Asset Pricing when “This Time Is Different”

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Motivation

Part I:
- Learning can have sizable AP implications with EZ preferences
  - “long-run-risk” logic at individual-investor level
  - persistent, variable updates to beliefs
  - preference for early resolution of uncertainty
- Evidence that learning is “imperfect”
  - Malmendier and Nagel (2011): over-weight personal experiences
    ⇒ large updates to beliefs

Part II:
- Agents of different ages coexist
- Do their beliefs average out?
- Does risk-sharing reinforce the risk faced by agents?

Part III:
- What if there is investment?
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“This Time is Different”: Malmendier and Nagel

- Not Bayesian updating
- Quite strong emphasis on recent observations (returns, inflation)
- No weight on history before agent’s birth
- Malmendier and Nagel (2011) – weight on shock \( l \) quarters ago for age \( a \):
  \[
  w_{a,l} = \frac{l^\lambda}{\sum_{l'=0}^{a-1} l'^\lambda}, \quad \lambda \approx 1.5
  \]
- Malmendier and Nagel (2013) – weight on latest shock:
  \[
  \gamma_a = \frac{\theta}{a}, \quad \theta \approx 3.
  \]
- Bayesian updating would require \( \lambda = 0 \) (\( \theta = 1 \))
“This Time is Different”: CJL

- Model:

\[
m_{t+1} = (1 + A_t)^{-1}m_t + A_t(1 + A_t)^{-1}\Delta c_t
\]

\[
A_{t+1} = A_t(1 + A_t)^{-1}, \quad A_0 = kA_{2T}
\]

- Bayesian updating ⇒ equal weighting of all experienced data points

- History before agent’s birth is downweighted

- Every new cohort takes the posterior mean of previous generation as its prior mean, but with higher variance (\(k = 5\) times higher)

  - Captures the notion of overweighting recent experiences
  - But less than Malmendier-Nagel

- Relevant observations for asset pricing:

  - CJL innovations permanent, MN not
  - CJL weight on latest shock drops faster with age (both start at 3%, end at 0.5% vs 1%)
  - CJL heterogeneity in updating across agents higher
Preferences, Demographics, Dividends

- Two cohorts alive at any point in time
  - Each lives $2T$ periods
  - Age difference always $T$

- EZ preferences with perfect bequest \(\Rightarrow\) two (representative) agents that, every $2T$ quarters, experience a dramatic loss of confidence in their understanding of the world

- Stochastic discount factor

\[
SDF_{t+1} \propto C_{t+1}^{-\gamma} \left( \frac{W_{t+1}}{C_{t+1}} \right)^{-\frac{\gamma - \frac{1}{\psi}}{1 - \frac{1}{\psi}}}
\]

- Usual (Bansal-Yaron) parameters

- “Leverage”: \(\beta_{\Delta d, \Delta c} = 3\)
Results

- Basically, it “works” (both versions) wrt AP moments
- Insights into the effect of heterogeneity in a TTID world
  - Different beliefs ⇒ excess volatility
  - Young and old update towards the same target, young more aggressively ⇒ Young perceive higher risk (LRR)
  - Excess volatility through risk-sharing can be overturned in some states: more optimistic agent may face more risk, therefore still seek insurance
  - Average effect is to increase excess volatility: analogous to heterogeneous risk aversion
- Predictions for risk-sharing patterns across cohorts
- Nice way to look at the predictions, given complexity: trace out the effects of the actual consumption-shock path
  - A drawback: Few (two) cohorts ⇒ discontinuities
    - Average over different possibility of ages at time 0
    - Krussel-Smith?
- One wish: Separate effects of TTID and heterogeneity
## Results

Table 2: This table gives average sample moments from 10,000 simulations of 247 quarters. The ‘data’ column sample average moments for the U.S. from 1929 to 2011. Panel A gives results from the “Uncertain mean”-calibration, whereas Panel B gives results from the “Uncertain probability”-calibration. The columns labelled “EZ” correspond to the calibrations given in Table 1. The “Power” columns have the EIS parameter, $\gamma$, set such that agents have power utility. The columns labelled “Known mean” and “Known probability” correspond to moments from the benchmark case where agents know the true parameters and therefore are not subject to the ‘This Time is Different’-bias.

### Panel A: “Uncertain mean”-case

<table>
<thead>
<tr>
<th></th>
<th>’This Time is Different’</th>
<th>Known mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data 1929 – 2011</td>
<td>$EZ: \gamma = 10$, $\psi = 1.5$, $\beta = 0.994$</td>
</tr>
<tr>
<td>$E_T [r_m - r_f]$</td>
<td>5.1</td>
<td>5.2</td>
</tr>
<tr>
<td>$\sigma_T [r_m - r_f]$</td>
<td>20.2</td>
<td>16.6</td>
</tr>
<tr>
<td>$SR_T [r_m - r_f]$</td>
<td>0.25</td>
<td>0.31</td>
</tr>
<tr>
<td>$E_T [r_f]$</td>
<td>0.86</td>
<td>2.4</td>
</tr>
<tr>
<td>$\sigma_T [r_f]$</td>
<td>0.97</td>
<td>0.3</td>
</tr>
</tbody>
</table>

|                  | $\sigma_T [M_{t+1}] / E_T [M_{t+1}]$ | 0.51 | 0.20 | 0.27 |
|                  | $\gamma \times \sigma_T [\Delta c_{t+1}]$ | -   | 0.27 | 0.27 |
|                  | $E_T [\Delta c_{t+1}]$             | 1.8% | 1.8% | 1.8% |
|                  | $\sigma_T [\Delta c^{TA}_{t+1}]$ | 2.2% | 2.2% | 2.2% |
Figure 5: The figure shows time series statistics from the 'Uncertain mean' model. The consumption shocks are taken from U.S. post-WW2 data, from 1947Q2 to 2009Q4.

'Uncertain mean' - case

The top left plot of Figure 5 shows the mean beliefs about the mean parameter, $\mu$, of the two agents using actual consumption shocks (real per capita quarterly U.S. consumption growth from 1947 to 2009). We set the prior mean beliefs equal to truth for both agents in 1947Q1 and let the agent from Dynasty A start out as a new Young, while the agent from Dynasty B starts out as just having become Old. The mean beliefs are annualized. The blue slide (red dashed) line shows the mean beliefs of the agent from Dynasty A (B). Since the two agents have differing variances of beliefs, they do not update the same, even though they observe the same shocks. Mean beliefs decrease in bad times, given the bad consumption outcomes, and the period around the Great Recession shows the biggest decline in belief about the long-run mean growth rate.

The range of the mean beliefs is from about 1.2% to 2.7% p.a. and the beliefs are clearly quite persistent, as one would expect given the updating rule. The top right plot in Figure 5 shows the model-implied Price-Dividend ratio.

Simulated paths of model quantities like the risk premium and the price-dividend ratio will have...
Investment Economy

- Cobb-Douglas with (asymmetric) capital adjustment costs
- Mean TFP growth not known by agents
- Results presented for TTID (two-dynasty) economy
- Main observation:
  - TTID pushes equity volatility up to 6% (cf. Kaltenbrunner-Lochstoer)
  - Explanation: Aggressive updating of beliefs allows for higher adjustment costs, more variable $q$
Too Much Preference for Early Resolution of Uncertainty?

Experiment of Epstein et al (2014): What percentage of consumption would a Bansal-Yaron investor forego to have all consumption uncertainty resolved at time 1?

Figure 1: Premium isoquant maps for the LRR model. The red dots denote the calibrated values of EIS and RRA. Other parameters are as in Table 1.

(a) Timing Premium constant volatility
(b) Risk Premium constant volatility
(c) Timing Premium stochastic volatility
(d) Risk Premium stochastic volatility
Some Final Comments

▶ “Pain”:
  ▶ Do we really have to match AP moments?
  ▶ How to judge whether increment in realism is worth that in complexity?
  ▶ E.g., how many cohorts, what kind of learning, learning about what

▶ Objective:
  ▶ Modus operandi: “best” parameters that match AP moments
  ▶ How do we judge how good of a success $\gamma = 10$, $\psi = 1.5$ is?
  ▶ Perhaps concentrate on satisfactory parameters and see how large AP effects. The model is bound to miss relevant channels anyway.

▶ Plausibility:
  ▶ Young behave as more risk averse because they’re worried about learning something big and bad about their consumption trend

▶ Learning:
  ▶ Are the findings of Malmendier and Nagel good descriptions of representative agent in a cohort?
  ▶ Maybe interaction btw a rational agent and a TTID one would actually lead to similar results?
Conclusion

- Reasonable motivation; from the beginning a quantitative question
- Concern for calibrating to data where available
- Channel can certainly generate first-order effect
- Paper couched in terms of TTID, but heterogeneity likely to be important. Authors can help quantify and clarify this point.
- Production: tighten the message?
- Lots of stuff, great pedagogical value