Empirical Finance: A Review

For Personal Reference

Sai Zhang

Inspired by the Course ***Empirical Finance*** at
London Business School by *Dr. Svetlana Bryzgalova*

March 30, 2021

HERE WE GO!

Empirical finance is an absolutely fascinating field, with some of the most cutting-edge methodologies and the most exploratory techniques. Although it is not my speciality, I am always interested in this literature. During my pre-doc research fellowship at London Business School, I have had the previlege to study in the course ***Financial Economics II: Empirical Finance***. The course instructor Dr. Svetlana Bryzgalova is absolutely one of the most brilliant scholars I have encountered. Thanks to her, I have got to understand this liturature more systematically. In this (personal) review, I summarize the most influential and inspirational works in this field and organize them by different topics. The structure of this review resembles the structure of Dr. Bryzgalova's course, while adjusted according to my personal research interest. I intend to review classic works and discuss some potential directions of future study regarding my personal interest in Behavioral Economics, Game Theory and Network.

Since this review is tailored according to my own research interest and experience, I will not only summarize the theoretical perspectives of the studies, present their findings and discuss how they fit into the literature, but document my replication attempts and pseudo codes as well. All the codes related to this review can be found on my Github page.

I thank Dr. Svetlana Bryzgalova for her valuable intuitions and impressive knowledge of the empirical finance literature. Building this review is truly a memorable journey for me. I would love to share this review and all the related materials to anyone that finds them useful. And unavoidably, I would make some typos and other minor mistakes (hopefully not big ones). So I'd really appreciate any correction. If you find any mistakes, please either set up a branch on Github or send the mistakes to this email address saizhang.econ@gmail.com, BIG thanks in advance!

Contents

1 Time-Series Predictability **4**

1.1 Concepts and models . . . 5
1.1.1 Market Efficiency . . . 5
1.2 Mean reversion in returns: early evidence . . . 5
1.3 Excess volatility puzzle . . . 5
1.4 Decomposing prices . . . 6
1.4.1 Campbell-Schiller decomposition . . . 6
1.4.2 Lettau-Ludvigson decomposition . . . 6
1.5 Prediction zoo . . . 6
1.6 Issues and extensions . . . 6
1.6.1 Persistency of most regressors . . . 6
1.6.2 Aggregate predictors without ex-ante choice . . . 6
1.6.3 Instability in the prediction relation . . . 6
1.6.4 Measurement . . . 7

2 Cross-Section Predictability **8**

2.1 Section 1 . . . 8

3 GMM and Cross-section test **9**

3.1 Section 1 . . . 9

4 Advances in cross-section asset pricing **10**

4.1 Section 1 . . . 10

5 Consumption-based asset pricing **11**

5.1 Section 1 . . . 11

6 Term structure of returns **12**

6.1 Section 1 . . . 12

7 Learning **13**

7.1 Section 1 . . . 13

8 Currencies: time-series and cross-section **14**

8.1 Section 1 . . . 14

9 Intermediary-based asset pricing **15**

9.1 Section 1 15

10 finance and big data **16**

10.1 Section 1 16

Bibliography **17**

CHAPTER 1

TIME-SERIES PREDICTABILITY

Contents

1.1 Concepts and models **5**
1.1.1 Market Efficiency 5
1.2 Mean reversion in returns: early evidence **5**
1.3 Excess volatility puzzle **5**
1.4 Decomposing prices **6**
1.4.1 Campbell-Schiller decomposition 6
1.4.2 Lettau-Ludvigson decomposition 6
1.5 Prediction zoo **6**
1.6 Issues and extensions **6**
1.6.1 Persistency of most regressors 6
1.6.2 Aggregate predictors without ex-ante choice 6
1.6.3 Instability in the prediction relation 6
1.6.4 Measurement 7

Every investor knows that trading in financial markets is to play games with time itself. Daily trades determine asset prices at every date and hence influence the random distribution of future prices as well as the initial level of prices. One would need "much more careful attention to the process by which both expected payoffs and required rates of return determine asset prices"[1].

In this chapter, I first, following Campbell (2017, Chapter 5), summarize models mapping cash flows and discount rates into prices using present value relations in

[1] See Campbell (2017, p. 121)

Section 1.1. Then I discuss the early evidence for mean reversion in returns in Section 1.2. In Section 1.3, I examine the excess volatility puzzle in the predictability debate. To accomodate the stylized facts of time-series predictability, Section 1.4 presents two of the most influential approaches to decompose prices. In Section 1.5, I selectively summarize some researches from the so-called "Prediction Zoo", which satirically describes the floods of price predictors. Finally, I discuss the issues and extensions of time-series predictability in Section 1.6.

1.1 Concepts and models

In this section, I follow Campbell (2017, Chapter 5) and discuss some of the conceptual building blocks for the strand of time-series empirical finance literature.

1.1.1 Market Efficiency

An intuitive way of explaining ***market efficiency*** is that efficient markets are competitive and allow no easy ways to make economic profit. A more useful and testable definition was given by Malkiel (1989, p. 127):

> The market is said to be efficient with respect to some information set ϕ, if security prices would be unaffected by revealing that information to all participants.

Some event studies that measure market responses to news announcements can be interpreted as tests of market efficiency regarding the announced information, but in general, this definition is not easy to test.

On the other hand, Malkiel (1989) gives a more testable alternative:

> Efficiency with respect to an information set ϕ implies that it is impossible to make economic profits by trading on the basis of ϕ.

1.2 Mean reversion in returns: early evidence

[insert text]

1.3 Excess volatility puzzle

[insert text]

1.4 Decomposing prices

[insert text]

1.4.1 Campbell-Schiller decomposition

[insert text]

1.4.2 Lettau-Ludvigson decomposition

[insert text]

1.5 Prediction zoo

[insert text]

1.6 Issues and extensions

[insert text]

1.6.1 Persistency of most regressors

[insert text]

1.6.2 Aggregate predictors without ex-ante choice

[insert text]

1.6.3 Instability in the prediction relation

[insert text]

1.6.4 Measurement

[insert text]

CHAPTER 2

CROSS-SECTION PREDICTABILITY

Contents

2.1 Section 1 8

Intro:

2.1 Section 1

Section 1:

CHAPTER 3

GMM AND CROSS-SECTION TEST

Contents

3.1 Section 1 9

Intro:

3.1 Section 1

Section 1:

CHAPTER 4

ADVANCES IN CROSS-SECTION ASSET PRICING

Contents

4.1 Section 1 10

Intro:

4.1 Section 1

Section 1:

CHAPTER 5

CONSUMPTION-BASED ASSET PRICING

Contents

5.1 Section 1 11

Intro:

5.1 Section 1

Section 1:

CHAPTER 6

TERM STRUCTURE OF RETURNS

Contents

6.1 Section 1 12

In this chapter, I summarize the stylized facts and models of intrest rates, and, combining with the time-series and cross-sectional properties of equities, discuss how the term structure of equity can be incorporated into the asset pricing dynamic. Instead of assuming the risk-free rate to be one period, as classic asset pricing models implying in the Euler equations and SDFs, one would expect that an ideal asset pricing model could not only explain the dynamic of equity, but reconcile the property of the term structure of interest rates as well.

The first part of this chapter summarizes studies of risk free bonds and the term structure of this asset class.

6.1 Section 1

Section 1:

CHAPTER 7

LEARNING

Contents

7.1 Section 1 13

In this chapter, I summarize the learning in empirical finance. This is one of the most cutting-edge research area now.

7.1 Section 1

Section 1:

CHAPTER 8

CURRENCIES: TIME-SERIES AND CROSS-SECTION

Contents

8.1 Section 1 . . . . . **14**

Intro:

8.1 Section 1

Section 1:

CHAPTER 9

INTERMEDIARY-BASED ASSET PRICING

Contents

9.1 Section 1 15

In this chapter, I summarize the

9.1 Section 1

Section 1:

CHAPTER 10

FINANCE AND BIG DATA

Contents

10.1 Section 1 16

Intro:

10.1 Section 1

Section 1:

BIBLIOGRAPHY

John Y Campbell. *Financial decisions and markets: a course in asset pricing*. Princeton University Press, 2017.

Burton G Malkiel. Efficient market hypothesis. In *Finance*, pages 127–134. Springer, 1989.