Homework

- Pick one country which is not the US
- If you choose Germany, I recommend dropping hyperinflation years. Or for any country, dropping observations with inflation > 200%.
- Assume risk aversion $\gamma = 10$, impatience $\delta = 0.01$ (1%)
- Calculate the implied safe rate
- Calculate the implied risky rate
- Calculate the average real return on equity and government bill rate
- Do the predictions of the model match the data?

Homework – specifics I

- Data: www.macrohistory.net (or country of your choice)
- Variables: eq_tr, cpi, bill_rate, rconpc
- Log real consumption growth:
  $\ln\Delta c = \log(\text{rconpc}_t) - \log(\text{rconpc}_{t-1})$
  - $E(\ln\Delta c)$: mean of $\ln\Delta c$ for this country
  - $\sigma^2[\ln\Delta c]$: variance of $\ln\Delta c$ for this country
- Log real equity return in the data:
  $\text{r\_eq\_tr} = (1 + \text{eq\_tr}) * \text{cpi}_{t-1}/\text{cpi}_t - 1 \ (\approx 7\%)$
- Log real bill rate:
  $\text{r\_bill\_rate} = (1 + \text{bill\_rate}) * \text{cpi}_{t-1}/\text{cpi}_t - 1 \ (\approx 1\%)$

Homework – specifics II

- Consumption beta:

$$\begin{aligned}\beta_{R^{risky},\Delta c} &= \text{cov}(\text{r\_eq\_tr}, \ln\Delta c)/\sigma^2[\ln\Delta c] \\ &= \text{corr}(\text{r\_eq\_tr}, \ln\Delta c)\sigma(\text{r\_eq\_tr})/\sigma(\ln\Delta c)\end{aligned}$$

- If you are struggling:
  - Forget about logs; use "normal" growth rates $\left(\frac{x_t - x_{t-1}}{x_t}\right)$
  - Assume $\beta_{R^{risky},\Delta c} = 2$
  - Assume $E(\ln\Delta c) = 0.015$; $\sigma^2[\ln\Delta c] = 0.035^2 = 0.0012$

$$r^{safe} = \ln(R^{safe}) = \delta + \gamma\mathbb{E}[\ln\Delta c] - 0.5\gamma^2\sigma^2[\ln\Delta c]$$

$$R^{risky} - R^{safe} = \beta_{R^{risky},\Delta c}\gamma\sigma^2(\Delta c)$$

Homework – submission

- Construct table(s), or send me a list of the following variables:
  1. Ingredients for model-implied risky and safe rates: $E(\ln \Delta c)$, $\sigma^2[\ln \Delta c]$, $\beta_{R^{risky},\Delta c}$
  2. Model-implied risky and safe rate
  3. Average real equity return and real bill rate in the data
- **Deadline: 15:00 on 22 April**
- Note: it's fine if the model does not fit the data; just report the results