



University of Zurich
Institute for Empirical Research in Economics



Behavioral Finance Die neue Sicht auf die Finanzmärkte

Luncheon

Business Economists Zürich
August 26th 2004

Prof. Dr. Thorsten Hens
NCCR-FinRisk
Universität Zürich

Contents

1. Ein Experiment
2. Behavioral Biases in Finanzmärkten
3. Strategien als Antwort auf Behavioral Biases
4. Evolutionary Finance



1. Ein Experiment

- Psychologie und Experimente
- Die Spielregeln
- Die Auswertung
- Die Relevanz des Spiels



The Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel 2002



Daniel Kahnemann

"for having integrated insights from **psychological research** into economic science, especially concerning human judgment and decision-making under uncertainty"

• 1/2 of the prize



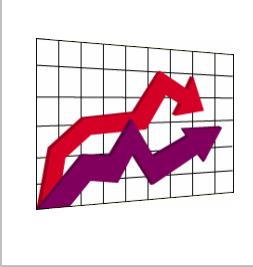
Vernon L. Smith

"for having established **laboratory experiments** as a tool in empirical economic analysis, especially in the study of alternative market mechanisms"

• 1/2 of the prize



Wer schlägt den Markt? - Spiel



Teilnehmer: Zuhörer dieses Vortrages.

Spielregel: Jeder nennt eine Zahl zwischen 0 und 100.

Gewinner: Derjenige, der am nächsten an $\frac{2}{3}$ des Durchschnitts ist.

Beispiel:

- 5 Zuhörer.
- Gewählte Zahlen: 10, 20, 30, 40, 50.
- Durchschnittliche Zahl 30.

Gewinner: Der Spieler, der 20 gewählt hat.



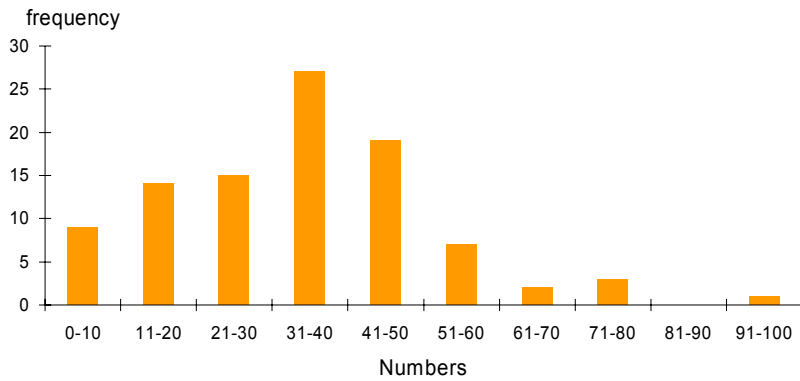
Name: _____

Meine Zahl (zwischen 0 und 100):



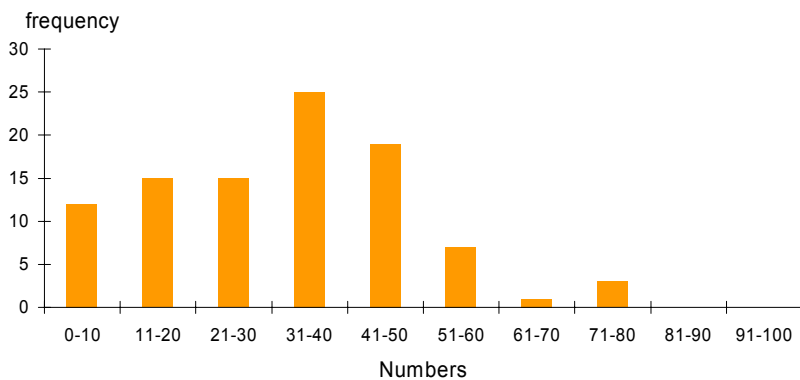
Ergebnis Bank Sarasin

2/3 average: 22.53



Ergebnis BHF-Bank

2/3 average: 21.10



Rational oder irrational?



- Typische Gewinnzahl: 20-25.
- **Rationale Lösung des Spiels:** Jeder wählt die 0.
- Es gewinnt derjenige, der die durchschnittliche Irrationalität der anderen am Besten einschätzen kann.



Relevanz des Spiels



- Getippte Zahl entspricht der erwarteten Anzahl Tage, die ein Trend noch anhält.
- Durchschnittlich getippte Zahl bestimmt die tatsächliche Dauer des Trends.
- $\frac{2}{3}$ des Durchschnitts, weil es immer schlau ist etwas früher als die anderen auszusteigen.



Berühmte Zitate hierzu

- **Druckenmiller**, manager of George Soros' Quantum Fund, was asked why he didn't get out of internet stocks earlier even though he knew that technology stocks were overvalued, he replied:
“We thought it was the eighth inning, and it was the ninth.”
- **Keynes**: “Market can remain irrational longer than you can remain solvent”



2. Behavioral Biases in Finanzmärkten

“There is a lot of psychology that might be relevant for the formation of investor sentiment, and no obvious way of deciding which psychological biases are the most important.”

Shleifer (2000) Inefficient Markets, S. 25.



2. Behavioral Biases in Finanzmärkten

- Was sind die schlimmsten Fehler?
 - Informations-suche
 - Availability Bias
 - Herding
 - Informations-verarbeitung
 - Framing Biases
 - Optimierung
 - Mental Accounting
 - Kontrolle
 - Regret



2. Behavioral Biases in Finanzmärkten

- Was sind die schlimmsten Fehler?
- Biases die zu Trends und Reversal führen
 - Representativeness Bias
 - Gambler`s Fallacy
- Sentiment Indices
- Empirische Evidenz auf Finanzmärkten





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Research Papers
Presentations
TV-Documentary

Activities

Consulting
Panel Discussion
Teaching
Workshop

Miscellaneous

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Contact

Behavioral Finance

Taking financial decisions is a non-trivial problem. Seen from a scientific point of view it amounts to combine various inter-related stochastic processes (stock prices, bond prices, interest rates, exchange rates etc.). Experimental economics has amassed evidence that the decisions people take in such complex situations systematically violate the principles of rational decision making as they have been formalized in science. Moreover, people may not even be able to formulate sufficiently clear and realistic objectives that they want to achieve when trying to handle inter-related stochastic processes.

In our research we try to explain why and in which way people deviate from the paradigm of rational decision making. The new behavioral models that we create this way have at least the following three important applications:

- 1. Private Banking:** The results will help to improve financial decisions by making people aware of the dissonance between the decisions they are tempted to take and the decisions they should take.
- 2. Product Development:** The models can also be used to design structured products that are best suited to serve the needs of private investors.
- 3. Asset Management:** The models give better explanations of asset prices observed in a market by taking into account the systematic deviations from the rational benchmark.



Representativeness Bias (1)

Frage:

Fondsmanager schlägt in 2 von 3 Jahren den Markt.

Welches der folgenden Protokolle ist am wahrscheinlichsten?

a) *BLBBB*

b) *LBLBBB*

c) *LBBBBB*



Representativeness Bias (2)

Typische Antwort: **b) LBLBBB**

Richtige Antwort: **a) BLBBB**

Erklärung: Häufigkeiten in b) sind am repräsentativsten für 2/3.

Jedoch ist b) das Protokoll a) und die Bedingung, dass zuerst L kommt.



Representativeness Bias (3)

Man hält eine kleine Stichprobe zu voreilig für repräsentativ für die Grundgesamtheit

Tversky und Kahneman (1971):

„Law of Small Numbers.“



Representativeness Bias (4)

Nach schon relativ kurzen Perioden von positiven Returns auf Finanzmärkten glaubt man, die Welt hätte sich grundlegend geändert.

„New Economy.“



Gambler`s Fallacy

- Aufgabe:
Stellen Sie sich einen Münzwurf vor.
Schreiben Sie eine Sequenz der Länge 100
von zufälligen Abfolgen von Kopf und Zahl auf.



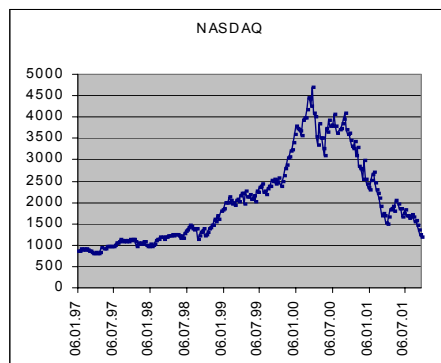
Häufigkeiten im Münzwurf Experiment



Leute unterschätzen die Häufigkeit von lang anhaltenden Runs.



Was there a NASDAQ Bubble in the late 1990s?

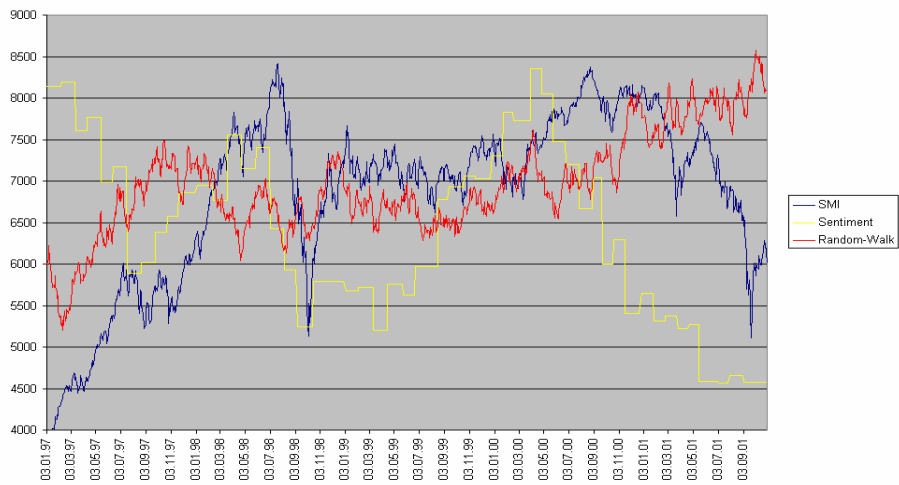


Pasteur (2004), from Chicago Business School argues NO!

„People just lost trust in the high level of prices.“

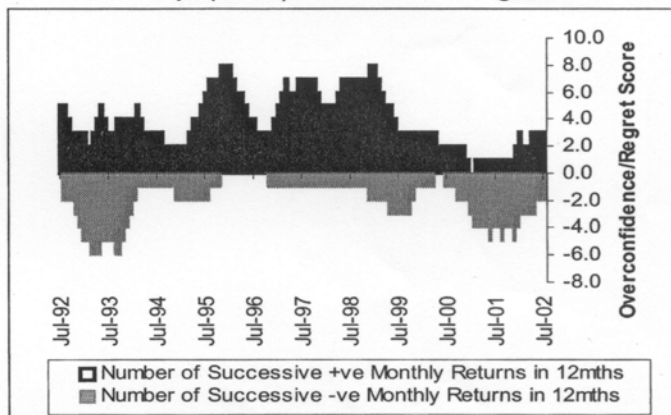


Sentiment-Index of CS



Merrill Lynch Overconfidence Regret Potential

Chart 364: Europe (Ex-UK) Overconfidence/Regret



Source: Datastream, Merrill Lynch

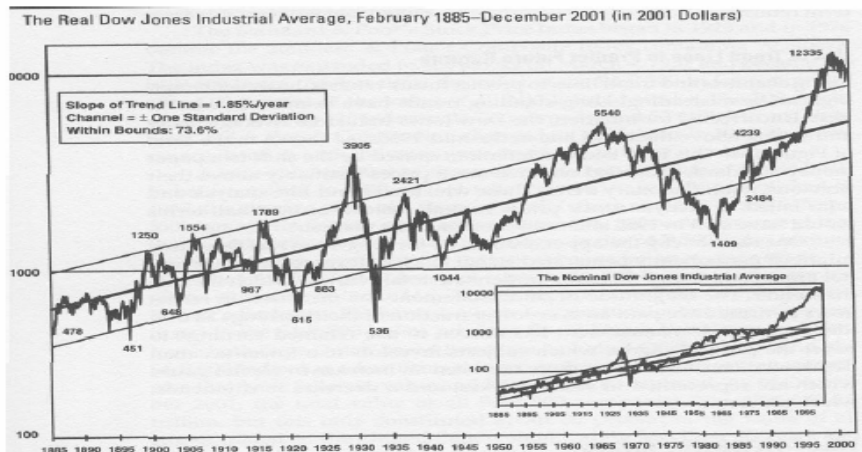


Empirische Evidenz von Sentiment auf Finanzmärkten

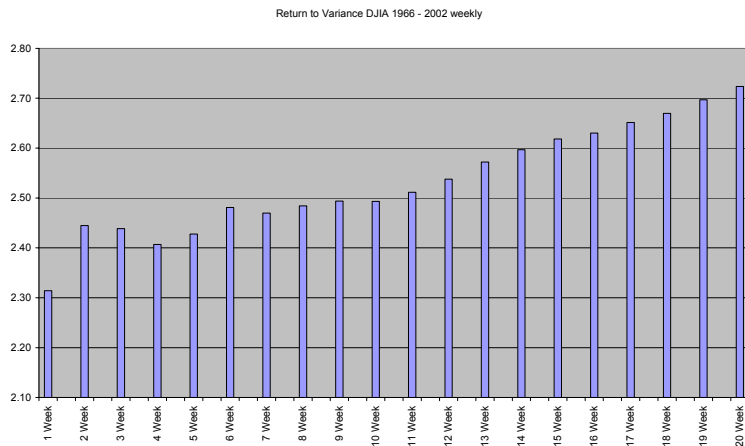
- Bands of one Standard Deviation
- Returns to Variance in the long run



Mean Reversion on DJIA



Return to Variance on DJIA weekly 1966 - 2002:



.. is a clear sign of mean-reversion!

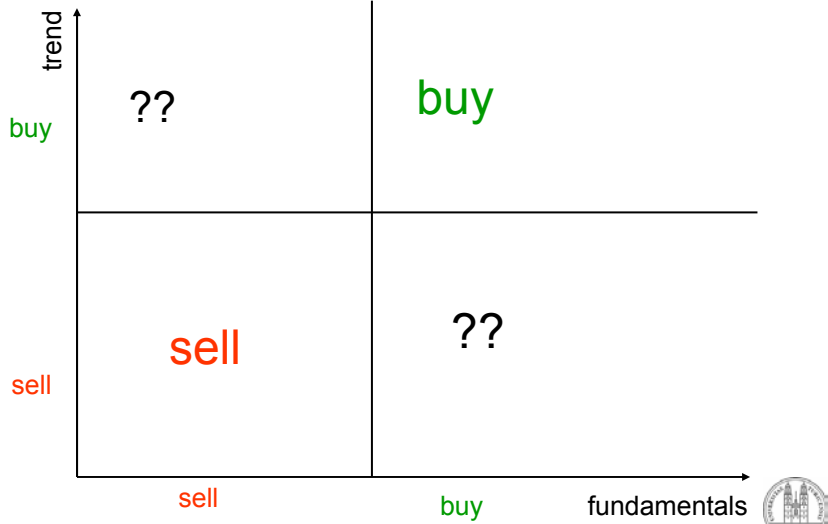


3. Strategien als Antwort auf Behavioral Biases

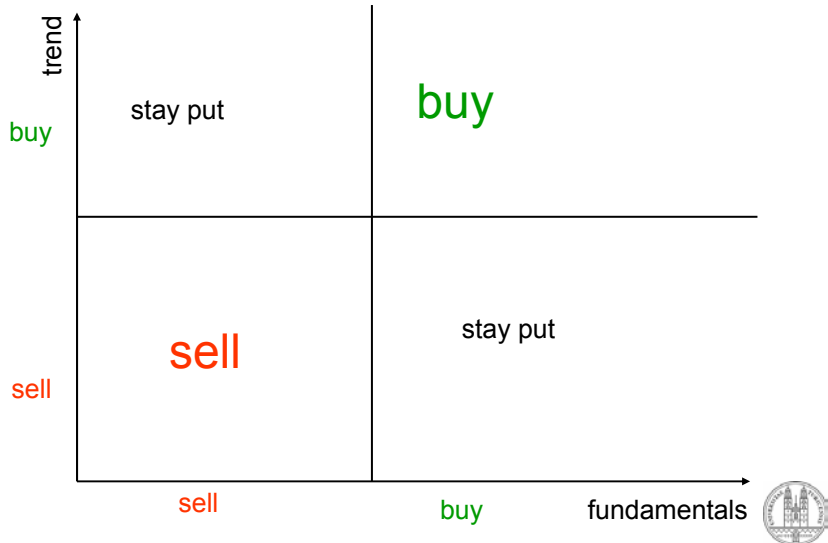
- Nicht auf einem Auge blind sein!
- Der vorsichtige Weg
- Der wissenschaftliche Weg



Behavioral Finance Tactical Asset Allocation

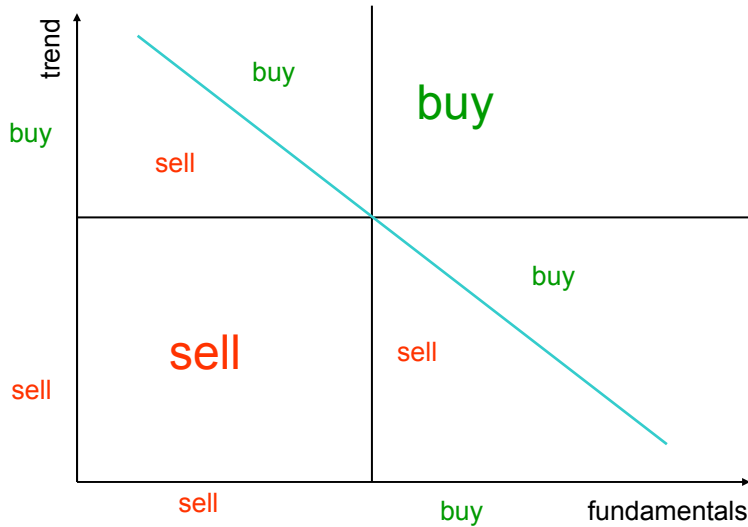


Der vorsichtige Weg



Regression:

$$\text{Signal} = \alpha * \text{trend} + \beta * \text{fundamentals}$$



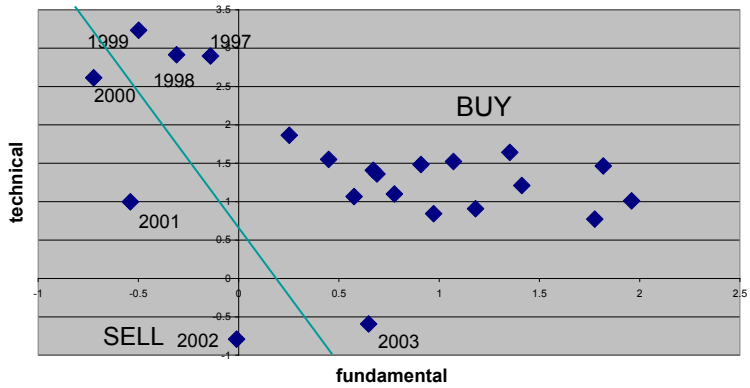
Beispiel: DJIA 1982-2003

- Fundamental:
 - 3 years moving average of
 - average **Div-yield** minus **10year G-Bond yield**
- Techninal
 - 3 years moving average of
 - Returns** on average market values



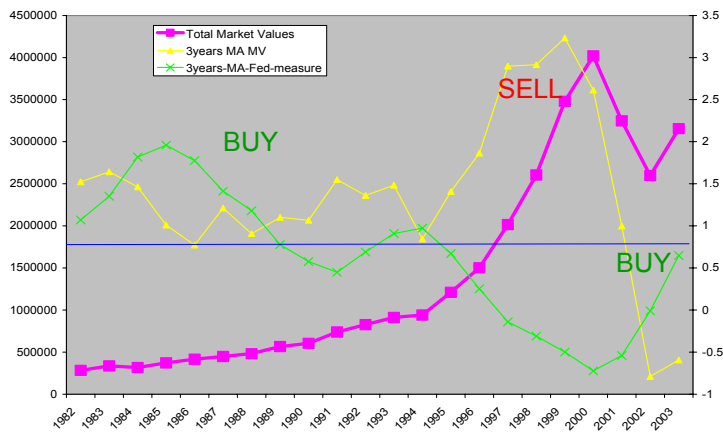
Beispiel DJIA

Fundamental and Technical Analysis



Beispiel: DJIA 1982-2003

Interaction of Fundamental and Technical Analysis

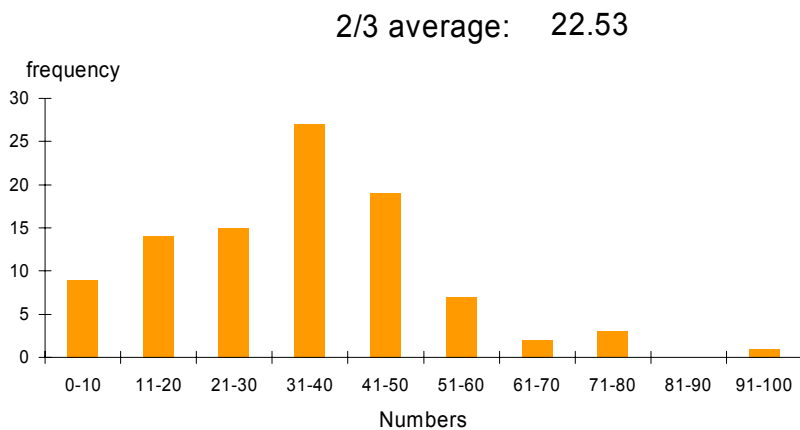


4. Evolutionary Finance

- Das wiederholte Spiel
 - Von welcher anderen Strategie verdiene ich Geld?
 - Wie lange wird jemand diese Strategie noch spielen?
- Beispiel Hedge Funds

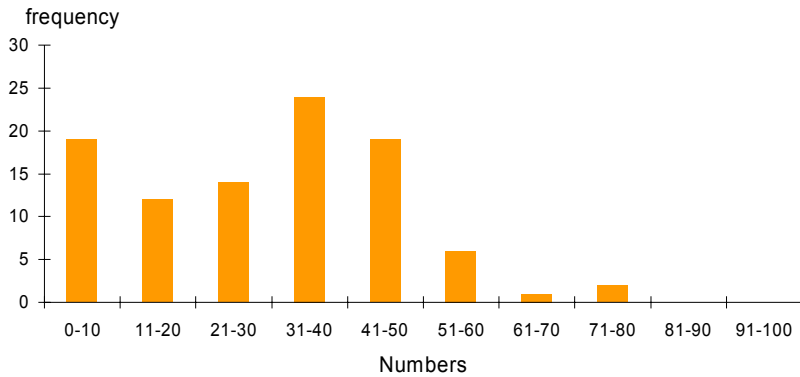


Ergebnis Bank Sarasin



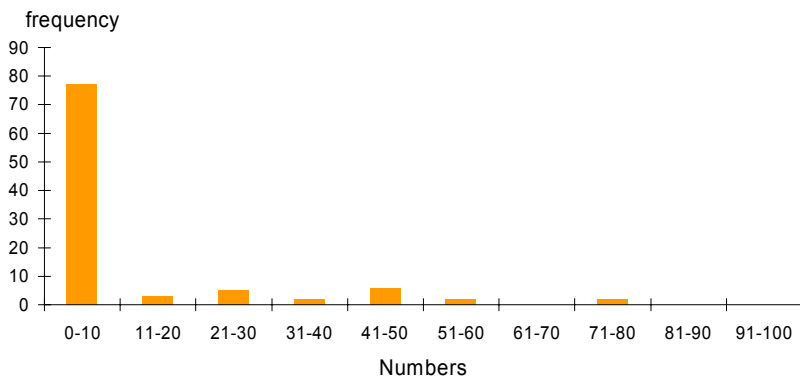
Das zweifach wiederholte Spiel

2/3 average: 19.47

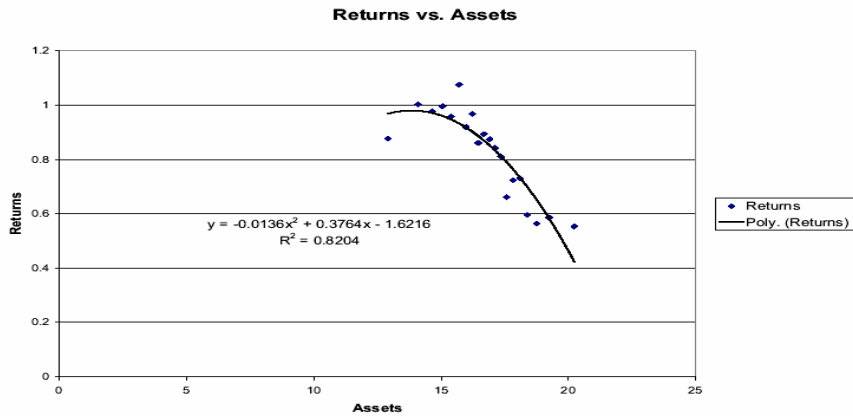


Das 10 mal wiederholte Spiel

2/3 average: 5.32



Beziehung von Assets und Returns in Hedge Funds



Je mehr Assets in Hedge Funds fließen desto geringer deren Return



Evolutionary Finance



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Evolutionary Finance

The idea of this project is to apply evolutionary dynamics (mutation and selection) to study the evolution of trading strategies and the evolution of financial innovations.

Evolution as a Paradigm for Finance

We believe that thinking in evolutionary terms like strategies, market selection and mutation is an appropriate framework for finance. In this view, for example, a stock market is understood as a heterogeneous population of frequently interacting portfolio strategies in competition for market capital. Market selection is perhaps most severe in these markets and innovations, respectively mutations, occur frequently. The aim of our project is to build a Darwinian theory of portfolio selection.

Our Evolutionary Market Model

The building blocks of the model are strategies and not individual investors, i.e. for each strategy all wealth being managed by that strategy is added up. This is analogous to Darwin's view according to which the species but not the individual animal counts for evolution. One then realizes that strategies but not individual investors have an impact on market prices. The strategies considered in our project are for example the mean-variance rule, the growth-optimal rule, the CAPM rule, naive diversification, prospect theory based rules and fundamental rules like relative-dividends rule. In our evolutionary market model the impact of any such rule on market prices is proportional to the amount of wealth managed by the rule. This gives a very simple and robust asset pricing equation. In a Darwinian model two forces are at work: one reducing the variety of species and one increasing it. In our model the first such force is the endogenous return process acting as a market selection mechanism that determines the evolution of wealth managed by the portfolio rules. That is to say, if some rule has gained wealth because it has managed to buy low and to sell high then other rules must have lost an equal amount of wealth. Secondly, any system of portfolio rules that is selected by the market selection process is checked for its evolutionary stability, i.e. it is checked whether the innovation of a new portfolio rule with very little initial wealth can grow against the incumbent rule.

Relevance of our model

The Darwinian theory of asset markets seems to describe very well a modern asset market in which most of the available capital is invested by delegated management. Indeed investors typically choose funds by the portfolio rules, also called "styles", according to which the money is invested. Style consistency appears nowadays to be one of the most important features in monitoring fund managers. Hedge funds are a sector of the financial market that can perfectly be described by our model. Moreover, using functions that describe the flow of wealth between hedge fund strategies our model can also be used to give good predictions of asset returns for sectors quite different to the hedge fund business.

