A pragmatic perspective on asset prices and monetary policy

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- Motivating question: how can we connect “proper” analysis of asset prices with the forecast?
- Is it realistic to think we can?
- Is it sensible to think we should?

Outline

- Asset prices: the conjuncture-forecast disconnect problem
- Some results: implications for asset prices from a New Keynesian model
- Where to next?

The disconnect

- Finance theory and macro models:
  - "But how does it relate to the forecast?"
  - "What if people are more uncertain?"

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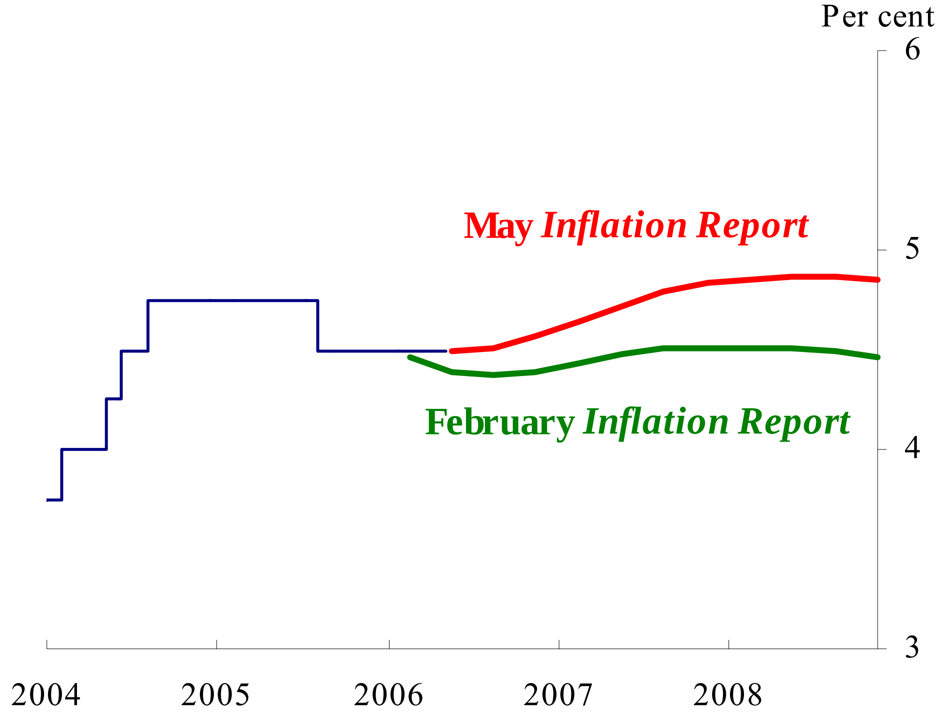
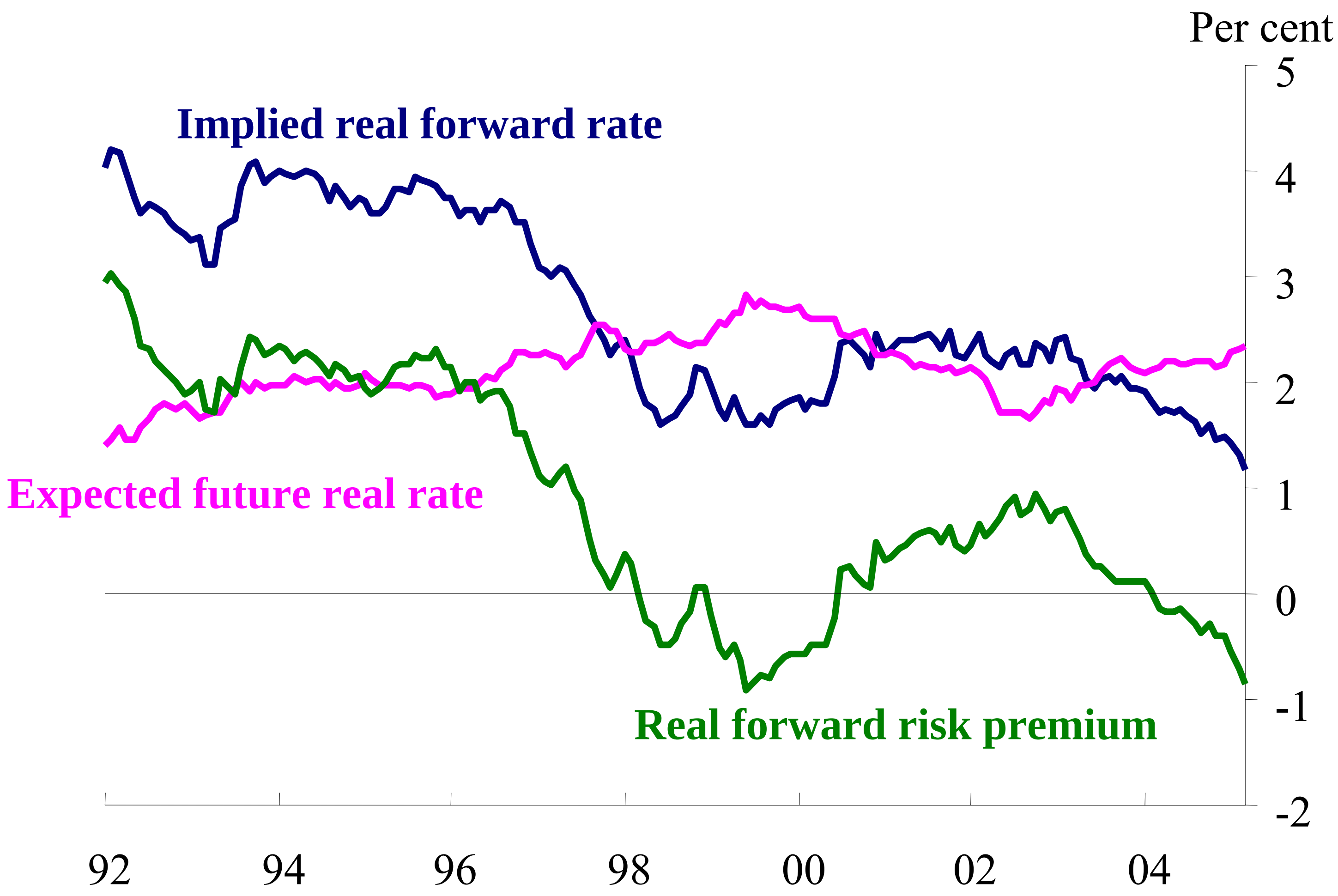
Begging the question of risk premia

- Conditioning on market forward rate paths in published *Inflation Report*



- Plus conjunctural issues (eg, the yield conundrum)

Affine yield curve models



- But minimal structure – where's the story?

Asset prices in a structural model

- Principles:
  - Fundamental asset pricing equation

$$P_t = E_t[M_{t+1} X_{t+1}] \qquad\qquad 1 = E_t[M_{t+1} R_{t+1}]$$

  - Example: consumption Euler equation

$$1 = E_t\left[\beta \frac{C_{t+1}^{-\gamma}}{C_t^{-\gamma}} R_{t+1}\right]$$

  - Risk premia: price of risk times quantity of risk

$$rp_t \approx \gamma \bullet \eta_{c\varepsilon} \bullet \eta_{r\varepsilon} \bullet \sigma_{\varepsilon}$$

Asset prices in a structural model

Method:

- Take typical closed-economy New Keynesian model
  - optimising households and firms, monopolistically-competitive goods and labour markets, real and nominal rigidities, fiscal and monetary rules
- Specify assets available:
  - shares, real bonds, nominal bonds
- Use 2nd order perturbations to calculate unconditional expectations of asset returns
- Vary parameters and variances to link asset returns to structure and shocks

Structural models

- Take basic NK model
- Principle:

$$rp_t \approx \gamma \bullet \eta_{c\varepsilon} \bullet \eta_{r\varepsilon} \bullet \sigma_{\varepsilon}$$

- Use 2nd order perturbations to calculate unconditional expectations of asset returns
- Vary parameters and variances to link asset returns to structure and shocks

Key equations: households

$$
{}_t \sum_{i=0}^{\infty} \beta^i U \left(\begin{array}{c} \dfrac{\left(C_{t+i}(a) - H^C_{t+i}(a)\right)^{1-\gamma^C} - 1}{1-\gamma^C} \\[2ex] - \dfrac{\left(N_{t+i}(a) - H^N_{t+i}(a)\right)^{1+\gamma^N} - 1}{1+\gamma^N} \\[2ex] + \dfrac{\left(\frac{M_{t+i}(a)}{P_{t+i}}\right)^{1-\gamma^M} - 1}{1-\gamma^M} \end{array} \right)
$$

$$
\begin{aligned}
& C_t(a) + \frac{T_t(a)}{P_t} + \frac{M_t(a)}{P_t} + \frac{V_t^{eq}}{P_t} S_t(a) \\
& + \sum_{j=1}^{J} \frac{V_{j,t}^{bn}}{P_t} B_{j,t}^n(a) + \sum_{j=1}^{J} V_{j,t}^{br} B_{j,t}^r(a) \\
= & \frac{W_t}{P_t} N_t(a) + \frac{M_{t-1}(a)}{P_t} + \frac{V_t^{eq} + D_t}{P_t} S_{t-1}(a) \\
& + \sum_{j=1}^{J} \frac{V_{j-1,t}^{bn}}{P_t} B_{j,t-1}^n(a) + \sum_{j=1}^{J} V_{j-1,t}^{br} B_{j,t-1}^r(a).
\end{aligned}
$$

Preferences:

- External habits in consumption
- External habits in labour
- Money in utility

Budget constraint:

- Financial assets: equity shares, money, nominal and real bonds of different maturities

Key equations: firms and government

- Monopolistically-competitive firms
- Rotemberg (1982) price adjustment costs

$$\max E_t \sum_{i=0}^{\infty} \beta^i \frac{\Psi_{t+i}(z)}{\Psi_t(z)} \left\{ D_{t+i}(z) - \frac{\chi^P}{2} \left(\frac{P_{t+i}(z)}{\overline{\pi} P_{t+i-1}(z)} - 1 \right)^2 P_{t+i} Y_{t+i} \right\}$$

- Dividends

$$D_{t+i}(z) = P_{t+i}(z) Y_{t+i}(z) - W_{t+i} N_{t+i}(z) - P_{t+i} I_{t+i}(z)$$

- Monetary Policy Rule

$$R_{1,t}^{cb} = \theta^R R_{1,t-1}^{cb} + (1-\theta^R)[\bar{R}\overline{\pi} + \theta^{\pi}(\pi_t - \overline{\pi})] + \varepsilon_t^R$$

Some initial results

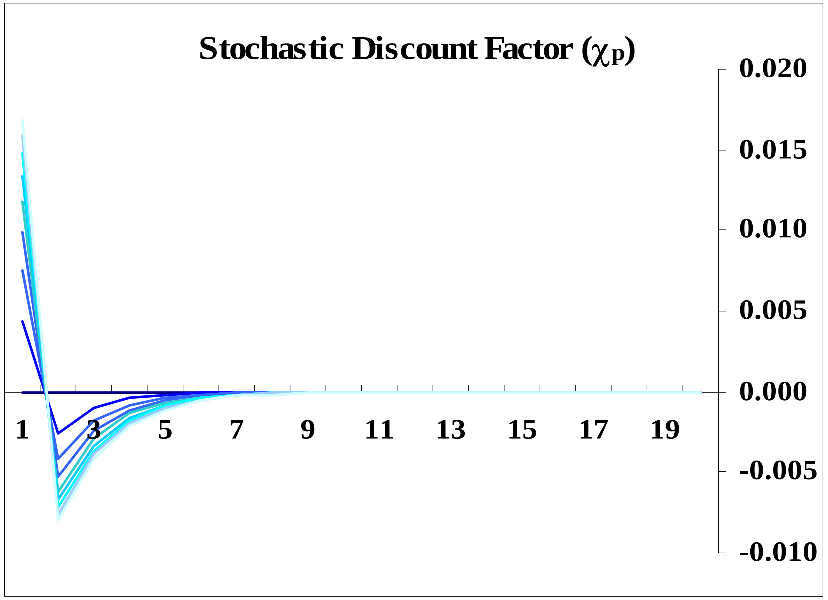
The shock matters:

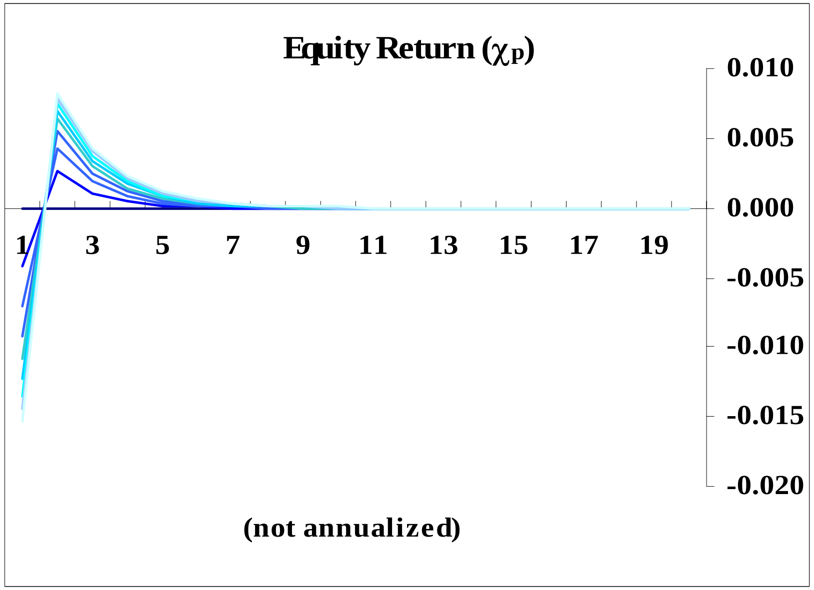
- Raising the degree of real rigidities always raises risk premia

- Raising the degree of nominal rigidities raises risk premia when there are only demand (ie, monetary policy) shocks

- Raising the degree of nominal rigidities lowers risk premia when there are only real (ie, productivity) shocks.

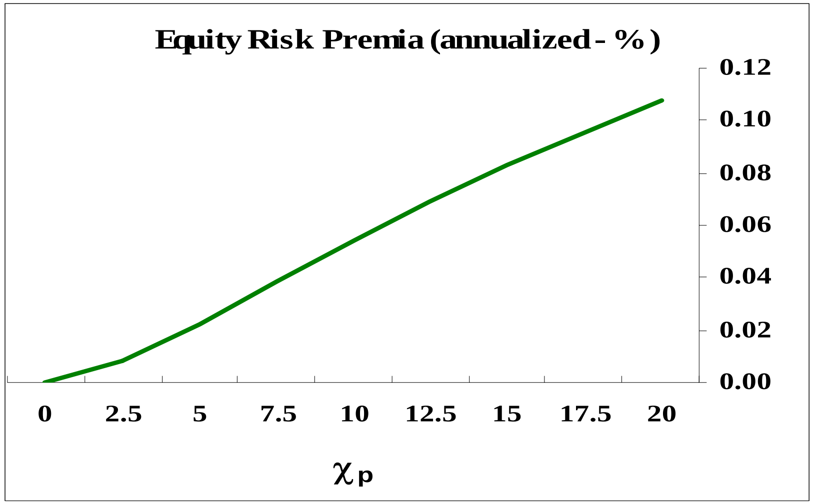
Changing nominal rigidities when there are only monetary policy shocks

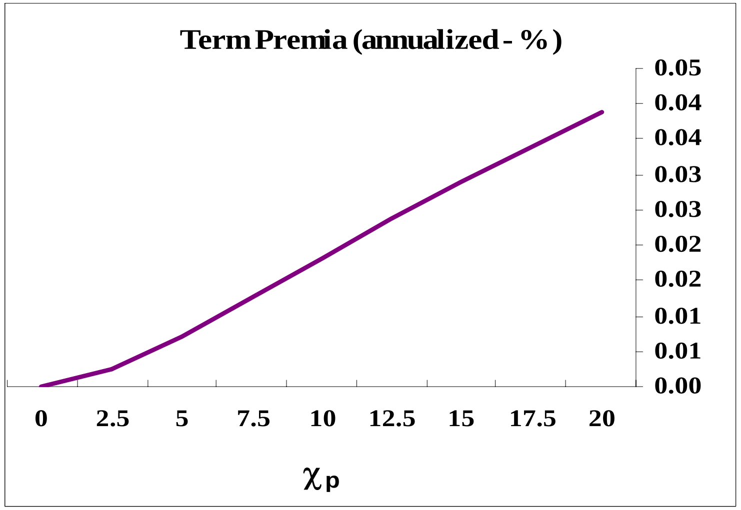


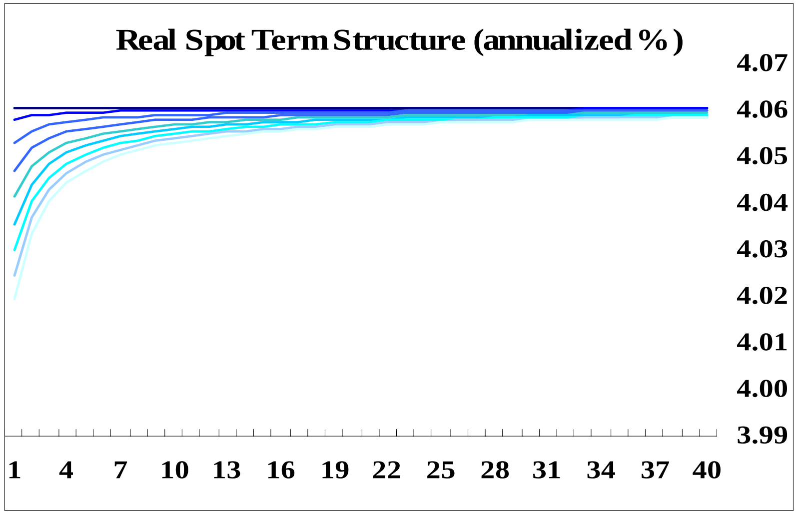


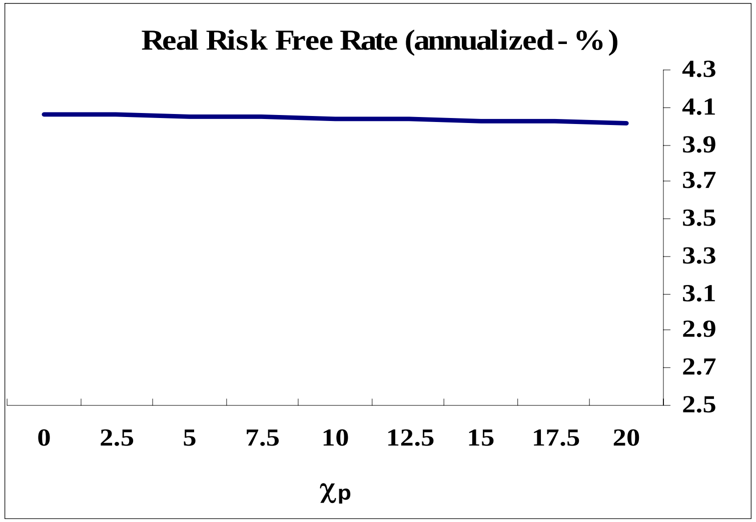
1. Negative covariance
2. Negative autocorrelation in the stochastic discount factor
3. Nominal rigidities increase the variability of the SDF and equity returns

Changing nominal rigidities when there are only monetary policy shocks

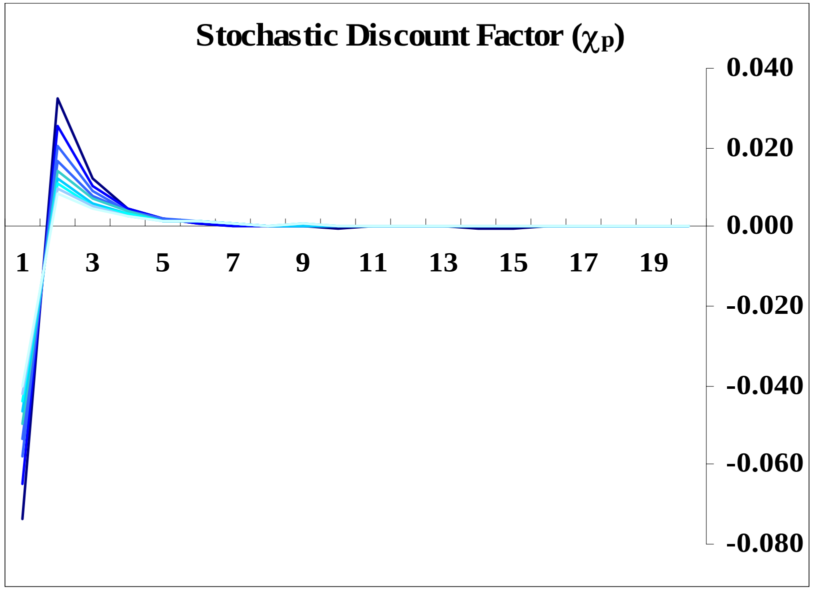


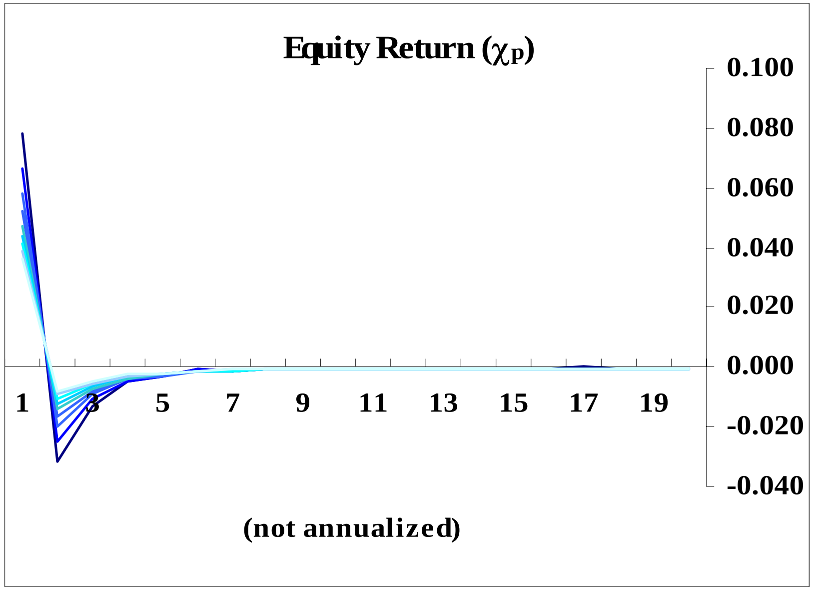






Changing nominal rigidities when there are only productivity shocks





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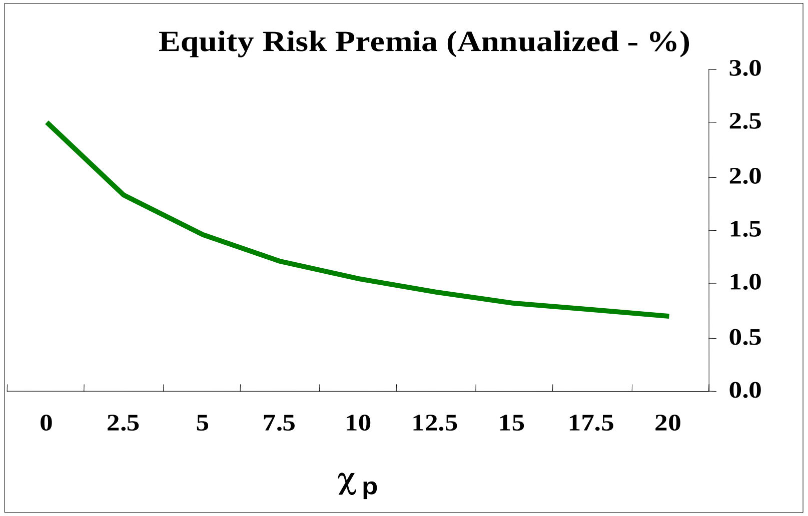

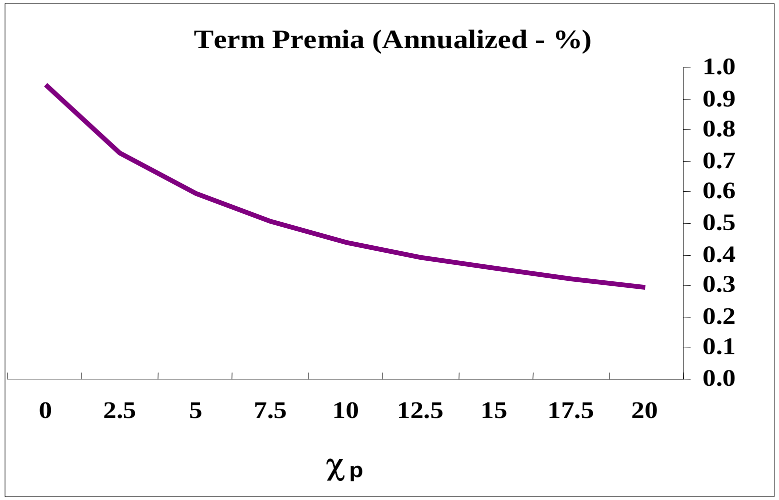

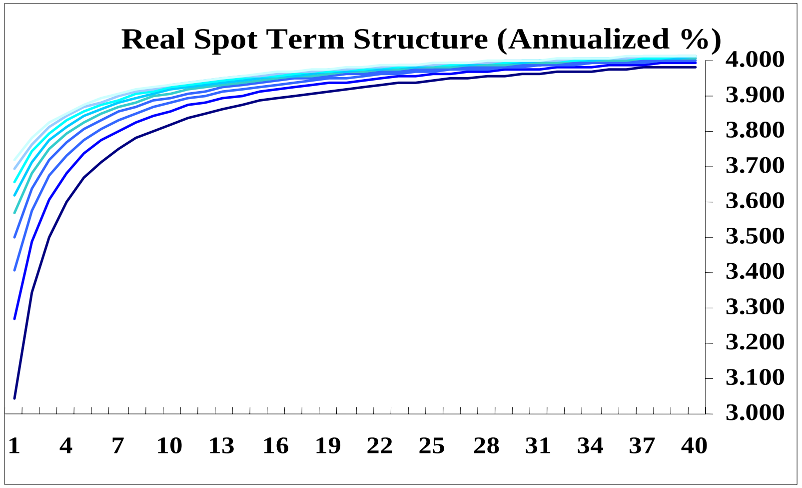

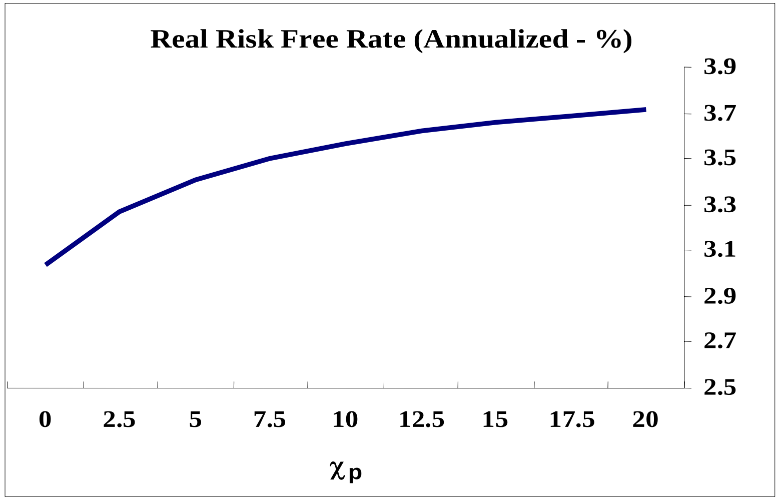

Where can this go?

- Potential future directions:
  - More structure and more shocks
  - Open economy and exchange rate
- But is it *realistic*?
  - We need a workhorse theory of time-varying risk premia that fits the facts (habits?)
  - 3rd order expansions to implement
- And is it *practical* and *sensible*?
  - Danger of the über-model?