

Sustainable Investing and Economic Growth Syllabus

Course Number: To come

Scheduled Meeting Times and Location: The course will be delivered in 14 two hour sessions during the spring semester at a time and location to be determined.

Instructor Information: Satyajit Bose, sgb2@columbia.edu

Response Policy: Please call 212-851-9425 or come to my office during office hours with any questions. At other times, please email me or set up an appointment at doodle.com/satyajit. I generally respond to my email within 24 hours during the work week. If you do not receive a timely response on an urgent matter, I encourage you to email me again.

Course Overview

The course provides an introduction to techniques and themes in sustainable investing and examines the relationship between investment return expectations, economic growth and sustainability initiatives. The course has two related goals: to provide a set of tools to analyze the monetary value of sustainable investing and to examine the potential and pitfalls of the standard measures of growth, risk and return.

We begin by outlining the circular flow of savings and investment through the financial ecosystem, highlighting the importance of the throughput of energy and resources embodied in savings. We identify the players in the ecosystem and the incentive structures that link finance, economy and the resource base. We briefly introduce the method of economic growth measurement, the system of national accounts before delving into a critical assessment of the standard investment allocation framework. We outline the structure of corporate governance, embedded in a brief history of the joint stock corporation as well as an examination of the requirements and limits of the concept of fiduciary duty and its linkages to modern portfolio theory and the practice of asset allocation and investment decision-making. We detail the techniques of investment analysis and due diligence methods such as CAPM and MPT and financial statement analysis, the use of leverage and derivatives to create specificity and magnification of risk and return, and broad measures of risk assessment that go beyond volatility and tracking error and are applicable across asset classes, geographies and investment horizons. We perform a comprehensive review of the studies linking corporate financial performance and indicators of excellence in environmental, social and governance factors, and examine related payoffs such as the potential of environmental policy to create business opportunity, the legal and financial risks related to human rights violations that can result from corporate behavior, the elevation of sovereign risk that is associated with social injustice and the business impact of often overlooked natural hazards. Guest speakers on the demonstrable but small scale achievements of impact investing and the positive externalities associated with job creation serve to highlight potential solutions to some of the problems posed.

Throughout the course we employ new and emerging data sources and methods of due diligence and portfolio screening that combine standard financial sources with information from alternative channels such as human rights organizations, supply chain assessment aggregators, natural scientists' open data initiatives and commercial data providers. For example, in weeks 8 and 9, we illustrate the tantalizing possibilities for short-term risk and return prediction in climate sensitive economic activity and

adaptation using forecasts of intermediate term changes in precipitation and temperature at precise geographic scales, overlaid with geospatially specific commodity production data.

By the end of the semester, students should be prepared to make a persuasive, balanced and evidence-based case for sustainable investing within their constituencies and to deploy and refine methods of implementation.

The course was inspired by the discussions with faculty and participants at the 1st and 2nd Sustainable Investing Workshops jointly convened by the Earth Institute and the Robert F. Kennedy Center for Human Rights and Justice in Fall 2013 and Spring 2014. The participants comprised long horizon investors (pension funds and endowments), consultants, investment managers (diversified banks, private equity, public equity and impact investing) and nonprofit investor advocacy groups who approached related problems in sustainable investing from a variety of angles. A number of students and alumni of the SUMA program participated in or assisted with the workshops and engaged in self-study of the workshop materials. This course is designed for both practitioners in the financial services and asset management industry who are interested in new and emerging models of investment analysis that examine the environmental, social and governance impact of investment choices as well as those broadly interested in the links between the economy and the environment.

Learning Objectives

This course is both for those who want to analyze investment choices for their sustainability impact and for those who want to develop a critical understanding of standard methods of investment analysis. Students are assumed to have had no previous exposure to economics or finance. By the end of the course, students should be able to critique an investment rationale from their chosen sustainability perspective, as well as conceive, plan and implement a data collection strategy to gather the information necessary to evaluate an investment.

By the end of the course, students should be able to

1. demonstrate an understanding of the financial ecosystem, the flow of savings and investment and outline the key incentives of the major institutions that comprise the ecosystem
2. explain in clear and concise language the meaning of theoretical concepts that are foundational to sustainable investing such as: fiduciary duty, corporate governance, due diligence, financial leverage, volatility, tracking error, correlation, portfolio optimization, factor decomposition.
3. explain in clear and concise language the relationship between economic growth and its determinants
4. demonstrate an understanding of quantitative techniques/skills necessary to compute changes in gross domestic product or portfolio risk or return measures caused by select real or hypothetical events.
5. explain the results of econometric analyses performed by others to an investment decision maker.
6. articulate whether there are risks to revenue and profit growth resulting from specific environmental, social or governance factors.
7. interpret any financial or economic argument employing a sustainability rationale.
8. develop proficiency in the language of investment decision-making, including the ability to structure a clear, concise and evidence-based argument both verbally and in writing.

Reading (Required and Recommended)

There is no one textbook which covers all the required material and there is no required textbook for the course. Readings for the course, selected from among the references cited below, will be posted on Courseworks. A selection of the readings below will be required, with supplementary notes and readings from other sources, including public filings such as 10-K reports and environmental disclosures prepared by government agencies and businesses.

Resources

The bulk of the reading materials will be available on Courseworks. A significant portion of the asynchronous participation will occur in the announcements and discussion board sections of Courseworks. The majority of the problem sets will require the use of Excel.

Course Requirements (Assignments)

Each week, before the lecture, you are required to review all readings. Understanding the foundational concepts presented in the texts is a critical pre-requisite to participation in the lecture.

Problem Sets: Four times during the course, you will complete problem sets in small groups (minimum size 2, maximum size 4). The problem sets will consist of quantitative exercises and essays interpreting quantitative information. Each problem set will be graded on a categorical scale from check- to check+. A check will be equivalent to 85 out of 100. Problem sets will account for 20% of the final grade. Absent extenuating circumstances, problem sets will be graded by the TA and returned to students approximately one week after they are due.

Attendance and Participation: For participation, students will be required to:

1. Contribute to class discussions. Contributing means enhancing the quality of the class experience for yourself and others. It involves making relevant, useful and non-obvious comments, or posing pertinent questions, in clear and succinct language;
2. Be prepared to give 2-3 minute answers to impromptu questions regarding the readings in the lectures; and
3. Provide at least three carefully considered and substantive (500 word) posts in the discussion board. Substantive responses to a colleague's post will count as a post. Please post as soon as possible. Everyone is expected to have submitted their first post by Week 4, their second post by Week 8 and their third post by Week 12. Students are encouraged to post more than three posts.
4. The attendance and participation grade will comprise a weighted index of numeric grades that combine performance under each of the three tasks above and actual attendance at lectures. Attendance/participation will account for 20% of the final grade.

Midterm: In week 9, you will take a take-home midterm consisting of short quantitative exercises, computation of financial analysis ratios and essays interpreting data. The midterm exam will be graded on a numeric scale from 1 to 100 and account for 30% of the final grade.

Term Project: A position paper, supporting spreadsheet analysis and an oral presentation arguing for a specific decision regarding a narrow aspect of sustainable investing for an institutional investor will be prepared in groups assigned by the instructor based on stated topic preference. You will choose from a list of topics distributed in the second week of class, prepare your report throughout the semester, and present it to your peers during the last few weeks of the course. The position paper, supporting spreadsheet and oral presentation will be graded on a letter grade scale from F to A+ and will constitute 30% of the final grade.

Evaluation/Grading

The final course grade will be computed using a weighted index of numeric grades that combine performance under problem sets, attendance and participation, midterm exam, analyst report, supporting spreadsheet and oral presentation. The weighted index will be scaled into a letter grade scale from F to A+ based on an expectation that a class representative of the population of Columbia masters students will receive a median grade of B+ or A-.

Problem Sets 20%
Midterm 30%
Term Project 30%
Participation & Attendance 20%

Course Policies

Attendance

Regular attendance in lectures is required. Students are expected to have done the readings for each session prior to the lecture.

Participation

Participation in all lectures and project activities is required. We expect your contributions to enhance the quality of the class experience for yourself and others. This involves making relevant, useful and non-obvious comments, or posing pertinent questions, in clear and succinct language. During the lectures, come prepared to answer impromptu questions about the readings and course assignments.

Participation in the weekly tutorial sessions conducted by the TA is optional, but strongly recommended for those striving to fully understand introductory concepts. Students with little or no familiarity with the basic vocabulary and concepts of investment analysis, the system of national accounting and economic growth will find these sessions helpful.

Late work

All assignments must be submitted on the published due dates. In the absence of well-documented extenuating circumstances, I will deduct 10 points from the assignment grade score for each day that you are late in submission.

School Policies

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School policies are listed in Appendix A. Students are expected to adhere to these policies to the letter and in spirit.

Course Schedule/Course Calendar

Week	Topics and Activities	Reading (due on this date)	Assignments (due on this date)
1	The Financial Ecosystem and the Circular Flow of Savings and Investment: Throughput, Thermodynamics and Optimal Scale	(Daly, 2004) Chs. 1-2 (Hall, 1986) Instructor's Notes	Statement of purpose due
2	The System of National Accounting and Environmental Extensions	(Hecht, 2005) Chs. 1-3 (Leontief, 1970) (Muller, Mendelsohn, & Nordhaus, 2011)	
2	The History of the Joint Stock Corporation and Fiduciary Duty	(Hawley, Johnson, & Waitzer, 2011) ("Cambridge handbook of institutional investment and fiduciary duty," 2014) Ch 1 (Monks & Minow, 2011) Ch 2 (Viederman, 2008)	Problem Set 1 due
4	The Capital Asset Pricing Model and Modern Portfolio Theory	(Perold, 2004) (Fama & French, 2004)	Discussion Post 1 due
5	Issuer-level Due Diligence Methods: financial statement analysis, management evaluation and competitive landscape.	Instructor's Notes and other readings to be determined	Problem Set 2 due
6	Asset Classes and Derivative Instruments: Financial Leverage and Endogenous Complexity	(Garcia-Feijoo, Jensen, & Johnson, 2012) (Inderst, 2010) (Greer, 1997)	
7	Sustainability and Monetary	(Margolis, Elfenbein, &	Problem Set 3 due

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	return: corporate social performance and financial return; environmental regulations and job creation	Walsh, 2009) (Berman & Bui, 2001) (Coglianese, Finkel, & Carrigan, 2013)	
8	Beyond Volatility, Tracking Error and Correlation: Factor decomposition and a taxonomy of risk and opportunity	(Kojien, Moskowitz, Pedersen, & Vrugt, 2013) (Anson, 2008) (Asl & Etula, 2012)	Problem Set 4 due Discussion Post 2 due
9	The Discount Rate and Extreme Events: Optimal Climate Change Policy	(Nordhaus, 2011) (Pindyck, 2011)	Takehome Midterm
10	The Causes of Economic Growth: Energy, Innovation, Demand Management, Labor Force Participation and the Control of Time	(Mitchell, 2011) Chs 3-5 Instructor's Notes	
11	Limits to Growth under Alternative Economic Theories: Neoclassical, Keynesian, Ecological, Marxian and Austrian	(Wolff, 2012) Chs. 5-6 (Daly, 1996) Chs 4-5	Presentation Outline due
12	Social Injustice and Sustainable Investment: Corporate Governance and Executive Compensation; Cross-country credit risk differentials Possible Guest Lecture	(Aizenman & Jinjark, 2012) (BlackRock Investment Institute, 2011) (Cohen, Dey, & Lys, 2013) (Edgerton, 2012)	Discussion Post 3 due
13	Case Study on the cost-benefit analysis of human rights: Triangle Shirtwaist and Rana Plaza Fires (Optional Module) Possible Guest Lecture	(Motlagh, 2014) (Kerr Iv, 1971)	
14	Group Presentations		Presentation Powerpoints and videos due.

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15	Epilogue on the Ethics of Change		Final Paper Due

APPENDIX A

School Policies

Copyright Policy

Please note -- Due to copyright restrictions, online access to this material is limited to instructors and students currently registered for this course. Please be advised that by clicking the link to the electronic materials in this course, you have read and accept the following:

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials. Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

Academic Integrity

Columbia University expects its students to act with honesty and propriety at all times and to respect the rights of others. It is fundamental University policy that academic dishonesty in any guise or personal conduct of any sort that disrupts the life of the University or denigrates or endangers members of the University community is unacceptable and will be dealt with severely. It is essential to the academic integrity and vitality of this community that individuals do their own work and properly acknowledge the circumstances, ideas, sources, and assistance upon which that work is based. Academic honesty in class assignments and exams is expected of all students at all times.

SCE holds each member of its community responsible for understanding and abiding by the SCE Academic Integrity and Community Standards posted at <http://ce.columbia.edu/node/217>. You are required to read these standards within the first few days of class. Ignorance of the School's policy concerning academic dishonesty shall not be a defense in any disciplinary proceedings.

Accessibility

Columbia is committed to providing equal access to qualified students with documented disabilities. A student's disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process. For more information regarding this service, please visit the University's Health Services website: <http://health.columbia.edu/services/ods/support>.

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