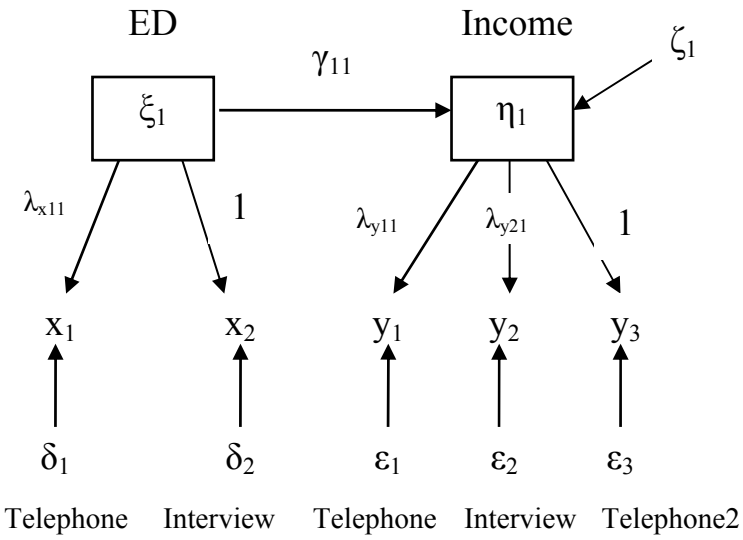
HOMEWORK 3

This assignment is due on Thursday May 29th at 5:30pm. You may turn it in to the Dropbox or at the beginning of class.

I. Consider the following walking dog model in six equations:



1. Write out the six equations in scalar algebra. (2 points)

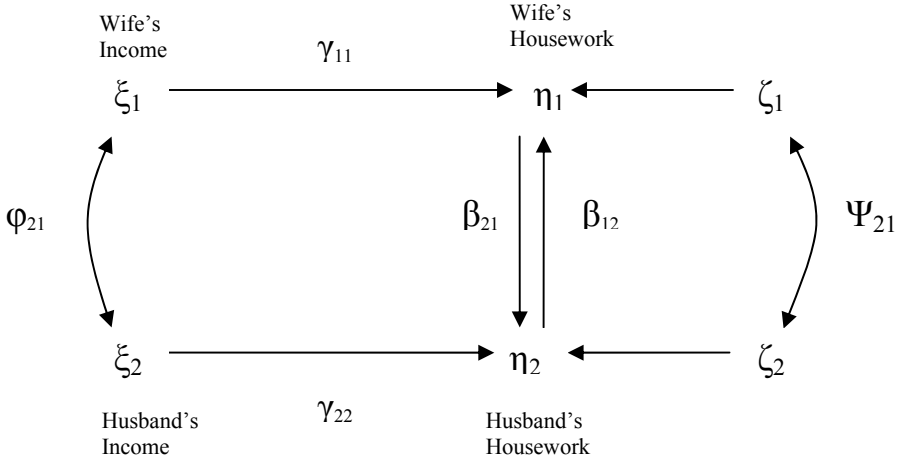
2. List out the seven parameter matrices (Φ, Γ, Ψ, Λ_x, Λ_y , Θ_δ, Θ_θ). (3 points)

3. How many tetrad difference overidentifying restrictions on observed moments does this model imply? Give an example of **one** of these. (2 points)

4. What would the overall goodness-of-fit χ^2 test? How many degrees of freedom does it have? (2 points)

5. How is the metric of ξ_1 and η_1 set? Suppose that $\theta_{11}^{\varepsilon} = .20$, $\theta_{22}^{\varepsilon} = .10$, and $\theta_{33}^{\varepsilon} = .25$. Which measure of income would you say is most accurate? (3 points)

III. Consider the following simultaneous equation model in two equations:



1. Write out the two structural form equations in scalar algebra. (2 points)

2. What are the properties of OLS for estimating the structural parameters (γs and βs) (i.e. is it consistent and unbiased)? Explain why. (2 points)

3. Briefly discuss whether each equation is just-identified, underidentified, or overidentified. (3 points)

4. Does each of the endogenous predictor variables have at least one instrumental variable? If they do, identify them. Also, if they do, discuss very briefly whether you believe they are, substantively, good instruments. If there is no instrument(s), suggest a potential viable instrumental variable(s). (3 points)

5. Suppose you estimated the model and found that $\beta_{21} > \beta_{12}$. What would you conclude substantively, given the labels on the variables above? (1 point)

6. Suppose that γ_{11} is actually zero in the population. What does this imply substantively? What does this imply for estimation of the model's parameters? (2 points)