

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

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Motivation

- **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

- bond: 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

$$dD_t = \mu^D dt + \sigma^D dW_t^D \quad (1)$$

- 3 types of agent: informed, uninformed and noise: all have CARA utility over terminal wealth with absolute risk aversion Γ , $u(X) = -\Gamma e^{-X/\Gamma}$
 - informed agents observe signal about D_T

$$G = D_T + \eta, \eta \sim N(0, \sigma^\eta) \quad (2)$$

- noise traders observe random variable $\phi \sim N[\mu^\phi, \sigma^\phi]$ 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)

$$\mathcal{U}^u = \underbrace{\mathcal{U}^{u,ni}}_{<0} \exp \left(- \left(\frac{\Delta \hat{P}^u(Z)}{\Gamma} + \Delta \hat{T}^u(Z) \right) \right) \quad (3)$$

Welfare impact via initial portfolio

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

$$\Delta \hat{P}^u(Z) = (\hat{B}(0) - 1)(D_0 + \mu^D T) + \hat{A}(0)Z - \frac{\Delta \hat{V}}{\Gamma} + \sigma^D \int_0^T \hat{B}(s) \hat{\gamma}(s) ds - \omega^n \hat{I}(0) \mu^\phi \quad (4)$$

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

$$\Delta \hat{P}^u(X) = (\hat{B}(0) - 1)(D_0 + \mu^D T) + \hat{A}(0)Z - \frac{\Delta \hat{V}}{\Gamma} + \sigma^D \int_0^T \hat{B}(s) \hat{\gamma}(s) ds - \omega^n \hat{\Gamma}(0) \mu^\phi \quad (5)$$

- 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 $-\omega^n \hat{\Gamma}(0) \mu^\phi$?
 - ω^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 (μ^ϕ), this term can drag down welfare

Welfare impacts via gains from trade

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

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

- $\frac{\Delta \hat{V}}{2\Gamma^2} < 0$, volatility decreases $\Rightarrow$ market price of risk falls, reducing welfare
- $-\frac{1}{\Gamma} \int_0^T \sigma_t^S \vartheta(Z|E_0[\xi_t^m D_t]) dt > 0$ – 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

Comments

- 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.