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President Obama tells us that the highest return investment you can make is in your own (or your children's) education. The aggregate statistics appear to bear this out with college graduates earning about 50% more than high school graduates. Even after taking into the direct cost of four years of higher education along with the cost of foregone income, it appears that rates of return on investment in higher education are quite high, on the order of 10%. This is much greater than recent returns on traditional bond and stock portfolios. However, unlike the case of traditional investments where you can reduce your risk by diversifying across a portfolio of securities, in the case of education investment it is much more difficult to reduce risk.

And there is a lot of risk. For one thing, college dropout rates are quite high (approximately 50% of students who enroll in four year schools ultimately receive a bachelor's degree). Second, the quality of education varies with the institution. Third, variability of wages across people with the same education credentials is also quite high. Fourth, the supply and demand picture for workers in your chosen field can change dramatically in just a few years. Thus, even though the aggregate and average statistics look compelling, there will many people who invest tens of thousands in college but do not reap the expected financial return (although they may still achieve significant non-pecuniary benefits).

What can you do to mitigate these risks? First, you can look at the data to help estimate the likelihood of financial success. This depends on the institution and course of study. There is a large data set that can be used for this exercise. For example, compensation expert PayScale (http://www.payscale.com/)

produces an annual assessment of the return on investment for 850 U.S. institutions of higher learning. They also show incomes by degree and occupation. However, to this point no one has combined the two types of analysis to show returns by institution by course of study. This will change soon. More granular data is being gathered by CollegeMeasures (http://collegemeasures.org/) , a partnership between the American Institutes for Research and Matrix Knowledge Group that "is focused on using data to drive improvement in higher education outcomes in the United States."

The probability of financial success also depends on individual characteristics. For example, high school academic rank is a fairly good predictor of college academic performance. While this does not mean that students who do poorly in high school should not go to college (for a different view, see Vedder[1]), it does mean that the probability of success (graduation) is lower.

Another strategy to mitigate risk is to invest incrementally. The theory of real options tells us that holding off major commitments in order to increase information is often a valuable strategy. One way to do this is to enroll in a two-year Community College program. This can be a low cost way to assess the depth of your commitment to a more rigorous and lengthy academic regimen.

A third strategy is to utilize online education options. It is likely that information technology can reduce the cost and expand the access to higher education. There are numerous initiatives to apply new technologies to reengineer the classroom. A "60 Minutes" segment recently featured Salman Khan, founder of the Khan Academy (http://www.khanacademy.org). The Khan Academy's motto is "A free world-class education for anyone anywhere." The website presently contains over 3,000 short (8 to 15

minute) videos on topics ranging from mathematics to science to economics to history. The videos and simple and entertaining and students can review them at their own pace. In a classroom, students can work problems with the results electronically monitored so that the classroom instructor can provide individualized and targeted help.

Numerous great universities now offer classes on line, and some of these are enormously popular. Former Stanford computer science professor Sebastion Thrune's robotics course had an enrollment of 60,000. Professor Thrune has set up a company (Udacity, http://www.udacity.com) to produce and market online courses. The company's first course, on building a search engine, drew a world-wide audience of 160,000 students. Students take the course Pass/No Pass and those who pass receive a certificate from the professor and Udacity.

Universities are participating as well. For years Yale University has made available on the internet taped lectures for many of its classes. Coursera (https://www.coursera.org/) is a joint venture of several great universities (participating institutions include Stanford, the University of Pennsylvania, the University of California at Berkeley, the University of Michigan and Princeton) to offer on line courses. Also, MIT and Harvard (http://www.edxonline.org/) have started a joint venture to produce online courses for free (for now). Each graduate will receive a certificate of completion. My own university, California Lutheran University (CLU), has been offering online graduate programs for years. For example, most of the students in the widely acclaimed master's degree program in Financial Planning are online students.

Online educational content is rapidly increasing. But in most cases that does not yet translate into a credential that helps someone get a better job or higher pay. Here is where improved predictive modeling can be useful.   If researchers can measure the connection between credentials, skills, individual characteristics and wages, then online courses can be designed to offer the skills in high demand, and educators can design programs and means of evaluating students that provide a valuable credential.

[1]Richard Vedder, "Why College Isn't for Everyone," Bloomberg BusinessWeek, April 2012.