# Comments on "Micro and Macro Elasticities in a Life Cycle Model With Taxes" by Richard Rogerson and Johanna Wallenius

Manuel Arellano

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## 1. Summary

- This paper was a pleasure to read: The quality and tractability of the theoretical development is of note.

- The goal is to provide an analytical foundation for elastic aggregate labor supply.

- To do so it addresses the question of why studies of LS estimated at the level of individuals find low elasticities. Whether micro and macro LS elasticities can be reconciled is attracting increasing attention, which is good both for micro and macro.

- The motivation is LS in the context of permanent (cross-country) differences in taxes, not in the context of business cycle fluctuations.

- This paper belongs to a literature that considers extensions of the neoclassical model of the labor market accounting for choices at the extensive margin (Rogerson has been an early contributor).

- The key feature of the current model (for delivering periods of non-participation) is the nonlinear mapping between hours of work and labor services (convex at low hours of work). This connects with the motivation underlying models with indivisible labor.

- There is a companion paper (Prescott–Rogerson–Wallenius) which shares basic modelling features. The current paper adds exogenous life cycle variation in productivity to determine the timing of work.

- Other papers have stressed individual heterogeneity (in preferences or in productivities) as a source of discrepancies between macro and micro elasticities (Mulligan, 2001; Chang and Kim, 2006; Fiorito and Zanella, 2008).

- In this model there is no heterogeneity within a cohort. There is cross-sectional heterogeneity only because there are people of different ages in a cross-section.

- One conclusion is that a small value of the reciprocal of the preference parameter $\gamma$ describing the curvature of leisure can coexist with a large aggregate LS elasticity.

- I provide some comments on micro and macro elasticities, drawing a closer connection with the microeconometric literature.

## 2. Intensive and extensive margins in empirical micro LS

- "A major lesson of the past 20 years is that the strongest empirical effects of wages on labor supply are to be found at the extensive margin –at the margin of entry and exit– where the elasticities are definitely not zero." (Heckman 1993)

- Nonlinear mapping between hours of work and labor services: A motivation is fixed costs of work, prominent in the micro literature since Cogan (1981).

- A prototypical individual LS schedule considered in microeconometrics takes the form
$$H\left(w\right) = f\left(w, V\right) \times \mathbb{I}\left[f\left(w, V\right) > H_R\right]$$
where $w$ is a wage argument, $V$ denotes other determinants (assets, demographics and unobservables) and $H_R$ is a reservation hours of work function due to fixed costs.

- Wages $W$ are determined at market level. Observables in micro data are employment status $D\left(W\right) = \mathbb{I}\left[f\left(W, V\right) > H_R\right]$ for all, and realized hours $H = H\left(W\right)$ and wages for participants.

- Conjectural aggregate (average) hours of work at $w$ are
$$E\left[H\left(w\right)\right] = E\left[f\left(w, V\right) \mid D(w) = 1\right] \times \Pr\left[f\left(w, V\right) > H_R\right]$$
so that the aggregate LS elasticity is
$$\frac{\partial \ln E\left[H\left(w\right)\right]}{\partial \ln w} = \frac{\partial \ln E\left[f\left(w, V\right) \mid D(w) = 1\right]}{\partial \ln w} + \frac{\partial \ln \Pr\left[f\left(w, V\right) > H_R\right]}{\partial \ln w} = \varepsilon_H + \varepsilon_P$$

- Mincer (1962) estimated $\varepsilon_P$. Ben–Porath (1973) noted the difference between $\varepsilon_H$ and $\varepsilon_P$. Borjas and Heckman (1978) argued that $\varepsilon_P > \varepsilon_H$, but most of these discussions took place in the context of female LS.

- Empirical developments in the micro LS literature soon called into question the empirical validity of a model with $H_R = 0$. It was clear that when workers move into the market usually they do not work a small number of hours, but many hours.

- The partial equilibrium effect of a tax change on the LS at the individual level is
$$H\left[(1 - \tau)\, w\right] - H\left[(1 - \tau')\, w\right].$$
This effect will be zero for some units, marginal for others, and a non-marginal step for the rest. The aggregate effect adds them all up.

*Not one but two micro elasticities*

- I am not sure I would say that "macro elasticities are unrelated to micro elasticities". But rather that the macro elasticity is the sum of two micro elasticities. And part of the literature has focused too much on one of them.

- A lesson of this paper is that abstracting from the distinction between employment and hours is not a good idea if you want to have a macro model with micro foundations.

- Micro LS elasticities are still relevant in predicting the aggregate effects of permanent changes in taxes in an indirect way.

- After all in the current model $\gamma$ remains a key parameter. What matters is to appropriately identifying and interpreting micro estimates of $\gamma$.

# 3. Too much emphasis on hours of work for too long

*Empirical micro focus on $\varepsilon_H$*

- In much of the micro literature models are structural as far as the hours equation is concerned but reduced-form with respect to the decision to participate.

- Why? Presumably a mixture of econometric convenience and disregard for macro implications (given focus on female LS, although more recently the literature has paid increasing attention to LS of older males and retirement decisions).

*Missing wages and selection problems*

- An important econometric reason for the focus on $\varepsilon_H$ at the expense of $\varepsilon_P$ is the missing-wage problem. Solutions require assumptions about counterfactual wages (market wages for non-workers).

- There is a selection problem created by the non-observability of wages for non-workers, which is not very different from the non-linearity problem in Rogerson–Wallenius.

- Suppose $f(w, V) = \beta \ln w + V$ independent of $W$. Then
$$E(H \mid W, D = 1) = \beta \ln W + g(W)$$
where $g(W) = E(V \mid W, D = 1) \neq 0$ in general. So that
$$\frac{\partial E(H \mid W = w, D = 1)}{\partial \ln w} \neq \beta$$

- Identification of $\varepsilon_H$ and $\varepsilon_P$ is not easy but is enormously facilitated by micro data.

*Macro focus on stand-in household models*

- True that a stand-in household model with a large $1/\gamma$ (or $1/\theta$ as in the paper) can reproduce the steady state effects of aggregate hours and taxes in this paper.

- But the lesson from both the microeconometric literature and the current paper is that such small $\gamma$ lacks microfoundations. In that sense it is a reduced form macro parameter to fit the cross-country data.

- The welfare implications of the stand-in household model with large $1/\theta$ are similar to those of the model in the current paper. I wonder to what extent separability of preferences between consumption and leisure is important for this result.

- Empirical objects of interest: differences across countries investigated on comparable micro panel data. This is now more feasible than ever, both from the point of view of data availability and computational technology.

## 4. Other comments

*Frisch elasticities are estimated from changes, not levels*

- A Frisch LS function (Browning et al 1985) holds constant the marginal utility of wealth, which may be treated as a fixed effect in a panel model of hours and wages (MaCurdy). The wage coefficient determines the reciprocal of preference parameter.

- So in order to hold the price of utility constant these regressions are run on differences, not levels.

- This is not relevant for the current model, but since the aim is to mimic empirical micro Frisch LS elasticities perhaps is worth looking at regression estimates in differences.

- It may well be that the downward bias caused by nonlinearity is even greater for first differences than for levels.

- The traditional panel literature also considered entry and exit decisions for female labor in the life-cycle context (Heckman and MaCurdy 1980; Browning et al. 1985).

- A small related comment is that the description on how the data are exactly generated from the model is insufficient.

*Health and work*

- If $\gamma$ is low and the increase in aggregate hours worked (following a reduction in $\tau$) is achieved from working hours of older workers, health status is potentially important.

- The authors consider an alternative model with constant productivity and an exogenous U-shaped disutility of work as a function of age, presumably motivated on age-related health and fitness considerations.

- But health may be endogenously related to labor outcomes.

- The evidence on the impact of retirement on health is mixed. Abandoning a stressful job may be health improving, but the effect may be negative if associated to a reduction in physical, mental and social stimuli.

- Interestingly, older North-Americans are apparently healthier than Continental Europeans: 73 % of 50+ individuals in the US self-report good health, but only 63% in Continental Europe (HRS and SHARE 2004, Fernandes et al. in progress).

## 5. Final remarks

- Despite progress in reconciling micro and macro elasticities, a significant quantitative mismatch remains.

- The current model's calibration needs to be stretched beyond reasonable limits to accommodate micro estimates of the curvature of leisure in the utility function.

- Partly to blame are systematic measurement errors in micro data on wages. There is evidence of a problem of empirical identification in well used panel data sets (PSID). But micro estimates of LS elasticities holding consumption constant are also small.

- There is still work to be done on the modelling front to be able to reconcile micro and macro elasticities.