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Discussion
of

Does Labor Supply Modeling Affect Findings of Transport Policy Analyses?

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Introduction

- An altogether excellent and admirable paper, and a fine piece of scholarship. Worthy of the *American Economic Review.*

- A huge amount of work evidently went into the paper's preparation.

- The paper makes the simple but very important point that the effects of transport policies predicted using metropolitan CGE models are sensitive to the specification of labor supply.

- Not only are they sensitive, but also in many of the realistically calibrated simulations, whether or not a policy is welfare-improving depends on the specification of labor supply, which is disconcerting.

- Policies considered: cordon toll, congestion toll, a fuel tax, a mile tax, and parking fees.

Specification of Household Labor Supply

Notation:

i, j, k	residential, work, and shopping location
z_{ijk}	units of composite good purchased at shopping location k, conditional on i and j
q_{ij}	housing
$\mathcal{L}_{1ij}$	workday leisure hours
$\mathcal{L}_{2ij}$	non-workday leisure hours
ℓ	leisure hours on a workday
l	leisure hours on a leisure
L	leisure days
h	daily work hours
D	workdays
e	daily time endowment
E	annual day endowment
p	consumer price
c_{ik}^{z}, c_{ij}	transport cost per mile per unit of z, of household
t_{ij}^{z}, t_{ij}	transport time per mile per unit of z, of household
I	lump-sum income

$$\max_{i,j} \left\{ \max_{z,\, q,\, \mathcal{L}_1,\, \mathcal{L}_2} u_{ij}(\{z_{ijk}\}, q_{ij}, \mathcal{L}_{1ij}, \mathcal{L}_{2ij}) \right.$$

s.t.

i) monetary budget constraint

$$\sum_k (p_k + c_{ik}^{z}) z_{ijk} + r_i^{q} q_{ij} = (w_j^{n} h_{ij} - c_{ij}) D_{ij} + I$$

ii) daily time constraint for a workday

$$eD_{ij} = (h_{ij} + t_{ij}) D_{ij} + \ell_{ij} D_{ij} + \sum_k t_{ik}^{z} z_{ijk}$$

iii) daily time constraint for a leisure day

$$eL_{ij} = l_{ij} L_{ij}$$

iv) yearly day constraint

$$\left. E = D_{ij} + L_{ij} \right\}$$

Even this specification is not as general as desirable

- It treats an *individual's* labor supply decision, though it uses the term *household.*
    - It can be interpreted as assuming that the labor supply decisions of individuals within a household are independent of one another.
    - However, they are not, because of joint trips, consumption goods that are public within the household, joint activities.
    - It ignores children.
    - It ignores household production.

- It treats shopping trip transport costs as linear in the amounts purchased.

- It ignores modal choice and the household choice of how many cars to own (but could easily be extended to include these margins).

- It is not activity based.

- It does not treat uncertainty.

I could go on. But my point is not to criticize these aspects of the paper, but rather to indicate that further generalizing the modeling of labor supply would create even more dispersion in the predicted outcomes of transport policy.

Decomposition into effects

- It would be nice to know which margins of choice/channels are particularly sensitive to the specification of labor supply. (The authors find that the level of congestion is typically not sensitive).

- This can be done by decomposing the effects. The comparative static derivatives can be decomposed, as in income/substitution effects or income/factor price effects in Harberger's analysis of the corporate income tax.

- But this would lengthen an already long paper, and would distract from the major point.

What Is to Be Done?

The authors propose two ways to deal with the problem:

1. To work with the general model, which they term the "inhomogeneous, hybrid model", which allows "households" to choose both how many hours a day to work (perhaps subject to constraints) and how many days a week to work, and distinguishes between workday and non-workday leisure hours.

2. To collect more detailed labor supply data.

Both of these proposals are welcome. However, I propose going a step further, and doing Monte Carlo forecasting.

Monte Carlo Simulation

Chuck Manski was the keynote speaker at the Kuhmo-Nectar Conference in Evanston in July 2013. He based his lecture on his most recent book, "Public Policy in an Uncertain World", where he laid out his argument for Monte Carlo simulation.

His basic argument was that

- We should explicitly recognize the uncertainty of a model's parameters, and of the future evolution of exogenous variables such as population. "should" is used advisedly to imply a moral imperative to not only undertake Monte Carlo simulations but also to report confidence intervals.
- Accordingly, we should report not only expected benefits from a policy, but also the probability distribution of benefits.

The discussion focused mainly on whether policy makers would understand forecasts with confidence intervals, and, if they did understand them, would feel comfortable acknowledging uncertainty concerning implications of their policy proposals.

Some argued that both voters and policy makers are becoming more sophisticated. In this regard, I note that the Weather Channel has started to introduce confidence intervals in their medium-term forecasting.

If politicians are risk averse, then the policy advisor/economist may wish to look for *robust* policies -- policies that perform pretty well in almost all scenarios.