

B9339 Systematic Investment Strategies Spring 2023

Course Description

In the last three decades, a number of investment strategies that capture (some source of) systematic risks have become popular. In some cases, the strategies have also become commonly available in the form of readily accessible investment vehicles (mutual funds, ETFs). Many of these strategies have been researched in detail and have been applied, in different guises, to multiple assets classes with varying degrees of success. Examples of broad categories of such strategies are “carry”, “momentum”, “risk parity”, “hedge fund replication”, “short volatility”, etc. Some of the strategies have become known collectively as ‘alternative beta’ or ‘alternative risk premia’ strategies.

In this course, we use a hands-on approach to study some of these strategies: the premises behind them, the various forms in which they have been applied to different markets, the main risks. We focus on strategies which, in one form or another, constitute either self-contained, independent investment approaches or building blocks of more complex investment approaches. We examine the quantitative models through which the strategies have been implemented, and we look at real-world data that have been, or may be, used for their implementation. We focus on the context in which the strategies have been applied and examine the success, or lack thereof, with which they have been employed. When appropriate, we discuss the tradeoffs among the forms in which the strategies have become available for the wider public (efficiency, ease of access).

Guest Lectures

Time and circumstances permitting, we have a number of distinguished professionals give “guest lectures” on different investment practices as applied in leading financial institutions.

Course Outline (Tentative)

We study approximately 6-8 strategies. We dedicate approximately 1-2 weeks to each strategy, and we structure each discussion through the presentation of a small number of select papers from the academic and the professional literature; we also provide background material for reference and more extensive reading.

An initial tentative list of strategies we may cover includes (in no particular order):

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| Carry | Extensively studied in the foreign exchange (FX) markets since the 1980s, the concept of carry has been ubiquitous (both on its own and as part of other, seemingly unrelated strategies) and has been commoditized through ETFs (e.g. Invesco DBV and iPath ICITF in FX, iShares CCRV in commodities). |
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Momentum	The main driving force behind the managed futures industry (CTAs) for the past 60 years, momentum has also been identified as a profitable factor in equities and is a technique widely used across almost all markets.
Risk Parity	The approach, which goes back to at least the mid-90s with Bridgewater's "All Weather" portfolio, became very popular with the financial crisis of 2007-2008, is offered today by many large financial institutions (e.g. AQR, PIMCO, Merrill Lynch), and has often lead to lively debates.
Hedge Fund Replication	Propelled by the success and the growth of the hedge fund industry in the 1990s, multiple approaches for delivering "hedge fund" returns (without investing in hedge funds) are now available on institutional platforms and in retail forms (e.g. ETFs: QAI, JPHF, DIVY, HDG, JPED).
Short(Long) Volatility	Since the late 1990s and especially since the final crisis of 2007-2008, the proliferation of tail hedging strategies (available through dedicated asset managers like Universa, 36 South Capital Advisors, specialized products from large firms like PIMCO and Capstone, and ETFs like Cambria's TAIL or Global X's QTR and XTR) has highlighted the classification of investment strategies along the dimension of volatility.
Stat(istical) Arb(itrage)	Organized as a systematic strategy in the early 1980s at Morgan Stanley, stat arb gave rise to a number of successful groups (e.g. Morgan Stanley's PDT, Ed Thorp's Ridgeline Partners) and has contributed to the establishment of a number of thriving firms today (e.g. D.E. Shaw, Jane Street, Two Sigma).
Fixed Income Relative Value	Catapulted to fame by the Salomon Arbitrage Group in the late 1980s/early 1990s and to infamy by the failure of Long-Term Capital Management (LTCM) in 1998, this strategy is still successfully practiced by a number of major market participants.
Factor Investing	Originally conceived in the mid-1970s, the strategy became common through the Fama-French model for equities in the early 1990s and has since been extended to smart beta strategies across different markets by almost every major financial firm (e.g. MSCI, Blackrock, Invesco).
Rebalancing	The concept of rebalancing plays a central role in a number of investment strategies and commercially available products (e.g. Janus Intech Equity portfolios).
Machine Learning	The most sought-after strategy du jour "aspires" to subsume all other systematic strategies.

Strategies may be added or substituted according to students' interests and backgrounds.

Recommended Background

The course is intended for MBA, MS and PhD students who have an interest in systematic investment strategies. The material is presented in a rigorous fashion and course discussions are self-contained: no prerequisite prior knowledge is assumed. Even though no prior knowledge is required, some familiarity with basic concepts in finance (e.g. fixed income, options, portfolio construction), probability and statistics, and elementary simulation and optimization may be useful for the easier absorption of the material.

Good review reading material for the course may be found in:

- J. C. Hull, Options, Futures, and Other Derivatives, Prentice Hall;
- David G. Luenberger, Investment Science, Oxford University Press.

For the homework assignments (please see below), we assume:

- proficiency with Excel, including its Solver (the built-in optimizer);
- sufficient knowledge (or willingness to acquire such knowledge) of any software environment that allows for financial calculations and completion of the homework assignments (e.g. VBA, Python, R, Matlab, Java, or any other programming language).

Grading

The grade for the course is based on homework assignments, a final exam/project, and in-class participation; there is no mid-term exam. Homework assignments count for 50% of the final grade. The final exam/project counts for 40% of the final grade. In-class participation counts for 10% of the final grade.

There are approximately 5-6 homework assignments. Students may work on the homework assignments in groups of up to three students per group. It is highly recommended that students first work on their own on all the problems in the homework assignments, and then confer with the other members of the group to check results, discuss difficulties, and/or resolve discrepancies. The homework assignments and the final exam/project are intended to be relevant, applicable and instructive. They include both implementation work with real data and theoretical work on conceptual problems. They are intended to give students hands-on experience with realistic projects that frequently arise in the everyday practice of asset management. Students are expected to spend a significant amount of time outside of the lectures to digest the material, complete the homework assignments, and prepare the final exam/project.