

Discussion:
“Long-Run Productivity Risk: A New Hope for
Production-Based Asset Pricing”

by Mariano Croce

Lu Zhang

University of Michigan
and NBER

The UBC PH&N Summer Finance Conference
July 2008: Whistler, BC

Theme

The paper

A general equilibrium model with long-run **productivity** risk

Theme

My discussion

A perfect R&R:

- Addressing an important question with a promising framework
- Lacking focus and clarity (temporary, however)

Outline

1 Review

2 Refocus: Which TFP Process?

3 Specifics

Review

The Model

$$U_t = \left[(1 - \delta) C_t^{1 - \frac{1}{\psi}} + \delta \left(E_t \left[U_{t+1}^{1 - \gamma} \right] \right)^{\frac{1 - \frac{1}{\psi}}{1 - \gamma}} \right]^{\frac{1}{1 - \frac{1}{\psi}}}$$

$$C_t + I_t \leq Y_t = K_t^\alpha [A_t \bar{n}]^{1 - \alpha}$$

$$K_{t+1} = (1 - \delta) K_t + \left[\frac{a_1}{1 - \frac{1}{\tau}} \left(\frac{I_t}{K_t} \right)^{1 - \frac{1}{\tau}} + a_2 \right] K_t$$

Review

Innovation: Long-run productivity risk

$$\begin{aligned}\log(A_{t+1}/A_t) \equiv \Delta a_{t+1} &= \mu + x_t + \sigma \epsilon_{a,t+1} \\ x_t &= \rho x_{t-1} + \sigma_x \epsilon_{x,t} \\ \begin{bmatrix} \epsilon_{a,t+1} \\ \epsilon_{x,t+1} \end{bmatrix} &\stackrel{\text{i.i.d.}}{\sim} N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\right)\end{aligned}$$

Document some empirical support

Review

Quantitative results

TABLE 3
PRODUCTION ECONOMY: BENCHMARK CALIBRATION

Panel A: Calibration

μ	σ	σ_x	ρ	δ_k	α	τ	δ^{12}	γ	Ψ
.165%	.60%	5.5% σ	.98	.5%	.33	.98	.98	30	2

Panel B: General Statistics

	Mean		St. Dev.		ACF ₁	
	Model	Data	Model	Data	Model	Data
C_{t+1}/C_t	2.0	2.0	1.4	1.4	.35	.32
I_{t+1}/I_t	2.0	2.4	1.8	7.0	.30	.5
I_t/Y_t	25	20	0.5	2.0	.98	.97
$r_{t+1}^d - r_t^f$	4.8	6.0	4.0	16.0	.05	.01
r_t^f	1.2	1.1	.34	1.5	.97	.90
$p_t - d_t$	3.25	3.2	.11	.35	.98	.96

Refocus

IID TFP growth, AR[1] TFP, or ARMA[1,1] TFP growth?

Asset pricing dynamics under traditional TFP processes:

- Kaltenbrunner and Lochstoer (2006): IID TFP growth, AR[1] TFP
- Campanale, Castro, and Clementi (2006): AR[1] TFP
- Kuehn (2008): IID TFP growth

How does the ARMA[1,1] specification change asset pricing dynamics?

- Can the Bansal and Yaron (2004) insight survive the GE extension?
- Does consumption smoothing hurt or help?
- What production-side frictions are necessary?

Specifics

Focus on the news! (Margin notes on my copy provide more details)

- 1 **News:** Long-run risk decreases the level of adjustment costs required for generating a reasonable equity premium
- 2 **News:** A high equity premium with a moderate correlation between consumption growth and excess returns
- 3 **News:** Less-than-perfect correlations between consumption growth, investment growth, and output growth
- 4 **Predictability:** Can long-run risk decrease the required level of investment commitment?
- 5 Start the Introduction with the third paragraph on p. 4
- 6 Shorten the discussion on adjustment costs, IES, and RRA

Items 1–4 need documentation on comparisons with RW and AR[1] TFP