To be sure, the average net price of college is somewhat below these figures, because grant-based financial aid from government and institutions reduces the price paid by students below the sticker price.

One natural conjecture is that a risk of recession should affect how students invest in a college education, but the direction of this effect is not clear. On one side, the opportunity cost of attending college in terms of foregone wages is lower during a recession, which should tend to increase college attendance during recessions; on the other side, there is a negative effect on wages for those who graduate from college during a recession that can persist as long as ten years (Kahn 2010), which might tend to discourage college attendance in a recession. Figure 3 indicates, however, that the estimated present discounted value of a four-year college degree has increased fairly steadily over the past 30 years through both booms and busts. Further, the comparisons in the figure are based on the average difference in wages for full-time workers with and without BA degrees, but the unemployment rate for college graduates tends to be substantially lower than that for high school graduates in a recession. For that reason, Figure 3 may understate the financial return to a college degree during a recession.

The message is clear: expected lifetime earnings associated with a college degree have increased markedly over time. As the investment value of a college degree rises, it is natural to think of individuals increasing their willingness to borrow to achieve these higher returns.

Of course, a number of factors also affect realized student borrowing which may well diverge from willingness to borrow. For example, the direct cost of college represented by tuition charges has increased markedly in both the public and private sectors, which will tend to increase demand for borrowing among those students who do not receive commensurate increases in financial aid. In addition,

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6 Data from the College Board (2010b, table 7) indicate that tuition and fees net of grant aid changed much less markedly than posted tuition or “sticker price.” At private four-year institutions, average net tuition and fees (in 2010 constant dollars) decreased from $12,230 to $11,320 between 2000–01 and 2010–11, decreased at public four-year institutions from $1,990 to $1,540, and also decreased at public two-year institutions from $920 to $670.

7 At the macroeconomic level, some combination of demographic changes and sectoral shifts in employment would be more likely than a long-lived recession to reduce the financial gains from a college degree indicated in Figure 3. In fact, 35 years ago, in The Overeducated American, Richard Freeman noted the dramatic decline in the earnings of new college graduates and argued that there would be little net benefit to further increases in the supply of college graduates. Consistent with Freeman’s analysis, Figure 3 suggests that expected financial returns to a college degree were near a long-term low for this time period towards the end of the 1970s. But our computations still indicate a clear positive value for completing college at that time. We compute average lifetime earnings in a given year by simply adding the average earnings of workers at each age in that year. As Smith and Welch (1978) note, although young (age 25 to 34) college graduates were earning relatively low wages, there remained large gaps in wages between college graduates and high school graduates at older ages throughout the 1970s. In essence, the qualitative comparisons from Figure 3 for the 1970s rely on the conjecture that college graduates would continue to enjoy substantial wage gains at age 35 and beyond—a conjecture that has been borne out in subsequent years.
Uncertainty and Heterogeneity across Individuals

To this point, we have focused on the college investment and borrowing decisions on average; however, substantial variation in expected returns at the time of college entry for individuals may lead to different conclusions about the investment value of college and the associated level of borrowing. First, ultimate educational attainment varies considerably: some students will start but not complete college, while others will go on to complete graduate degrees that can pave the way to lucrative careers. Second, choice of occupations varies considerably, some with higher and some with lower average wages, among those students who achieve a given level of educational attainment. Third, substantial dispersion in wages exists even conditional on educational attainment and (broad) choice of occupation. In this section, we discuss these three factors, and the implications for the expected financial returns to college for a given student. As students make borrowing decisions, a central question is the extent to which they can accurately predict these determinants of future earnings. If students can accurately predict these determinants of future earnings, we would expect borrowing to vary substantially with these outcomes.

Collegiate Attainment

Only 55 percent of dependent students who anticipate completing a BA degree actually do so within six years of graduating high school, while more than one-third of them do not complete any postsecondary degree within six years. Similarly, more than half of dependent students who anticipate completing an associate’s degree do not do so within six years of graduating high school (authors’ tabulations, Beginning Postsecondary Study 2004:2009). Table 2 shows expected degree completion, realized degree completion, and the associated distribution of borrowing. One particularly negative outcome emerges: among students who anticipate completing a BA degree, 51.3 percent will end up with no degree and an average of $7,413 in student loans ($14,457 conditional on having borrowed at all).

To some degree, differences in educational outcomes across the set of college freshmen can be predicted by factors that are observable at the time of college entry. Not surprisingly, Bound, Lovenheim, and Turner (2010) show substantial differences in
degree completion rates conditional on student achievement. In addition, graduation rates and expected future earnings may differ among colleges and universities, perhaps because U.S. colleges and universities differ widely in available resources. Tabulations specific to this paper show that among students beginning at four-year colleges, private for-profit colleges have dramatically lower average graduation rates (16 percent) for dependent students than do public (63 percent) or private not-for-profit (68 percent) colleges. In addition, there is substantial variation in graduation rates within each college category, with more-selective colleges typically having higher graduation rates.

Table 2

Expected Degree Completion, Realized Degree Completion, and Borrowing

<table>
<thead>
<tr>
<th>Expected attainment</th>
<th>No degree</th>
<th>Certificate</th>
<th>AA</th>
<th>BA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution by expected attainment</td>
<td>3.6%</td>
<td>4.0%</td>
<td>13.0%</td>
<td>79.4%</td>
</tr>
<tr>
<td>Realized attainment</td>
<td>66.2%</td>
<td>51.9%</td>
<td>62.0%</td>
<td>38.0%</td>
</tr>
<tr>
<td>No degree</td>
<td>7.0%</td>
<td>31.9%</td>
<td>9.1%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Certificate</td>
<td>4.9%</td>
<td>5.5%</td>
<td>21.5%</td>
<td>7.5%</td>
</tr>
<tr>
<td>AA</td>
<td>21.9%</td>
<td>10.8%</td>
<td>7.3%</td>
<td>52.4%</td>
</tr>
<tr>
<td>BA</td>
<td>35.6%</td>
<td>37.0%</td>
<td>39.2%</td>
<td>51.3%</td>
</tr>
<tr>
<td>Certificate</td>
<td>22.0%</td>
<td>29.8%</td>
<td>47.9%</td>
<td>43.8%</td>
</tr>
<tr>
<td>AA</td>
<td>54.6%</td>
<td>35.1%</td>
<td>54.7%</td>
<td>55.6%</td>
</tr>
<tr>
<td>BA</td>
<td>66.3%</td>
<td>42.8%</td>
<td>65.4%</td>
<td>63.7%</td>
</tr>
<tr>
<td>Percentage with student loans</td>
<td>$4,475</td>
<td>$4,128</td>
<td>$4,222</td>
<td>$7,413</td>
</tr>
<tr>
<td>No degree</td>
<td>$1,618</td>
<td>$2,788</td>
<td>$4,794</td>
<td>$5,113</td>
</tr>
<tr>
<td>Certificate</td>
<td>$7,651</td>
<td>$3,565</td>
<td>$8,544</td>
<td>$9,564</td>
</tr>
<tr>
<td>AA</td>
<td>$22,183</td>
<td>$9,658</td>
<td>$16,645</td>
<td>$15,562</td>
</tr>
<tr>
<td>BA</td>
<td>$33,480</td>
<td>$22,582</td>
<td>$25,465</td>
<td>$24,437</td>
</tr>
</tbody>
</table>

Source: Authors’ tabulations from Beginning Postsecondary Survey (BPS) 2004:2009, including survey results in 2008–09 for students who entered any four-year college or public two-year college in 2003–2004. Note: AA is Associate’s degree; BA is Bachelor’s degree.

degree completion rates conditional on student achievement. In addition, graduation rates and expected future earnings may differ among colleges and universities, perhaps because U.S. colleges and universities differ widely in available resources. Tabulations specific to this paper show that among students beginning at four-year colleges, private for-profit colleges have dramatically lower average graduation rates (16 percent) for dependent students than do public (63 percent) or private not-for-profit (68 percent) colleges. In addition, there is substantial variation in graduation rates within each college category, with more-selective colleges typically having higher graduation rates.\textsuperscript{8}

\textsuperscript{8} There is some debate in the literature about whether the economic benefits of attending a more-selective college can be explained entirely by selection, because more-promising students tend to attend more-selective colleges (for example, Hoxby 2001; Black, Daniel, and Smith 2005; Hoekstra 2009; Dale and Krueger 2011). But for the purpose of assessing the expected willingness to borrow, this debate is mostly immaterial—the question of interest to any particular student is “What is my expected financial gain
A student’s computation of the expected financial return to entering college should incorporate the conditional probability of not completing college given all known factors, including that student’s past achievement and the historical graduation rates for the college chosen. These adjustments would have more effect in reducing the expected value of attending higher education for students with lower achievement levels and especially for those attending colleges—such as private for-profit colleges—with very low documented graduation rates.

**Choice of College Major and Career**

One widely cited story about a student struggling with an unusual amount of debt is the case of a 26 year-old graduate from New York University with $97,000 in loans referenced in a May 2010 *New York Times* story (Leiber 2010). With an interdisciplinary degree in religious and women’s studies—which are fields of study with quite low expected earnings—one is left to wonder how this student’s expectations about future earnings aligned with her borrowing decisions, both at the start of her college career and as she settled on her choice of major. Plainly, the student’s prospects of paying the loan back are somewhat limited with a $22/hour job working for a photographer. Could this student have predicted the divergence between her earnings and her capacity to repay the loan? In practice, there are substantial differences in the expected lifetime earnings by choice of major.

**Figure 4** shows the present discounted value of predicted lifetime earnings associated with different fields of specialization for men with exactly a BA. The estimates are based on a regression with the log of annual earnings as the dependent variable, and dummy variables for undergraduate major, post-baccalaureate degree attainment, job experience, race, and gender as explanatory variables. Not surprisingly, students who have chosen a technical field—in the broad categories of computer science, engineering, and math—tend to earn more than the average and more than those with education or humanities undergraduate concentrations. There is a substantial economics literature on the return to different undergraduate specializations including Paglin and Rufolo (1990), Grogger and Eide (1995), and dynamic models like Arcidiacono, Hotz, and Kang (2010). There are also more accessible publications available through public policy and career services sources (like Carnevale, Strohl, and Melton 2011), although it is not clear that students use this information when selecting a college major and choosing how much to borrow for college.

If students enter college with knowledge of their intended major, we would expect to see systematic differences in borrowing by field of study in relation to the expected earnings by field of study. Of course, some students enter college with no specific choice of major or career field in mind, while others may change their majors while enrolled in college, which in either case makes it difficult to take this factor into account in advance.

---

(or loss) given that I am attending college instead of taking a full-time job and not “What would be my expected financial gain (or loss) if I attend more-selective College Y rather than less-selective College Z?”
Collegiate Investment and the Increased Dispersion in Earnings and Attainment

As the average earnings of college graduates has increased, so too has the variance in earnings, and gains have been disproportionately concentrated among graduates with professional degrees and those with earnings outcomes in the top deciles (Acemoglu and Autor 2010; Lindley and Machin 2011). Annual differences in earnings among college graduates are magnified over the life course and, in turn, have a substantial impact on the expected return to a collegiate investment.

Figure 5 presents the distributions of lifetime earnings for different levels of postsecondary attainment for men in 1978, which is approximately the trough in the return to a college education, and 2008. (See the online Appendix available with this paper at http://e-jep.org for a similar figure for women, a group for whom participation in the labor market changed substantially during this time.) In both years, distribution of lifetime earnings for those with graduate degrees dominates the distribution for those with BA degrees, which in turn dominates the distribution for those completing some college, which in turn dominates the distribution for high school graduates. The difference in outcomes across these distributions widens markedly at the top part of the distribution beyond about the 80th percentile.

Source: Authors using data from the American Community Survey (2009).

Note: Based on regression of log annual earnings on dummy variables for undergraduate major, post-baccalaureate degree attainment, a quartic in experience, and indicators for race and gender using data from the American Community Survey (2009) with sample weights.

Figure 4
Expected Lifetime Earnings by Undergraduate Major, 2008

Source: Authors using data from the American Community Survey (2009).

Note: Based on regression of log annual earnings on dummy variables for undergraduate major, post-baccalaureate degree attainment, a quartic in experience, and indicators for race and gender using data from the American Community Survey (2009) with sample weights.
Figure 5
Distribution of Present Discounted Value of Career Earnings, Men

A: Men, 1978

B: Men, 2008

Source: Data are from the 1979 and 2009 annual files of the March CPS and are limited to full-time, full-year workers.
Notes: Percentiles of age-specific earnings profiles in each year are discounted to generate the expected value of lifetime earnings assuming a discount rate of 3 percent. More details of the calculations are presented in the online Appendix.
Figure 5 suggests two conspicuous changes from 1978 to 2008. First, differences in earnings between different postsecondary outcomes are more pronounced in 2008 than in 1978, with especially large gaps in 2008 between graduate degree recipients and BA degree recipients, and separately for BA degree recipients and those completing less than a BA degree. Secondly, within each education group, the difference between the median and the top of the distribution is much larger in 2008 than in 1978. To illustrate, the difference in expected lifetime earnings between a male college graduate at the 90th percentile and a male college graduate at the median rises from $963,149 in 1978 to $2,287,067 in 2008. For those who complete a graduate degree and find themselves in the top part of the distribution, the difference in earnings in 2008 relative to 1978 is extraordinary—for the order of $1.7 million over a lifetime for a man at the 90th percentile. For those who attend college and do not receive a degree, outcomes are notably stagnant, particularly in the lowest two-thirds of the distribution. Among men, those who have attended college but not received a BA degree are actually somewhat worse off over the life course in 2008 relative to 1978, while women in this situation are only modestly better off in 2008 than in 1978.

As we consider the increased observed variance in earnings within postsecondary outcomes, a key question is whether individuals are able to predict their position in the earnings distribution at the start of college and as they are making within-college borrowing decisions. If individuals have such information, we would expect borrowing to increase with an individual’s place in the earnings distribution. Alternatively, the increase in the variance in earnings over time may reflect increased uncertainty about the economic outcomes associated with any educational trajectory.

While the relative importance of heterogeneity and uncertainty provide one framework for considering differences in collegiate investments and borrowing, it may be that student borrowing and investment decisions are also affected by imperfect information. If students systematically misperceive the likelihood of collegiate attainment or expected earnings, they may make “mistakes” in borrowing too much (or too little).

**Implications for Borrowing and Collegiate Investments**

How does the variation in the likelihood of completing a degree, choice of major, or where one will end up on the income distribution affect the decision to invest in a college education and, in turn, the decision to borrow for college? If individuals can make accurate predictions about whether they will complete college and what they would earn conditional on attaining a college degree, then most of the variation in lifetime earnings outcomes can be attributed to heterogeneity that is observable at the time of the decision—differences in individual aptitude or preparation, choice of college, and so forth. If, instead, individual characteristics that are observable at the time of college enrollment provide little information about future educational attainment and subsequent labor market outcomes, then an individual’s best estimate of the financial return to enrolling in college, and how
much to borrow, must be based on a probabilistic assessment of earnings, which may encompass a wide range of outcomes. In effect, are realized differences in earnings a result of heterogeneity or uncertainty?\(^9\)

To illustrate the implications of these two different cases, consider hypothetical scenarios based on the correlation between a student’s rank order in the distribution of career earnings for college graduates (assuming that this student attends and graduates from college) and that student’s rank order in the distribution for high school graduates (assuming instead that the student does not go to college). At one extreme, an individual would have the same position in the rank order distribution of earnings at each degree level—so that someone at the 80\(^{th}\) percentile of the high school distribution could expect to be at the 80\(^{th}\) percentile of the collegiate distribution. At the other extreme, the correlation between an individual’s position in the high school distribution and the college distribution is zero, which means that the best estimate of the outcome will be the earnings outcome for the person at the median of the college distribution. An intermediate case is the assumption of a correlation coefficient between postsecondary and college outcomes on the order of 0.75\(^{10}\).

How do these projections differ across the three decades from 1978 to 2008, given the appreciable gains at the very top of the collegiate wage distribution? Table 3 presents estimates under the three alternative assumptions of the high school–college correlation in rank (\(\rho = 0, 0.75, 1\)); the top panel shows the expected present value of net lifetime earnings of a college graduate and the bottom panel shows the expected differential between collegiate and high school earnings. Assuming perfect correlation between high school rank and college rank produces the distributions with the steepest upward trajectories—increasing earnings. To illustrate, a man at the 90\(^{th}\) percentile of the high school, career-earnings distribution would be projected to have net collegiate, career earnings of $1.8 million in 1978 (constant dollars) and $2.3 million in 2008, while a student at the 10\(^{th}\) percentile of the high school distribution would be projected to have career earnings of $603,624 in 1978 and the slightly lower outcome of $570,865 in 2008. As uncertainty increases, or the correlation coefficient decreases, projected career earnings “flatten” across the baseline distribution. With a weaker correlation, a greater share of the distribution

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\(^9\) Recent work in applied econometrics including Chen (2008) and Gunka, Heckman, and Navarro (2005) addresses the challenges of measuring the extent to which the potential dispersion of earnings is attributable to individual heterogeneity or uncertainty. In general, the problem of distinguishing heterogeneity from uncertainty is complicated by the absence of clear identification without very strong functional form assumptions. Chen (2008) attributes much of the greater wage inequality among college graduates than high school graduates to relatively larger effect of heterogeneity among individuals, though she estimates that about 80 percent of potential wage inequality among college graduates is attributable to uncertainty.

\(^{10}\) In essence, we match the percentile of the high school distribution (\(HS\)) to a percentile in the college distribution as a conditional expectation which is a function of the correlation between \(HS\) and \(C\), such that \(E(C|HS) = (1 - \gamma)HS + \gamma HS\) where \(\gamma\) is the square of the correlation coefficient and \(HS\) is the average percentile (the median). When the correlation is 0.75, gamma is equal to 0.5625, and the expected rank in the college distribution is a weighted average of the median and the observed high school rank. Expected earnings are computed as a share-weighted combination of the earnings distributions for those at the different levels of collegiate attainment from less than a BA to graduate degrees.
Table 3

<table>
<thead>
<tr>
<th>Percentile of earnings distribution</th>
<th>1978</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ρ = 1</td>
<td>ρ = .75</td>
</tr>
<tr>
<td>Expected PDV collegiate earnings</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>378,180</td>
<td>492,778</td>
</tr>
<tr>
<td>25</td>
<td>492,775</td>
<td>564,747</td>
</tr>
<tr>
<td>50</td>
<td>646,042</td>
<td>646,042</td>
</tr>
<tr>
<td>75</td>
<td>824,954</td>
<td>736,132</td>
</tr>
<tr>
<td>90</td>
<td>1,012,494</td>
<td>824,934</td>
</tr>
<tr>
<td>95</td>
<td>1,162,783</td>
<td>869,542</td>
</tr>
<tr>
<td>99</td>
<td>1,418,246</td>
<td>930,391</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>603,625</td>
<td>838,579</td>
</tr>
<tr>
<td>25</td>
<td>810,516</td>
<td>926,495</td>
</tr>
<tr>
<td>50</td>
<td>1,072,293</td>
<td>1,072,293</td>
</tr>
<tr>
<td>75</td>
<td>1,372,471</td>
<td>1,217,483</td>
</tr>
<tr>
<td>90</td>
<td>1,814,302</td>
<td>1,366,319</td>
</tr>
<tr>
<td>95</td>
<td>2,172,964</td>
<td>1,440,285</td>
</tr>
<tr>
<td>99</td>
<td>3,095,903</td>
<td>1,552,359</td>
</tr>
<tr>
<td><strong>Percentile of high school wage distribution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>134,813</td>
<td>249,411</td>
</tr>
<tr>
<td>25</td>
<td>167,899</td>
<td>239,871</td>
</tr>
<tr>
<td>50</td>
<td>221,041</td>
<td>221,041</td>
</tr>
<tr>
<td>75</td>
<td>273,940</td>
<td>185,138</td>
</tr>
<tr>
<td>90</td>
<td>296,916</td>
<td>109,356</td>
</tr>
<tr>
<td>95</td>
<td>322,090</td>
<td>28,849</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>235,318</td>
<td>470,272</td>
</tr>
<tr>
<td>25</td>
<td>298,880</td>
<td>414,859</td>
</tr>
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<td>50</td>
<td>361,800</td>
<td>361,800</td>
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<tr>
<td>75</td>
<td>410,767</td>
<td>255,779</td>
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<tr>
<td>90</td>
<td>509,569</td>
<td>151,586</td>
</tr>
<tr>
<td>95</td>
<td>813,152</td>
<td>80,473</td>
</tr>
<tr>
<td>99</td>
<td>1,116,979</td>
<td>-426,564</td>
</tr>
</tbody>
</table>

Source: Authors.
Among students at the median is relatively modest: zero for students beginning at college entrance by type of first institution. Table 4 presents total accumulated student borrowing six years after some indication of whether it is likely that the current generation is part of a “debt bubble.”

Table 4 also highlights the widespread variation in borrowing levels. Borrowing among students at the median is relatively modest: zero for students beginning at college can be viewed as a lottery with substantial probability of amassing debt but earning no degree, risk aversion would likely reduce the attractiveness of borrowing to enroll in college. At the same time, students can anticipate a flow of new information about costs (for example, time and effort required to complete a degree) and benefits (likely job placement and salaries) of college while enrolled. Since it is possible to drop out at any time, this flow of information induces an option value to initial college enrollment. Indeed, Stange (forthcoming) estimates that 14 percent of the (positive) expected return to college enrollment can be attributed to this option value (see also Stinebrickner and Stinebrickner 2009).

One important implication of the option value of enrolling in college is that even assuming optimal enrollment decisions by students based only on the financial implications of college (excluding, for example, the consumption value of attending college), we should still expect to see some students dropping out. George Stigler once commented, “If you never miss a plane, you’re spending too much time at the airport.” Similarly, if no one dropped out of college, we could likely conclude that more students should be enrolling.

Additional Factors

Two additional factors may have important implications for the financial costs and gains of enrolling in college: risk aversion and option value. Since enrolling in college can be viewed as a lottery with substantial probability of amassing debt but earning no degree, risk aversion would likely reduce the attractiveness of borrowing to enroll in college. At the same time, students can anticipate a flow of new information about costs (for example, time and effort required to complete a degree) and benefits (likely job placement and salaries) of college while enrolled. Since it is possible to drop out at any time, this flow of information induces an option value to initial college enrollment. Indeed, Stange (forthcoming) estimates that 14 percent of the (positive) expected return to college enrollment can be attributed to this option value (see also Stinebrickner and Stinebrickner 2009).

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Do Students Make Optimal Use of Loans in Financing College?

While it is too early to assess the extent to which early twenty-first century student borrowers as a group will face oppressive long-term burdens from their student debt, a look at student outcomes six years after college enrollment provides some indication of whether it is likely that the current generation is part of a “debt bubble.” Table 4 presents total accumulated student borrowing six years after college entrance by type of first institution.

Table 4 also highlights the widespread variation in borrowing levels. Borrowing among students at the median is relatively modest: zero for students beginning at college.
community colleges, $6,000 for students at four-year public colleges, and $11,500 for students at private nonprofit colleges. Even at the 90th percentile, student borrowing does not exceed $40,000 outside of the for-profit sector. Examples of students who complete their undergraduate degree with more than $100,000 in debt are clearly rare: outside of the for-profit sector, less than 0.5 percent of students who received BA degrees within six years had accumulated more than $100,000 in student debt. The 90th percentile of degree recipients starting at for-profits have $100,000 in debt; so a nontrivial number of students at for-profits accumulate this much debt, but the situation is still far from the norm.

Leaving aside extreme cases, are student borrowing levels assumed by the majority of undergraduate students consistent with their capacity to repay these loans? There is little evidence to suggest that the average burden of loan repayment relative to income has increased in recent years. The most commonly referenced benchmark is that a repayment to gross income ratio of 8 percent, which is derived broadly from mortgage underwriting, is “manageable” while other analysis such as a 2003 GAO study set the benchmark at 10 percent. To put this in perspective, an individual with $20,000 in student loans could expect a monthly payment of about $212, assuming a ten-year repayment period. In order for this payment to accrue to

Table 4
Borrowing Distribution after Six Years, by Degree Type and First Institution

<table>
<thead>
<tr>
<th>Type of institution of first enrollment</th>
<th>Public 4-year</th>
<th>Private nonprofit 4-year</th>
<th>Private for-profit 4-year</th>
<th>Public 2-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>All students beginning in 2004</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Borrowing</td>
<td>61%</td>
<td>68%</td>
<td>89%</td>
<td>41%</td>
</tr>
<tr>
<td>Percentile of borrowers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>25th</td>
<td>$0</td>
<td>$0</td>
<td>$6,376</td>
<td>$0</td>
</tr>
<tr>
<td>50th</td>
<td>$6,000</td>
<td>$11,500</td>
<td>$13,961</td>
<td>$0</td>
</tr>
<tr>
<td>75th</td>
<td>$19,000</td>
<td>$24,750</td>
<td>$28,863</td>
<td>$6,625</td>
</tr>
<tr>
<td>90th</td>
<td>$30,000</td>
<td>$40,000</td>
<td>$45,000</td>
<td>$18,000</td>
</tr>
<tr>
<td>Mean</td>
<td>$11,706</td>
<td>$16,606</td>
<td>$19,726</td>
<td>$5,586</td>
</tr>
</tbody>
</table>

| BA recipients                          |               |                         |                          |               |
| BA completion                          | 61.5%         | 70.7%                   | 14.8%                    | 13%           |
| % Borrowing                            | 59%           | 66%                     | 92%                      | 69%           |
| Percentile of borrowers                |               |                         |                          |               |
| 10th                                   | $0            | $0                      | $12,000                  | $0            |
| 25th                                   | $0            | $0                      | $30,000                  | $0            |
| 50th                                   | $7,500        | $15,500                 | $45,000                  | $11,971       |
| 75th                                   | $20,000       | $27,000                 | $50,000                  | $23,265       |
| 90th                                   | $32,405       | $45,000                 | $100,000                 | $40,000       |
| Mean                                   | $12,922       | $18,700                 | $45,042                  | $15,960       |

Source: Authors’ tabulations based on the Beginning Postsecondary Survey 2004:2009.
10 percent of income, the student would need an annual income of about $25,456, which is certainly within the range of expected early-career wages for college graduates. Overall, the mean ratio of student loan payments to income among borrowers has held steady at between 9 and 11 percent, even as loan levels have increased over time (Baum and Schwarz 2006; Baum and O’Malley 2003). Among student borrowers in repayment six years after initial enrollment, the mean ratio of monthly payments to income is 10.5 percent (author’s tabulations from the Beginning Post-secondary Study 2004:2009).

Table 4 also highlights differential levels of borrowing by first institution of attendance. In particular, the borrowing behavior among students beginning at for-profit institutions is distinctly higher at all levels of credit attainment than among students at other types of postsecondary institutions. These systematic differences in borrowing translate predictably into differences in default rates by first institution of attendance. Data from the Department of Education on the Official Cohort Default Rates for Schools (available at http://www2.ed.gov/offices/OSFAP/defaultmanagement/cdr.html#table) shows two-year cohort default rates rising from 6.7 to 8.8 percent between 2007 and 2009. At for-profit institutions, default rates are appreciably greater, reaching 15 percent over two years and 24.9 percent over three years. Student characteristics are insufficient to account for these high default rates in the for-profit sector (as discussed by Deming, Goldin, and Katz in this symposium), which suggests that students choosing to attend these institutions may be systematically borrowing too much.

**Student Loans and Financial Portfolios**

Even when college is a “good investment” in a net present value sense, students may finance it badly. Do students borrow the “right” amount for college? Do they borrow from the lowest cost of capital? Even if some students may borrow “too much” for college, other students may make the opposite mistake, “underborrowing” by insufficient use of student loans in financing college.

Cadena and Keys (2010) estimate that one in six full-time students at four-year institutions who are eligible for student loans do not take up such loans—thus forgoing the subsidy. The most obvious explanations for this behavior are that some students are deterred by the complexity of the FAFSA form (Dynarski and

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11 A growing number of community college students do not have access to federal Stafford loans. For students entering college in 1992–93, less than 3 percent of community college students did not have access to Stafford loans (calculated from National Longitudinal Study of 1988). For community college students entering college in 2004–2005, about 11 percent of students did not have access to loans (Educational Longitudinal Study of 2002). The Project on Student Debt report found similar numbers, and in their April 2011 report, they calculated that 9 percent of community college students do not have access to Stafford loans. One explanation for why a community college might not offer loans is that if an institution has a default rate over 25 percent for three consecutive years or if a community college has a default rate of 40 percent in one year, the institution will lose access to Title IV funds (including Pell grants). But few community colleges are near the default thresholds.
Scott-Clayton 2006) or that students rationally avoid student loans as a self-control device (Cadena and Keys 2010). Another possible sign of the underuse of student loans is that a number of students are carrying more-expensive credit card debt when they could instead be borrowing through student loans. Among students who entered college in 2004, 25.5 percent of those who were still enrolled in 2006 and 37.7 percent of those who were still enrolled in 2009 reported that they had credit card debt. But between one-third and one-half of these students (45.6 percent of students with credit card debt in 2006 and 38.5 percent of students with credit card debt in 2009) had not borrowed from the Stafford loan program. Carrying credit card debt without maximizing Stafford borrowing burdens students with unnecessarily inflated interest rates—a choice that can interfere with a student’s ability to finish a degree: some years back, a school administrator, John Simpson at Indiana University, said: “[W]e lose more students to credit card debt than academic failure” (Rubin 1998). Along similar lines, about half of the students who are working more than 20 hours per week while attending a public or private nonprofit four-year college have no Stafford loans at all (authors’ tabulations from Beginning Postsecondary Study 2004:2009). But since there is some evidence that part-time work reduces academic performance and the likelihood of attaining a degree (Stinebrickner and Stinebrickner 2003), it might be optimal for some of these students to work fewer hours and use Stafford Loans to substitute in the short- and medium-term for lost wages.

**Conclusions and Further Thoughts**

Enrolling in college is likely the first major capital investment that young people will make. For many students, it will be their first encounter with a formal loan. From a financial perspective, enrolling in college is equivalent to signing up for a lottery with large expected gains—indeed, the figures presented here suggest that college is, on average, a better investment today than it was a generation ago—but it is also a lottery with significant probabilities of both larger positive, and smaller or even negative, returns.

The natural advice for a high school graduate contemplating the economic consequences of investing in college is to estimate the probabilities of the long-term outcomes as precisely as possible. In particular, a student needs to focus on the probability of degree completion, the earnings differences associated with different levels of degree completion, and the choice of a field of study. Although self-knowledge is difficult, students can look at their own observed traits, and then at how students with similar traits have fared at the school they are planning to attend. For example, those who begin their studies at community colleges and for-profit colleges have particularly low college completion rates and are unlikely to realize substantial earnings gains associated with degree completion. For students at for-profit institutions, the consequences of weak outcomes are compounded by high levels of borrowing; not surprisingly, these students are unusually likely to default on loans. Perhaps the hardest risk to estimate involves the substantial and
increasing variation in realized earnings within different levels of postsecondary attainment: for students who end up in the bottom part of the wage distribution (given attainment in college), debt levels are likely higher than their earnings would justify.

The claim that student borrowing is “too high” across the board can—with the possible exception of for-profit colleges—clearly be rejected. Indeed, media coverage proclaiming a “student loan bubble” or a “crisis in student borrowing” even runs the risk of inhibiting sound and rational use of credit markets to finance worthwhile investments in collegiate attainment. McPherson and Baum (2011) note that one form of cognitive bias impacting collegiate investments is attaching too much significance to extreme examples, like the few instances of undergraduate students burdened with more than $100,000 in debt with poor job prospects. Even if macroeconomic shocks were to erode the higher education earnings premium to levels not seen in three decades, collegiate attainment would remain a good investment for many potential students. Given the relatively slow rate of growth in the supply of college graduates in recent decades and modest projections for further increases in the coming decades, it is highly unlikely that the economy will experience a demand shock that will have a substantial adverse impact on the wages of college graduates.

The observation that college is a good investment for most young people still leaves a number of significant and unanswered research questions about how students make decisions about collegiate attainment and student borrowing. In the context of this paper, an especially important question would be to assess more carefully what verifiable characteristics students could observe about their own skills and attributes at the time of college entry which in turn would affect their outcomes both in higher education and in the workplace later in life. Student decisions about whether to enroll in college, where to enroll in college, what to study in college, and how to finance college are complex and highly dependent on individual circumstances. While some uncertainty will inevitably remain about the decision of whether and how to invest in higher education, it seems clear that a substantial number of students could benefit from more-tailored and individualized advice than they have been receiving.

We thank the JEP Editors and Assistant Editor for their patience and guidance and also Andrew Barr and Erin Dunlop for research assistance.

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Available at: http://www2.ed.gov/offices/OSFAP/defaultmanagement/cdr.html#table.


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