Financial Market Dynamics and Human Behavior

This course develops a new perspective on the dynamics of financial markets and the roles that human behavior and the business environment play in determining the evolution of behavior and institutions. Although neoclassical economic theories such as expected utility maximization, rational expectations, general equilibrium, and efficient markets have dominated the literature on economic behavior and market structure, recent advances in the cognitive neurosciences, artificial intelligence, computational social science, and evolutionary biology provide a number of new insights into market dynamics. We will draw on these diverse disciplines to develop a more complete understanding of human behavior in the specific context of markets and other economic institutions. Academic research will be the main focus of the course, but topics will be motivated and illustrated by practical applications from financial markets, the hedge fund industry, private equity, government regulation, and political economy. Using the ideas from this new perspective, we will formulate several new hypotheses regarding recent challenges to traditional finance thinking, including: how financial crises are formed and whether or not they can ever be eliminated; why certain investment strategies seem to wax and wane; where business cycles come from; what role ethics play in financial intermediation; whether capitalism is more sustainable than other political systems; and why financial engineering may be the solution to some of society’s biggest challenges.

Class Schedule
The class meets once per week: T 4:00–7:00pm, E51-345.

Recitations
The TA, Dimitrios Bisias (dbisias@mit.edu), will hold recitations where class material will be reviewed, and additional applications and exercises presented. Recitation sessions will take place on Fridays from 2:00 to 3:00pm in E51–335

Course Website
The course website is on Stellar and all class announcements, TA office hours, project data, and additional teaching materials will be posted on this site.

Office Hours
The course instructor and TA will also hold regular office hours. The times and locations will be announced on the course website.

Administrative Assistant
Patricia Thompson, E62–611, 617 715–4817, pthomps@mit.edu
Course Requirements and Grading

Course requirements include regular attendance and participation in class, which requires having read the assigned articles prior to coming to class and being prepared to discuss them (10%), three group-based projects (10% each, totaling 30%), and one 5,000-word research paper (60%) due before the end of the semester. There is no final examination for the class. The projects are:

1. Efficient Markets Revisited
2. The Power of Selection
3. AQR Delta Strategy Case Study

The research paper involves identifying and analyzing a specific business context in which human behavior departs from traditional economic logic. The analysis should include a brief literature review, a proposed explanation for the anomaly (i.e., how it arose and why it persists), and how your knowledge of this anomaly might change the way you approach business decisions in this context. Several well-executed research papers from last year will be posted on the course website to illustrate the possibilities for this project.

Course Materials

- **Class Notes and Recitation Notes.** Notes will be available on the course website.
- **Research Articles.** Research articles will be made available on the course website.

Additional Readings (not required)

- This best-selling introduction to investing is now in its 9th edition and is as popular as ever because of its entertaining style and sage advice. This is a great way to ease into financial markets, particularly for those who are not financially inclined.

- Bernstein was one of the most well-respected and influential practitioners in the financial industry, and the founding editor of the *Journal of Portfolio Management*. This is a lively and beautifully written account of the most important ideas in academic finance, many of which were developed at MIT in the 1960’s and 1970’s.

Sloan Values

You are responsible for upholding Sloan’s code of conduct, which mandates zero tolerance for cheating and plagiarism. For more details on Sloan’s academic policies, please read the document “Classroom Values in Practice” which is available on the course website.
# Course Outline

<table>
<thead>
<tr>
<th>Class</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: 2/4</td>
<td>Introduction and Economic Orthodoxy</td>
</tr>
<tr>
<td></td>
<td>Origins of neoclassical economics and finance</td>
</tr>
<tr>
<td></td>
<td>Expected utility theory, general equilibrium models, rational expectations, and market efficiency</td>
</tr>
<tr>
<td></td>
<td>The rise of <em>Homo economicus</em></td>
</tr>
<tr>
<td>2: 2/11</td>
<td>Rejecting the Random Walk and Efficient Markets</td>
</tr>
<tr>
<td></td>
<td>Early evidence and the sociology of efficient markets</td>
</tr>
<tr>
<td></td>
<td>Variance ratio tests, mean reversion, and contrarian trading strategies</td>
</tr>
<tr>
<td></td>
<td>Other empirical anomalies and market inefficiencies</td>
</tr>
<tr>
<td>3: 2/24†</td>
<td>Psychology and Behavioral Biases (†Note: This class meets on Monday 2/24)</td>
</tr>
<tr>
<td></td>
<td>Differences between psychology and economics</td>
</tr>
<tr>
<td></td>
<td>Probability matching, loss aversion, overconfidence, and risk vs. uncertainty</td>
</tr>
<tr>
<td></td>
<td>Bayesian learning models</td>
</tr>
<tr>
<td>4: 3/4</td>
<td>Neuroscience and Decision-Making</td>
</tr>
<tr>
<td></td>
<td>Basic neuroanatomy; fear, greed, pleasure, pain, and emotion</td>
</tr>
<tr>
<td></td>
<td>Language, logic, theory of mind, abstraction, and executive function</td>
</tr>
<tr>
<td></td>
<td>The psychology and psychophysiology of proprietary trading</td>
</tr>
<tr>
<td>5: 3/11</td>
<td>Evolution and the Origin of Behavior</td>
</tr>
<tr>
<td></td>
<td>Sociobiology, evolutionary psychology, and bounded rationality</td>
</tr>
<tr>
<td></td>
<td>The binary choice model and evolutionary origins of risk aversion, loss aversion, probability matching, and mixed strategies</td>
</tr>
<tr>
<td></td>
<td>Deriving bounded rationality, collective intelligence, and group selection</td>
</tr>
<tr>
<td>6: 4/1</td>
<td>The Adaptive Markets Hypothesis</td>
</tr>
<tr>
<td></td>
<td>Economic mechanisms as adaptive traits</td>
</tr>
<tr>
<td></td>
<td>How markets adapt to stochastic environments</td>
</tr>
<tr>
<td></td>
<td>The importance of systematic vs. idiosyncratic risk</td>
</tr>
<tr>
<td>7: 4/8</td>
<td>Hedge Funds: The Galapagos Islands of Finance</td>
</tr>
<tr>
<td></td>
<td>DE Shaw, Renaissance, and a brief history of the hedge-fund industry</td>
</tr>
<tr>
<td></td>
<td>The dynamics of risk and return in hedge-fund strategies</td>
</tr>
<tr>
<td></td>
<td>August 1998, August 2007, and May 2010</td>
</tr>
</tbody>
</table>
8: 4/15 Applications of Adaptive Markets
- Hedge-fund beta replication, strategy indexes, and structured products
- The evolution of quantitative trading strategies
- Dynamic asset allocation and risk-budgeting

9: 4/29 The Financial Crisis
- Establishing the phenomena and the importance of the scientific method
- The role of fear, greed, and complexity in economic bubbles and crashes
- Homeostasis, the NTSB, and adaptive regulation

10: 5/6 Ethical Implications
- Brief review of ethics and moral reasoning
- The neuroscience of ethics applied to financial transactions
- Ayn Rand, Karl Marx, and sustainable capitalism

11: 5/13 The Finance of the Future and the Future of Finance
- Why the Efficient Markets Hypothesis is still relevant for practice
- How career opportunities are created
- How financial engineering can cure cancer, stop global warming, and solve the energy crisis
Readings*

1: 2/4 Introduction and Economic Orthodoxy

2: 2/11 Rejecting the Random Walk and Efficient Markets

3: 2/24 Psychology and Behavioral Biases

*Asterisks indicate required readings.

4: 3/4  Neuroscience and Decision-Making


5: 3/11  Evolution and the Origin of Behavior


6: 4/1 The Adaptive Markets Hypothesis

7: 4/8 Hedge Funds: The Galapagos Islands of Finance

8: 4/15 Applications of Adaptive Markets
9: 4/29 The Financial Crisis

10: 5/6 Ethical Implications

11: 5/13 The Finance of the Future and the Future of Finance