Discussion of
“The Risky Capital of Emerging Markets”
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Lucas 1990

**Data**  Capital productivity is orders-of-magnitude bigger in some countries (low-income?) than others (high-income?)

**Theory**  Frictionless and complete world capital markets $\Rightarrow$ MPKs equal across countries

**Puzzle**  Why doesn’t capital flow from low-MPK countries to high-MPK countries to bring these differences closer to equality?
MPK India/US 1960-1989 (Lucas, TFP equal)
Lucas  Proposed (and dismissed) a number of possibilities
  ▶  human capital
  ▶  externalities from human capital
  ▶  capital-market frictions

Others  More of the same
This paper’s question(s)

Are high MPKs compensation for high risk?

What kinds of risks could command such large premiums?

Approach:

- measurement of returns
- asset-pricing model
MPK India/US 1960-1989 (PWT8.0 capital)
MPK India/US 1990-2011 (Lucas, TFP equal)
MPK India/US 1990-2011 (PWT8.0 capital)
MPK India vs. US (PWT8.0 capital)
DHS: Avg Return to K vs. Avg Income
DHS: Avg Return to K vs. Avg Income
DHS: Regress Avg Return to K on Avg Income

slope = -0.016

Return to Capital vs. Log GDP per Worker
DHS: Income-based portfolios
Portfolios?

- Why income?
  - Lucas was thinking about development
  - But maybe there are other equally interesting questions

- Lots of other alternatives:
  - DHS do income and “openness”... interesting!
  - finance guys do things like size, growth, momentum...
  - inflation/financial stability
  - geography or colonial history
  - resource vs. manufacturing vs. agriculture
  - “Doing Business” index and the like
Model

- Endowment/exchange economy
- Representative agent with Epstein-Zin preferences
- Correlation structure between US and foreign consumption and “cashflows” from owning US and foreign capital
- Calibrated to match features of international returns to capital
Risk

- Recursive references

\[
U_t = V[c_t, \mu_t(U_{t+1})] = [(1 - \beta)c_t^\rho + \beta\mu_t(U_{t+1})^\rho]^{1/\rho}
\]

\[
\mu_t(U_{t+1}) = [E_t(U_{t+1}^\alpha)]^{1/\alpha}
\]

\[
V, \mu_t \text{ is } \text{hd} 1, RA = 1 - \alpha, EIS \equiv \sigma = 1/(1 - \rho)
\]

- Pricing kernel with recursive preferences

\[
m_{t+1} = \beta \left( \frac{c_{t+1}}{c_t} \right)^{\rho-1} \left( \frac{U_{t+1}}{\mu_t(U_{t+1})} \right)^{\alpha-\rho}
\]
Constant vs. stochastic volatility

\[
\log m_{t+1} = \log \beta + (\rho - 1) \log (c_{t+1}/c_t) + (\alpha - \rho) \left[ \log U_{t+1} - \log \mu_t(U_{t+1}) \right]
\]

\(\text{short run risk}\)

\(\text{long run risk}\)

\[\begin{align*}
\log U_{t+1} - \log \mu_t(U_{t+1}) &= 
\begin{array}{c}
\underbrace{u_{t+1} - E_t u_{t+1}} \\
\text{utility shock}
\end{array} \\
\begin{array}{c}
\underbrace{\alpha V_t(u_{t+1})/2} \\
\text{utility risk}
\end{array}
\end{align*}\]

- What if \(u_t \equiv \log U_{t+1} \sim N(E_t u_{t+1}, V_t(u_{t+1}))\)?
- New dynamics?
Equity vs. Capital: the role of $\phi$ and $\phi^*$

\[
\Delta c_{t+1} = \mu_c + x_t + \eta_{t+1} \\
x_{t+1} = \rho x_t + e_{t+1} \\
\Delta d_{t+1} = \mu_d + \phi x_t + \pi \eta_{t+1} + \mu_{t+1} \\
\Delta c^*_{t+1} = \mu^*_c + \xi^* x_t + x^*_t + \pi^*_c \eta_{t+1} + \eta^*_{t+1} \\
x^*_{t+1} = \rho^* x^*_t + e^*_{t+1} \\
\Delta d^*_{t+1} = \mu^*_d + \bar{\phi}^* (\xi^* x_t + x^*_t) + \pi^* \eta_{t+1} + \pi^*_d \mu_{t+1} + \pi^*_c \eta^*_{t+1} + \mu^*_{t+1}
\]

- In a model with limited liability and levered equity investments, $\phi$ is a hack to capture the fact that aggregate equity is like a call option on aggregate consumption.
- When we’re measuring capital itself, rather than levered equity, how do we interpret $\phi$? Nationalization? Disasters?
What about capital?!!

▶ Doesn’t it seem a bit strange to study a capital-flow puzzle in an economy with no capital accumulation or mobility?

▶ New work by Backus, Ferriere and Zin shows that this is not a big deal:
  ▶ stochastic growth model with recursive utility (and stochastic volatility)
  ▶ endogenous capital dynamics unaffected by shocks, risk (constant or stochastic), or risk aversion
  ▶ for asset-pricing problems, the growth model with endogenous capital and recursive utility will behave just like the endowment economy studied in this paper
Model Expected Returns