Proposal:

Preliminary Investigations of Home Equity Position Markets

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Outline

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Introduction

We can use mathematics to model and understand the behavior of financial systems.

With respect to existing markets, such as stock exchanges and housing markets, these applications are well understood.

- Our project: define and study a new type of financial instrument.
    - How useful are the existing tools and methods of financial mathematics in this context?
    - What new methods need to be developed?

The Home Equity Position and the Market

Definition: A *home equity position* is a claim on a fixed percentage of the equity in a particular owner-occupied residence.

A homeowner A offers a new home equity position on the Primary Market for a fixed asking price P. Investors then bid down the percentage claim value C of the position until a bid is accepted and the position is sold for that fixed price.

Home Equity Position Exchange

Home equity position trading:

The home equity position can then be traded in the manner of a stock on the Secondary Market. Note: multiple investors can co-own a single home equity position.

We will often simply refer to this secondary exchange as *"the market"*.

Outline

1. Introduction
2. Existing Methodologies
   - Securities Exchanges
   - Housing Markets
3. Unique Considerations
4. Plan of Action

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Securities Exchanges

Characteristics and Standard Approaches

There is a wealth of literature on the subject of equity markets. Several factors involved in traditional equity exchanges will be relevant to this new market, including:

- Supply/Demand
- Speculation
- Investor Behavior
- Stochastic Processes

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Housing Markets

Characteristics and Standard Approaches

Real Estate markets are influenced by many of the same factors as other equity markets, but they have a few unique characteristics:

- Durability of the Commodity
- High Transaction Costs
- Heterogeneity
- Dual Use of the Commodity

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Home-Equity Exchange

- In a market with similarities to both of these, which factors will still be important? Which evaluation techniques will still be relevant?
- In short, what existing ideas apply to this new market and what new approaches does it demand?

Key Differences

Some new characteristics of a Home-Equity market:

- Individuality/heterogeneity
- Importance of local economies
- Dependence (Investor/Homeowner)

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Further Differences

- Risk/Return
- Liquidity
- Tax Structure (1031 Exchange)
- Pricing Structure
- Portfolio Diversification

Outline

Questions To Be Explored

- What behaviors might be typical in this new market?
- What kinds of events could trigger a crash in this market?
- Are the standard tools for evaluation of traditional markets still useful in this situation?
- In addition, how might a market like this grow from the very beginning, as it has not yet been established? How do dynamics change with additions of new cities, new types of investors?

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First Steps

At the beginning of the semester, each week Dan and Emily will review topics in

- Stochastic Calculus
  - Brownian Motion
  - Random Walks
  - Markov Chains
- Quantitative Finance
  - Portfolio Theory
  - Univariate/Multivariate Risk Assessment.

Methods and Models

In weekly meetings with Rozi we will discuss the aforementioned topics and build simple computer models to understand market dynamics.

Concurrently, we will begin to apply these concepts and construct more complex models of the new home equity position market.

Thank you for your time and attention.

We appreciate the opportunity to pursue this research at BSM. We are grateful in particular to our project advisors Dezső and Rozi Miklos.

Also, a special thank you to Agnes for listening to all of Emily's emails.

Questions?