

The Epidemiology of Economic Expectations¹

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ABSTRACT

This chapter first discusses the pervasive evidence for heterogeneous expectations held by agents in a variety of contexts. One of the most important mechanisms that drive such heterogeneity is social interaction. We discuss how epidemiologic models of different kinds can be useful to model how social interactions shape people’s expectations and how they can be incorporated into standard macroeconomic models. We also draw broad strands of literature that embeds such a framework, such as technology diffusion, viral marketing, economic narratives,

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and so forth. We also discuss how newly developed methods and tools such as social network analysis, natural language processing can be used to extend in such a line of effort.

Keywords: Epidemiology, Economic Expectations, Social interactions, Information diffusion, Economic Narratives

A very natural next step for economics is to maintain expectations in the strategic position they have come to occupy, but to build an empirically validated theory of how attention is in fact directed within a social system, and how expectations are, in fact, formed.

[1]

While mass media play a major role in alerting individuals to the possibility of an innovation, it seems to be personal contact that is most relevant in leading to its adoption. Thus, the diffusion of an innovation becomes a process formally akin to the spread of an infectious disease.

[2]

If we want to know why an unusually large economic event happened, we need to list the seemingly unrelated narratives that all happened to be going viral at around the same time and affecting the economy in the same direction.

[3]

1.1 OUTLINE

1.1.1 MOTIVATION AND CONTEXT

- Browning, Hansen and Heckman intro to “Handbook of Macroeconomics”: [4].
 - The most universal lesson of microeconomics is that “people are different in ways that importantly affect their economic behavior”
 - circs: wealth, income
 - prefs: risk aversion, impatience
 - Microfoundations of macro literature
 - When micro heterogeneity in circs or prefs is matched, fundamental conclusions change
 - Like, how do fiscal and monetary policy work
 - Remaining kind of heterogeneity much less explored (until recently): in expectations/beliefs
 - even though heterogeneity in beliefs is just as apparent in micro data as

- other kinds
- If expectations are heterogeneous, aggregate patterns depend on the distribution of expectations
 - stock market expectations of people who will never own stock are not important
 - housing market expectations of the *marginal* participants (buyer, seller) set prices [5]
- Heterogeneous expectations likely interact with other types of heterogeneity
 - rich people do more consumption than poor people
 - so, need to weight expectations by the degree to which the person’s actions affect the outcome
- Existing literature on heterogeneity in expectations:
 - Most commonly explored reasons for heterogeneity in expectations:
 - information
 - different updating (=“learning”) process
 - different initial beliefs (=“priors”)
 - different histories
 - costs of updating info \Rightarrow frictions, delays
 - even optimizing agents will happen to update at different times
 - Epidemiology is different from all of these
 - It’s about how ideas *spread*

1.1.2 WHAT INSIGHTS CAN THE EPIDEMIOLOGICAL FRAMEWORK OFFER?

- Explains how people can have somewhat coherent beliefs about macroeconomy without PhD in macroeconomics
 - ordinary people: read news media to hear what “experts” say
 - population beliefs depend on “infectiousness” of experts’ views
 - Embeds RE model as the limit corresponding to “infinitely instantly perfectly infectious” beliefs
 - Epi models slow down the spread so it is testable
 - “infectiousness” matters
 - how social network and media affect the spread of economic news [6] [7]
 - how policy communication makes its way to average economic agents making their decisions
 - What should Fed governors, Treasury Secretaries, etc do
- and why it could be a useful tool, methodologically speaking
 - if epi models are true, they have testable implications for cross-sectional distribution of expectations
 - and implications for aggregate belief dynamics (and thus actual aggregate macro dynamics)
 - goal: reconcile micro/cross-section data with (appropriately weighted) ag-

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gregate dynamics

- goal: determine importance of social learning in structural models [8]

1.1.3 MOTIVATING EXAMPLES

- household expectations for macroeconomic environment, i.e. inflation [9], [10], [11]
- ponzi scheme and fraud [12], [13], [14]
- as a driver of financial asset bubbles, especially some new class of assets, e.g. bitcoin. [3], [15]
- bank runs/spread of panic and fear
 - Canonical models are basically timeless: run happens instantly [16]
 - Understanding process by which they happen over time means possibility of arresting them
 - Financial crisis in the Great Recession has been described as “giant extended bank run on financial sector”
- housing prices [8], [5]
- stock investment [17]

1.1.4 EPIDEMIOLOGY MODEL BASICS

- [18], [19], [20]
- *ex ante* homogeneous models
 - Common source
 - SIS and SIR
 - SEIR
 - Features of homogenous models
 - simplicity due to independence assumptions
 - easy to aggregate up to macro patterns and can be tested
 - capture the dynamics
- *ex ante* heterogeneous models (and consequences, if any)
 - incorporates network structure [21]
 - “superspreaders”
 - higher degree distributions lead to more “infection”
 - transition probability is location-specific depending on the degree of the node
 - interact with individual economic conditions
- Economists’ methodologies offer a lot of ways to improve standard epi models
 - transmission/infection rate can be contingent on state variables
 - optimizing behavior by agents (incentives to seek/avoid infection)
 - much more sophisticated about causality, inference, etc
 - possible that economists’ ideas will infect the epidemiologists!

1.1.5 POTENTIAL AREAS WHERE TECHNIQUES COULD BE APPLIED

- economic sentiment and confidence [22], [23], [24]
- economic narratives [25], [26]
- spread of fake news and rumours [27], [28]
- spread of default. [29]
- search-and-matching problems [5]
- diffusion of innovation [2], [30]
- communication, the role of opinion leaders [31]
- fads and fashions: information cascade [32]
- viral marketing and internet memes, [33], [34]

1.1.6 RELATION TO “AGENT-BASED” MODELING IN MACROECONOMICS

- Provides discipline on agents’ actions/decisions
 - [35]
 - [36]
 - [37]
 - [38]
 - In finance, [39], [40]
 - Both time-series and cross-sectional distribution properties
 - Allow examination of “off-equilibrium” behavior [41]

1.1.7 OTHER TOOLBOXES TO USE AND PROMISING DIRECTIONS OF RESEARCH

- Natural language processing [42], [7]
 - counts of the word frequency
 - use google searches to predict flu trends:[43]
 - “sentiment analysis” [44]
 - topical modelling
 - literature on differential infectiousness of different emotions
 - fear, anger, disgust more “infectious” than happiness, satisfaction
 - e.g., could yield asymmetries between good and bad news
- Social network data sources [21]
 - how network friends affect economic expectations [6], [45]
 - Potential application:
 - Greater geographical connectedness \Rightarrow fewer local boom/bust cycles, more aggregate ones
 - social connectedness and aggregate economic outcomes
- Cognitive and neuroscience approach
 - “microfoundation” for results about differential infectiousness

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- example: FMRI's show brain's “fear/disgust” center more easily activated than pleasure/reward center

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