Discussion of "Climbing off and going up the ladder" by Lawrence Schmidt

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Overview of the paper

- Lots of interesting stuff (99 pages!)
- Big picture:
  - risk of idiosyncratic disasters matters for asset pricing,
  - because it is correlated with stock returns

- Model: merges Constantinides-Duffie & Dreschler-Yaron,
- and add time-varying **skewness** of individual cons. growth

- Data:
  - we have measures of skewness at annual frequency
  - use time series methods to extrapolate to higher frequency and measure the volatility of skewness

Discussion

1. Recent literature by Guvenen, Song et al. on income dynamics
2. Explain different steps in the model
3. Some quantitative comments

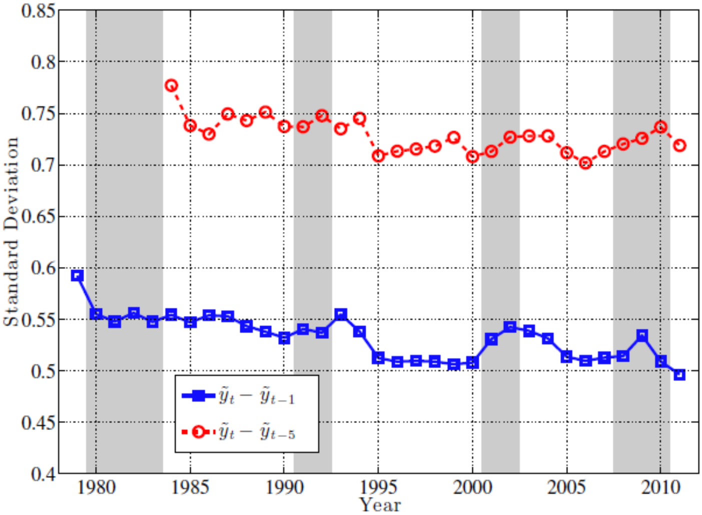
1. Guvenen, Song and coauthors: data

- Study labor income dynamics using SSA records (W2s)
  - almost no measurement error
  - almost no attrition
  - no top coding
  - huge sample (10% of male population)
  - includes stock options, bonuses, etc.
  - annual, pretax, 1978-2011

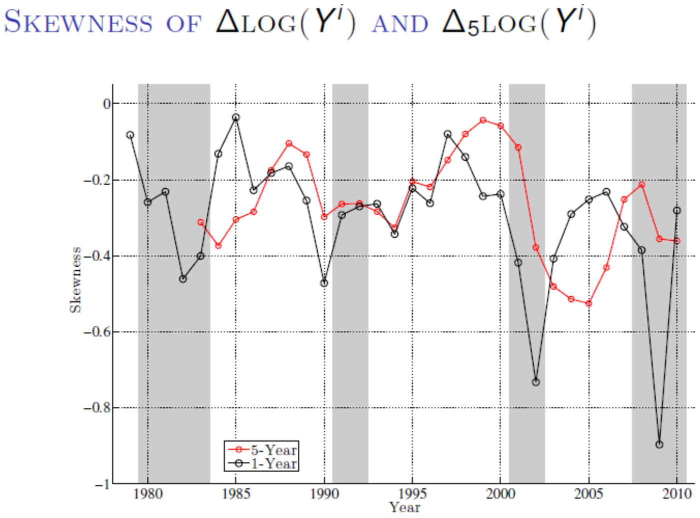
Guvenen, Song and coauthors: findings

- Some key results:
  - income growth volatility shows no trend...
  - ... and no business cycle variation (unlike STY)
  - but skewness is countercyclical
  - both at 1y and 5y horizon

Income growth volatility is flat



Income growth skewness is countercyclical



Interpretation

- "Displacement risk"
  - bond trader becomes a high school teacher?
  -
  - career interruption for family/health reasons, then goes back at much lower wage?
- Other findings
  - large kurtosis: lots of tiny changes
  - systematic risk differences given average income
  - note skewness of log wages, but wages have >0 skew!

2. Modeling contribution

- Start with Constantinides-Duffie
  - Add Skewness (instead of volatility)
  - Add Recursive utility (instead of CRRA)
  - Add Long run risk (richer model for aggregate variables)

Simple version of Constantinides-Duffie

- Consumption process

$$\Delta \log (c_{it+1}) = \Delta \log (C_{t+1}) + \eta_{it+1}$$

- CRRA preferences, no frictions, so $\forall$ asset j :

$$E_t \beta \left(\frac{c_{it+1}}{c_{it}} \right)^{-\gamma} R_{jt+1} = 1$$

$$E_t \beta \left(\frac{C_{t+1}}{C_t} \right)^{-\gamma} e^{-\gamma \eta_{it+1}} R_{jt+1} = 1$$

$$E_t \beta \left(\frac{C_{t+1}}{C_t} \right)^{-\gamma} E\left(e^{-\gamma \eta_{it+1}} | s_{t+1} \right) R_{jt+1} = 1$$

- Constantinides-Duffie: η_{it+1} is $N\left(-s_{t+1}^2/2, s_{t+1}^2\right)$. Hence

$$\underbrace{E_t \beta \left(\frac{C_{t+1}}{C_t} \right)^{-\gamma} e^{\frac{\gamma^2}{2} s_{t+1}^2}}_{=M_{t+1}} R_{jt+1} = 1$$

Constantinides–Duffie without normality

- Suppose instead:

$$\eta_{it+1} = \left\{ \begin{array}{c} u, \text{ w/prob } 1 - p_{t+1} \\ -d, \text{ w/prob } p_{t+1} \end{array} \right\}$$

- Then

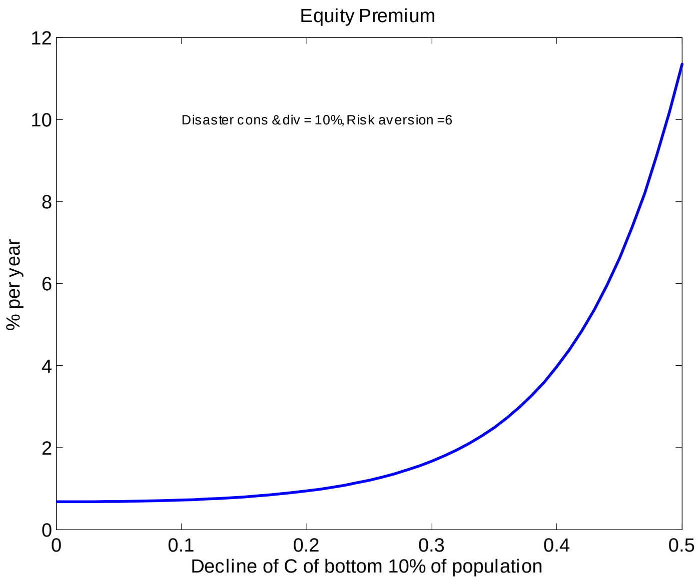
$$M_{t+1} = \beta \left(\frac{C_{t+1}}{C_t} \right)^{-\gamma} \left((1 - p_{t+1}) e^{-\gamma u} + p_{t+1} e^{\gamma d} \right)$$

- Extension (as in Martin (REStud 2012)):

$$E\left(e^{-\gamma \eta_{it+1}} \middle| s_{t+1} \right) = \exp \sum_{n=0}^{\infty} \kappa_{n,t+1} \frac{(-\gamma)^n}{n!}$$

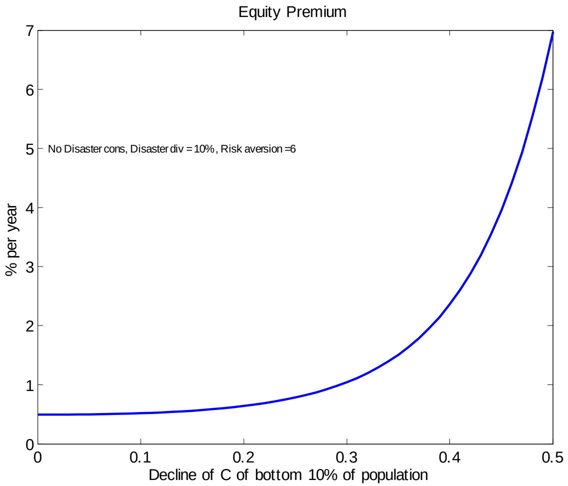
where $\kappa_{n,t+1}$ are cumulants of η_{it+1}

Numerical illustration: role of concentration



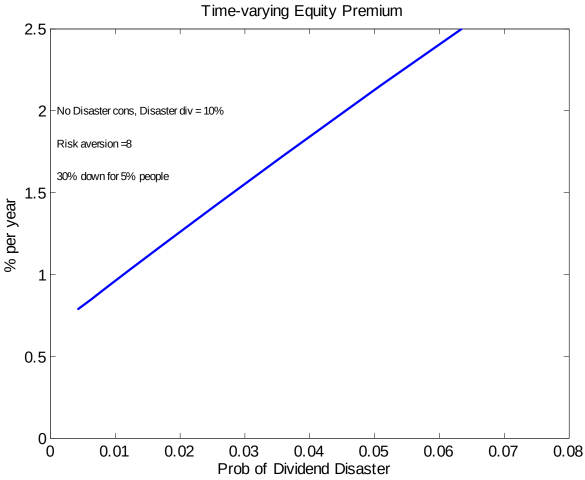
Even with constant aggregate consumption!

- this requires a dividend shock correlated with idiosyncratic risk



Time-varying equity premium

- if p_t moves around



Evaluating the mechanism

- EE holds at household level, so can estimate using individual consumption data
  - Brav, Constantinides and Geczi; Cogley; etc.
- Measure directly XS moments of cons growth
  - Tricky because extreme observations matter a lot
  - Measurement error
- Here: Epstein-Zin utility so not directly implementable.

Adding Epstein-Zin

- If p_t is iid, EZ doesn't really matter
- But if serially correlated, news about future p_t are priced
- How to solve? if random walk, then wealth-consumption ratio same for everyone, so EE looks very similar to before

$$E_t\left(\beta\left(\frac{c_{it+1}}{c_{it}}\right)^{-\psi}\left(\frac{V_{it+1}}{E_t(V_{it+1}^{1-\gamma})^{\frac{1}{1-\gamma}}}\right)^{\psi-\gamma}R_{jt+1}\right)=1$$

$$E_t\left(\beta\left(\frac{c_{t+1}}{c_t}\right)^{-\gamma}e^{-\gamma\eta_{it+1}}\frac{v_{t+1}^{\psi-\gamma}}{E_t(v_{t+1}^{1-\gamma}\left(\frac{c_{it+1}}{c_{it}}\right)^{1-\gamma})^{\frac{1}{1-\gamma}}}R_{jt+1}\right)=1$$

3. Quantitative work

Very good fit;

- note the LRR model does not seem to do a lot
  - need the dividend shock to get stock prices to fall in bad times

Questions:

- Does the model fit the predictability evidence?
- How much does the model generate for $\sigma(R_m)$?

Return volatility unaffected by most parameters

- Big part is dividends are fairly volatile

Moment	Data Estimate	Markets	Baseline	No Covariance	Less CF Vol	IID Cons
$E[R_m - R_f]$	7.1	Inc	6.5	5.5	5.8	5.3
		RA	3.2	3.1	2.5	2.0
$\sigma(R_m)$	20.3	Inc	24.2	20.2	23.4	23.1
		RA	26.9	23.5	26.0	25.5
$E[R_f]$	0.6	Inc	0.4	0.4	0.6	0.7
		RA	2.0	2.0	2.0	2.0
$\sigma(R_f)$	2.9	Inc	3.7	3.7	3.5	3.3
		RA	0.3	0.3	0.1	0.0
$E[pd]$	3.4	Inc	3.4	3.4	3.5	3.6
		RA	4.5	4.1	5.1	6.2
$\sigma(pd)$	0.45	Inc	0.22	0.21	0.21	0.20
		RA	0.25	0.25	0.24	0.24
$AC1(pd)$	0.87	Inc	0.62	0.64	0.60	0.60
		RA	0.59	0.62	0.58	0.57
$E[\Delta c]$	1.9	Both	2.0	2.0	2.0	2.0
$\sigma(\Delta c)$	2.2	Both	2.1	2.1	2.1	2.1
$AC1(\Delta c)$	0.45	Both	0.23	0.23	0.23	0.23
$E[\Delta d]$	1.15	Both	0.68	0.75	0.70	0.80
$\sigma(\Delta d)$	11.1	Both	14.5	12.8	14.4	14.4
$AC1(\Delta d)$	0.21	Both	0.53	0.50	0.53	0.53
$Corr(\Delta c, \Delta d)$	0.55	Both	0.40	0.44	0.41	0.36

Table 12: Data and model-implied moments for different specifications

Vol of P-D lower than the data

- Same reason: most vol is dividends, not price

	Data	Simulated Model-Implied Moments				
Moment	Estimate	Markets	Baseline	No Covariance	Less CF Vol	IID Cons
$E[R_m - R_f]$	7.1	Inc	6.5	5.5	5.8	5.3
		RA	3.2	3.1	2.5	2.0
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Table 12: Data and model-implied moments for different specifications

Risk-free rate more volatile with incomplete markets

- Time-varying precautionary savings

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		Markets	Baseline	No Covariance	Less CF Vol	IID Cons
$E[R_m - R_f]$	7.1	Inc	6.5	5.5	5.8	5.3
		RA	3.2	3.1	2.5	2.0
$\sigma(R_m)$	20.3	Inc	24.2	20.2	23.4	23.1
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$E[pd]$	3.4	Inc	3.4	3.4	3.5	3.6
		RA	4.5	4.1	5.1	6.2
$\sigma(pd)$	0.45	Inc	0.22	0.21	0.21	0.20
		RA	0.25	0.25	0.24	0.24
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Summary

- Important topic;
- Very ingenious modeling;
- Clever time series work;
- Current paper does not show the full potential of the model!