# nature

nature > letters > article

Letter Published: 11 February 1999

# Scaling and criticality in a stochastic multi-agent model of a financial market

Thomas Lux № 4 & Michele Marchesi2

Nature 397, 498-500 (1999)

**3998** Accesses | **1285** Citations | **13** Altmetric | Metrics

#### **Abstract**

Financial prices have been found to exhibit some universal characteristics 1,2,3,4,5,6 that

### Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 92 **partners**, also use optional cookies and similar technologies for advertising, personalisation of content, usage analysis, and social media.

By accepting optional cookies, you consent to allowing us and our partners to store and access personal data on your device, such as browsing behaviour and unique identifiers. Some third parties are outside of the European Economic Area, with varying standards of data protection. See our **privacy policy** for more information on the use of your personal data. Your consent choices apply to nature.com and applicable subdomains.

You can find further information, and change your preferences via 'Manage preferences'. You can also change your preferences or withdraw consent at any time via 'Your privacy choices', found in the footer of every page.

We use cookies and similar technologies for the following purposes:

- > Store and/or access information on a device
- Personalised advertising and content, advertising and content measurement, audience research and services development

**Accept all cookies** 

Reject optional cookies

## Buy this article

- Purchase on SpringerLink
- Instant access to full article
  PDF

Buy now

# Subscribe to this journal

Receive 51 print issues and online access

199,00 € per year

only 3,90 € per issue

Learn more

Prices may be subject to local taxes which are calculated during checkout

#### **Additional access options:**

- Log in
- <u>Learn about institutional subscriptions</u>
- Read our FAQs

### Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 92 **partners**, also use optional cookies and similar technologies for advertising, personalisation of content, usage analysis, and social media.

By accepting optional cookies, you consent to allowing us and our partners to store and access personal data on your device, such as browsing behaviour and unique identifiers. Some third parties are outside of the European Economic Area, with varying standards of data protection. See our **privacy policy** for more information on the use of your personal data. Your consent choices apply to nature.com and applicable subdomains.

You can find further information, and change your preferences via 'Manage preferences'. You can also change your preferences or withdraw consent at any time via 'Your privacy choices', found in the footer of every page.

We use cookies and similar technologies for the following purposes:

Store and/or access information on a device

Personalised advertising and content, advertising and content measurement, audience research and services development

**Accept all cookies** 

Reject optional cookies

- 3 Mantegna, R. N. & Stanley, E. Scaling behaviour in the dynamics of an economic index. *Nature* **376**, 46–49 (1995).
- **4** Ghashgaie, S., Breymann, W., Peinke, J., Talkner, P. & Dodge, Y. Turbulent cascades in foreign exchange markets. *Nature* **381**, 767–770 (1996).
- 5 Galluccio, S., Caldarelli, G., Marsili, M. & Zhang, Y. -C. Scaling in currency exchange. *Physica A* **245**, 423–436 (1997).
- 6 Liu, Y., Cizeau, P., Meyer, M., Peng, C.-K. & Stanley, H. E. Correlations in economic time series. *Physica A* **245**, 437–440 (1997).

### Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 92 **partners**, also use optional cookies and similar technologies for advertising, personalisation of content, usage analysis, and social media.

By accepting optional cookies, you consent to allowing us and our partners to store and access personal data on your device, such as browsing behaviour and unique identifiers. Some third parties are outside of the European Economic Area, with varying standards of data protection. See our **privacy policy** for more information on the use of your personal data. Your consent choices apply to nature.com and applicable subdomains.

You can find further information, and change your preferences via 'Manage preferences'. You can also change your preferences or withdraw consent at any time via 'Your privacy choices', found in the footer of every page.

We use cookies and similar technologies for the following purposes:

Store and/or access information on a device

Personalised advertising and content, advertising and content measurement, audience research and services development

**Accept all cookies** 

Reject optional cookies

- 13 Brock, W. & LeBaron, B. Adynamical structural model for stock return volatility and trading volume. *Rev. Econ. Stat.* **78**, 94–110 (1996).
- 14 Brock, W. & Hommes, C. Rational routes to randomness. *Econometrica* **65**, 1059–1095 (1997).
- 15 Lux, T. Time variation of second moments from a noise trader/infection model. *J. Econ. Dyn. Control* **22**, 1–38 (1997).
- 16 Lux, T. The socio-economic dynamics of speculative markets: interacting agents, chaos, and the fat tails of return distributions. *J. Econ. Behav. Organizat.* **33**, 143–165 (1998).

### Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 92 **partners**, also use optional cookies and similar technologies for advertising, personalisation of content, usage analysis, and social media.

By accepting optional cookies, you consent to allowing us and our partners to store and access personal data on your device, such as browsing behaviour and unique identifiers. Some third parties are outside of the European Economic Area, with varying standards of data protection. See our **privacy policy** for more information on the use of your personal data. Your consent choices apply to nature.com and applicable subdomains.

You can find further information, and change your preferences via 'Manage preferences'. You can also change your preferences or withdraw consent at any time via 'Your privacy choices', found in the footer of every page.

We use cookies and similar technologies for the following purposes:

Store and/or access information on a device

Personalised advertising and content, advertising and content measurement, audience research and services development

**Accept all cookies** 

Reject optional cookies

23 Youssefmir, M. & Huberman, B. Clustered volatility in multiagent dynamics. *J. Econ. Behav. Organizat.* **32**, 101–118 (1997).

#### **Acknowledgements**

Financial support by Deutsche Forschungsgemeinschaft, Sonderforschungsbereich 303 at the University of Bonn is acknowledged.

#### **Author information**

**Authors and Affiliations** 

Department of Economics, University of Bonn, Adenauerallee 24-42, 53113, Bonn, Germany Thomas Lux

#### Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 92 **partners**, also use optional cookies and similar technologies for advertising, personalisation of content, usage analysis, and social media.

By accepting optional cookies, you consent to allowing us and our partners to store and access personal data on your device, such as browsing behaviour and unique identifiers. Some third parties are outside of the European Economic Area, with varying standards of data protection. See our **privacy policy** for more information on the use of your personal data. Your consent choices apply to nature.com and applicable subdomains.

You can find further information, and change your preferences via 'Manage preferences'. You can also change your preferences or withdraw consent at any time via 'Your privacy choices', found in the footer of every page.

We use cookies and similar technologies for the following purposes:

Store and/or access information on a device

Personalised advertising and content, advertising and content measurement, audience research and services development

**Accept all cookies** 

Reject optional cookies

DOI

https://doi.org/10.1038/17290

#### This article is cited by

# Business cycle and herding behavior in stock returns: theory and evidence

Kwangwon Ahn, Linxiao Cong ... Daniel Sungyeon Kim

Financial Innovation (2024)

# <u>Coexistence of critical phenomena: the concept of manifold multi-</u> <u>spectral criticality</u>

Michał Chorowski, Ryszard Kutner & Zbigniew R. Struzik

#### Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 92 **partners**, also use optional cookies and similar technologies for advertising, personalisation of content, usage analysis, and social media.

By accepting optional cookies, you consent to allowing us and our partners to store and access personal data on your device, such as browsing behaviour and unique identifiers. Some third parties are outside of the European Economic Area, with varying standards of data protection. See our **privacy policy** for more information on the use of your personal data. Your consent choices apply to nature.com and applicable subdomains.

You can find further information, and change your preferences via 'Manage preferences'. You can also change your preferences or withdraw consent at any time via 'Your privacy choices', found in the footer of every page.

We use cookies and similar technologies for the following purposes:

Store and/or access information on a device

Personalised advertising and content, advertising and content measurement, audience research and services development

**Accept all cookies** 

Reject optional cookies

### Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 92 **partners**, also use optional cookies and similar technologies for advertising, personalisation of content, usage analysis, and social media.

By accepting optional cookies, you consent to allowing us and our partners to store and access personal data on your device, such as browsing behaviour and unique identifiers. Some third parties are outside of the European Economic Area, with varying standards of data protection. See our **privacy policy** for more information on the use of your personal data. Your consent choices apply to nature.com and applicable subdomains.

You can find further information, and change your preferences via 'Manage preferences'. You can also change your preferences or withdraw consent at any time via 'Your privacy choices', found in the footer of every page.

We use cookies and similar technologies for the following purposes:

Store and/or access information on a device

Personalised advertising and content, advertising and content measurement, audience research and services development

**Accept all cookies** 

Reject optional cookies