Discussion of

Daly, Hryshko and Manovskii: **Reconciling Estimates of Earnings Processes in Growth Rates and Levels**

Fourth Conference on Household Finance and Consumption

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Frankfurt, December 2015

The views expressed are mine
and do not necessarily reflect those of the ECB.

Key Contribution

- Standard **permanent/persistent (p)–transitory (τ) income process**:

$$\begin{aligned} y_{it} &= \alpha_i + p_{it} + \tau_{it} \\ p_{it} &= \phi_p p_{it-1} + \xi_{it} \\ \tau_{it} &= \theta(L)\epsilon_{it} \end{aligned}$$

- Reconcile / understand discrepancies between estimates of var(ξ) and var(ϵ) in levels and differences (growth rates)
- Discrepancies driven by large variation of income around missing observations
- Missing observations affect estimates consumption insurance a la BPP (2008)

Estimation of Variances

- Estimation based on autocovariance moments $E[y_{it}y_{it+j}]$ or $E[\Delta y_{it}\Delta y_{it+j}]$
- Following Heathcote, Perri, Violante (2010)
- Levels
  - var $\xi = E[y_t y_{t+1}] - E[y_{t+1}y_{t-1}] - E[y_t y_{t-2}] + E[y_{t-1}y_{t-2}]$
  - var $\epsilon_t = E[y_t y_t] - E[y_t y_{t+1}] - E[y_{t-1}y_t] + E[y_{t-1}y_{t+1}]$
- Differences
  - var $\xi = E[\Delta y_t \Delta y_{t-1}] + E[\Delta y_t \Delta y_t] + E[\Delta y_t \Delta y_{t+1}]$
  - var $\epsilon_t = -E[\Delta y_t \Delta y_{t+1}]$

Findings

- Moments: Cross-sectional averages
- Moments for differences can be based on fewer observations than for levels
- E.g. when **missing observations**
- Results in bias if **NOT missing at random**, eg if large variance around missing obs's
- Empirically, discrepancy b/w estimates in diffs and levels
  is driven by earnings at the beginning / end of sample and around missing values

Results

- Missing data associated with high variance of rare (large) shocks
- Unmodeled rare shocks around missing obs's bias level estimates of transitory var upward
- Level moments blow up vars of transitory shocks because they confuse them with rare shocks
- Estimates of perm var in differences are biased upward

Lessons

- Level estimates of perm shock variance are unbiased
- Difference estimates of trans shock variance are unbiased
- Size of biases depends on how mean/variance of rare shocks differs from 'normal' shocks

Data

Large administrative datasets from Denmark and Germany

An Aside: Survey vs Administrative Data

- **Administrative data**
  - Typically more precise, large samples
  - Can be particularly useful given this application with missing observations
- **BUT survey data** may cover whole year
  - Asking about monthly income & number of months
  - Incomplete years at beginnig/end of sample in administr data could be adjusted/annualized?
  - May be better for some households, eg self-employed, grey economy

Estimates of Variances in Unbalanced Samples

	9 consec.				20 not nec. consec.			
	German data		Danish data		German data		Danish data	
	Levs. (1)	Diffs. (2)	Levs. (3)	Diffs. (4)	Levs. (5)	Diffs. (6)	Levs. (7)	Diffs. (8)
$\hat{\phi}_p$	0.980	0.992	0.964	0.990	0.995	0.997	0.967	0.989
	(0.001)	(0.0008)	(0.0008)	(0.0004)	(0.001)	(0.001)	(0.0007)	(0.0006)
$\hat{\sigma}^2_\xi$	0.007	0.019	0.007	0.012	0.0046	0.008	0.0066	0.0103
	(0.0002)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)
$\hat{\phi}_\tau$	0.173	0.173	0.289	0.285	0.158	0.316	0.184	0.355
	(0.006)	(0.014)	(0.003)	(0.004)	(0.009)	(0.012)	(0.004)	(0.004)
$\hat{\sigma}^2_\epsilon$	0.025	0.009	0.022	0.014	0.016	0.011	0.023	0.016
	(0.0004)	(0.0003)	(0.0002)	(0.0001)	(0.0003)	(0.0003)	(0.0002)	(0.0001)

- **var(ξ): 0.0046–0.019, var(ϵ): 0.009–0.025**
- var(ξ) almost twice as high for diffs
- Level of earnings lower after missing spells, volatility higher

Estimates of Variances in Balanced Samples

- Discrepancy nearly absent in balanced samples
- 50% reduction in permanent shocks when diffs, 50% reduction in transitory shocks when levels

Estimates of Consumption Insurance a la Blundell et al. (2008)

- Use PSID to replicate BPP estimates of insurance
- Dropping income outliers lowers substantially estimates of insurance against perm shocks: 74% $\rightarrow$ 40%

Friedman Permanent–Transitory Income Process

$$
\begin{aligned}
y_t &= \alpha + p_t + \tau_t \\
p_t &= p_{t-1} + \xi_{it}
\end{aligned}
$$

- Clean, sharp separation b/w permanent and transitory income shocks
- Convenient computationally (normalization)
- BUT results in (some?) misspecification

Variation in Estimates of Variances—Literature Review

Authors	Permanent σ^2_ξ	Transitory σ^2_ϵ
Individual data		
MaCurdy (1982)	0.013	0.031
Topel (1991)	0.013	0.017
Topel and Ward (1992)	0.017	0.013
Meghir and Pistaferri (2004)	0.031	0.032
Nielsen and Vissing-Jorgensen (2006)	0.005	0.015
Krebs, Krishna, and Maloney (2007)	$\sim$ 0.01	$\sim$ 0.1
Jensen and Shore (2008)	0.054	0.171
Guvenen (2009)	0.015	0.061
Heathcote, Perri, and Violante (2010)	0.01–0.03	0.05–0.1
Hryshko (2012)	0.038	0.118
Low, Meghir, and Pistaferri (2010)	0.011	–
Sabelhaus and Song (2010)	0.03	0.08
Guvenen, Ozkan, and Song (2012)	$\sim$ 0.05	$\sim$ 0.125
Karahan and Ozkan (2012)	$\sim$ 0.013	$\sim$ 0.09
Blundell, Graber, and Mogstad (2013)	$\sim$ 0.015	$\sim$ 0.025
Household data		
Carroll (1992)	0.016	0.027
Carroll and Samwick (1997)	0.022	0.044
Storesletten, Telmer, and Yaron (2004a)	0.017	0.063
Storesletten, Telmer, and Yaron (2004b)	0.008–0.026	0.316
Blundell, Pistaferri, and Preston (2008)	0.010–0.030	0.029–0.055
Review of Economic Dynamics (2010)	0.02–0.05	0.02–0.1
Blundell, Low, and Preston (2013)	$\sim$ 0.005	
DeBacker, Heim, Panousi, Ramnath, and Vidangos (2013)	0.007–0.010	0.15–0.20
Implied by **Daly, Hryshko, Manovskii**	$\sim$ 0.01	$\sim$ 0.02

To What Extent Does Misspecification Matter? I

Carroll, Slacalek, Tokuoka (2014)

Table 5 The MPC Under Alternative Variances of Income Shocks

Scenario	Baseline $\sigma^2_\psi = 0.01$ $\sigma^2_\theta = 0.01$	Low σ^2_ψ $\sigma^2_\psi = 0.005$ $\sigma^2_\theta = 0.01$	High σ^2_θ $\sigma^2_\psi = 0.01$ $\sigma^2_\theta = 0.05$	Very High σ^2_θ $\sigma^2_\psi = 0.01$ $\sigma^2_\theta = 0.10$
Overall				
Average	0.12	0.12	0.14	0.17
By wealth-to-permanent income ratio				
Top 1%	0.06	0.06	0.06	0.06
Top 10%	0.06	0.06	0.06	0.06
Top 20%	0.06	0.06	0.06	0.06
Top 40%	0.06	0.06	0.06	0.07
Top 50%	0.07	0.07	0.05	0.07
Top 60%	0.07	0.06	0.07	0.08
Bottom 50%	0.17	0.17	0.22	0.26

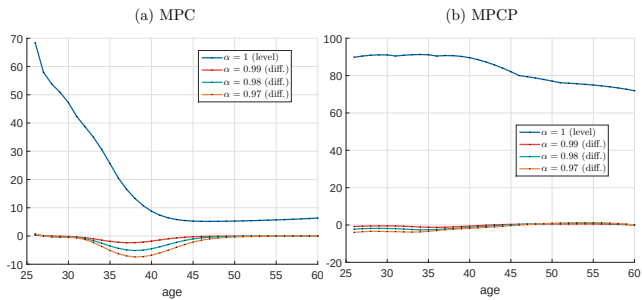
- Transitory shocks: increase MPC among wealth-poor $0.22 \rightarrow 0.26$
- Permanent shocks: affect shape of C function negligibly

To What Extent Does Misspecification Matter? II

Druedahl and Jørgensen (2015): Misspecification of persistence ϕ_p

- Biases upward estimates of CRRA coef, up to 30%
- BUT affects little MPCs

Figure 4.1: MPC and MPCP Age Profiles ($\rho = 2$).



Notes: Figure 4.1 shows average age profiles of 500.000 simulated households. For the case without misspecification the *levels* are reported; otherwise the *differences* between the *estimated* and the *true* model are shown. All households are initialized without any wealth.

Conclusions

- Careful paper investigating biases in estimates of income variances
- Important work analyzing cross-country administrative data
- Need to understand more implications for modelling
- First-best may be to have age-specific shocks or rare shocks in income process

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Top 40%	0.06	0.06	0.06	0.07
Top 50%	0.07	0.07	0.05	0.07
Top 60%	0.07	0.06	0.07	0.08
Bottom 50%	0.17	0.17	0.22	0.26
By income				
Top 1%	0.09	0.08	0.10	0.11
Top 10%	0.09	0.09	0.10	0.12
Top 20%	0.10	0.10	0.11	0.12
Top 40%	0.11	0.11	0.12	0.14
Top 50%	0.12	0.11	0.12	0.14
Top 60%	0.12	0.11	0.13	0.15
Bottom 50%	0.12	0.13	0.16	0.20
By employment status				
Employed	0.11	0.11	0.14	0.16
Unemployed	0.23	0.24	0.25	0.27
Time preference parameters‡				