

Disagreement, Speculation, and Aggregate Investment

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Discussed by Jaroslav Borovička (NYU)

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Plan for the discussion

- ▶ nice clean paper
- ▶ clearly separates two channels

$$\begin{aligned} Y_t &= AK_t = C_t + I_t && \text{consumption-investment decision} \\ C_t &= C_{a,t} + C_{b,t} && \text{consumption distribution} \end{aligned}$$

- ▶ mitigates some undesirable effects generated in heterogeneous agent economies with iid consumption growth

Plan for the discussion

1. Comment on the way how optimists and pessimists are modeled
 - ▶ speculation vs. preference for consumption/saving
2. Discuss the mechanism and results
 - ▶ asset pricing implications (qualitative / quantitative)
 - ▶ role of the wealth distribution as the state variable
 - ▶ 'anomalies'

Modeling of belief distortions

- ▶ Agent j with **subjective probability measure** Q_j

$$V_{j,0} = E_0^{Q_j} \left[\int_0^{\infty} e^{-\rho t} u(C_{j,t}) dt \right]$$

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with

$$M_{j,t} = \exp \left(\int_0^t u_{j,s} dW_s - \frac{1}{2} \int_0^t |u_{j,s}|^2 ds \right)$$

(here, the disagreement process $u_{j,s} = (\delta_z - \delta_j) / \sigma$)

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- ▶ agent overweighs/underweighs probabilities = **speculation**
- ▶ The agent then **perceives a different trend** in quantities that are driven by the Brownian motion:

$$\frac{dK_t}{K_t} = (\phi(i_t) - \delta_j) dt + \sigma dW_{j,t}$$

Two consequences

1. Agents' **disagreement** modeled through different M_j processes leads to volatile relative consumption allocations (static problem $C_t = C_{a,t} + C_{b,t}$)

$$\frac{M_{a,t}}{M_{b,t}} = \frac{1}{\lambda} \frac{u'(C_{b,t})}{u'(C_{a,t})}$$

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 - ▶ **Optimists** perceive a higher trend \implies with $IES < 1$, wealth effect dominates \implies **lower desire to save**.
 - ▶ Good shock: higher risk-free interest rate and (in a production economy) a **lower saving rate**.
 - ▶ Auhors call this **speculative aggregate consumption risk**. Is it about speculation?

Risk-free rate vs risk premium effects

In **good times**, optimists gain a larger wealth share

- ▶ risk premia decrease \implies P/D ratios pushed up, expected returns down
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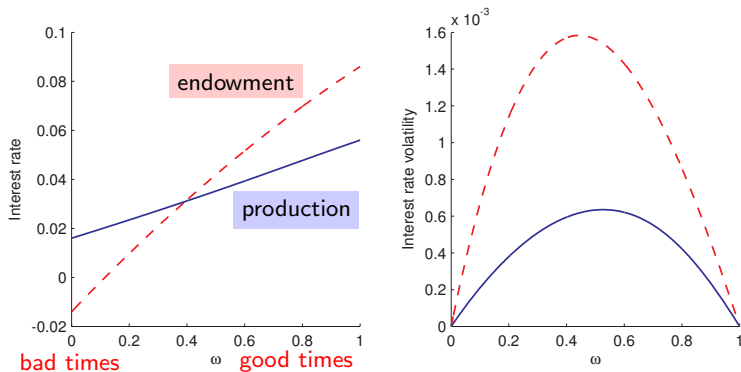
Solution

- ▶ Compensate willingness to save of the optimistic agent
 - ▶ Make the optimist more patient
- ▶ Recursive (Duffie-Epstein-Zin) preferences with $IES > 1$.
 - ▶ $IES > 1$ will flip the result.

Qualitative and quantitative success of the results

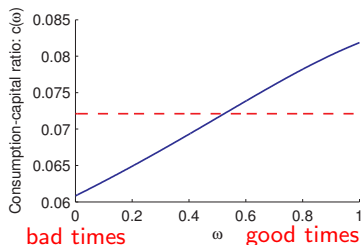
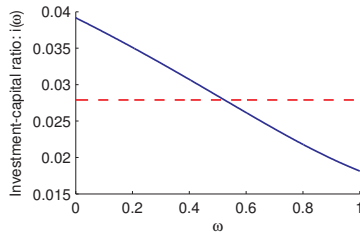
- ▶ Authors claim superior performance relative to **an** endowment economy
 - ▶ heterogeneous beliefs but iid aggregate consumption growth.
- ▶ But do we gain also relative to a similar economy with homogeneous beliefs?
- ▶ Or are we just (at least partially) correcting unappealing features of the endowment economy?

Interest rates



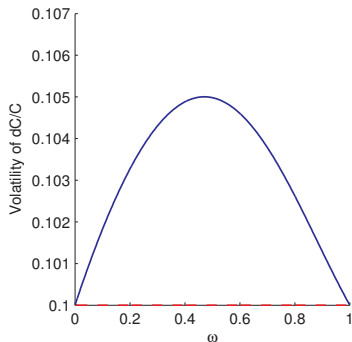
- ▶ IR less sloped than in the endowment economy \implies lower volatility
- ▶ but in the representative agent economy, IR is constant

Consumption and investment



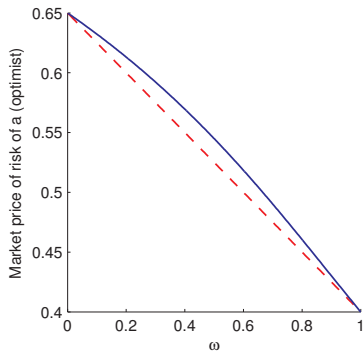
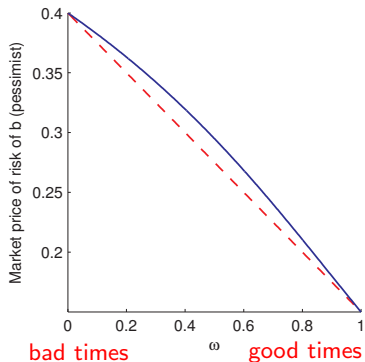
- ▶ aggregate consumption: $C_t = \frac{C_t}{K_t} K_t$ (and $\frac{C_t}{K_t}$ and K_t move in the same direction)
- ▶ consumption more volatile than investment (equal volatility in representative agent economy)

Consumption volatility



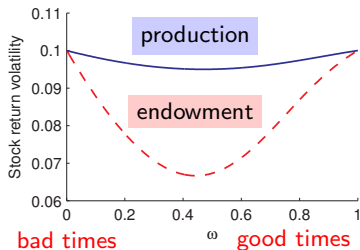
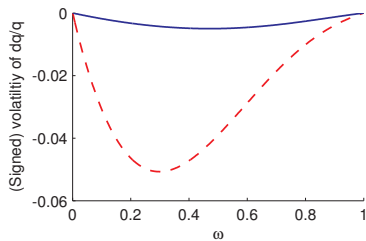
- ▶ aggregate consumption volatility increases, but only very modestly
- ▶ price of risk will also increase only very modestly

Price of risk



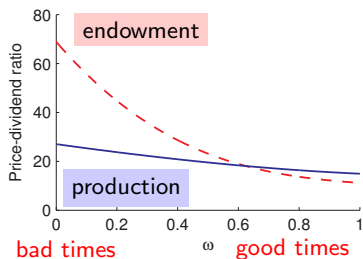
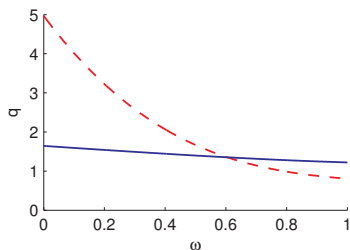
- ▶ price of risk a weighted average of the prices in homogeneous agent economies
- ▶ small endogenous effect generated by the heterogeneity

Stock return volatility



- ▶ stock return volatility in the endowment economy lower than in the homogenous agent economy
 - ▶ strongly procyclical risk-free interest rate
- ▶ **production economy**: risk-free rate less procyclical
 - ▶ stock returns still less volatile than in the homogeneous agent economy

Price-dividend ratio



- ▶ risk-free rate strongly procyclical, risk premia modestly countercyclical
- ▶ \implies price-dividend ratio countercyclical, although less than in the endowment economy

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The only relevant state variable is the wealth distribution.

- ▶ How much fluctuations in wealth distribution does the **model generate**?
 - ▶ way to discipline the belief distortions
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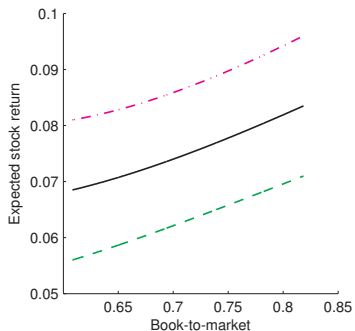
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Long horizon implications

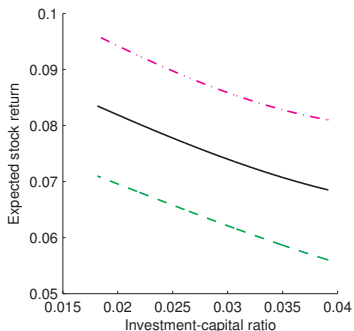
- ▶ No steady state distribution for wealth share.
- ▶ Recursive preferences would address this (*Borovička (2013)*).

Anomalies



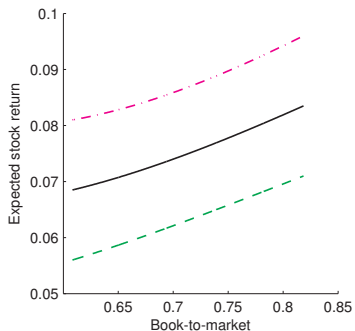
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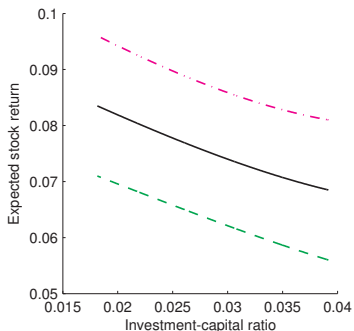
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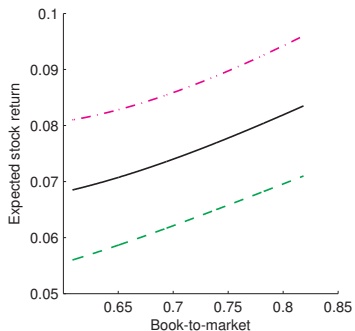
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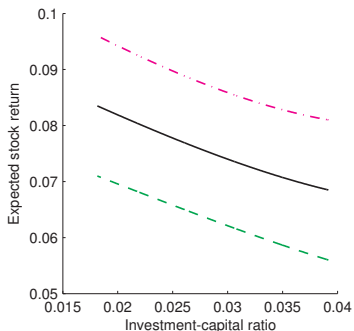
- ▶ value / size premium etc. are **cross-sectional predictions** \implies this is a representative firm model
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 - ▶ the logic then must be (?) that different firms are permanently in good or bad times and thus have different associated risk premia
- ▶ but the above shape is driven by the **risk-free rate effect**, not risk premium
 - ▶ value / size premia are about risk premia

Summary

- ▶ Belief heterogeneity in a simple **endowment economy generates many undesirable features**
 - ▶ speculation (betting) vs. preferences for consumption / saving
- ▶ Adding **production side alleviates these problems** to some extent
 - ▶ model still performs worse in many aspects than a homogeneous economy
- ▶ Separating **IES** and **risk aversion** would help much more (Duffie-Epstein-Zin)
- ▶ Is the **wealth distribution** mechanism the right story?
- ▶ Anomalies . . .
- ▶ Still a nice paper: uncovers all these features in a very transparent way.