Discussion: Dynamic Noisy Rational Expectations Equilibrium with Information Production and Beliefs-Based Speculation

Harjoat S. Bhamra
Imperial College
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Robert Reich, Chancellor’s Professor of Public Policy, University of California at Berkeley; author, ‘Saving Capitalism: For the Many, Not the Few’

Why is there so little discussion about one of Bernie Sanders’s most important proposals – to tax financial speculation?

Buying and selling stocks and bonds in order to beat others who are buying and selling stocks and bonds is a giant zero-sum game that wastes countless resources, uses up the talents of some of the nation’s best and brightest, and subjects financial markets to unnecessary risk.
Questions

- Is speculation good or bad?
- What is speculation?
- What do we mean by good and what do we mean by bad?
What is speculation? I

- Trading based on differences in beliefs
- Why might beliefs be different? Some market participants may have more information than others, because they worked to accumulate it – this paper
Is speculation good?

- No one argues about whether or not speculation is good for the speculators. It’s what it does for the rest of us ‘ordinary folks’ which causes concern.

- Basic objections
  - some smart person has this extra information and they are going to use it to get rich at my expense – it’s a zero-sum game where they win & I lose
  - the smart person could be working on making Mars inhabitable or something else ‘more socially useful’ than getting rich via speculation.

- Basic responses
  - if speculators have extra information and trade on it, this makes prices more informative, which is good for the rest of us – it’s not a zero-sum game
  - A non-speculator may wish to trade for hedging purposes and a speculator may be willing to be on the other side of the trade. Example of speculators providing liquidity.

- Problems with basic responses
  - Many are not convinced
  - At best – economists have failed to communicate basic ideas
  - At worst – we are wrong
Model I

- Model: risk-free rate not determined because of no intertemporal consumption, so set it to zero.
- One risky asset: claim to date-\( T \) terminal dividend, \( D_T \)

\[
dD_t = \mu D_t dt + \sigma D_t dW_t^D
\]  

(1)

- 3 types of agent: informed, uninformed and noise: all have CARA utility over terminal wealth with absolute risk aversion \( \Gamma \), \( u(X) = -\Gamma e^{-X/\Gamma} \)
  - Informed agents observe signal about \( D_T \)
    \[
    G = D_T + \eta, \quad \eta \sim N(0, \sigma^\eta)
    \]  
    (2)
  - Noise traders observe random variable \( \phi \sim N[\mu, \sigma^\phi] \) and treat it as a signal about \( D_T \)
  - Uninformed traders – these are the ‘ordinary folks’
- Two components to risky asset demand: mean-variance & hedging demand
Welfare Results

- Paper has many results – I think the most important results are in Proposition 12
- What the Proposition does: computes welfare gains and losses for the uninformed when private information trades are allowed.
- This is exactly what we need to know to understand how ‘ordinary folks’ are impacted by speculation!
Proposition 12

- Welfare effect of speculation on ‘ordinary folks’ has two components:
  - Impact on initial portfolio – think of this as welfare impact on ordinary folks who don’t know how to trade
  - Impact via gains from trade – welfare impact from ordinary folks trading with speculators (and noise traders)

\[
U^u = U^{u, ni} \exp \left( - \left( \frac{\Delta \hat{P}^u(Z)}{\Gamma} + \Delta \hat{T}^u(Z) \right) \right)
\]

(3)
Welfare impact via initial portfolio

- Welfare impact on ordinary folks who don't know how to trade

\[
\Delta \hat{P}^u(Z) = (\hat{B}(0) - 1)(D_0 + \mu^D T) + \hat{A}(0)Z - \frac{\Delta \hat{V}}{\Gamma} + \sigma^D \int_0^T \hat{B}(s)\hat{\gamma}(s)ds \\
- \omega^n \hat{I}(0)\mu^\phi
\]  

(4)
Ordinary folks probably don’t go to high school here

Figure: A somewhat well known Parisian high school

So what can they make of this result?
Welfare impact via initial portfolio

- Welfare impact on ordinary folks who don’t know how to trade

\[
\Delta \hat{P}^u(X) = (\hat{B}(0) - 1)(D_0 + \mu^D T) + \hat{A}(0)Z - \frac{\Delta \hat{V}}{\Gamma} + \sigma^D \int_0^T \hat{B}(s)\hat{\gamma}(s)ds
\]
\[-\omega^n \hat{I}(0)\mu^\phi
\]

One important term seems to be \(-\frac{\Delta \hat{V}}{\Gamma}\)

\(-\Delta \hat{V} > 0\) is the reduction in realized variance of the price – this makes \(\Delta \hat{P}^u(X) > 0\), which is good

What about \(-\omega^n \hat{I}(0)\mu^\phi\)?

\(\omega^n\) is proportion of stock held by noise traders at date-0. If the noise the noise traders treat as a signal has a sufficiently high mean \((\mu^\phi)\), this term can drag down welfare.
Welfare impacts via gains from trade

- Welfare impact on ordinary folks who do know how to trade

\[
\Delta \hat{T}^u(Z) = \frac{\Delta \hat{V}}{2\Gamma^2} - \frac{1}{\Gamma} \int_0^T \sigma_t^S \vartheta(Z|E_0[\xi^m_t D_t]) dt + \mathcal{I}^u(Z) \tag{6}
\]

- \(\frac{\Delta \hat{V}}{2\Gamma^2} < 0\), volatility decreases \(\Rightarrow\) market price of risk falls, reducing welfare
- \(-\frac{1}{\Gamma} \int_0^T \sigma_t^S \vartheta(Z|E_0[\xi^m_t D_t]) dt > 0\) – depends on interaction between volatility and price of risk
- \(\mathcal{I}^u(Z)\), informational efficiency effect – positive or negative

- Basic take away – if ‘ordinary folks’ can trade sensibly with speculators around, they benefit
More emphasis on welfare impact via initial portfolio

Assuming ‘ordinary folks’ can trade sensibly when speculators are around seems like a big assumption.

Who can solve the signal extraction problem? Can most financial economists solve the model in this paper?
In the real world, the signal extraction problem would be nonlinear

Model ‘ordinary folks’ with limited abilities – perhaps some type of capacity constraint – Sims, Veldkamp et al.