Session 1: The world has changed!

Presenters:

Steven Polzin. Trends in U.S. Travel Behavior: Insights and Implications

Chandra Bhat. An Evaluation of the Long-Term Effects of the COVID-19 Pandemic on Public transportation Use

Eric Miller. Non-work/school activity participation in a flexible work future: A pre/post-pandemic comparative study

Discussant:

Sergio Jara-Diaz. Should these recent changes lead us to reconsider core assumptions in how we model and plan a transportation system?

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Sergio Jara-Diaz

Universidad de Chile

Steven on USA trends (COVID+):
VMT, VMT/H, trip rates, travel duration, time spent, e-commerce, etc. **seem to resume historical trends**, but….

Chandra on USA public transport (COVID): (in)stability of changes in public transport use.

- 7,076 adults: 42% use public transit less often than before COVID; 63% of those will keep that way.
- **Women more likely than men** to have reduced their PT use through the pandemic; 50% say this change is permanent.
- Strong decline in public transit use for those over **the age of 65**.
- **Hispanics and individuals of Black/Asian origin** have changed their public transit use relative to before-COVID (mostly decline in PT), but state that the PT changes are temporary.
- **Individuals without driver's licenses** and those who live in **households with fewer vehicles than adults** are more likely than others to take transit more often than before the pandemic. Change viewed as permanent.
- **Low-income households** more likely than high-income to have increased their PT use during the pandemic, or to be more willing to return to transit in the future if they reduced their PT use.

Eric on Toronto (COVID): emphasis on changes in time use by type of worker and type of day

- Hybrid workers' shopping trips on commuting days are similar to on-site workers', and similar to **remote workers**' on **non-commuting days**.

- Out-of-home leisure and personal business activity: hybrid workers tend to squeeze trips on commuting days and favor staying at home on non-commuting days.
- Compared to the pre-pandemic era, remote workers engage in fewer out-of-home shopping and leisure/personal business trips.

Other than North-American?

Worldwide impact of a reduction in committed travel time (teleworking):
Aksoy et al., 2023: international survey on the impact of a reduction in committed travel time (teleworking due to Covid) on other activities in 27 countries.
Conclusions:

- "The average daily time savings when working from home is 72 minutes";
- "On average, those who work from home devote **40 % of their time savings to primary and secondary jobs**, 34 % leisure, and 11 % caregiving activities".
- The percentage of liberated time that goes to additional work varies from 31% (Germany and Spain) to 53% (Malaysia, Singapore, and Taiwan).

Australia:
Hensher et al. (2022): reallocation of time due to reduced commuting in Australia.

- 29 % to more paid work.
- 23 % to more unpaid work.
- 48 % to more leisure and family activities.

$$\boldsymbol{T_w(T_t)?}$$

Change: behavior or conditions?

- The Mercedes Benz example
- Jaime & Elsa
- The test (reversible or not)
- Mmmm…

(It pays to go) **Back to basics**:

- Transport cost functions: sophisticated econometrics, **weak output def**.
- Mode choice: up to five random errors, **no income effect**.
- Value of in-vehicle time: **specify all activities** (work-leisure on-board)

- **Tw and all activities should be looked at in a work-leisure cycle**

$$T_w(T_t)?$$

Work, leisure, and committed time: theoretical framework (towards $T_w(T_t)$)

$max\ U = U(G, L, T_W)$

Subject to

$G + E_C \leq wT_W \qquad \lambda$

$L + T_W + T_C = \tau \qquad \mu$

$\rightarrow$ $\boldsymbol{T_W(w, E_C, T_C)}$: labor supply $T_W(w)$ should be looked at as parametric in E_C and T_C.

E_C, T_C, and the preferences behind MUW, MUL, and MUC present a host of combinations that can explain observed behavior regarding time at work for different wage rate levels.

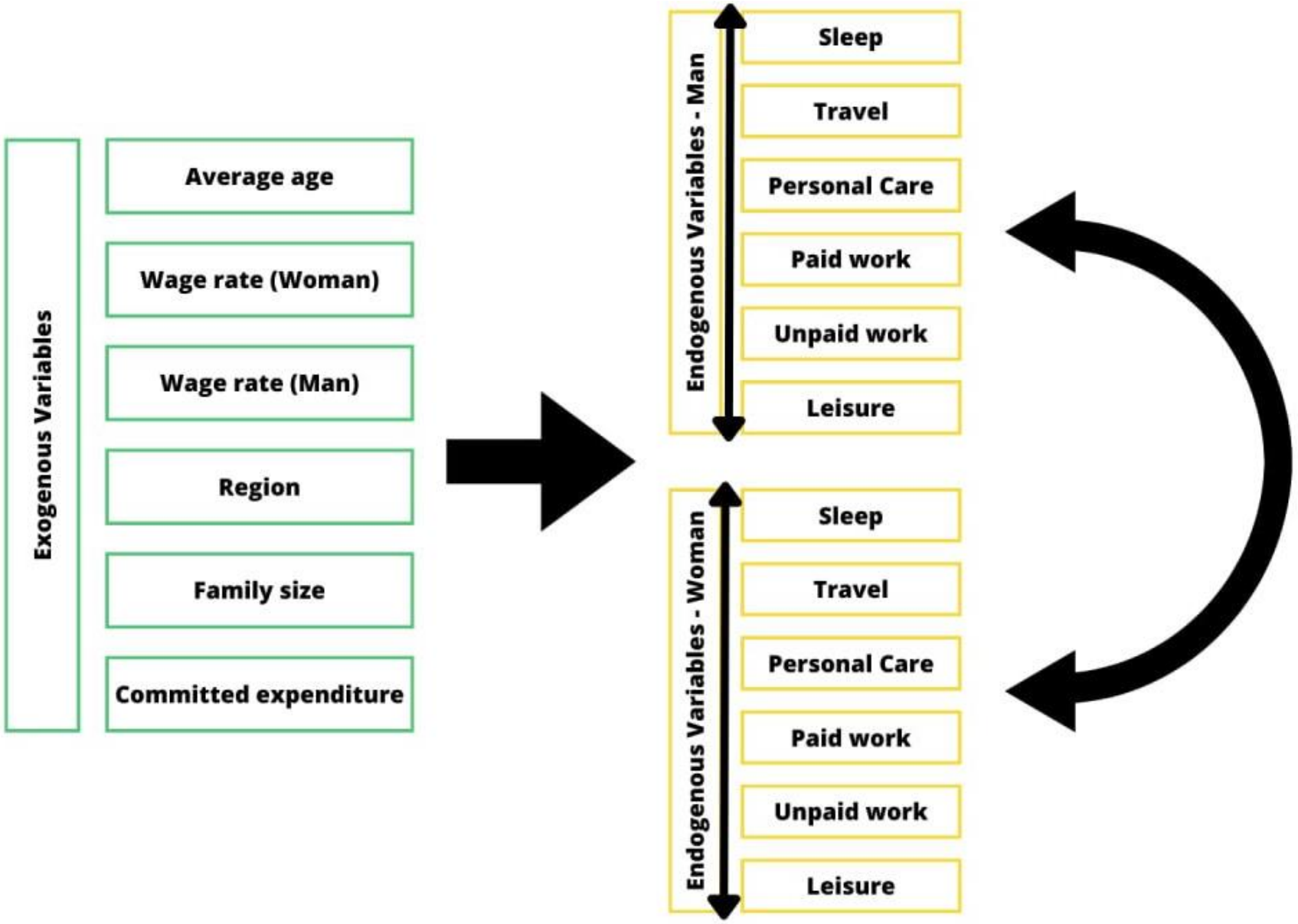
It makes no sense to search for a utility function flexible enough to generate a single analytical representation of all possibilities regarding the relation between w and T_w.

Two steps to estimate a labor supply model:

- **SEM to analyze activities hierarchy, detect committed time T_C, and recognize gender roles.**
- **Flexible labor supply equations.**
- **Data from ENUT (Chile), 2015. 770 two-workers households (different gender).**

Revealed hierarchy of activities in the households: SEM

$$T_{ih} = \alpha_{ih} + \Sigma_l \beta_{lh} Z_{lh} + \Sigma_{j \neq i} \gamma_{ijh} T_{jh} + \Sigma_j \delta_{ihjk} T_{jk} + \varepsilon_{ih}$$



Model specification and estimation.

$$T_{Wi}[w_i, w_j, E_C, T_{Ai}, T_{Aj}].$$

$$Y = A + \Sigma_i \beta_i (X_i - \bar{X}_i) + \Sigma_i \beta_{ii} (X_i - \bar{X}_i)^2 + \Sigma_i \Sigma_{j>i} \gamma_{ij} (X_i - \bar{X}_i)(X_j - \bar{X}_j) + \varepsilon$$

Control socioeconomic variables (family size, region, and average age of the couple) on the first order coefficients only (multiplicative dummy variables affecting the β_i).

Equations T_{Wf} and T_{Wm} share the explanatory variables, and decisions are interrelated → estimated with the Seemingly Unrelated Regression technique (SUR).

Reference group: households with two-workers only, less than 40, non-MR residents.

Labor supply model (Data: ENUT 2015)

Variables	Female worker	Male worker
Constant	43.878***	49.294***
dummy More than two-person household	-3.796***	-0.508
dummy Metropolitan Region	0.893	-0.273
dummy Couple's average age > 40	1.689*	0.101
Male's wage rate (1000 CLP/h)	-1.322***	-1.895***
dummy Metropolitan Region		-1.085***
dummy Couple's average age > 40		-0.370*
Female´s wage rate (1000 CLP/h)	-4.057***	-1.524***
dummy More than two-person household	1.452**	-1.304**
Male's available time (h/week)	-0.022	0.447***
dummy Metropolitan Region	-0.201**	
Female's available time (h/week)	0.641***	-0.092**
dummy More than two-person household	-0.194*	
dummy Couple's average age > 40	-0.178**	
Committed expenses (1000 CLP/week)	0.127***	0.069***
dummy More than two-person household	-0.047***	0.026**
Male's wage rate squared	0.036***	0.033***
Female's wage rate squared	0.068***	0.111***
Male's wage rate × Female's wage rate	0.127***	0.052
Male's wage rate × Female's available time	0.024**	
Male's wage rate × Committed expenses	-0.004***	
Female's wage rate × Female's available time		-0.039**

1. Diminishing mandatory travel time induces an increase in working hours that varies between 27 and 64 % of the liberated time depending on gender, household size, region, and age. Income and leisure increase.

As **data was collected well before the Covid pandemic**, it is striking that these results compare quite well with the world figures measured and reported by Aksoy et al. (2023) and Hensher et al. (2022).

2. Labor supply diminishes with the wage rates of either working member of the household. Income and leisure increase.

The Backward Bending Supply Curve

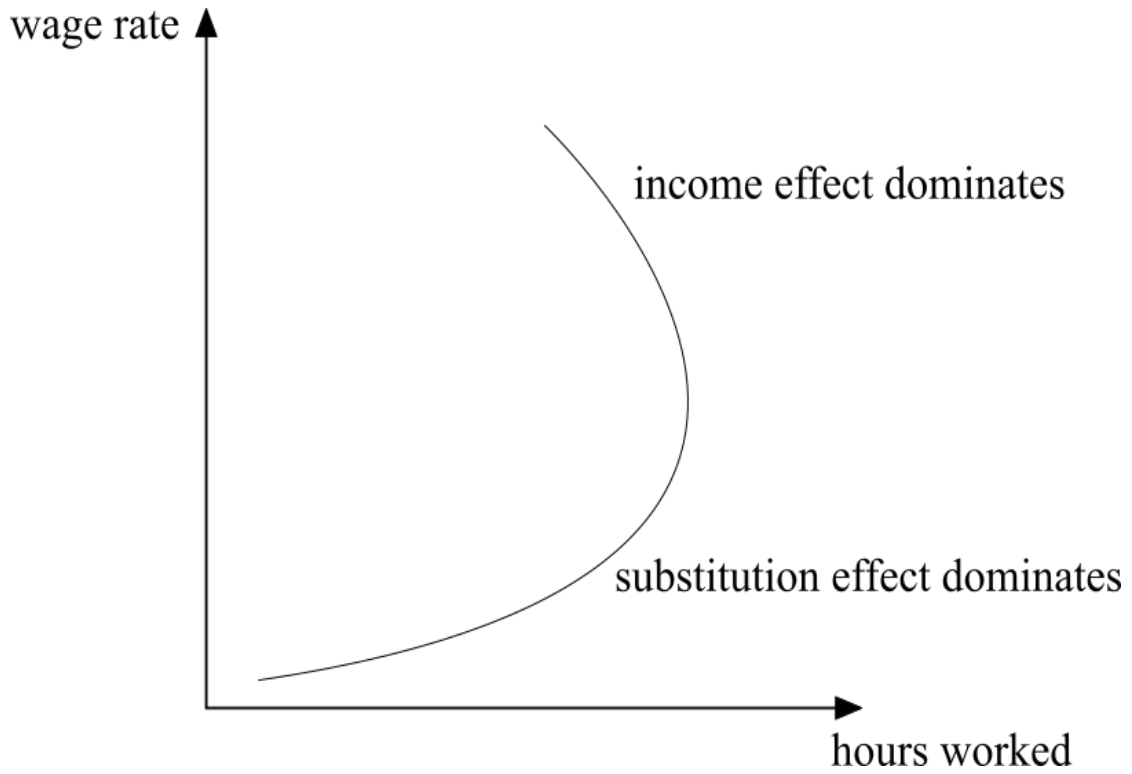
$$max\ U(G, L)$$

Subject to

$$wT_w = G$$

$$T_w + L = \tau$$

$$\partial U / \partial L = w \partial U / \partial G$$



Wage elasticity of time at work in the developed world: mostly positive, less than one, and higher for women.

Many countries exhibit **negative wage elasticities, large working hours, low wages: "Forward falling" shape. Explanations?**

Mongiovi (1991), "*If workers aim to **maintain a given standard of living**, the labour supply curve will take the form of a rectangular hyperbola".*

Dessing (2002): **household subsistence frontier**.

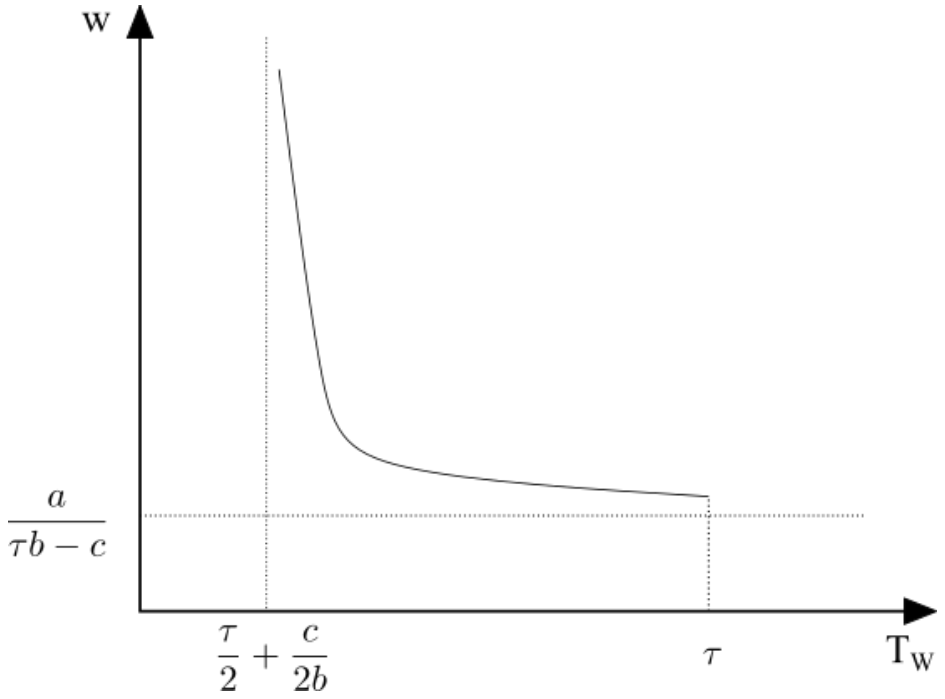
Prasch (2000):
marginal utility of leisure is increasing function of income (consumption): $\frac{\partial U}{\partial L} = -a + bG$

Our view: $U = -aL + bGL + V(G)$ $V = cG$

$$\frac{\partial U}{\partial G} = bL + c \qquad \partial U/\partial L = w\partial U/\partial G$$

$$T_w = \frac{\tau}{2} + \frac{c}{2b} + \frac{a}{2wb}$$

(Our) hidden forward-falling labor supply curve behind Prasch's (2000)



Challenge: expand to $U(G, L, T_W)$ considering T_c and E_c

- Different individuals, different environments; evolving individuals, evolving environments. Technological, demographic, economic, geographic, political conditions.

- **Big changes? Moving far away from the mean. A structural view seems mandatory.**

- **Long run decisions: location and time use, or time use and location?**

- Changes between time cycles as opposed to changes within a cycle.

- Constraints: absolute and relative; endogenous and exogenous.

- **Questions in a survey should evolve: Fromm on Weimar 1929 (back to lifestyles?)**

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And the world still reveals internal variation (not random errors)

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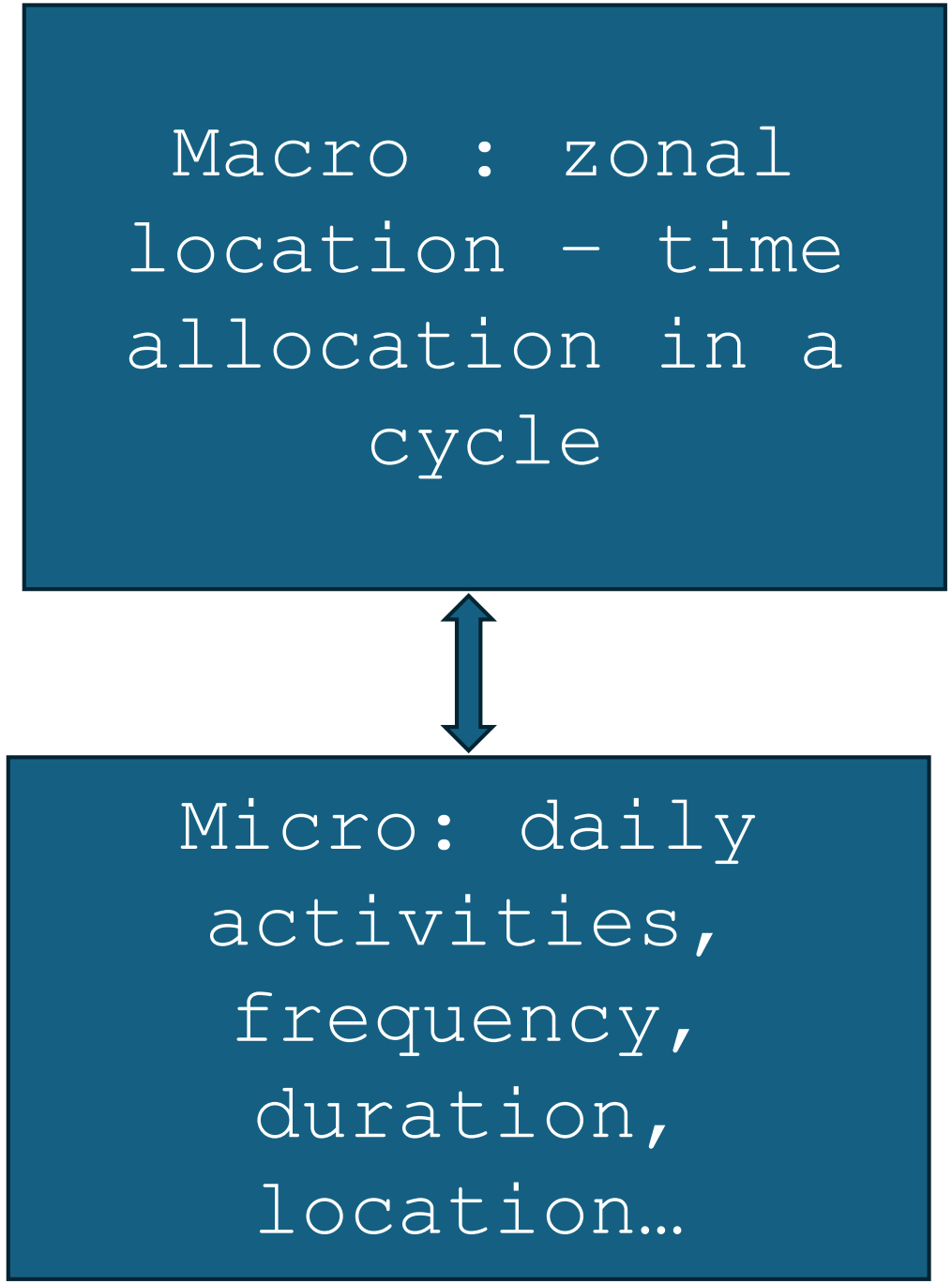
Macro : zonal location – time allocation in a cycle
Micro: daily activities, frequency, duration, location…