THE HAMILTON PROJECT

MAJOR DECISIONS, PART 1: WHAT GRADUATES EARN OVER THEIR LIFETIMES

BY BRAD HERSHBEIN AND MELISSA KEARNEY
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Appendix 2: Technical Details

The earnings data in this analysis are drawn from the U.S. Census Bureau's American Community Surveys (ACS) from 2009 through 2012. The ACS samples approximately 1 percent of all U.S. residents each year, more than 3 million people. The 2009 wave was the first to ask about undergraduate college major among respondents who had completed a bachelor's degree or higher. The ACS does not collect information on major for individuals who earned an associate's degree or left college before earning a degree; it also does not collect information on graduate field of study.

The ACS data are cross-sectional, meaning they record the earnings of individuals of various ages in a given year but do not follow the same individuals over time and record how their earnings change from year to year. The earnings profiles therefore assume that earnings over a worker's career are reasonably estimated by the earnings of different people at different points in their careers.

Earnings are defined as the sum of wages, salaries, and self-employment business income over the 12 months prior to the time of survey. Since the ACS is fielded continuously throughout the year, earnings from the 2009 through 2012 waves actually cover the years 2008 through 2012. For example, a respondent interviewed in January of 2009 would report earnings almost entirely in 2008, while a respondent interviewed in December of 2012 would report earnings almost entirely in 2012. The earnings data are adjusted for inflation to year 2014 dollars using the Personal Consumption Expenditures index from the Bureau of Economic Analysis. An important note to this analysis is that the earnings period overlaps with the Great Recession, when incomes are known to have fallen considerably.

Earnings are calculated among individuals who worked for at least one week within the past 12 months and reported non-negative earnings over the same time period. Individuals who report negative earnings (generally from business income) are dropped, as are individuals whose earnings are imputed by Census and not self-reported. This definition of worker captures the risks of unemployment and underemployment, which vary across majors and are especially prevalent in early career. Users of the interactive component of the web site can opt to view career earnings only for full-time, year-round workers, but should be aware that these earnings are not likely to be the typical experience for all college graduates and especially not for individuals without a college degree.

Earnings by major are for individuals with no more than a bachelor's degree. While this highlights the earnings associated with the undergraduate degree itself, it does not take into account that some majors are more likely to lead to graduate degrees than others. Users of the interactive tool can thus choose to include graduate degree holders in the earnings data, which are still presented by the *undergraduate* major.

In calculating earnings over the career, we do not observe the age at which respondents finished school. Instead, we assume that careers start at age 18 for high school dropouts and graduates, at age 19 for those with some college but no degree, at age 20 for associate's degree graduates, at age 22 for bachelor's degree

graduates, at age 24 for master's graduates, at age 26 for professional degree graduates, and at age 27 for doctoral degree graduates. Clearly, these assumptions do not hold for everyone; some people finish their schooling at younger ages, some finish at later ages, and some start their career before finishing their last degree. Nonetheless, these assumptions provide reasonable estimates of career earnings even for those who begin their careers at different ages.

Cumulative earnings are the sum of discounted earnings over the first 40 years of the career, a period chosen to minimize issues relating to retirement. Each year's earnings are discounted at a 3 percent annual rate, so the cumulative totals shown do not accord with simple sums. The discounting process converts earnings into a "present value," the amount that if invested today at a 3 percent annual rate of return would yield the same total value as lifetime earnings.

Even though the ACS is a large survey, data on some majors are insufficient to reliably estimate earnings over the entire career. In some cases, similar majors are combined to allow for a sufficient sample, and all earnings estimates are smoothed over the career using three-year moving averages. Even after these steps, some majors do not have data in the late career stage, often because the major is too new to permit sufficient data on older graduates.