

# Preface

This book is an attempt (we think successful) to apply modern systems theory to the trading of the financial markets.

The successes of systems theory in influencing our daily lives (radio, television, electronic games, etc.) or in putting a man on the moon or exploring the huge universe are endless. The world has changed because of it.

Who, after reading this book, will still argue that one cannot make reliable profits on the financial markets must also be ready to maintain that its HD television does not work really, that it is just an illusion, and that the same holds true for its car navigation system and much more.

We will talk about trading systems, that is, those rules – in essence – that tell when one should buy or sell a security in the financial markets.

This has always been a controversial topic.

The key question is: Are the results I get today on historical data also reproducible in the future?

It was necessary to answer this question.

This book is the answer, and I anticipate that the response is positive.

Other authors have recently attempted paths in the same area.

For example, two researchers at Cambridge University (Hong and Satchell 2011) showed, with a powerful statistical apparatus, that the popular trading strategy based on the crossing of two moving averages (Di Lorenzo 2011a), the first and most simple strategy that practitioners have identified many years ago, is actually profitable because it reflects the structure of prices' autocorrelation without in fact knowing it analytically.

Others (Ehlers 2004) began the same path but essentially stopped at the first step – that is, the theory of filtering (namely, the indicators) – without having the courage to face the very core of the problem, which is the simple fact that looking at the indicators, decisions are taken, and this forms the basis of a trading system.

As you will discover in this book, it is not quite the same thing to observe an indicator and to make decisions.

We believe, therefore, that we have gone far ahead of everyone else, at least at the moment.

In this regard, it is now an established fact – although often many pretend not to notice it – that the majority of the academic research – which unfortunately is used by a large part of the institutional investors – is not suitable for making profits consistently on the market. The reason is that it uses equilibrium models, while the markets are inherently in a situation of constant nonequilibrium. In this book, it will be shown also, on the other side, that even the plethora of stochastic models (AR, ARMA, GARCH, etc.) that are usually proposed by the remaining part of the academic world are actually disappointing in practice, and we will show how to overcome the inconvenience.

A warning: sometimes it was necessary to force the formulas and the procedures used, that is, it was necessary not to be too rigorous in order to reach a workable conclusion. Classic is the problem, for example, of the use of the sample mean and sample standard deviation in formulas that should require the population mean and population standard deviation. It is correct that the statisticians turn up their noses, but we have almost always a fairly conclusive evidence: that is, if what we find does work or not in practice. It is with this wall of fire that we are confronted every single day to be fairly confident that our approximations have not been too excessive.

The book has been kept as much self-contained as possible to facilitate those that are not familiar with the matter. Therefore, also results of an elementary nature (such as the definition of probability, for instance) have been summarized. However, it is hoped that also those readers that know perfectly such elementary content will enjoy a somehow fresh look at it.

A fairly high number of different trading systems are presented.

A reasonable question that one can ask is: *Why?* Why examine so many of them? Would it not be better to rush to the conclusions, and would it not be enough to give the reader only one system that shows to be the best?

Unfortunately, it does not work that way.

The best results on an asset may not be the best results on other assets with different dynamic characteristics, so one needs a variety of tools to choose from, from time to time, as the most appropriate.

The book responds to this need also.

Richard Feynman (1918–1988) once was asked (Di Lorenzo 2011b) by a member of the Caltech faculty to explain why particles with spin  $\frac{1}{2}$  obey the Fermi-Dirac statistics. “I will prepare a lesson for the freshmen on this topic,” he answered.

Days later he came back saying: “I did not succeed. I was unable to reduce the explanation at a level understandable by a freshman. It means that we ourselves have not yet really understood it.”

In writing this book, as I have always done, I tried to respect the Feynman program: if you are unable to explain the most complicated parts to a freshman, appealing solely to notions learned in the secondary schools, it means that we ourselves did not understand the matter, and then we have to go back and study it again ourselves.

There is another protocol that a book of this sort in my opinion should respect: if a specialist, one who knows everything about the matter, reads it, he should enjoy

discovering or rediscovering aspects which he had not yet discovered or that he had forgotten.

Despite the forced simplifications, in other words, an author has not to say things wrong. . . and when the whole matter is reduced to a minimum, it is not that simple, believe me.

It remains just to wish you all a good job.

Renato Di Lorenzo

## References

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<http://www.springer.com/978-88-470-2705-3>

Trading Systems

Theory and Immediate Practice

Di Lorenzo, R.

2013, XVI, 232 p., Hardcover

ISBN: 978-88-470-2705-3