HUMAN INVESTMENT or MEASURING EFFECTS WITH MANY OBSERVATIONS

There are special problems with human investment studies

- each person will react differently to identical opportunities/training
- this is so even if the circumstances facing each person are identical, which is almost never so
- this is so even if the characteristics of each person are identical, which is never so (even with identical twins raised in the same family)

A useful way of beginning is to create a table, with benefits and costs listed in the first column and with columns for the Individual and for Others; the sum of these equal Society, which should be the last column heading. When a benefit or cost applies to a particular group, mark an X. Later, you'll be able to replace the X with a figure and do the sum. This will also make identifying transfers much easier because it makes you consider each benefit and each cost for each group separately.

Note that you may need a more fine division of the "Others" category to identify winners and losers. The scheme is the same; just add the additional columns. Unless you're certain that your specialized columns include everyone, however, you'll want to retain the "Others" column. See Gramlich for an example table. Many of these costs and benefits are general ones that apply to any human investment project.

What can we say about the measurement issue?

- Particularly if you're looking at a program ex post, most of the costs of a project will be straightforward to measure; just ask (assuming no political/protectionist behavior on the part of those with the information).
- Benefits are more of a pain. There is more likely to be a discounting problem. Also, non-monetary effects will generally be left out in the sense that they won't be quantified. However, those kinds of benefits can be used to support the justification for doing a project that is otherwise a net winner; they can also be used (in a very subjective way) to justify doing a project that is a slight net loser.

If we were measuring the effects of the MPP at Michigan, we'd set up a small regression equation with the following variables:

Y_i = income

X_i = 1 if person has an MPP, 0 if person does not have an MPP

Zi = observables
Ui = unmeasurables (average = 0)

So the (linear) regression equation with coefficients on each variable is

$$Yi = a0 + a1Xi + a2Zi + Ui$$

You might want to think about whether your regression really should be linear for a particular model; in some cases a logarithmic equation should be used. The more Zi terms you have, the more accurate your results will be. Ui covers things that you can't control for, like motivation, ambition, other personal characteristics.

The coefficient for the Xi term is the one we're interested in; it represents the effect of the MPP on earnings, holding all else constant.

$\delta Yi/\delta Xi = a1$ Y^{MPP} = Avg. Yi when Xi = 1; Y^0 = Avg. Yi when Xi = 0
We're asking whether $Y^{MPP}-Y^0>0$.

Pitfalls:

- Using an analysis of variance can be misleading (see Gramlich for the discussion; we skipped over this)
- If you're looking at a program that has already been implemented and some of the local versions were implemented well and some were not, you can't throw out the data from the bad implementations because that gets rid of what will happen in real life, but if you include them you're not measuring the value of the program absent incompetence. Do the numbers both ways to get a sense of the range of outcomes.
- random error measurements in Yi aren't a problem; they just make the Ui term bigger, but the coefficient on the Xi should still be correct.
- error measurements in Xi are a problem: the more noise in the variable, the smaller your coefficient will be (downward bias). This applies to all independent variables, including the Zi coefficient, but we only care about the Xi coefficient in this case. Again, Gramlich discusses how you might handle these problems.
- selection bias in your data is a problem. solution: randomize the sample. This problem arises in voluntary pilot programs (upward benefit bias) or in those where the program directors select in the worse cases (downward benefit bias).

Look at the Perry Preschool study for a good human investment study.