



University of Zurich  
Institute for Empirical Research in Economics



# Behavioural Finance und die Rolle der Informatik

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23.Mai 2005 NCCR-FinRisk  
Universität Zürich

## Behavioural Finance und die Rolle der Informatik

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- Spekulative Blasen und Behavioural Finance
- Informatik als Gegenstand der Spekulation
- Informatik als Mittel zur Spekulation
- Ökonomische Modelle einer Spekultativen Blase
- Ökonometrische Verfahren



# Behavioural Finance und die Rolle der Informatik

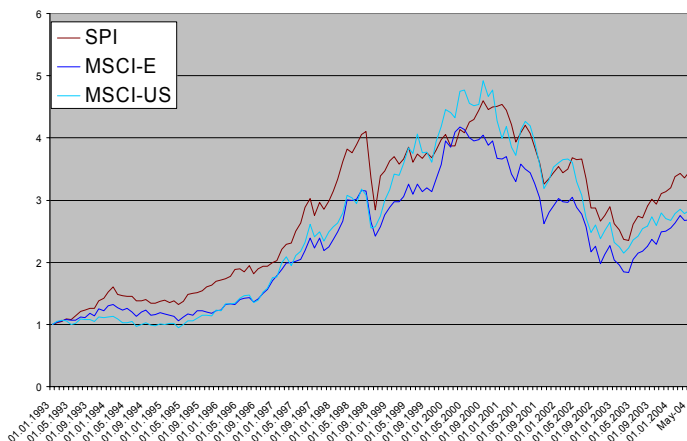
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- **Spekulative Blasen und Behavioural Finance**
- Informatik als Gegenstand der Spekulation
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## Was ist passiert? Grosse Spekulative Blase!

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## Wie wird das erklärt? Behavioural Finance!

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### *Wie wichtig sind folgende Einflussfaktoren auf den Aktienkurs?*

% Befragte	sehr wichtig	Rang 2002	Rang 2000
Management	48	1	4
Unternehmensgewinn	42	2	2
Angebot und Nachfrage	37	3	3
Medien*	31	4	-
Psychologische Faktoren*	30	5	-
Fusionen	26	6	1
Zinsentwicklung	26	7	5
Corporate Governance*	22	8	-
Produkte und Dienstleistungen	20	9	8
Politik	19	10	7
Spekulation	18	11	6
Schaffung von Arbeitsplätzen	18	12	9

Cocca & Volkart (2002) *Aktienbesitz in der Schweiz*



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## Informatik als Gegenstand der Spekulation (1)

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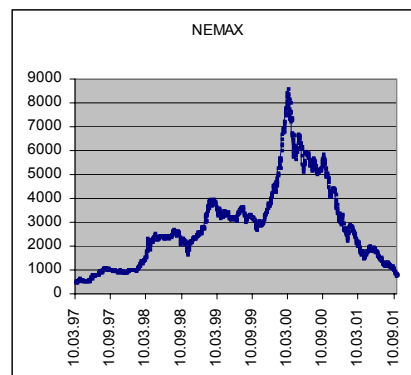
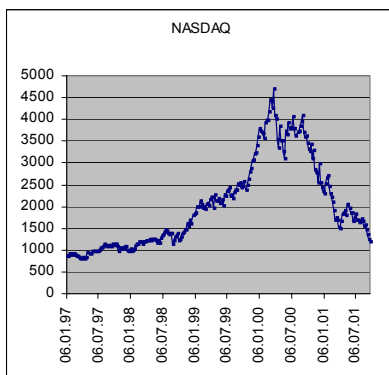
### Fallstudie VA Linux Systems (1994 gegründet)

- Dezember 99
  - Jahresumsatz von 17.7 Mio. US\$
  - Verlust von 14.5 Mio. US\$
- IPO am 9. Dezember 1999
  - Zeichnungskurs 30 US\$
  - Schlusskurs auf 239 US\$ (+ 698 %)
  - Marktkapitalisierung 9 Mrd. US\$!
- Ende März 2001 fiel Kurs auf 3 US\$!
- Andere Fälle e-toys, Broadvision oder Infineon und ThinkTools.



## Informatik als Gegenstand der Spekulation (2)

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## Informatik als Mittel der Spekulation (1)

### Informationsquellen (I)

% Befragte	Presse	$\Delta$ 2000	TV	$\Delta$ 2000	Internet	$\Delta$ 2000
Gesamtheit der Befragten	75	-18	39	-39	54	35
<b>Alter</b>						
18 – 29	76	-14	49	-23	78	27
30 – 39	68	-25	31	-44	63	14
40 – 49	83	-13	33	-53	59	26
50 – 59	74	-20	40	-40	51	53
60 – 76	75	-19	45	-29	19	57
<b>Einkommen</b>						
Weniger als CHF 3000	72	-24	71	7	39	18
3000 bis unter 4500	61	-27	28	-59	30	-5
4500 bis unter 6000	73	-22	51	-23	47	63
6000 bis unter 8000	73	-20	26	-57	40	-4
8000 bis unter 10000	80	-16	41	-41	72	41
10000 bis unter 15000	75	-16	38	-29	62	17
15000 bis unter 20000	88	-9	31	-57	68	36
20000 und mehr	78	-22	34	-19	76	43



## Informatik als Mittel der Spekulation (2)

### Informationsquellen (IV) – Internet Sites

% Befragte	Total	18-29	30-39	40-49	50-59	60-74
ubs.ch/quotes.ch	31	29	41	21	31	38
swissquote.ch	23	31	28	23	15	0
credit-suisse.ch/directnet/youtrade	22	12	26	24	21	26
borsalino.ch	13	11	11	11	21	9
Internet-Suchseiten (Yahoo, Bluewin)	7	6	15	6	2	0
Kantonalbanken	4	3	4	8	2	0
moneycab.ch	3	4	2	3	5	0
Seiten von Zeitungen und Zeitschriften (NZZ, Spiegel usw.)	3	5	4	2	2	0
consors.ch	3	3	4	2	2	0

Cocca & Volkart (2002) *Aktienbesitz in der Schweiz*



## Informatik als Mittel der Spekulation (3)

### Handelsphase

Das Internet ist bei der Übermittlung von Börsenaufträgen weiterhin auf dem Vormarsch. Während das Online-Trading im Jahr 2000 von 16% der Befragten genutzt wurde, sind es nun bereits 25%. Bei den 18- bis 29-Jährigen ist das Internet heute mit Abstand die häufigste Art der Orderübermittlung.

% Befragte	Total	18-29	30-39	40-49	50-59	60-74
Telefon/Handy	35	18	32	41	37	44
2000	-18%	-40%	-36%	-7%	-24%	12%
Schriftlich via Fax	2	2	3	0	1	1
2000	7%	31%	107%	-100%	0%	-30%
Schriftlich via Post	3	5	4	6	2	5
2000	-21%	-2%	8%	7%	0%	0%
Via Internet/Telebanking	25	47	33	17	27	8
2000	60%	59%	35%	-7%	308%	57%
Direkt bei Bank (persönlich)	43	34	38	52	38	51
2000	-9%	-24%	5%	9%	-21%	-12%

In den USA gab es 1999 bereits 9.7 Millionen „online accounts“.



## Reflexivity (Soros)

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„Financial markets attempt to predict a future that is contingent on the decisions people make in the present. Instead of just passively reflecting reality, financial markets are actively creating the reality that they, in turn, reflect. There is a two way connection between present decisions and the future events, which I call reflexivity.“ (page xxiii)

„Reflexivity is absent from natural science, where the connection between scientists‘ explanations and the phenomenon that they are trying to explain runs only one way.“ (page xxiv)



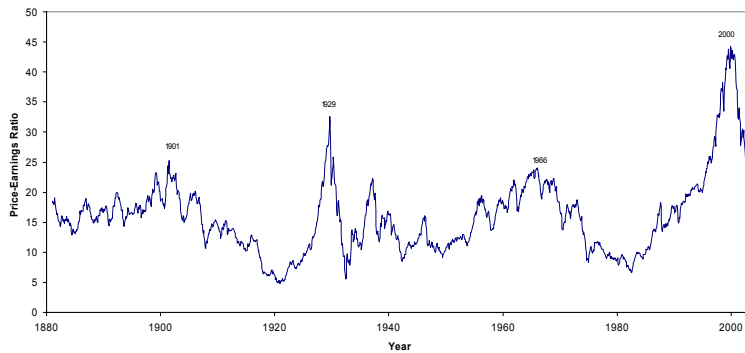
## Reflexivität<sup>2</sup>

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## Bubbles auf dem S&P 500 (1880-2000)

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# Die Modellierung einer Spekulativen Blase

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- Die Mitspieler
- Die Phasen einer Spekulativen Blase
- Indikatoren einer Spekulativen Blase



# Die Mitspieler

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- Investoren
  - Fundamentalisten
  - Trendfolger
  - Aussenstehende
- Medien
- Firmen
- Banken
- Regulatoren



# Die Mitspieler

- Investoren
  - Fundamentalisten → Ver/kaufen, falls Preis höher/niedriger als Fundamentalwert
  - Trendfolger → Ver/kaufen, falls Preis gefallen/gestiegen ist
  - Aussenstehende → Werden durch extreme Kurssteigerungen angelockt
- Medien → Koordinieren die Erwartungen der Marktteilnehmer
- Firmen → Versuchen von der Marktstimmung zu profitieren
- Banken → Erfinden immer neue Spielzeuge
- Regulatoren → Dividendenpolitik, Zinspolitik



# Merrill Lynch Werbung 1995



**SINCE YOU SHOULDN'T  
EXPECT TO GET RICH QUICKLY,  
MAYBE YOU SHOULD PLAN  
TO GROW RICH SLOWLY.**

Chances are you won't become a millionaire overnight. And if a deal sounds too good to be true, it probably is. Still, it is possible to grow rich. If you take control of your future by doing just six simple things.

**First. Find the best partner.** Just like you found the very best electric, find the very best person to advise you. A Merrill Lynch Financial Consultant. You don't leave your health in the hands of an amateur. So don't do the same with your money.

**Second. Plan.** Work out a real plan with your Financial Consultant. On paper. With your assets and liabilities on one page, your long-term goals on another, and a lot of hard thinking in between. Then sit with the plan for life, making sure it changes as your life does.

**Third. Save regularly.** Stop spending a bit regularly and start saving a bit regularly. Pay yourself more of what you earn. Then you can put the power of compounding and dollar cost averaging to work for you.

**Fourth. Diversify.** Don't put all your money in one place. Spread it around—stocks, bonds, mutual funds, international investments, even real estate. That way you'll have less exposure to market fluctuations.

**Fifth. Maximize tax deferrals and matched funds.** Put your money in tax-deferred savings programs—IRAs, Keoghs, SEPs, annuities, and 401(k)s—and give the most to employer-matched programs. Money that's between

defined grows much faster than money that's subject to taxes.

**Sixth. Start now.** The most important thing about a plan is that it won't work if you don't start it. Get started now and put the power of compounding to work for you sooner. The longer it works the better off you are.

Your Financial Consultant will help you figure out how much you can pay now, what kind of growth you need, how to save on taxes, and where your money will do you the most good—to get what you want like a home, a college education for the kids and a comfortable retirement.

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**WE'RE PLANNING:** We provide full consultation that helps the retirement plan client with the right mix of assets.

**MY NAME IS:** Thomas R. Smith, Merrill Lynch Financial Advisor, Columbia, SC.

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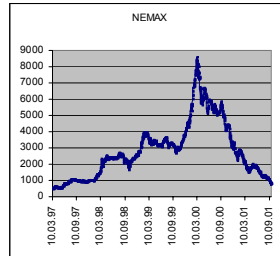
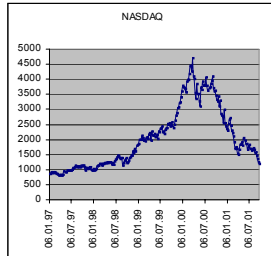
**TOTAL MERRILL**



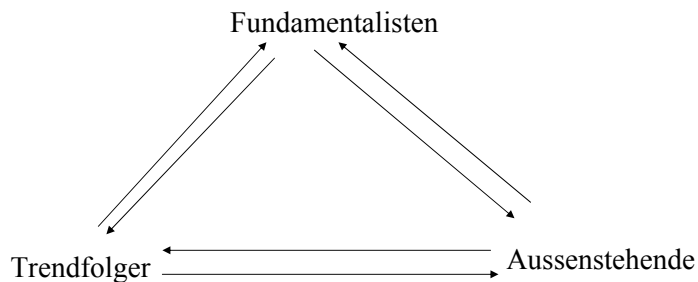
# Die Phasen einer Spekulativen Blase

## Stages of a bubble:

- Displacement (diffusion of new technology starts)
- Take off (stock prices show abnormal increase)
- Exuberance (stock prices grow at very high rate)
- Critical Stage (stock price growth slows down)
- Crash (stock prices start tumbling)



# Populationsdynamik

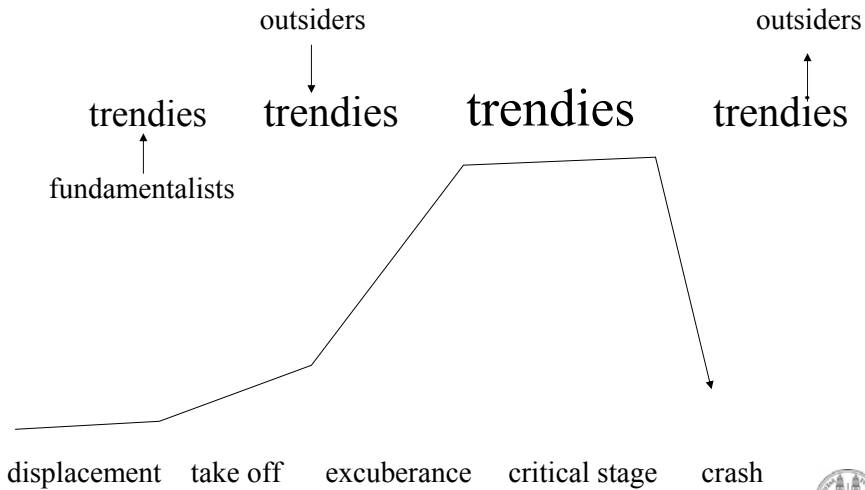


Strategien werden nach der Regel : „Imitate if better“ gewechselt.



## Populationsdynamik während eines Bubbles

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## Indikatoren einer Spekulativen Blase

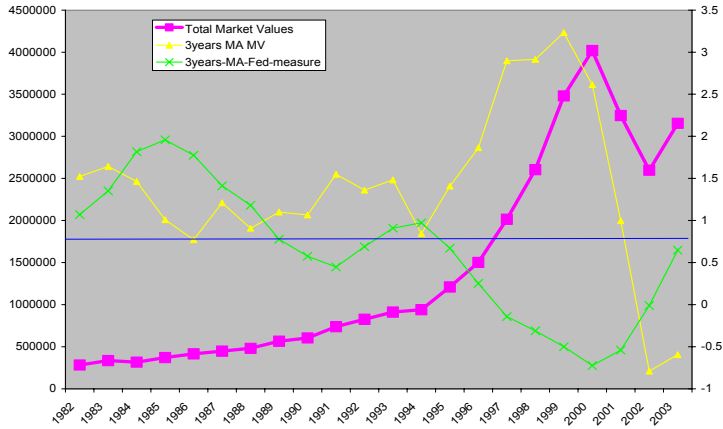
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- Fed-measure
- Momentum measure
- Sentiment Indices
- Verhalten der Aussenstehenden

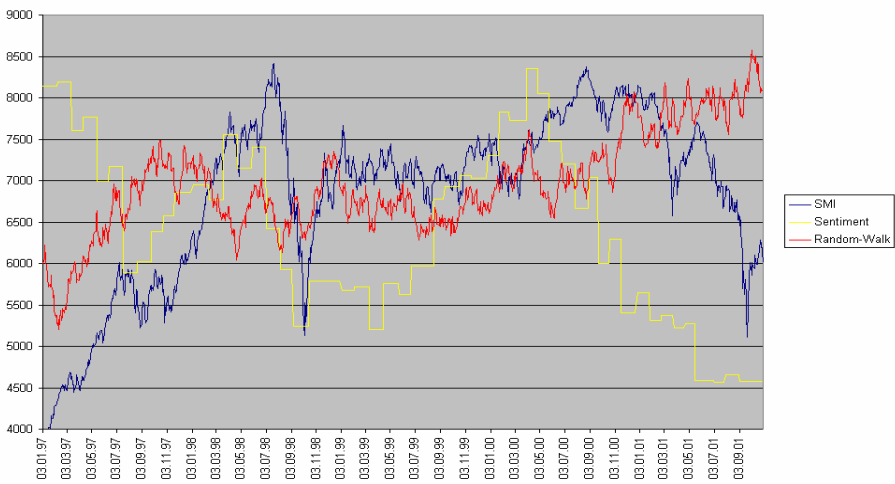


# Fed- und Momentum-measure: DJIA 1982- 2003

Interaction of Fundamental and Technical Analysis

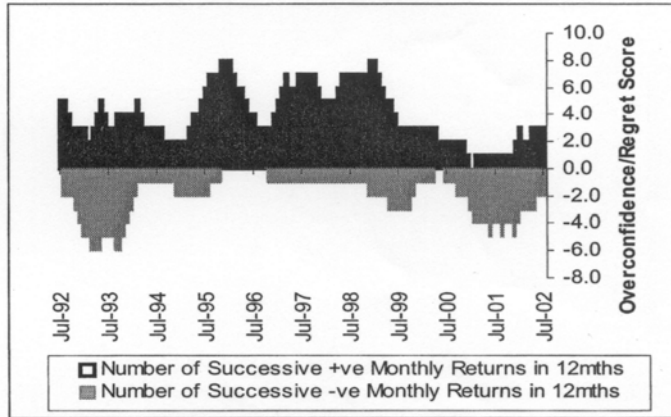


# Sentiment-Index of CS



# Merrill Lynch Overconfidence Regret Potential

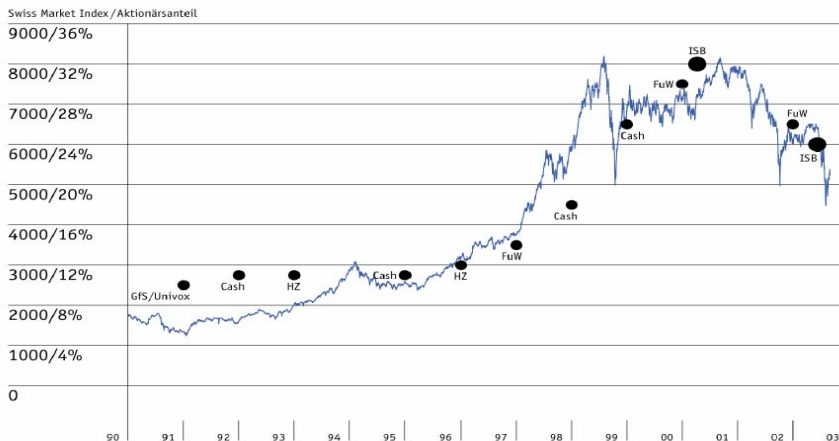
Chart 364: Europe (Ex-UK) Overconfidence/Regret



Source: Datastream, Merrill Lynch



# Verhalten der Aussenstehenden



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# Ökonometrische Verfahren (1)

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- Spekulation hinterlässt Spuren
- Exogene Grössen
  - Fundamentalwerte
  - Preismomentum
  - Sentimentmasse
  - Vermögensfluss
- Endogene Grössen
  - Erwarteter Return



## Ökonometrische Verfahren (2)

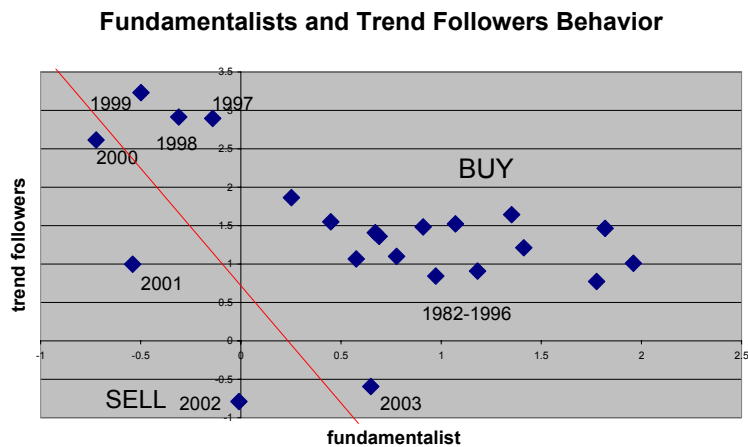
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- Vereinfachung:
- Exogene Größen
  - Fundamentalwerte
  - Preismomentum
  - Sentimentmasse → folgt Preismomentum
  - Vermögensfluss → folgt Erfolg der Strategien
- Endogene Größen
  - Erwarteter Return



## Beispiel einer BF-Regression

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## Ökonometrische Verfahren (3)

**Variables:** Holding period return  $R_{t+1}$  Information period returns  $R(t) = R_t, R_{t-1}, \dots$

Regimes:  $\Omega(t)$  Momentum and reversal parameters  $\theta(\cdot)$

**Statistical model:**  $R_{t+1}^{\text{expected}} = \Psi(R(t); \theta(\Omega(t)))$  reading in the linear case:

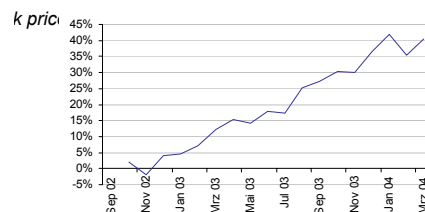
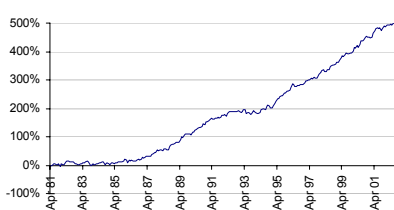
$\Omega(\cdot) = \theta_0 + \theta_1 R_t + \theta_2 R_{t-1} + \dots$  where  $\theta_i > 0$  ( $< 0$ ) indicates momentum

(reversal) with respect to information period  $i$ . Parameters  $\theta$  are estimated based on rigorous statistical tests instead of data mining.

**Investment procedure:** On each time step, let the statistical model decide based on recent historical data, whether, there is significant momentum or reversal in an asset. Then, carry out the respective trade signal.



## Quantitative momentum and reversal strategies



In sample and out-of-sample cum. Returns are shown in left and right picture, respectively. Momentum and reversal is detected by

$$R_{t+1}^{\text{expected}} = \theta_1 R_t$$

<b>Stock:</b>	Ford	US Bancorp	Wyeth	Wachovia	Bank America
<b>Sig. <math>\theta_i</math>:</b>	-0,35	-0,19	-0,16	-0,17	-0,21



# Zusammenfassung

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## [www.behavioralfinance.ch](http://www.behavioralfinance.ch)

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### 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.

