Lecture 2 cont'd: Taxation, Labor Supply, & Expenditure Programs for the Poor

reference: Keane and Moffitt, 'A Structural Model of Multiple Welfare Program Participation and Labor Supply,' IER 1998; Keane, 'A New Idea for Welfare Reform,' FRB of Minneapolis Quarterly Review 1995.

It is generally true that families that participate in one US government transfer program participate in others. In 1984, 89% of AFDC recipients also received both Food Stamps and Medicaid. Another 42% of those also received a 4^{th} benefit (housing subsidy, etc.)

With the first dollar earned, AFDC imposed a marginal tax rate of 100%, Food Stamps 30% and subsidized housing up to 30%. In addition, Medicaid was lost in its entirety with the end of AFDC eligibility. The overall budget constraint created by the overlap of these programs included a marginal tax rate on the lowest earnings of well in excess of 100%.

Keane & Moffitt model the choice of a single mother to participate in the AFDC, Food Stamps and subsidized housing programs, along with her labor supply decision. They use simulation techniques in their estimation (Simulated Maximum Likelihood (SML), Method of Simulated Moments (MSM)) to solve the problems more standard estimation techniques have with the joint estimation of labor supply and multiple program participation decisions.

Model of Labor Supply and Multiple Program Participation

M different welfare programs available

Each program includes a guarantee level, given to 0 income participants, and a rate at which the benefit is taxed away with labor earnings.

Utility *U(H,Y)*   *H* hours of work (a 'bad'), *Y* income (a 'good')

One possible approach to determining the labor supply function: Construct the budget constraint (*Y* as a function of *H*) for each of the 2^M possible program combinations. Derive the upper envelope of these constraints (the segments of the existing constraints such that no competing program-combination BC lies to the northeast of an included segment), and allow the single mother to optimize subject to the envelope constraint.

Why does this approach fail empirically?
Some families locate below the envelope constraint. There are significant numbers of nonparticipating eligibles, in other words families who could increase their incomes by participating in some program with out changing their hours of work fail to do so.

Explanations for this behavior: Stigma (Moffitt 1983), time, foregone work and other costs of program participation (getting to the program office, waiting in line, etc.)

Empirical problem created

[MATERIAL LOST HERE TO BE FOUND IN LECTURE5R.PDF!!]

The individual's problem is then made up of (1.3) and (1.1), with solution (1.2).

α represents the marginal disutility of work at *H=0.*
ψ_m represents the marginal disutilities of program participation

Stochastic Structure

Both α and the 3 ψ_m are allowed to vary in the population, conditional on observable individual characteristics

$$\alpha = \tilde{\bar{X}}'\tilde{\bar{\alpha}} + \varepsilon_\alpha \qquad (1.1)$$

$$\psi_m = \tilde{X}'\tilde{\bar{\psi}}_m + \varepsilon_m,\ m = A, F \text{ or } R \qquad (1.2)$$

where $\tilde{X}$ is the vector of characteristics and $\tilde{\bar{\psi}}_m$ and $\tilde{\bar{\alpha}}$ are vectors of coefficients.

The full model can be derived by inserting (1.1), (1.4) and the three equations in (1.5) into (1.3). The full model contains 24 choice equations (see (1.2)) and 4(!!!) error terms.

'Our model is structural in the sense that it has a particular factor structure of the errors, that arises from the imposition of a particular utility function (albeit one with flexible form), and a presumption that the major source of variation in choices arises from heterogeneity in a selected set of preference parameters,' K&M 1998.

The wage specification (necessary since wages for the unemployed are unobserved) is

$$\ln(w) = \tilde{X}'\tilde{\nu} + \varepsilon_w \qquad (1.3)$$

(Impressively, given the difficulty of estimating multinomial choice models with few covariance matrix restrictions,) the five error terms ($\varepsilon_\alpha, \varepsilon_A, \varepsilon_F, \varepsilon_R$ and ε_w) are assumed multivariate normal with diagonal elements σ_j^2, $j = \alpha, A, F, R, w$ and off-diagonal elements $\rho_{jk}\sigma_j\sigma_k$, $j \neq k$.

Some identification power on the effects of welfare benefits on behavior is obtained by using cross-state variation in welfare benefits.

The model is estimated using SML *and* MSM, and estimates and simulation outcome are reported for each.

Data

Survey of Income and Program Participation, 1984
Note that the SIPP was designed to elicit accurate info on income and transfer program participation.

Data on singly mothers aged 18-64 w/ kids < 18 present. High-asset mothers ($4500+) excluded.

N = 968.

Participation in *A*, *F* or *R* is defined as any receipt in the last month before the survey, hours are PT if 1-35 weekly avg in last month before the survey, and FT if 35+.

Table 1 shows the breakdown of participation and hours observed into the 24 categories. Almost no women on welfare work and almost all women off welfare work.

The vector of observable characteristics includes education, age, # children above and below 6, region, race, SMSA and others.

Modifications to the Utility

The parameterization of the utility includes ϕ_{mn} to capture interactions of program disutilities. These were difficult to reinterpret in terms of the additivity or non-additivity of stigma effects. This portion of the utility was respecified as

$$\lambda(\psi_A P_A + \psi_F P_F + \psi_R P_R) + (1-\lambda)\max(\psi_A P_A, \psi_F P_F, \psi_R P_R)$$

with $0 < \lambda < 1$. Here the estimate of λ is a measure of the extent of additivity in stigm (or general cost) of program participation.

Modifications to the Budget Constraint

Several benefits received by the women in the sample were in-kind and thus not cash equivalent. Parameters multiplied their terms in the BC to account for this difference.

Some of these benefits were Medicaid and private health insurance (PHI). It is assumed that all women on AFDC receive Medicaid and not PHI, and all women not on AFDC receive PHI and not Medicaid. Thus the final BC is

$$\begin{aligned} Y(H, P_A, P_F, P_R) = wH + N + B_A(H)P_A + B_F(H)P_F + \gamma_R B_R(H)P_R \\ + \gamma_{\text{MED}} B_{MED} P_A + \gamma_{\text{PHI}} B_{PHI}(1-P_A) - T(H) - E(H) \end{aligned}$$

Estimates

Table 2 reports SML estimates of the model parameters.

The top panel gives coefficients multiplying the vector of individual characteristics in the expressions for work tastes, and disutilities of each of the programs.

The bottom panel shows utility parameters and parameters in the covariance matrix of the errors. The lambda estimates differ significantly from both 0 and 1, an the magnitude of the estimates seems to indicate that the stigma (cost) effect is close to all-or-nothing, not additive with each additional program.

The gamma estimates indicate that Medicaid has a significant effect of drawing women onto AFDC.

Table 5 reports actual and predicted distributions of labor supply and program participation as an indicator of model fit. This sort of step can be important in structural estimation of this nature. The model fit is fairly strong based on the reported rates in Table 5.

K & M also perform specification tests comparing SML to MSM estimates.

Table 7 reports simulation results for a number of policy changes. Suggested and analyzed are two decreases in the tax rate out of AFDC, wage subsidies, increase in the AFDC and a work subsidy for women on AFDC off it but earning little.