

Module

4

What is the logic behind statistical probability?

The poverty risk calculator is based upon the notion of statistical probability. And in fact, virtually all social science and medical research is based on this concept. The core idea is that by knowing key characteristics about an individual (as opposed to knowing nothing at all about them), we are able to make a more accurate estimate regarding the likelihood of an event occurring.

Example of Statistical Probability

A classic example of this would be predicting the probability of having a heart attack in the future. Cardiologists use a statistical formula to determine your 10 year risk of having a heart attack based upon factors such as cholesterol, blood pressure, family history, weight, age, gender, and smoking history. By factoring in these variables, your doctor can give you a more targeted estimate of having a heart attack in the next 10 years.

For example, those who have high cholesterol and blood pressure, a family history of early heart disease, are overweight, older, male, and have smoked during their entire adulthood, are much more likely to experience a heart attack in the future than someone who does not have these characteristics. Let us suppose that such an individual (person A) has a ten year risk of 15 percent, while their counterpart who does not have these characteristics (person B), has a risk of 5 percent. What does this mean?

One interpretation would be that if we were to draw from the general population a random sample of 100 individuals with the characteristics of person A, we would find that approximately 15 of those individuals would have a heart attack in the next 10 years. Likewise, if we did the same thing and drew 100 individuals with the characteristics of person B, we would find that approximately 5 of those individuals would have a heart attack in the next 10 years. Thus, the likelihood of having a heart attack is increased

threefold for individuals with the characteristics of person A as compared to individuals with the characteristics of person B.

However, as you can also see, although individuals with person A's characteristics are at a much great risk of experiencing a heart attack, the vast majority of them will not. Likewise, although the risk of having a heart attack is much lower for individuals with person B's characteristics, a few of them will have such an attack.

Thus, what is being predicted are differences in the overall odds of an event occurring, as well as the changes in those odds depending on changes in the set of background characteristics. These models cannot definitely say that if you have a certain combination of these characteristics, then the event will occur - only that the odds are increased or decreased over time.

Poverty Probabilities and Time

So it is with poverty. We are able to take a select number of background factors, and based upon your responses to those factors, estimate a prediction in terms of a 5, 10, and 15 year risk of poverty. These predictions are grounded in several hundred thousand cases taken from the PSID data set between 1968 and 2013. During this period of time, we're able to observe what happens to individuals with respect to their risk of poverty. Assuming that these patterns hold for the future, we are able to make an estimate

regarding your personal chances of experiencing poverty based upon your age, race, gender, marital status, and education.

Another element to keep in mind is that of time. As one projects out across longer time periods, the likelihood of an event occurring increases. For example, as we extend out to 15 years, there is a greater chance that a detrimental event will occur (e.g., losing a job, a health emergency, families splitting up) that can throw you into poverty. Indeed, in our earlier work we found that a majority of Americans would experience poverty when we looked over a 55 year period.

Yet in spite of this, it's frequently the case that when we're asked to estimate the likelihood of an event occurring, we often fail to appreciate the long-term horizon. This results in our underestimating the probability of a particular event happening, which partially explains why so many people believe that poverty will never happen to them.

In using the risk calculator, you can observe how your risk of poverty increases as you project out from 5 to 10 to 15 years in the future. Were we to extend the time dimension out further, the risk would continue to rise. However, it is also true that the rate of increase in the risk of poverty generally slows down considerably after the 15 year mark. In other words, if poverty hasn't happened within the 15 year window, it becomes less likely that it will happen. ★