THE HAMILTON PROJECT

TECHNICAL APPENDIX FOR
"REGARDLESS OF THE COST, COLLEGE STILL MATTERS"
The Hamilton Project
October 5, 2012

In the October employment analysis on the returns to a college education, we calculated the costs and benefits attending college. This appendix explains the details and data sources for the calculation.

Costs of College
In a given year, we consider an 18-year-old starting college, and assume that the tuition she will pay is equal to the national average tuition of four-year public and private institutions. This figure also includes university fees, but excludes room and board, because that student would have to pay living expenses regardless of whether or not she was enrolled in college. We also take into account the opportunity cost of attending college and add in the foregone income that the student would have made had she been working. For every year of college—that is, for 18-through 21-year-olds—we estimate that this income is equal to the average earnings of individuals of the same age with only high school diplomas. All costs are discounted at a rate of 5 percent per year to age 18. More formally, the costs of college in a given year are estimated to be:

$$\sum_{n=18}^{21} \frac{tuition + avg.\, earnings\; of\; high\; school\; grads\; at\; age\; n}{1.05^{n-18}}$$

Benefits of College
In a given year, we find the mean earnings of all college graduates at every age between 22 and 64 (inclusive). For every age, we then subtract the mean earnings of individuals with only a high school diploma. What we are left with, then, is a snapshot in a given year of how much higher the earnings of a college graduate are expected to be than the earnings of someone who only has a high school diploma at every age until retirement. To get total lifetime benefits, we simply sum the difference in earnings for college graduates compared to high school graduates at every age, and discount all earnings 5 percent to age 18. More formally, the benefits of attending college in a given year are estimated to be:

$$\sum_{n=22}^{64} \frac{avg.\, earnings\; of\; college\; grads\; at\; age\; n - avg.\, earnings\; of\; high\; school\; grads\; at\; age\; n}{1.05^{n-18}}$$

Rate of Return on a College Education
The return to a college education is calculated as an internal rate of return. We assume that college entails a one-time investment at age 18. This investment represents the cost of attending college for four years, and for a given year *x*, this cost equals four times the average tuition level in year *x*, plus the average earnings of an 18-year-old, 19-year-old, 20-year-old, and 21-year-old in year *x*. The benefits to attending college in year *x* are accrued over 43 years, starting at age 22 and continuing through age 64, and they are equal to the sum of the average difference in earnings between a college graduate and a high school graduate at every period.

Sources of Data
Tuition data are an average of four-year public and private institutions in the United States in each year going back to 1976 and are taken from the NCES. Earnings data come from the March Supplement of the Current Population Survey for the non-institutionalized population, and from the U.S. Census Bureau for the institutionalized population. In non-Census years, data for the institutionalized population are interpolated using Census data.