

[Home](#) > [Business Economics](#) > Article

# Ultra-Easy Money: Digging the Hole Deeper?

| Published: 18 October 2016

| Volume 51, pages 188–202, (2016) [Cite this article](#)



## [Business Economics](#)

[Aims and scope](#) →

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 **[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 springer.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](#)

[Manage preferences](#)

is not inadequate liquidity but excessive debt and possible insolvencies. The policy stakes are now very high.



This is a preview of subscription content, [log in via an institution](#)  to check access.

Access this article

Log in via an institution →

Subscribe and save

✓ Springer+ Basic

€32.70 /Month

Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 **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 springer.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

Manage preferences

## Notes

1. For a record of these changes, which have affected all aspects of the conduct of monetary policy, see White [[2013](#)].
2. This was the term used by Ken Rogoff in his Adam Smith presentation to NABE in 2011. See Rogoff [[2011](#)].

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 **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 springer.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**

**Manage preferences**

to essentially “unsustainable” levels in many countries.

7. There was a vigorous debate about such supply side issues in the pre-War period. See Selgin [[1997](#)].
8. Careful historical analysis indicates that the Great Depression was essentially unique in there being an association between falling prices (CPI) and a shrinking economy. See Atkeson and Kehoe [[2004](#)] and Borio and others [[2015](#)].
9. There is now a huge literature documenting earlier crises in which both the real and financial sectors have been affected. Common themes are some early piece of good news that justifies optimism, associated financial innovation, and

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 **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 springer.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**

**Manage preferences**

13. A large part of this is due to weak prices for commodities, energy in particular. However, other measures of inflation and inflationary expectations have also been weak.
14. Core inflation in the US is not much below 2 percent, and most estimates indicate the output gap is now quite small. Nevertheless, both market and survey based measures of inflationary expectations continue to decline.
15. For a fuller description of the various ways in which ultra-easy monetary policy might actually decrease consumption and investment, see White [\[2012\]](#).

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

20. Borio and others[[2015](#)] provide estimates of the magnitude of these effects. They are not trivial, amounting to one-quarter of a percentage point off growth (annually) in the upturn and double that in the subsequent downturn.
21. For example, see Hoffman [[2013](#)]. Also the extensive discussion of these issues in Eurofi [[2016](#)]. Of particular note, to the extent that low interest rates push up the deficits of corporate pension funds with defined benefits, the corporation must fill the gap. This will be a direct charge on cash flow and profits. It is hard to avoid the conclusion that this will discourage investment.
22. The return on equity for institutions designated as Systemically Important Financial Institutions (SIFIs) has fallen dramatically in recent years. The

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

balance sheet liabilities, foreigners are finding that dollar financing has become increasingly difficult. Moreover, with strong pressure from the Japanese government on Japanese financial institutions to raise returns by investing abroad, and the incentive provided by negative risk-free rates in Japan, this problem can only get worse. Other anomalies are the growing gap between corporate bond spreads in the Eurozone and CDS spreads, and the relative performance of the Nikkei and Topix in Japan. Both clearly reflect central bank asset purchases.

26. At the end of July, the Bank of Japan announced an expansion of its US dollar funding facility for Japanese banks, allowing them to roll over dollar loans for as long as four years. Presumably this was done in recognition of potential dollar funding problems and with the agreement of the Federal Reserve.

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

30. Recall the “taper tantrum” of June 2013 when Chairman Bernanke merely hinted at the possibility of a “tapering” of QE purchases in September.
31. From 2009 to 2015 Q3, U.S. dollar denominated debt owed by non-bank borrowers outside the U.S. rose about 50 percent to \$9.8 trillion. It doubled to non-bank borrowers in EMEs to \$3.3 trillion. See Bank for International Settlements [[2016](#), pp. 12–13].
32. In August of 2016, the IMF’s Article 4 review of China gave a stark warning about the quality of credit in China. See also Blundell-Wignal and Roulet [[2014](#)] who note that much of the EME borrowing has arisen in industrial sectors where the rate of return on capital has been falling in recent years.

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)



FOMC's decision in September 2015 not to raise the policy rate. However, members of the FOMC at the time emphasized that this was not done in China's interests, but due to the associated knock on effects (perhaps aggravated by associated slowdowns elsewhere) on the United States itself. International concerns seemed off the table when the FOMC raised the policy rate in December, but seemed to return around the time of the Brexit vote in June of this year.

38. Central banks are part of government. Therefore, when central banks buy longer-term government debt with central bank liabilities, they are essentially replacing the government's longer-term, fixed rate obligations with short-term debt which tends to have a much lower rate of interest. Indeed, in some countries that rate is now negative. Accordingly, exit from QE will increase government deficits. So too will raising policy rates.

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

42. In both Japan and the Eurozone, massive increases in the base money provided by central banks have not led to significant increases in broad money. This is because the central bank purchases of debt have largely come out of the portfolios of banks. A “tipping point” for expectations could possibly arise when nonbanks begin to sell bonds in exchange for central bank money and measures of broad money do finally begin to increase.
43. When the Fed raised rates in December, long rates did not rise but fell. This is more consistent with Risk-Off behavior and market anticipations of slower growth not faster growth. Similarly, when the BOJ introduced negative policy rates in January of this year, the Yen rose (Risk Off) rather than fall. As a further sign of decreasing confidence, in only one week in August, the Financial Times had three major op ed pieces by respected observers (Amar Bhidé, Bill Gross and Eric Lonergan) all expressing views similar to those

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

800 general elections. They argue in their Abstract that “Our key finding is that policy uncertainty rises strongly after financial crises as government majorities shrink and polarization rises. After a crisis, voters seem to be particularly attracted to the political rhetoric of the extreme right, which often attributes blame to minorities or foreigners.” Normal business cycle downturns do not have the same political consequences.

## References

Atkeson, Andrew and Patrick J. Kehoe. 2004. “Deflation and Depression: Is There an Empirical Link?” *American Economic Review*, 94(2): 99–103

[Article](#) [Google Scholar](#)

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 **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 springer.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](#)

[Manage preferences](#)

Blundell-Wignal, Adrian and Carolin Roulet. 2014. "Stagnation Hypotheses: What do Company Data on Infrastructure and Other Investments in the Global Economy Tell Us?" *Committee on Financial Markets*, OECD.

Borio, Claudio and William R. White. 2003. "Whither Monetary and Financial Stability: The Implications of Evolving Policy Regimes?" In *Monetary Policy and Uncertainty: Adapting to a Changing Economy*. Federal Reserve Bank of Kansas City.

Borio, Claudio, Piti Disyatat and Mikael Juselius. 2013. "Rethinking Potential Output: Embodying Information about the Financial Cycle" *BIS Working Papers 404*. Bank for International Settlements.

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

Domanski, Dietrich, Michela Scatigna and Anna Zabai. 2016. “Wealth Inequality and Monetary Poicy.” *BIS Quarterly Review*, March.

Eurofi. 2016. “Summary of Discussions: Resilience, Digitalisation, Growth Challenges” *The Eurofi High Level Seminar*, April 21–22.

Fahr, Stephan, Roberto Motto, Massimo Rostagno, Frank Smets and Oreste Tristani. 2011. “Lessons for Monetary Policy Strategies from the Recent Past” In *Approaches to Monetary Policy Revisited—Lessons from the Crisis*, edited by M Marek Jarociński, and Christian Thimann, European Central Bank.

Financial Stability Board. 2016. “FSB Publishes Further Guidance on Resolution Planning and Fifth Report to the G20 on Progress in Resolution.” Press release,

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

Hoffman, Daniel M. 2013. “The Poisonous Prescription of Low Interest rates—Were Banks Rescued at the Expense of the Insurance Industry?” *Insurance Economics* No 68.

Kindelberger, Charles P. and Robert Z. Aliber. 2005. *Manias, Panics and Crashes*, 5th edn. Palgrave-Macmillan.

Koo, Richard. 2003. *Balance Sheet Recession*. Wiley.

Marriage, Madison. 2016. “Passive Funds Take Third of US Market,” *FTfm*, September 12.

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

Phelps, Edmund S. 1968. "Money Wage Dynamics and Labor Market Equilibrium." *Journal of Political Economy*, 76(4 (Part 2)): 678–711.

[Article](#) [Google Scholar](#)

Reinhart, Carmen M., Kenneth S. Rogoff. 2009. *This Time is Different: Eight Centuries of Financial Folly*. Princeton University Press.

Reinhart, Carmen M. and Kenneth S. Rogoff. 2013. "Financial and Sovereign Debt Crises: Some Lessons Learned and Those Forgotten" *International Monetary Fund Working Paper* 266.

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 **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 springer.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](#)

[Manage preferences](#)

Schularik, Moritz and Taylor, Alan. 2012. "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises 1870–2008." *American Economic Review*, 102(2): 1029–1061.

[Article](#) [Google Scholar](#)

Selgin, George R. 1997. "Less than Zero: The Case for a Falling Price level in a Growing Economy" *IEA Hobart paper No 132*, Institute of Economic Affairs.

Shin, Hyun Song. 2011. "Global Liquidity" Remarks at an IMF Conference on "Macro and Growth Policies in the Wake of the Crisis," March 7–8.

Tarashev, Nikola, Stefan Avdjiev and Ben Cohen. 2016. "International Capital

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)



White, William R., 2013. “Is Monetary Policy a Science? The Interaction of Theory and Practice over the Last 50 Years.” In *50 Years of Money and Finance: Lessons and Challenges*”, *SUERF 50<sup>th</sup> Anniversary Volume*, edited by Morten Balling and Ernest Gnan. Larcier.

White, William R., 2015. “How False Beliefs about Exchange rate Systems Threaten Global Growth and the Existence of the Eurozone.” In *The Political Economy of the Eurozone*. Cambridge University Press, forthcoming. Also available as *Federal Reserve Bank of Dallas Globalization and Monetary Policy Institute Working Paper 250*.

Wicksell, Knut. 1936. Interest and Prices. First published as *Geldzins and Guiterpreise* in 1898. Macmillan.

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)

# Rights and permissions

[Reprints and permissions](#)

## About this article

### Cite this article

White, W.R. Ultra-Easy Money: Digging the Hole Deeper?. *Bus Econ* **51**, 188–202 (2016).

<https://doi.org/10.1057/s11369-016-0012-2>

Published

18 October 2016

Issue Date

October 2016

DOI

<https://doi.org/10.1057/s11369-016-0012-2>

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 **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 [springer.com](https://www.springer.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](#)

[Manage preferences](#)

## Your privacy, your choice

We use essential cookies to make sure the site can function. We, and our 96 [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 [springer.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](#)

[Manage preferences](#)