

What are Quantitative Skills?

Royal Geographical Society
with IBG

Advancing geography and geographical learning

Richard Harris

School of Geographical Sciences
University of Bristol
rich.harris@bris.ac.uk



U466a
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GCSE and A level Geography 2016

What are quantitative skills?

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- They are fundamental part of what it means to do geography and be a geographer



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- They help us to explore and to explain geographical outcomes and processes



What are quantitative skills not?

- Limited to physical geography and primary data collection in the field



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What are quantitative skills not?

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- A pseudonym for statistical tests from the last century of uncertain relevance to non-random 'samples' of data 😊

$\chi^2 = 13.9$ (p = 0.016)

	# English LAs	% LAs	# greater share Leave	Expected number
Urban, major conurbation	75	23.0	33	56.8
Urban, minor conurbation	9	2.76	7	6.82
Urban with city/town	97	29.8	78	73.5
Urban with significant rural	54	16.6	46	40.9
Largely rural	41	12.6	36	31.1
Mainly rural	50	15.3	47	37.9
	326	100	247	247

$$\chi^2 = 13.9 \quad (p = 0.016)$$

	# English LAs	% LAs	# greater share Leave	Expected number
Urban, major conurbation	75	23.0	33	56.8
Urban, minor conurbation	9	2.76	7	6.82
Urban, significant				
Largely rural	41	12.6	36	31.1
Mainly rural	50	15.3	47	37.9
	326	100	247	247

“Chi-square is something taught to geographers at school and misunderstood thereafter!” (Crawley, 2007)

Percentages are easier

	# English LAs		# greater share Leave	% of group
Urban, major conurbation	75		33	44.0
Urban, minor conurbation	9		7	77.8
Urban with city/town	97		78	80.4
Urban with significant rural	54		46	85.2
Mainly rural	41		36	87.8
Largely rural	50		47	94.0
	326		247	

What are quantitative skills?

Europe referendum 1975 v 2016

1975

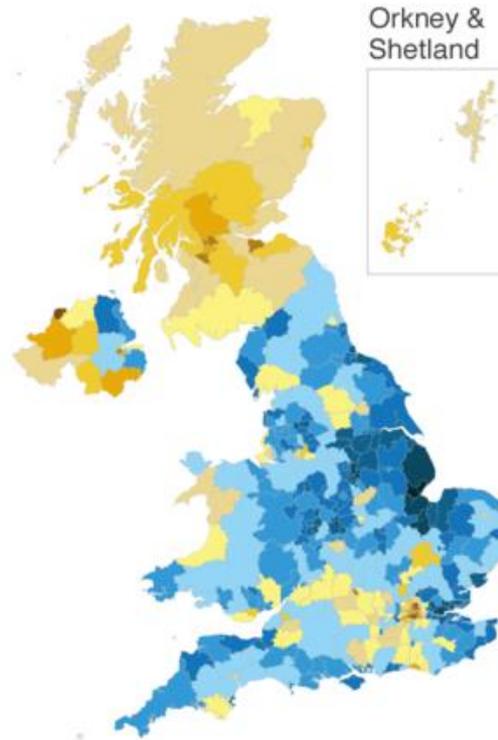
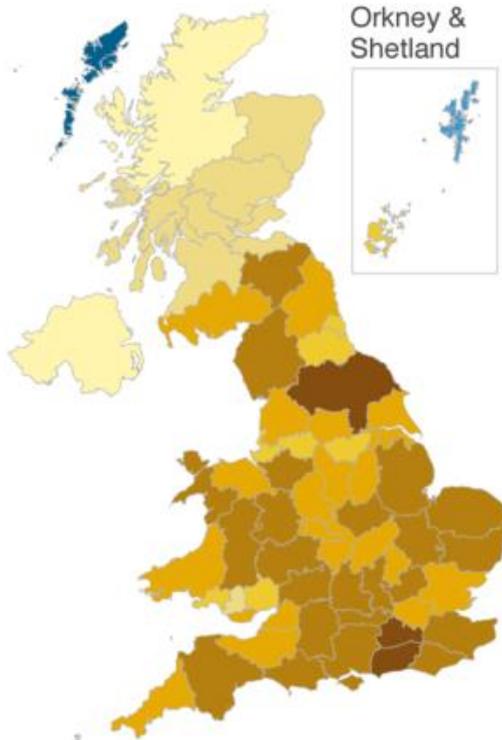
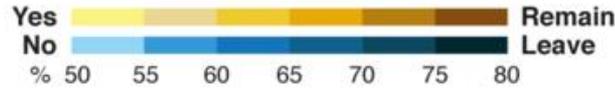
Question asked: "Do you think the UK should stay in the European Community (Common Market)?"

2016

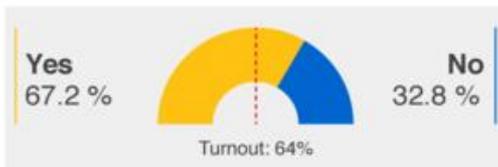
Question asked: "Should the UK remain a member of the European Union or leave the European Union?"



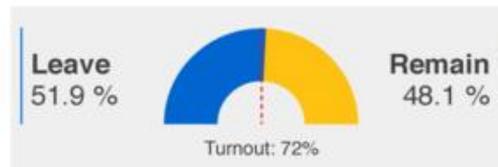
Winning side in area and vote share



Results



Results



<http://www.bbc.co.uk/news/uk-politics-36616028>

What are quantitative skills?

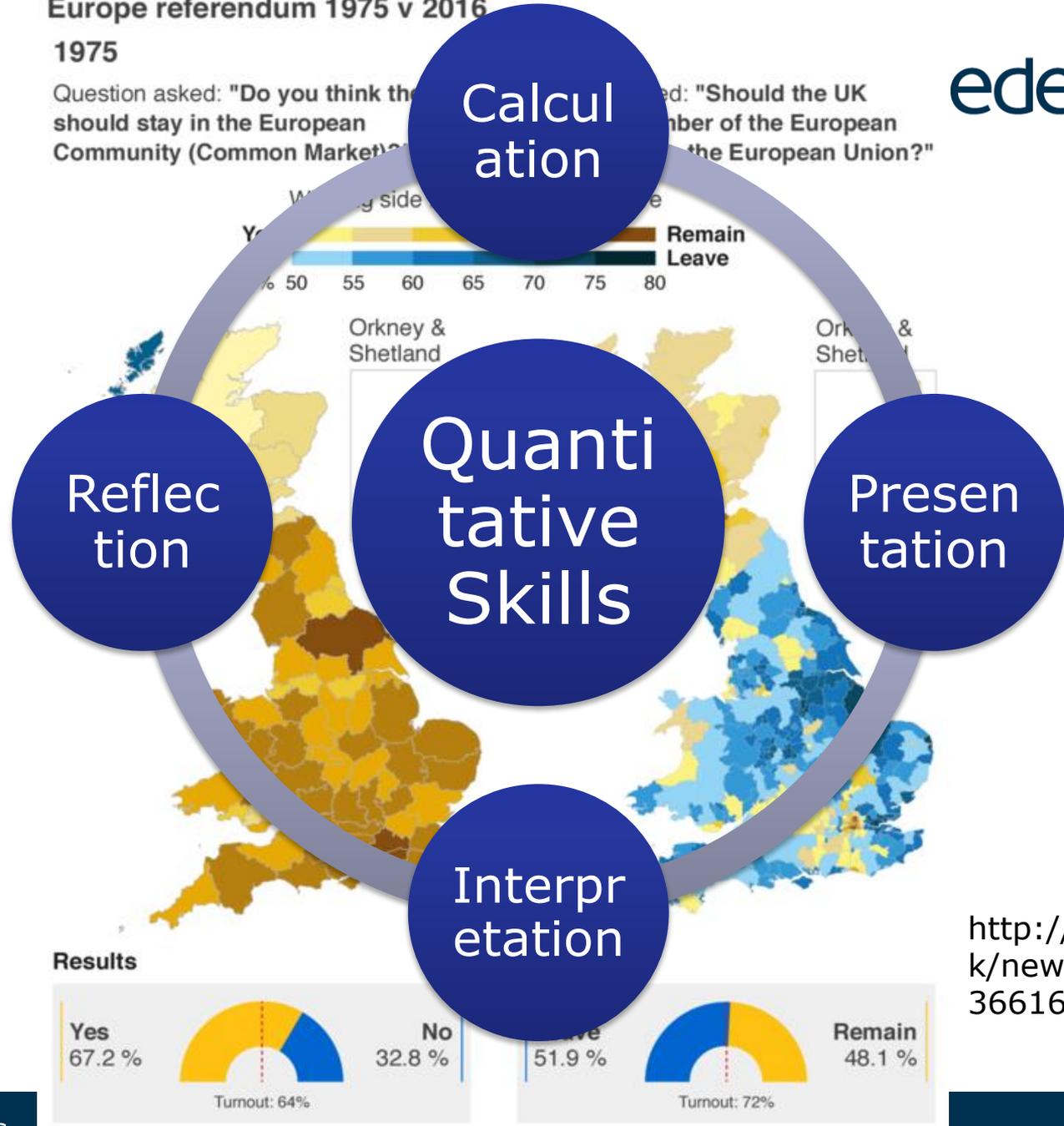
Europe referendum 1975 v 2016

1975

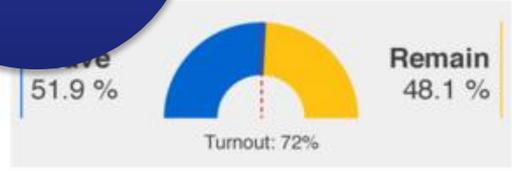
Question asked: "Do you think the UK should stay in the European Community (Common Market)?"

Calculation

Question asked: "Should the UK remain a member of the European Union?"



Results

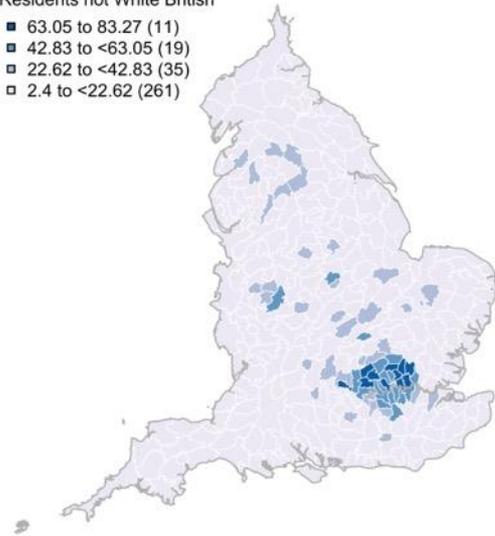


<http://www.bbc.co.uk/news/uk-politics-36616028>

(a) Equal interval classification

% Residents not White British

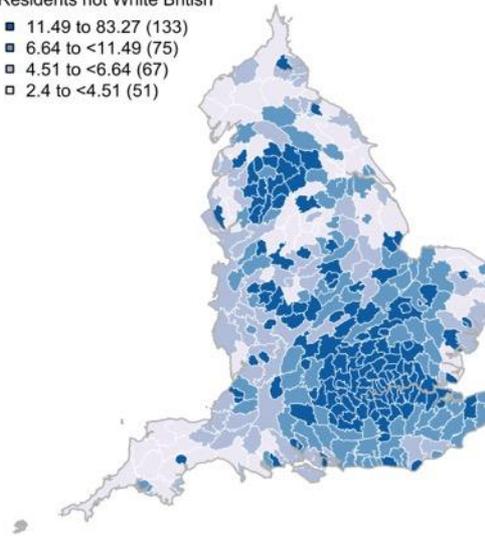
- 63.05 to 83.27 (11)
- 42.83 to <63.05 (19)
- 22.62 to <42.83 (35)
- 2.4 to <22.62 (261)



(b) Equal area classification

% Residents not White British

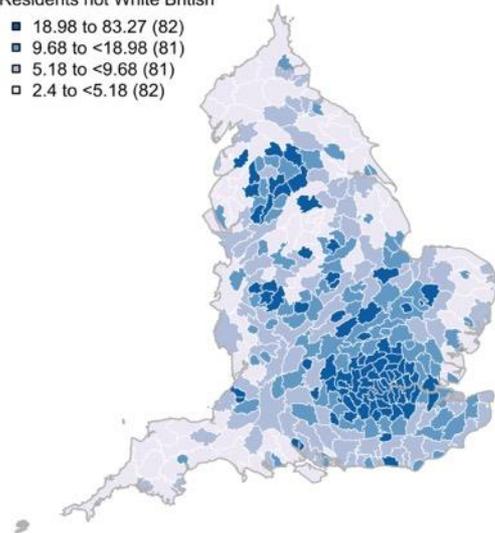
- 11.49 to 83.27 (133)
- 6.64 to <11.49 (75)
- 4.51 to <6.64 (67)
- 2.4 to <4.51 (51)



(c) Quantile classification

% Residents not White British

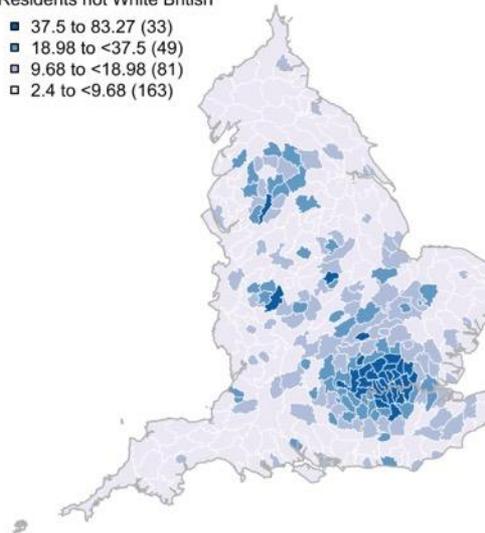
- 18.98 to 83.27 (82)
- 9.68 to <18.98 (81)
- 5.18 to <9.68 (81)
- 2.4 to <5.18 (82)



(d) Manual classification

% Residents not White British

- 37.5 to 83.27 (33)
- 18.98 to <37.5 (49)
- 9.68 to <18.98 (81)
- 2.4 to <9.68 (163)



**Which
of these
maps is
correct?**

Demystifying!

<http://www.independent.co.uk/news/business/analysis-and-features/does-the-treasurys-brex-it-equation-stand-up-to-scrutiny-a6989356.html>

$$(A.1) \quad \ln(T_{ijt}) = \alpha_{ij} + \gamma_t + \alpha_1 \ln(Y_{it} * Y_{jt}) + \alpha_2 \ln(POP_{it} * POP_{jt}) + \alpha_3 \ln(DIST_{ij}) + \alpha_4 COMLANG_{ij} + \alpha_5 COLONY_{ij} + \alpha_6 BORDER_{ij} + \varepsilon_{ijt} \\ = \alpha_{ij} + \gamma_t + \alpha X_{ijt} + \varepsilon_{ijt}$$

$$(A.2) \quad \ln(T_{ijt}) = \alpha_{ij} + \gamma_t + \alpha_1 \ln(Y_{it} * Y_{jt}) + \alpha_2 \ln(POP_{it} * POP_{jt}) + \varepsilon_{ijt} \\ = \alpha_{ij} + \gamma_t + \alpha X_{ijt} + \varepsilon_{ijt}$$

$$(A.3) \quad \ln(T_{ijt}) = \alpha_{ij} + \alpha X_{ijt} + \beta_1 EU2_{ijt} + \beta_2 EU1_{ijt} + \beta_3 EEA_{ijt} + \beta_4 FTA_{ijt} + \varepsilon_{ijt}$$

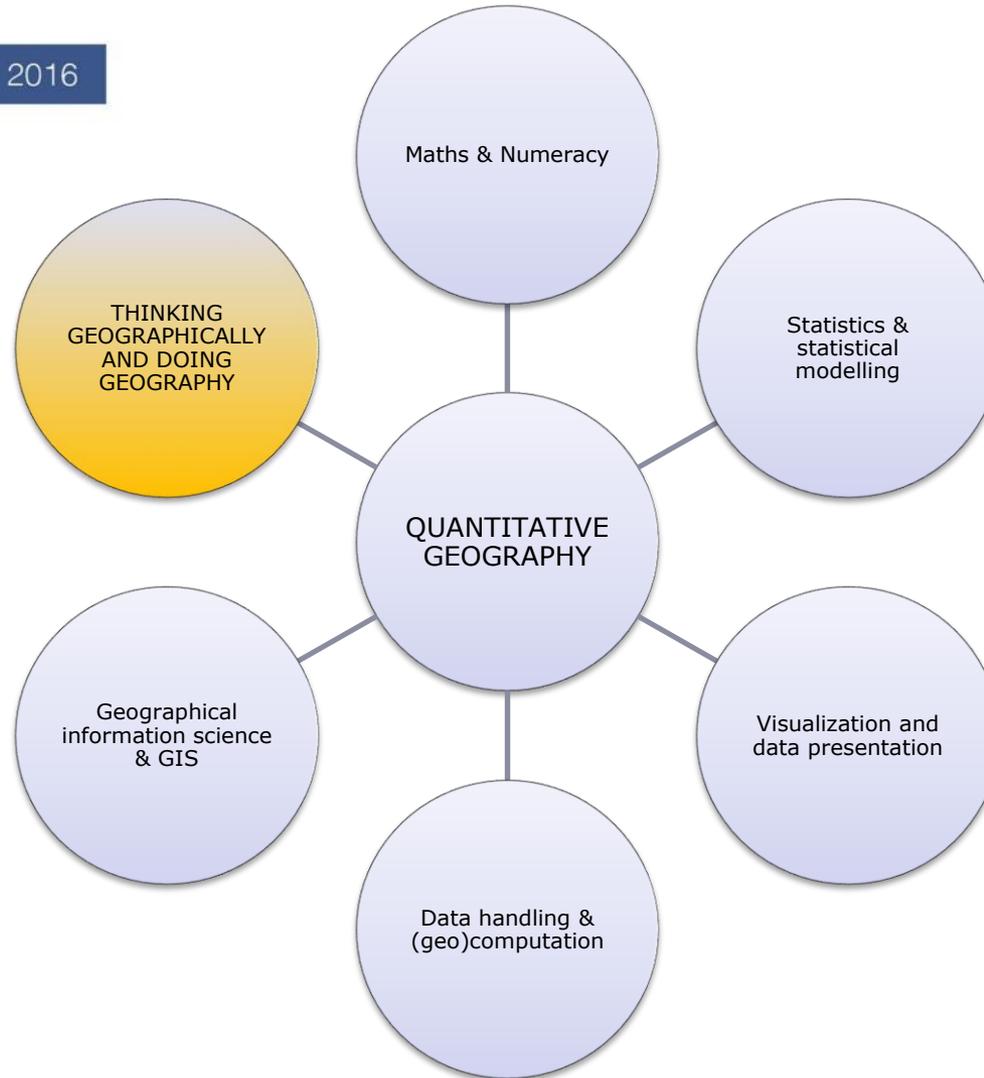
$$(A.4) \quad x_{ij} = \frac{y_i y_j}{y^w} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma}$$

$$\ln(T_{ijt}) = \alpha X_{ijt} + \beta_1 NTB_{ijt} + \beta_2 Tariff_{ijt} + \varepsilon_{ijt}$$

$$(A.5) \quad \ln(IFDI_{ijt}) = \alpha_{ij} + \alpha_1 \ln(Y_{it}) + \alpha_2 \ln(Y_{jt}) + \alpha_3 \ln(DIST_{ij}) + \alpha_4 POP_{it} + \alpha_5 POP_{jt} + \alpha_6 COMLANG_{ij} + \alpha_7 COLONY_{ij} + \alpha_8 BORDER_{ij} + \alpha_9 EMU2_{ijt} + \alpha_{10} EMU1_{ijt} + \varepsilon_{ijt} \\ = \alpha_{ij} + \alpha X_{ijt} + \varepsilon_{ijt}$$

$$(A.6) \quad \ln(IFDI_{ijt}) = \alpha_{ij} + \alpha_1 \ln(Y_{jt}) + \alpha_2 \ln(Y_{it}) + \alpha_3 POP_{it} + \alpha_4 POP_{jt} + \alpha_5 EMU2_{ijt} + \alpha_6 EMU1_{ijt} + \varepsilon_{ijt} \\ = \alpha_{ij} + \alpha X_{ijt} + \varepsilon_{ijt}$$

$$(A.7) \quad \ln(IFDI_{ijt}) = \alpha_{ij} + \alpha X_{ijt} + \beta_1 EU2_{ijt} + \beta_2 EUM_{ijt} + \beta_3 FTA_t + \varepsilon_{ijt}$$





- And it's easier than it's often portrayed
- 'Cheap geography', see

<http://www.rgs.org/NR/rdonlyres/9A5CB6C8-CDE5-47AA-9577-0C7FA7765987/0/WhytheFutureofGeographyisCheap.pdf>



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- Telling stories with data...



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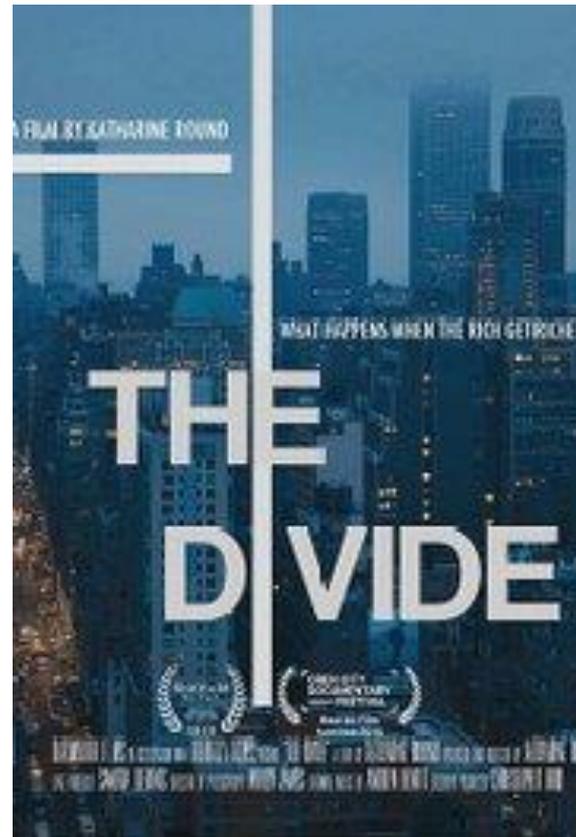
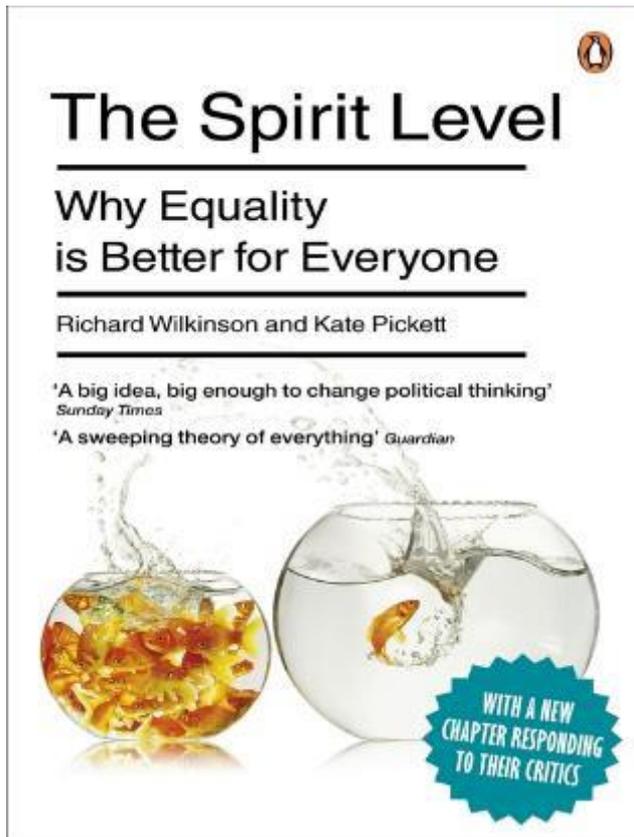
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- But some stories are better told than others

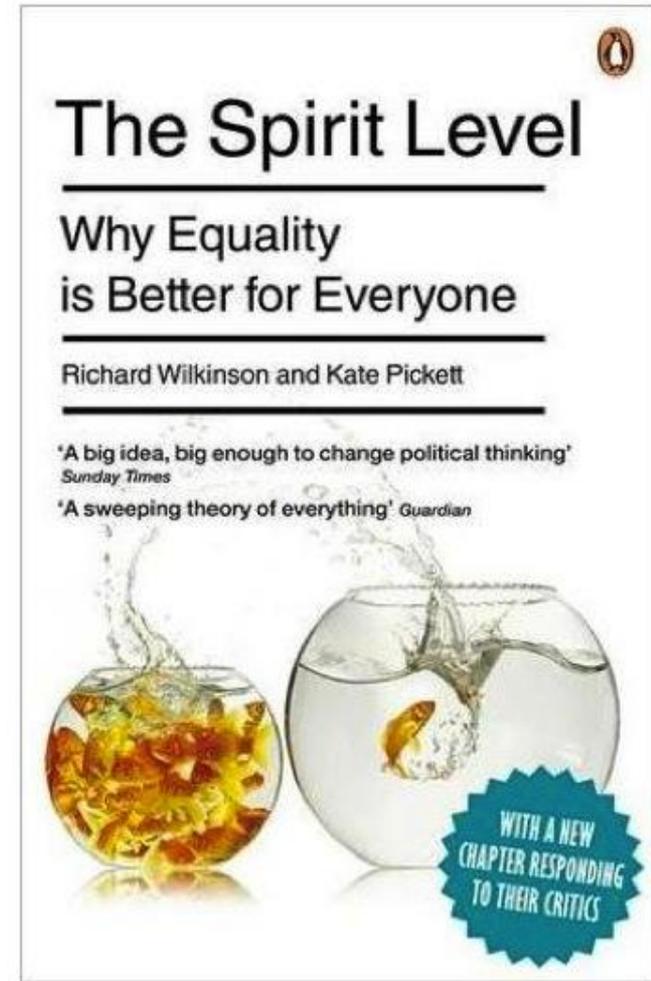


For example



Introduction

- This PowerPoint file contains 35 of the more important graphs shown on The Equality Trust website at www.equalitytrust.org.uk
- The graphs are also published in the book by Richard Wilkinson and Kate Pickett, *The Spirit Level: Why Equality is Better for Everyone* (Penguin, 2010).
- We hope you will use them in talks, lectures or discussion groups to help increase people's understanding of the effects of inequality.
- These slides are provided on condition that you acknowledge their source.
- We strongly recommend that you use them in conjunction with the book, which explains the relationships shown in the graphs.



Donations

The Equality Trust is working hard to build a better society, by gaining a wider public understanding of the damaging effects of large inequalities of income and wealth. Together we can build support for policies to reduce them.

As these slides represent many years of work and thought, we would be very grateful for donations to help The Equality Trust continue its work.

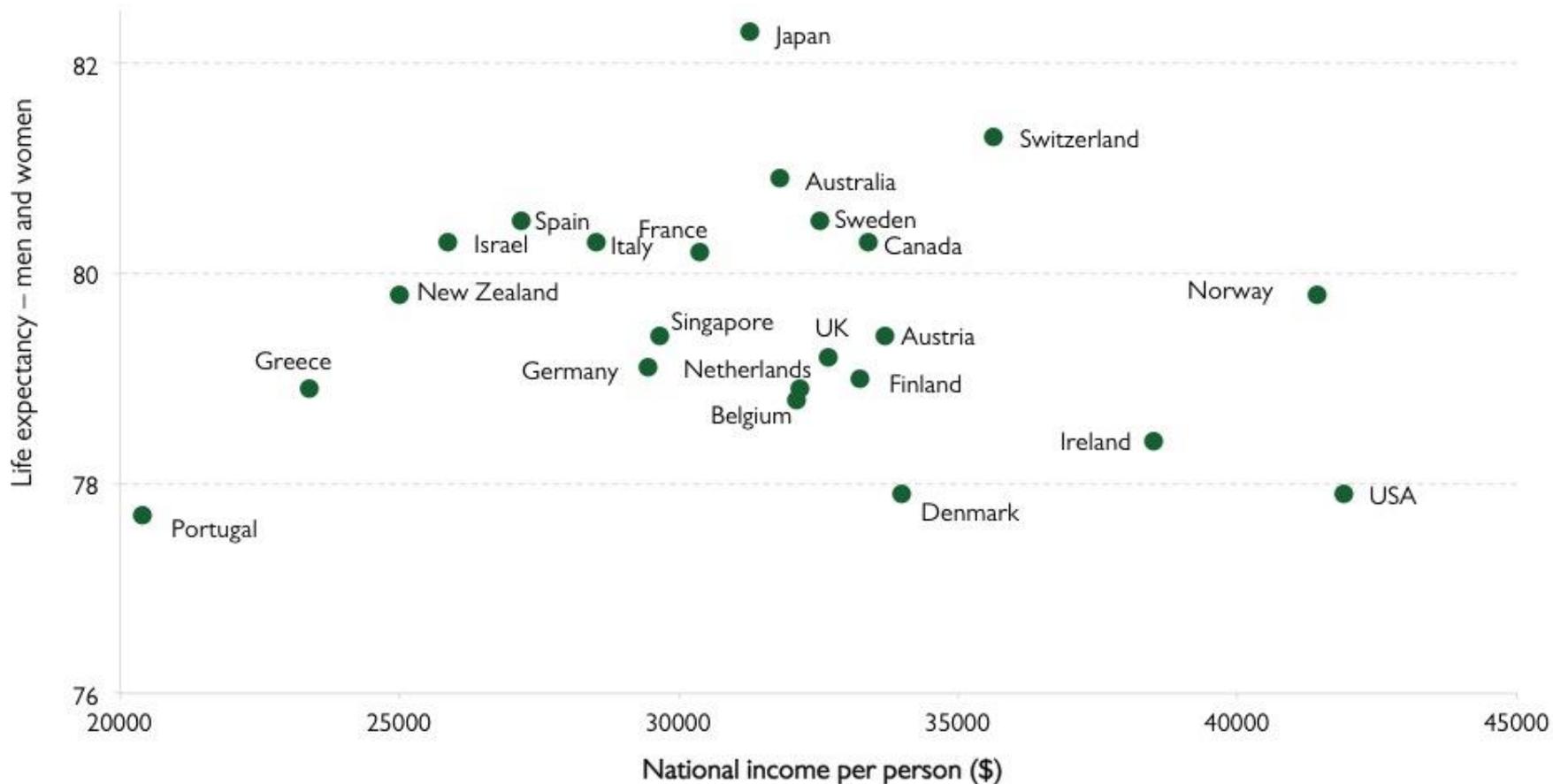
As an independent, not-for-profit organisation, our work depends on generous donations from individuals and trusts which share our vision.

You can donate in two ways:

- Use PayPal to donate online at www.equalitytrust.org.uk
- Send a cheque payable to **The Equality Trust, 32-36 Loman Street, London SE1 0EH, UK**

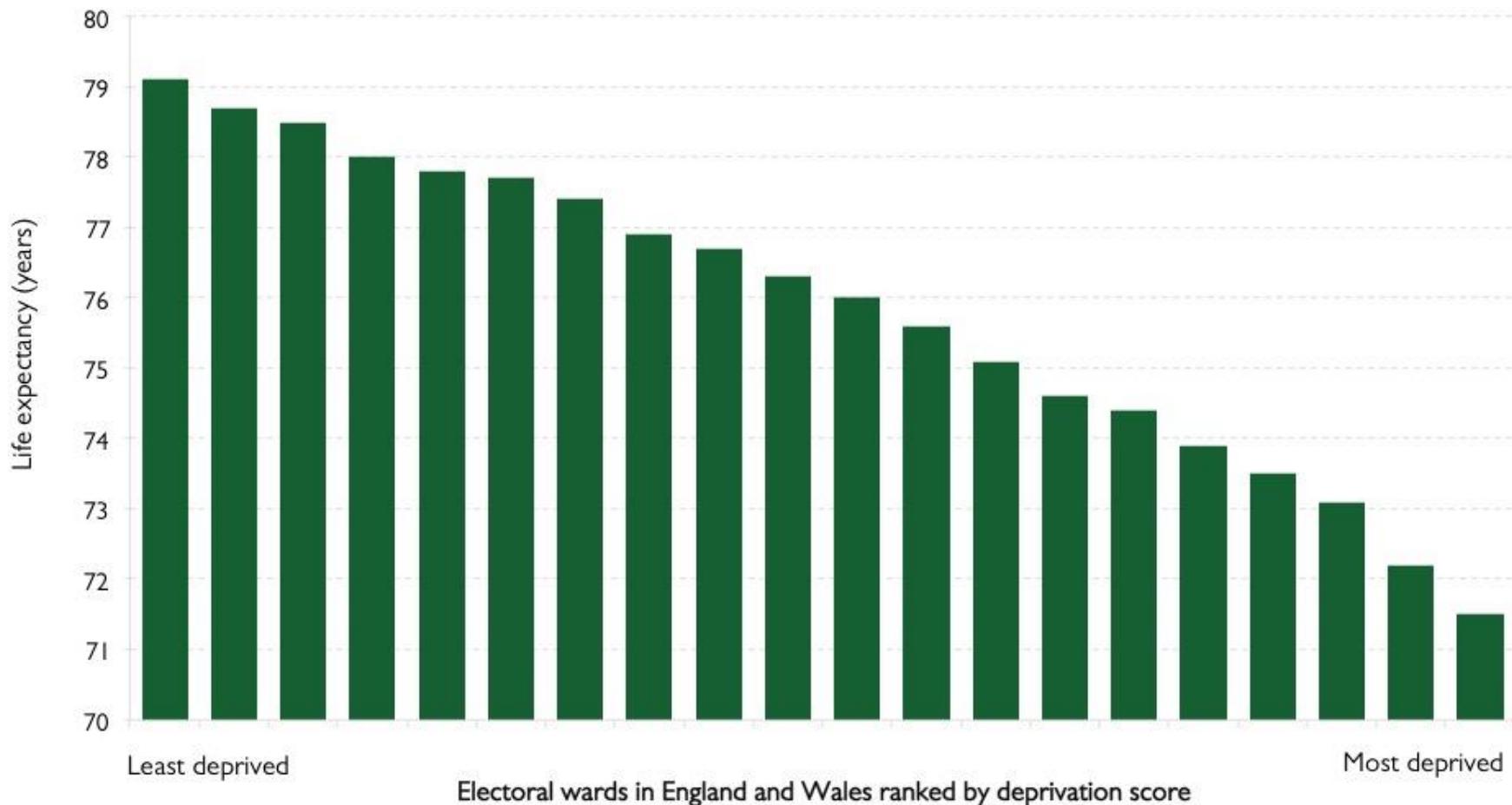
Health is related to income differences *within* rich societies but not to those *between* them

Between (rich) societies

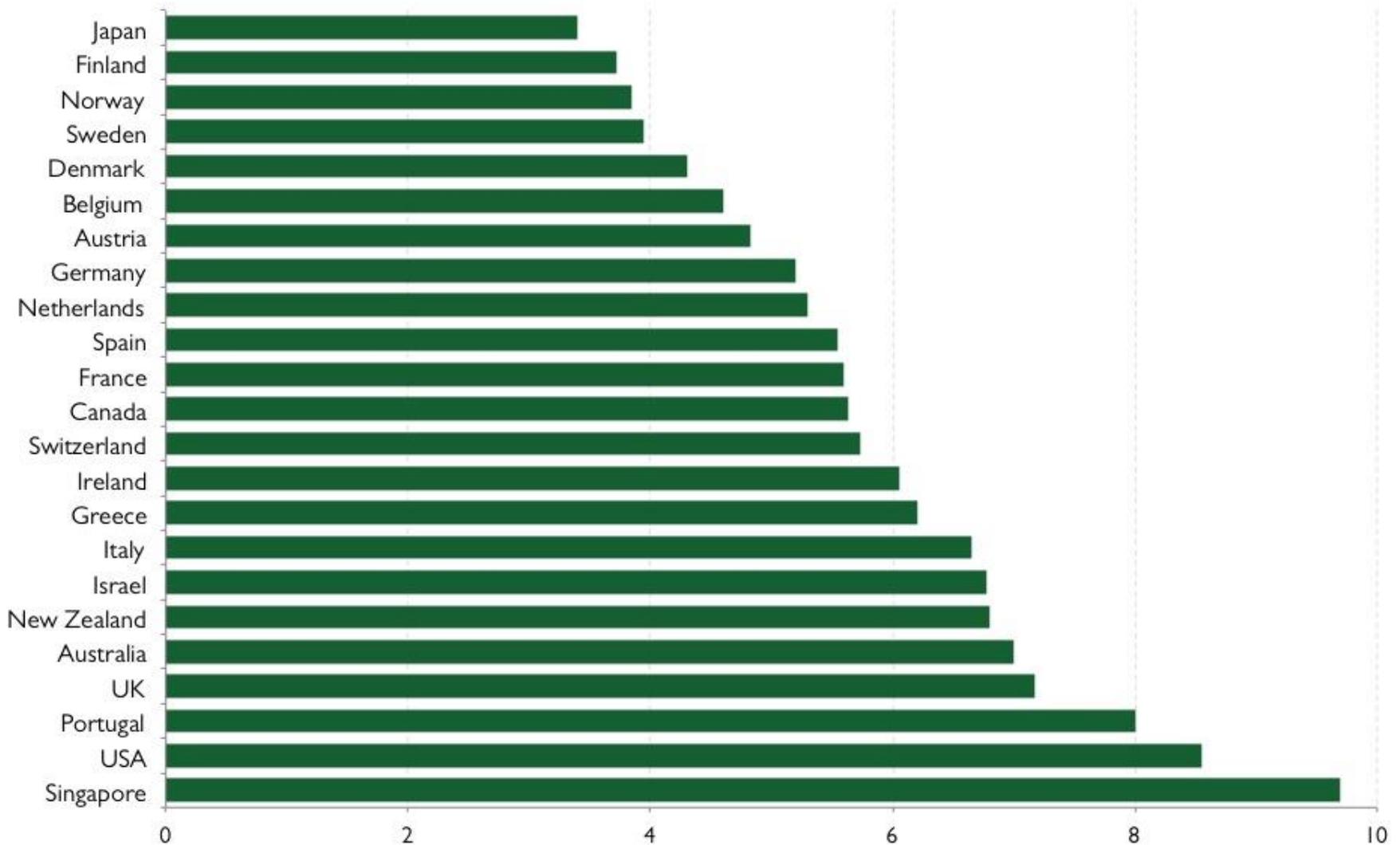


Health is related to income differences *within* rich societies but not to those *between* them

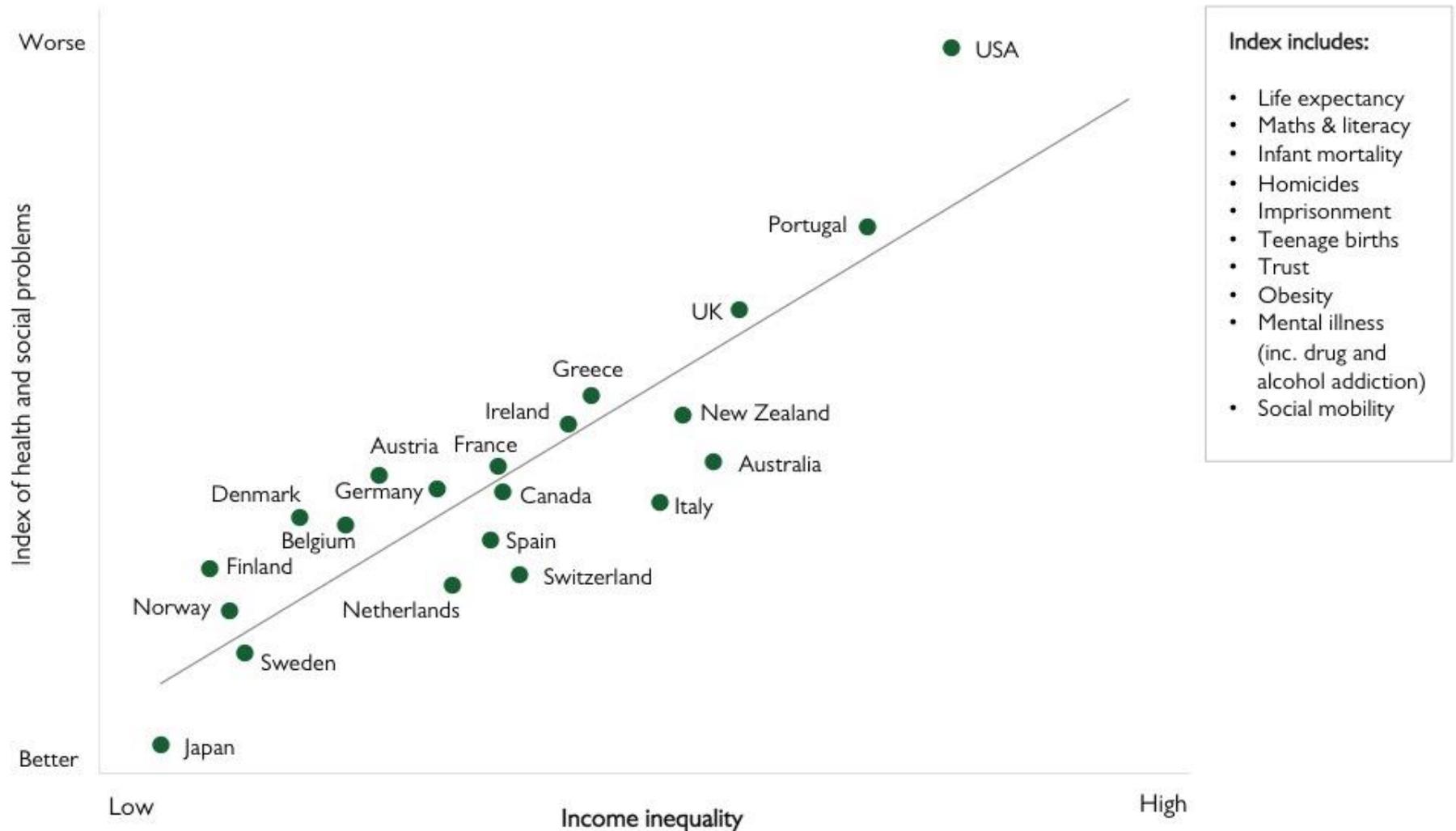
Within societies



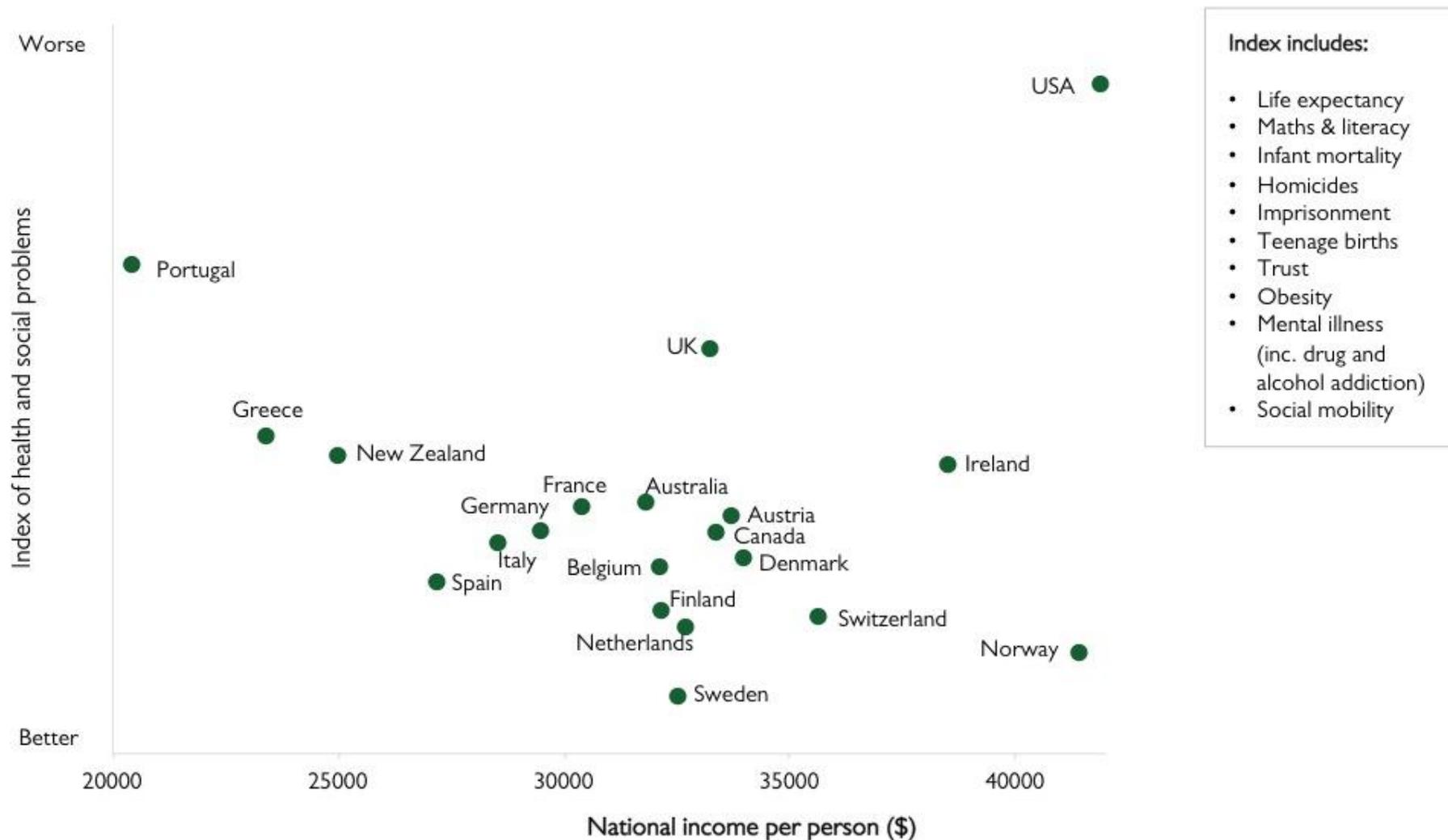
How much richer are the richest 20% than the poorest 20%?



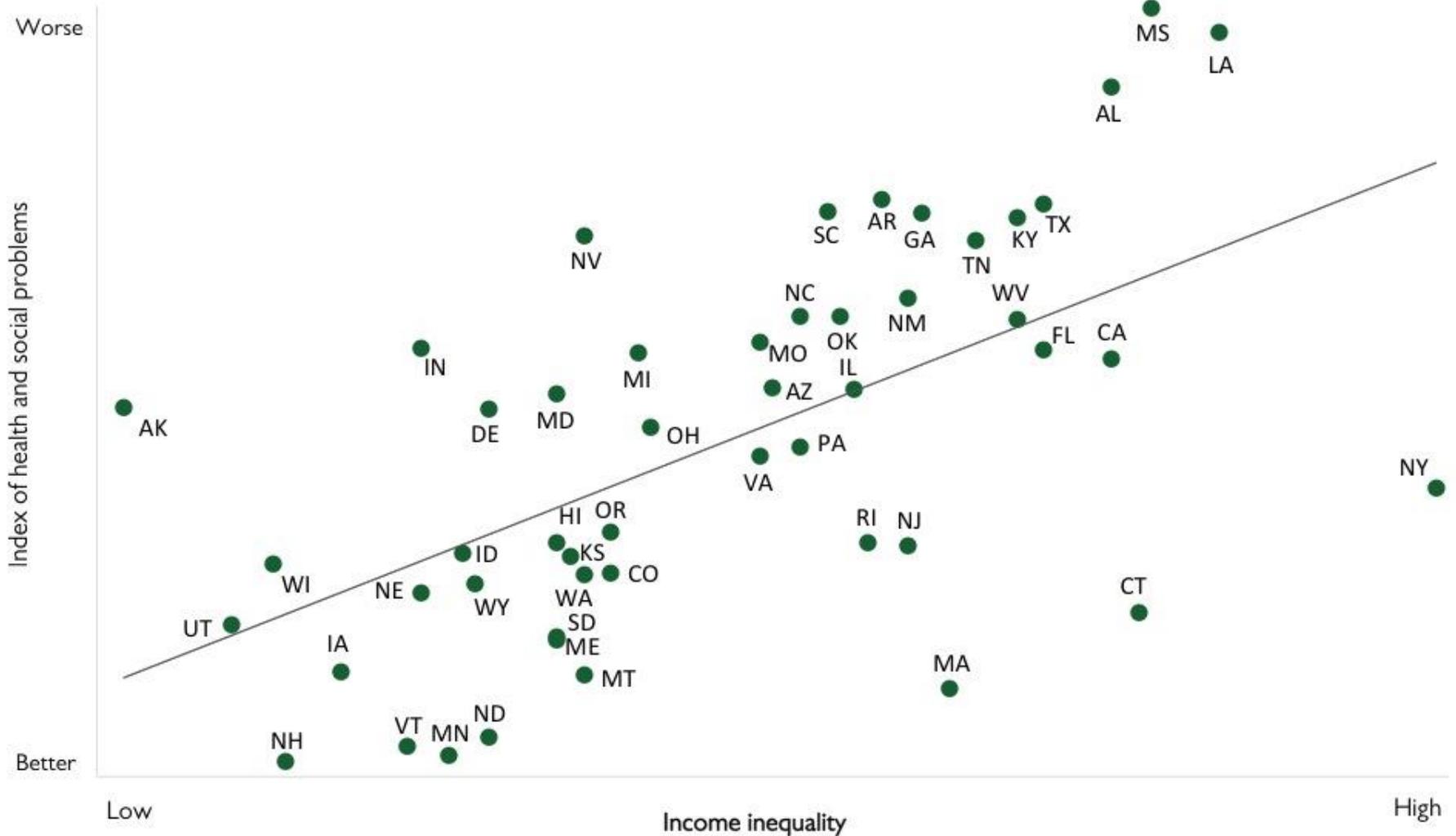
Health and social problems are worse in more unequal countries



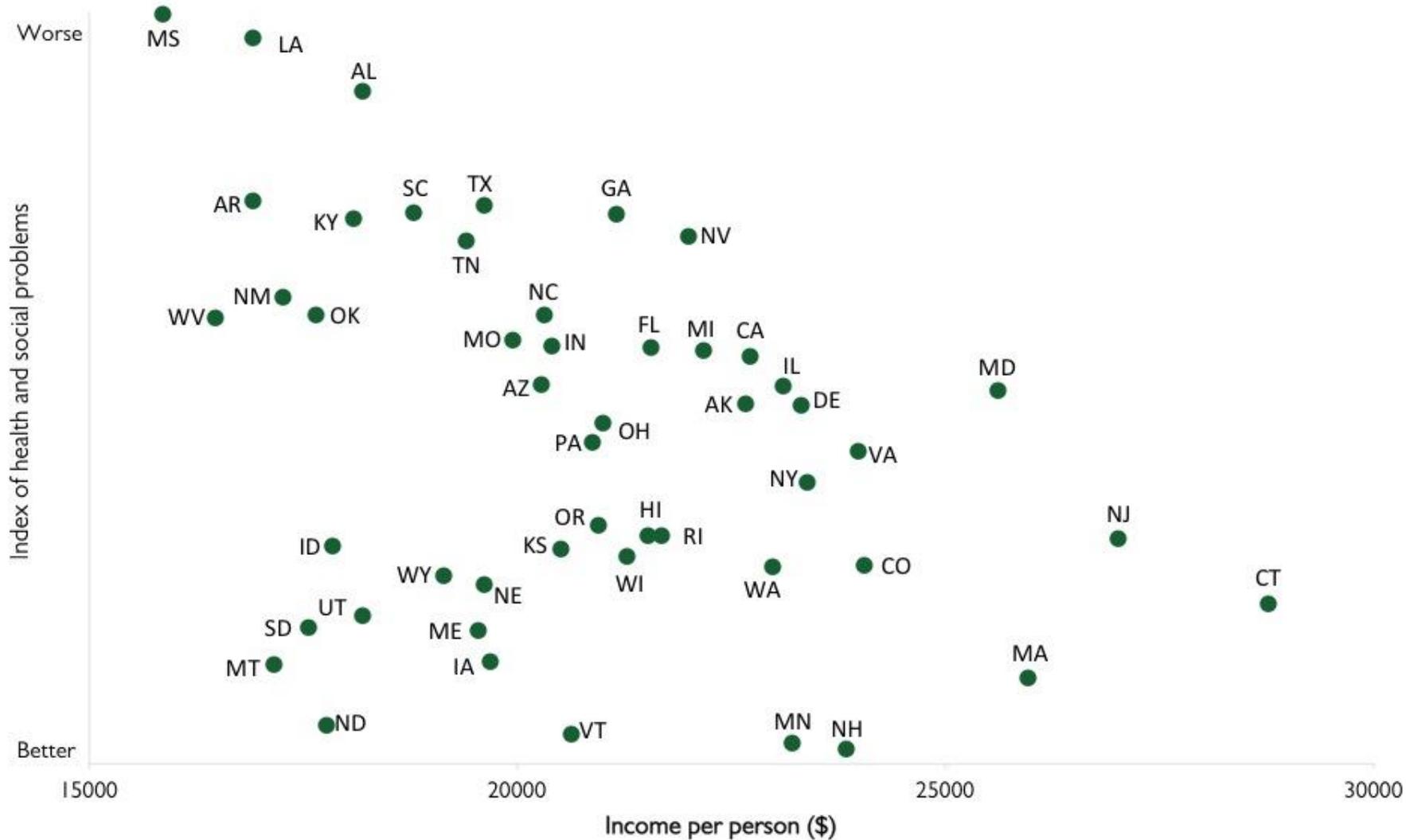
Health and social problems are not related to average income in rich countries



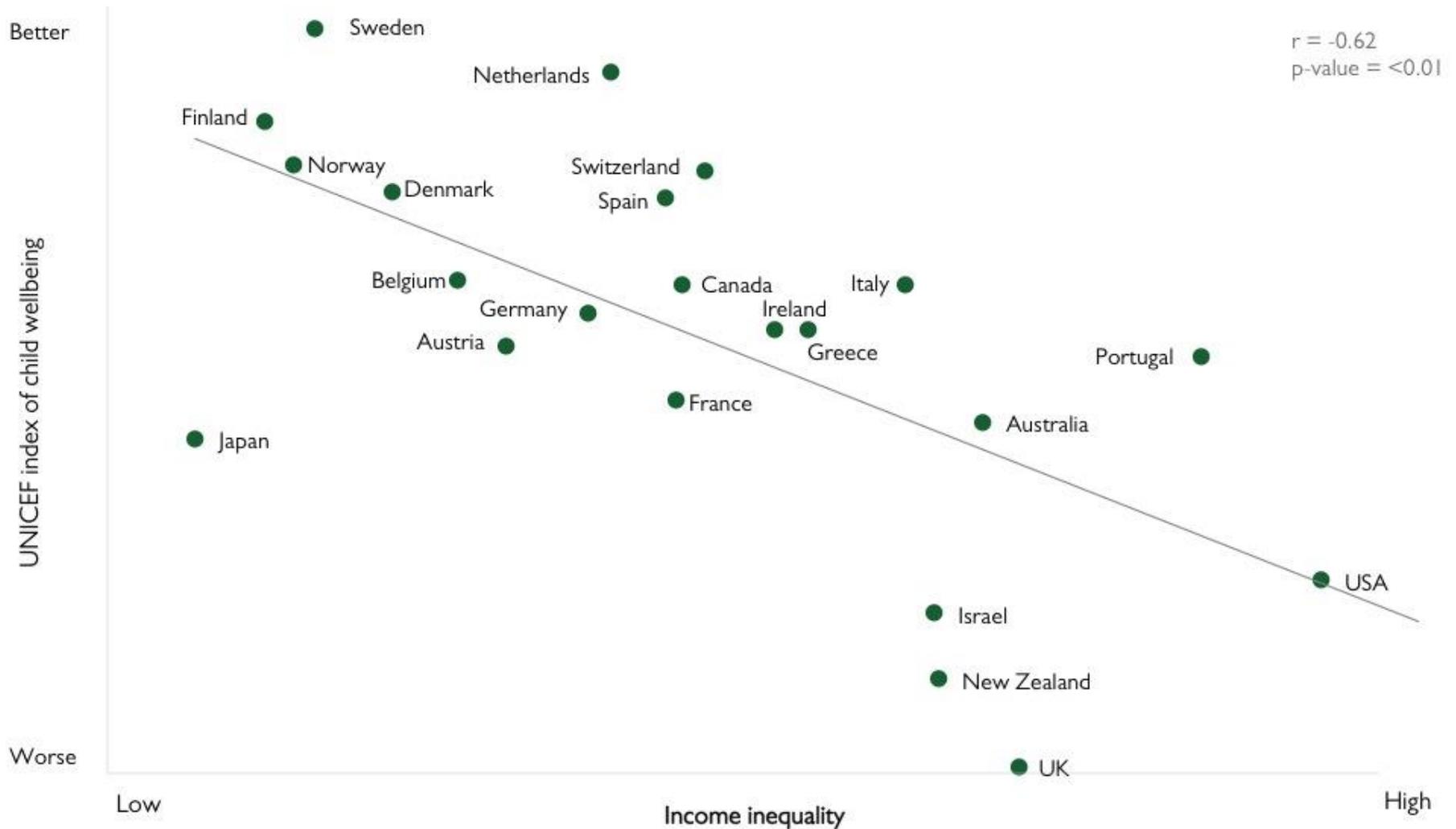
Health and social problems are worse in more unequal US states



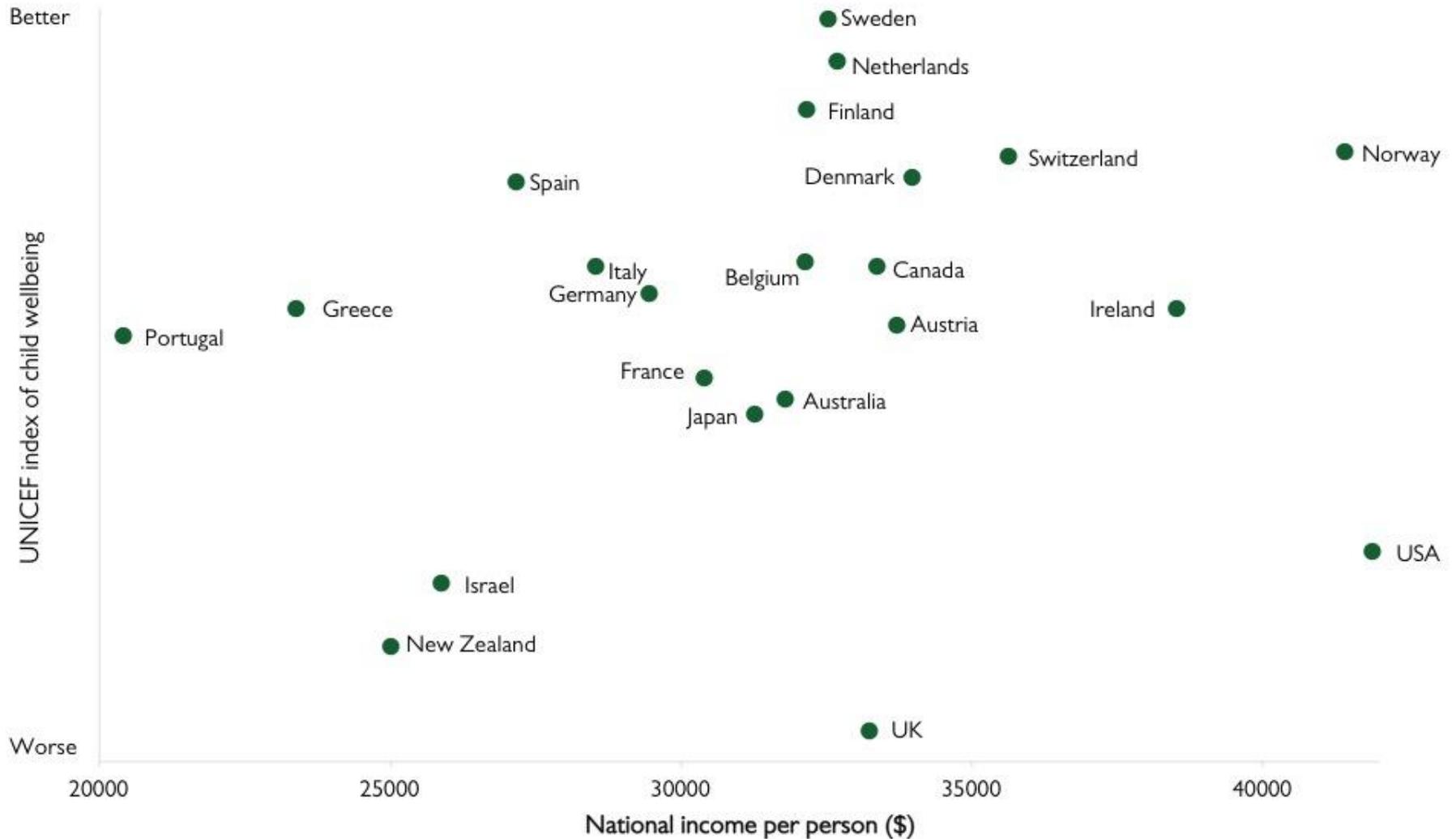
Health and social problems are only weakly related to average income in US states



Child wellbeing is better in more equal rich countries

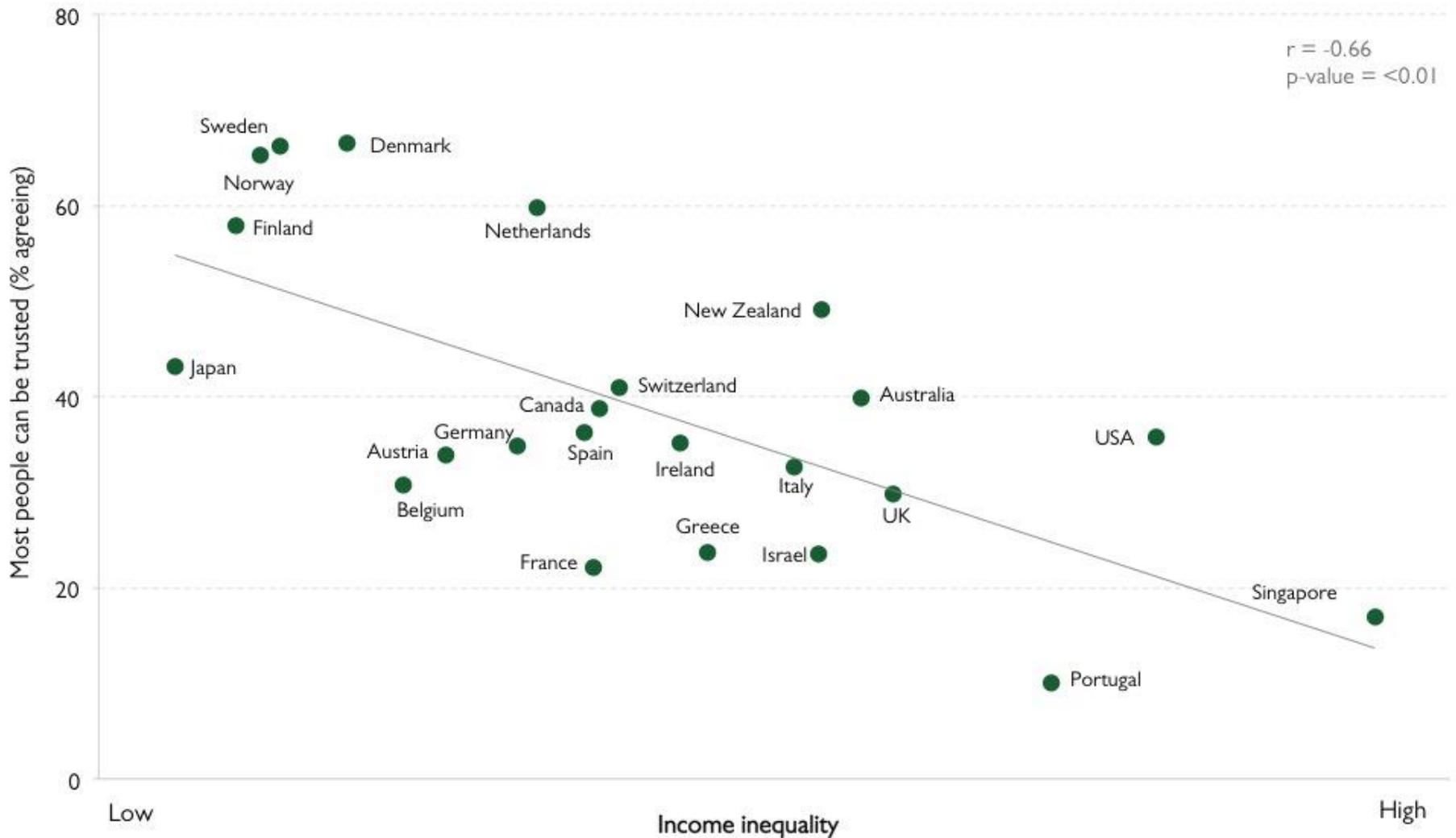


Child wellbeing is unrelated to average incomes in rich countries

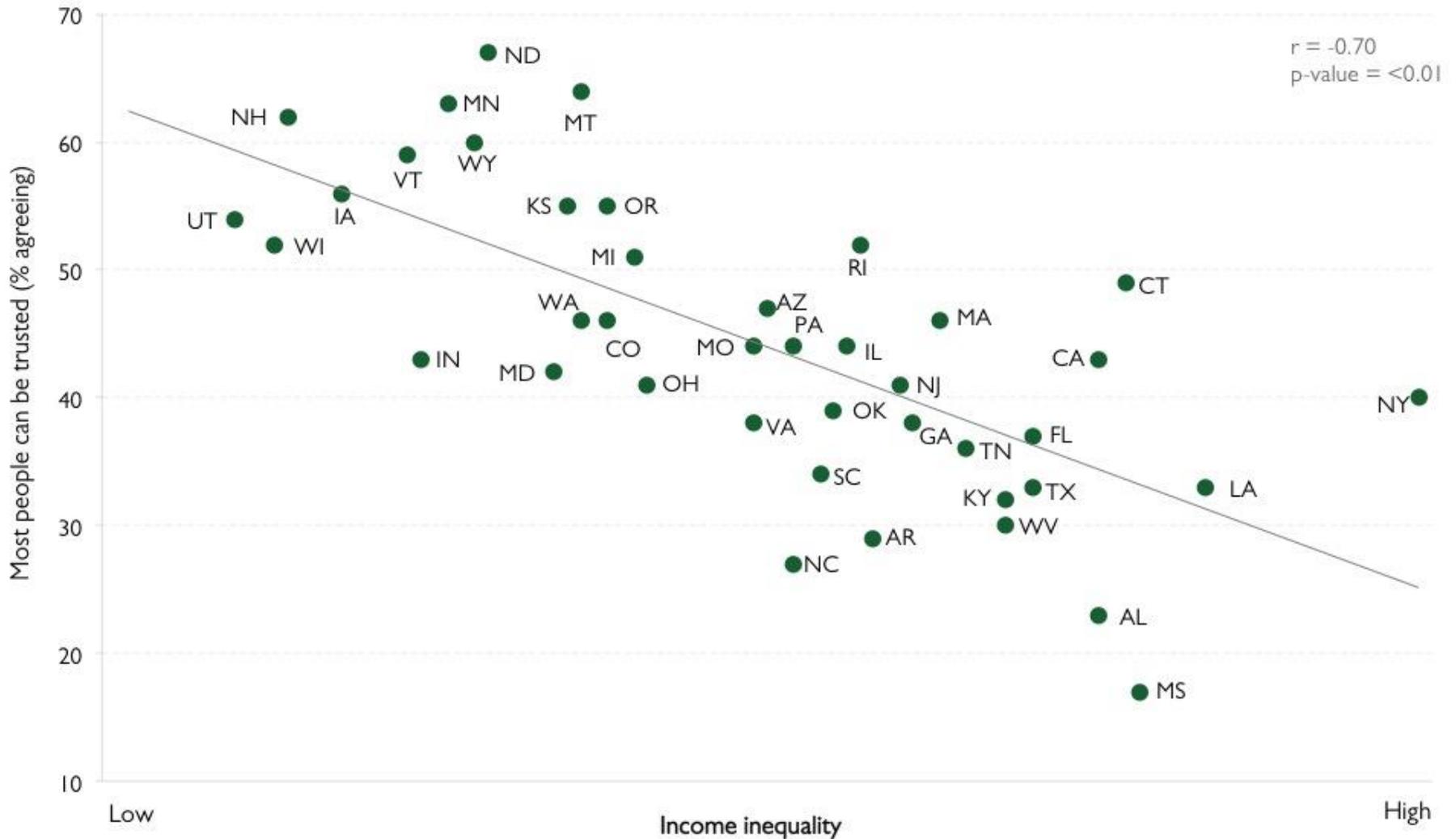


Source: Wilkinson & Pickett, *The Spirit Level* (2009)

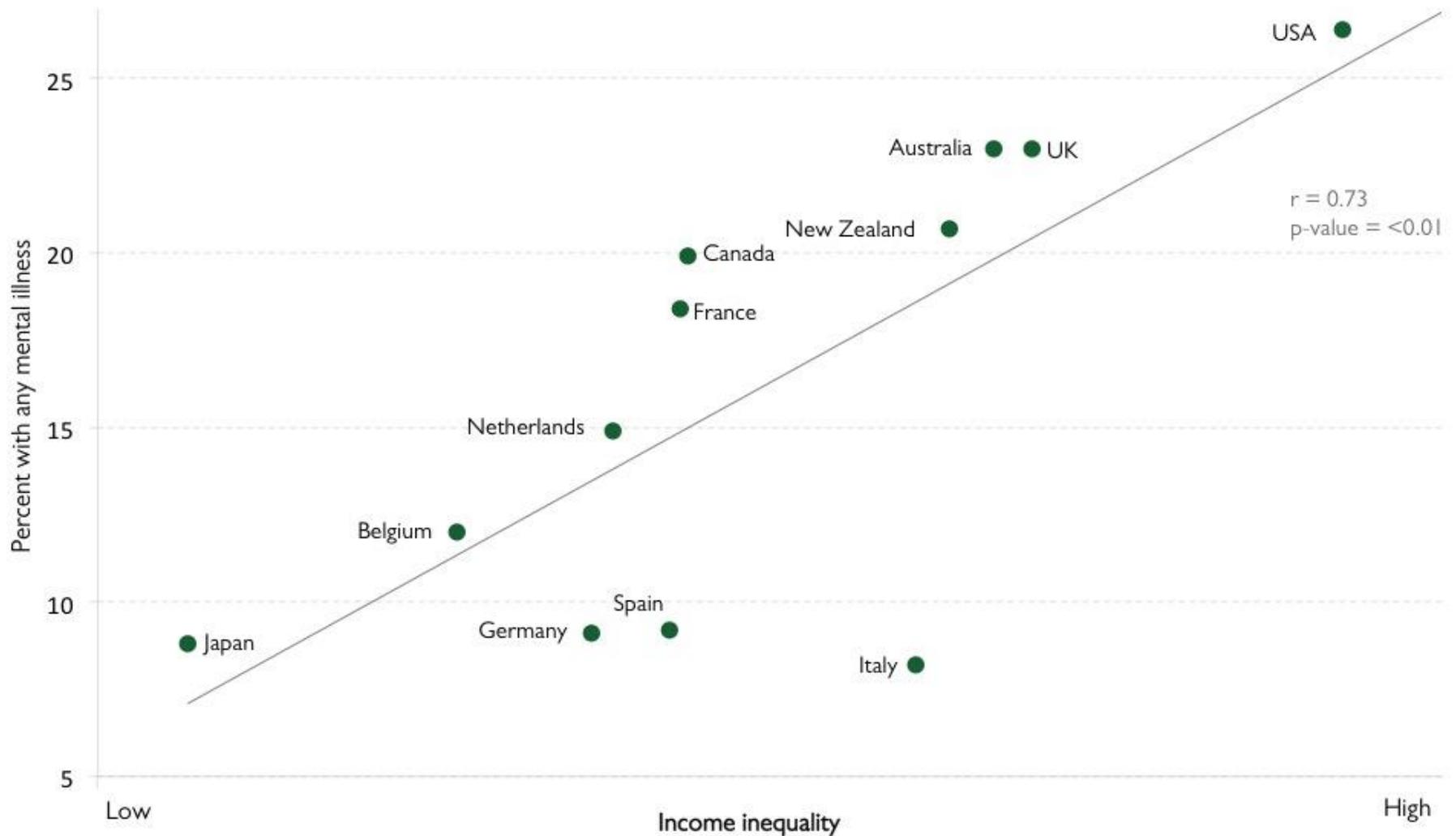
Levels of trust are higher in more equal rich countries



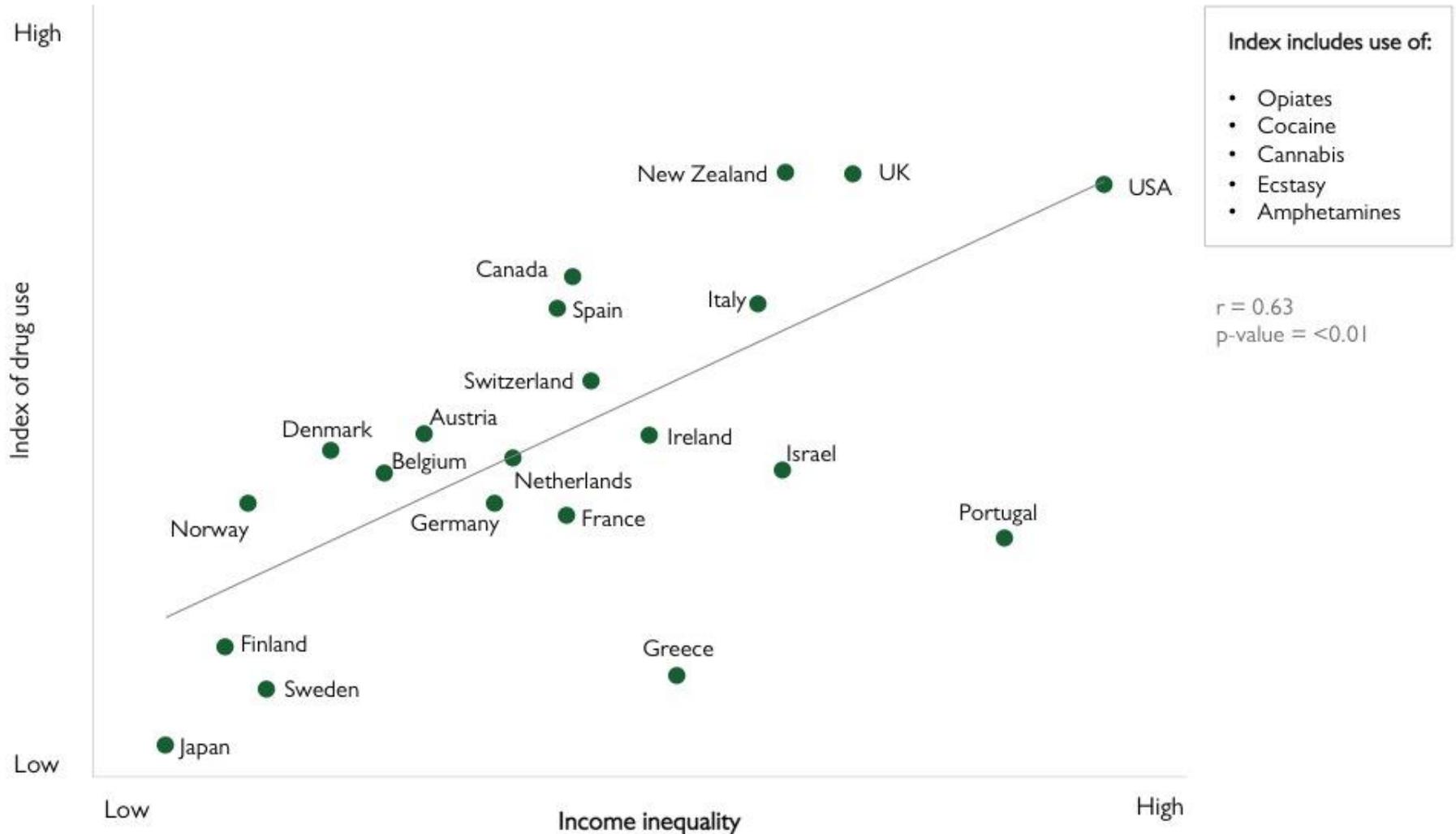
Levels of trust are higher in more equal US states



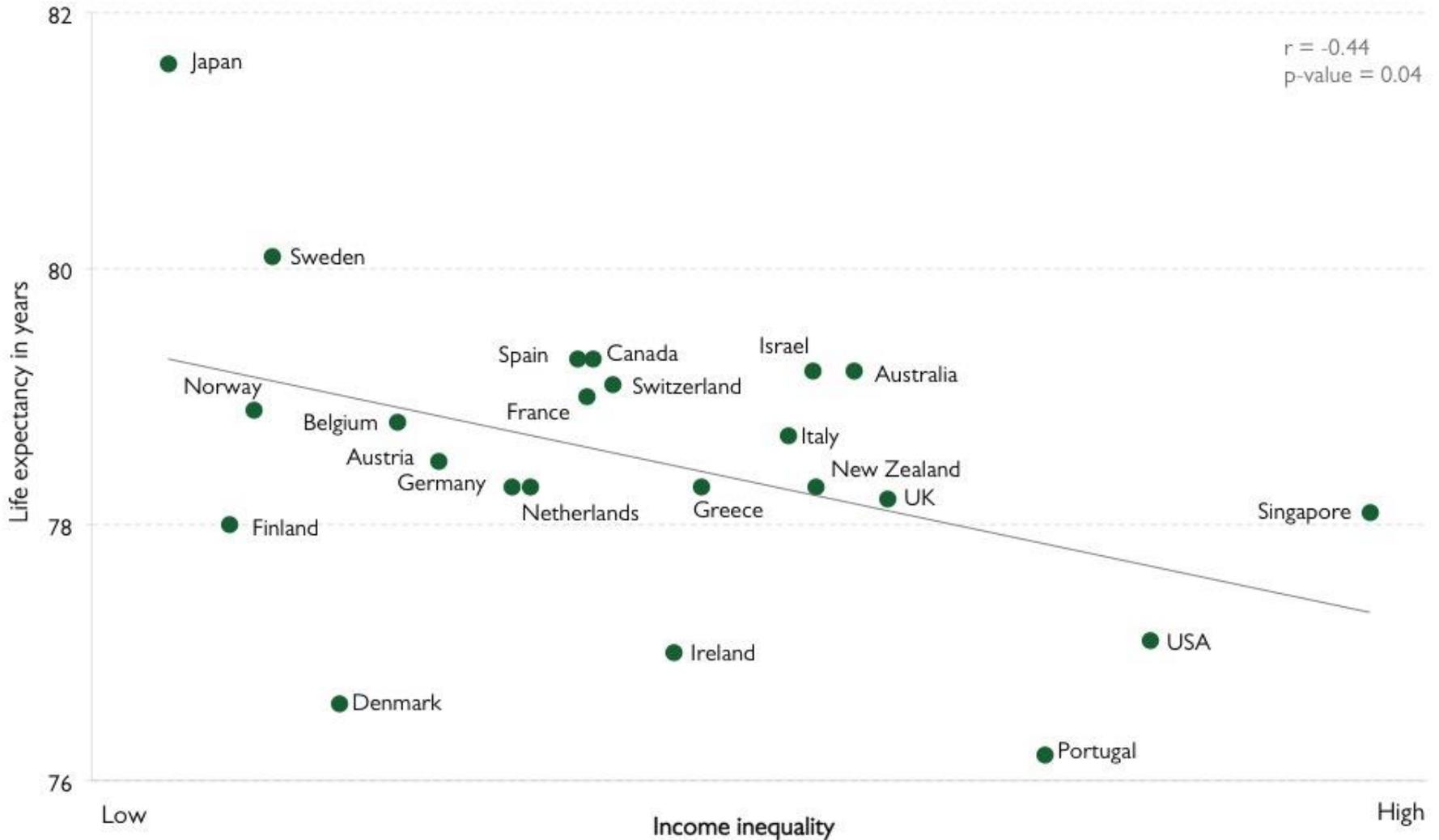
The prevalence of mental illness is higher in more unequal rich countries



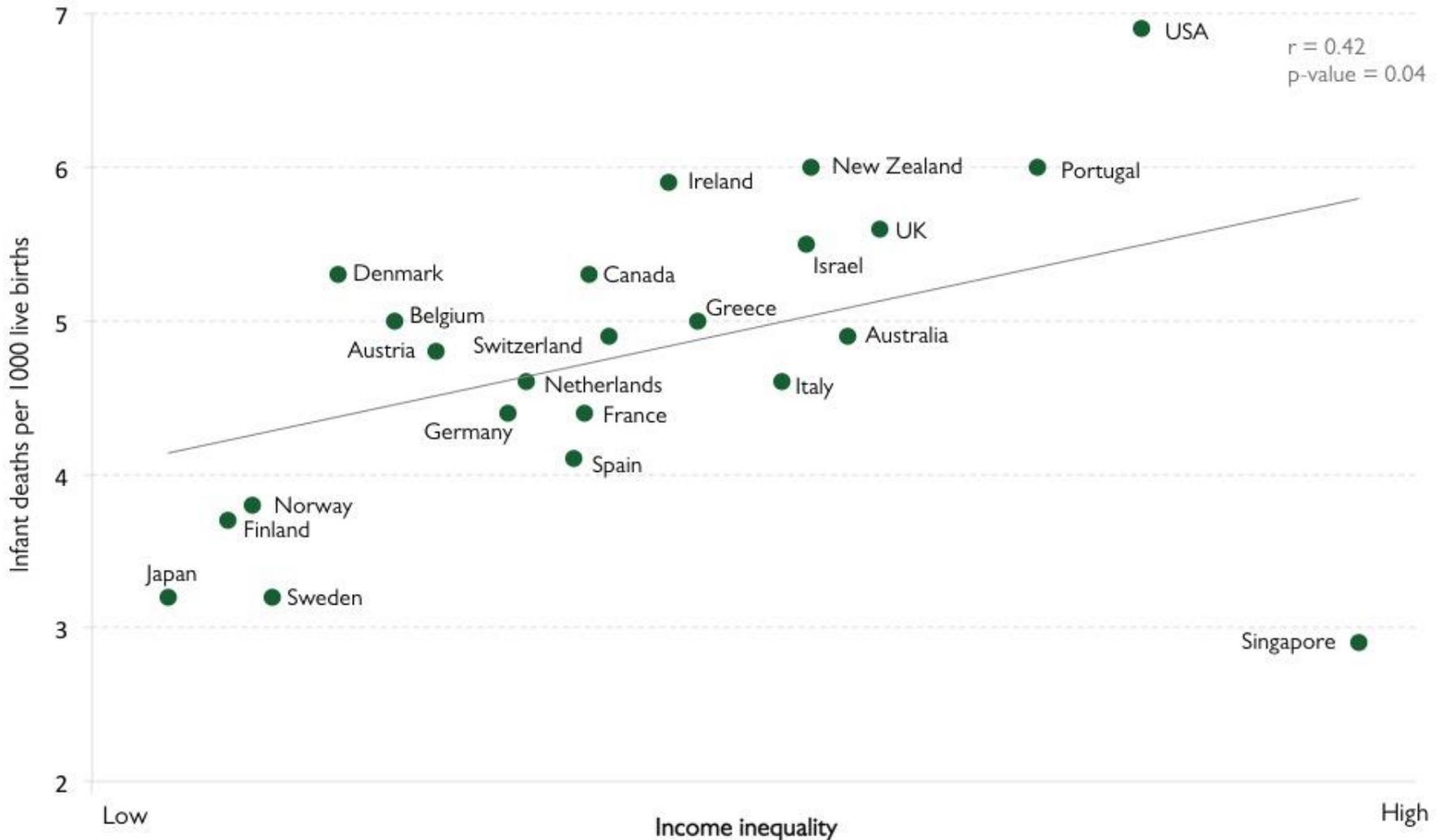
Drug use is more common in more unequal countries



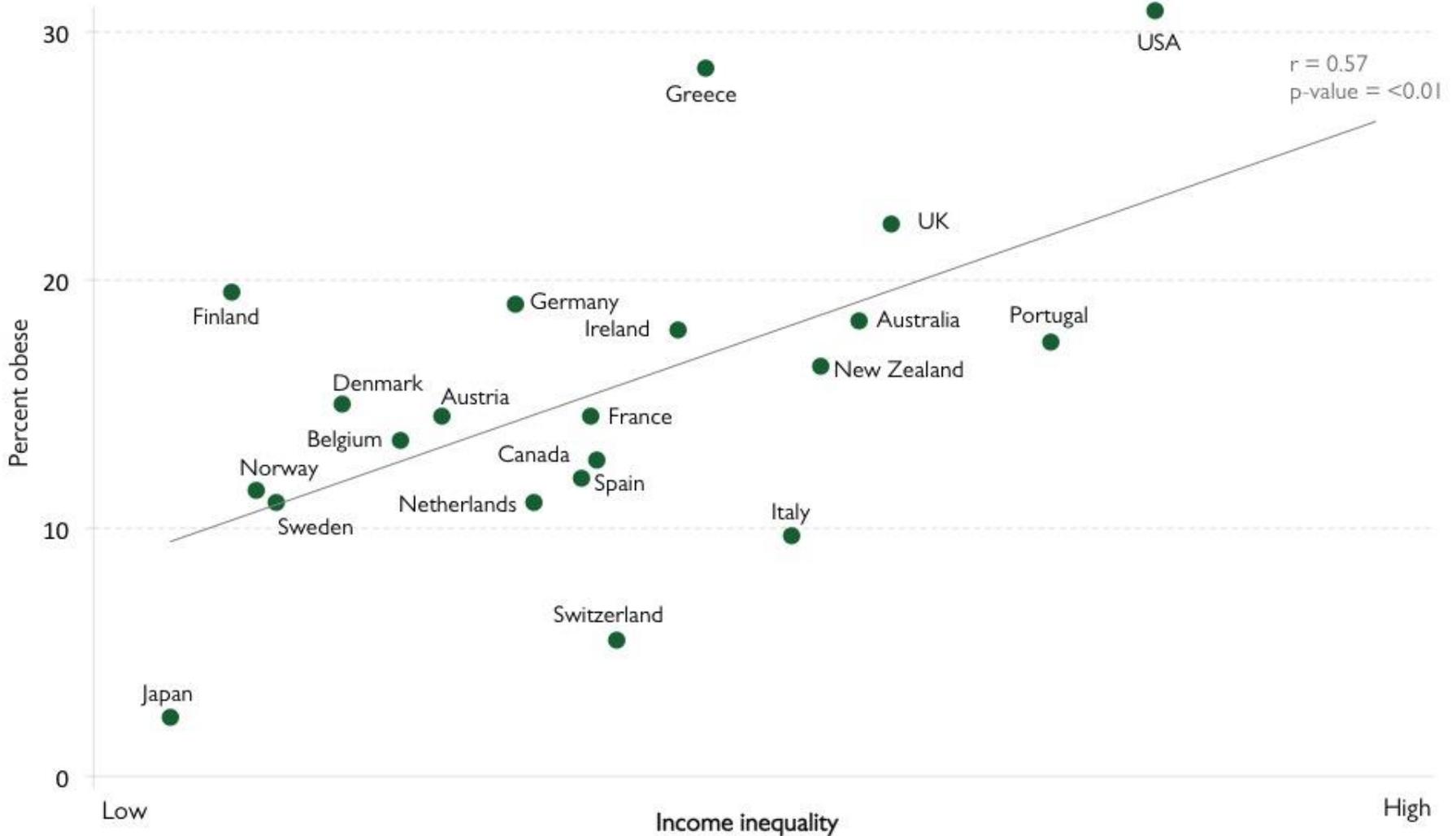
Life expectancy is longer in more equal rich countries



Infant mortality rates are higher in more unequal countries



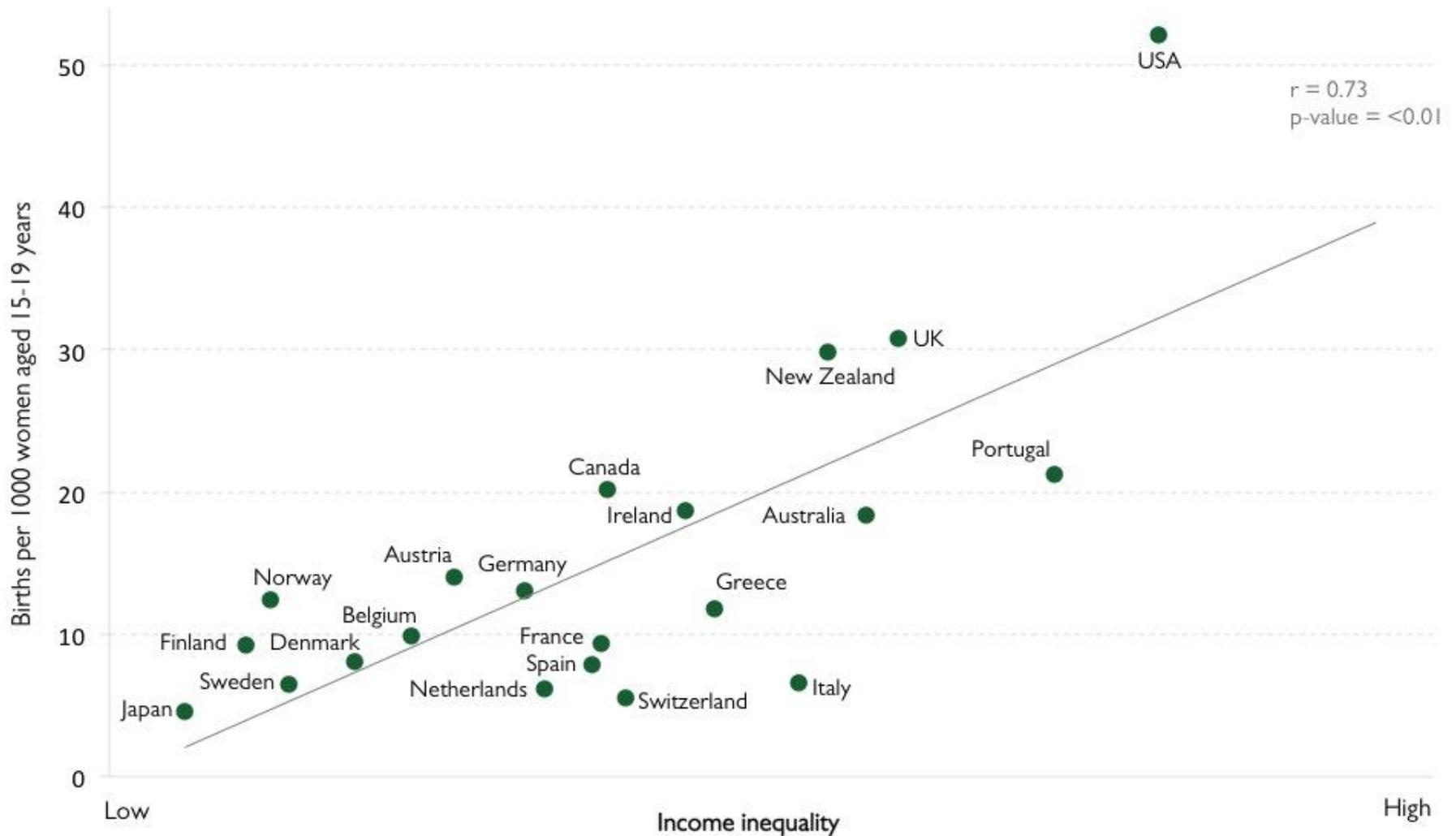
More adults are obese in more unequal rich countries



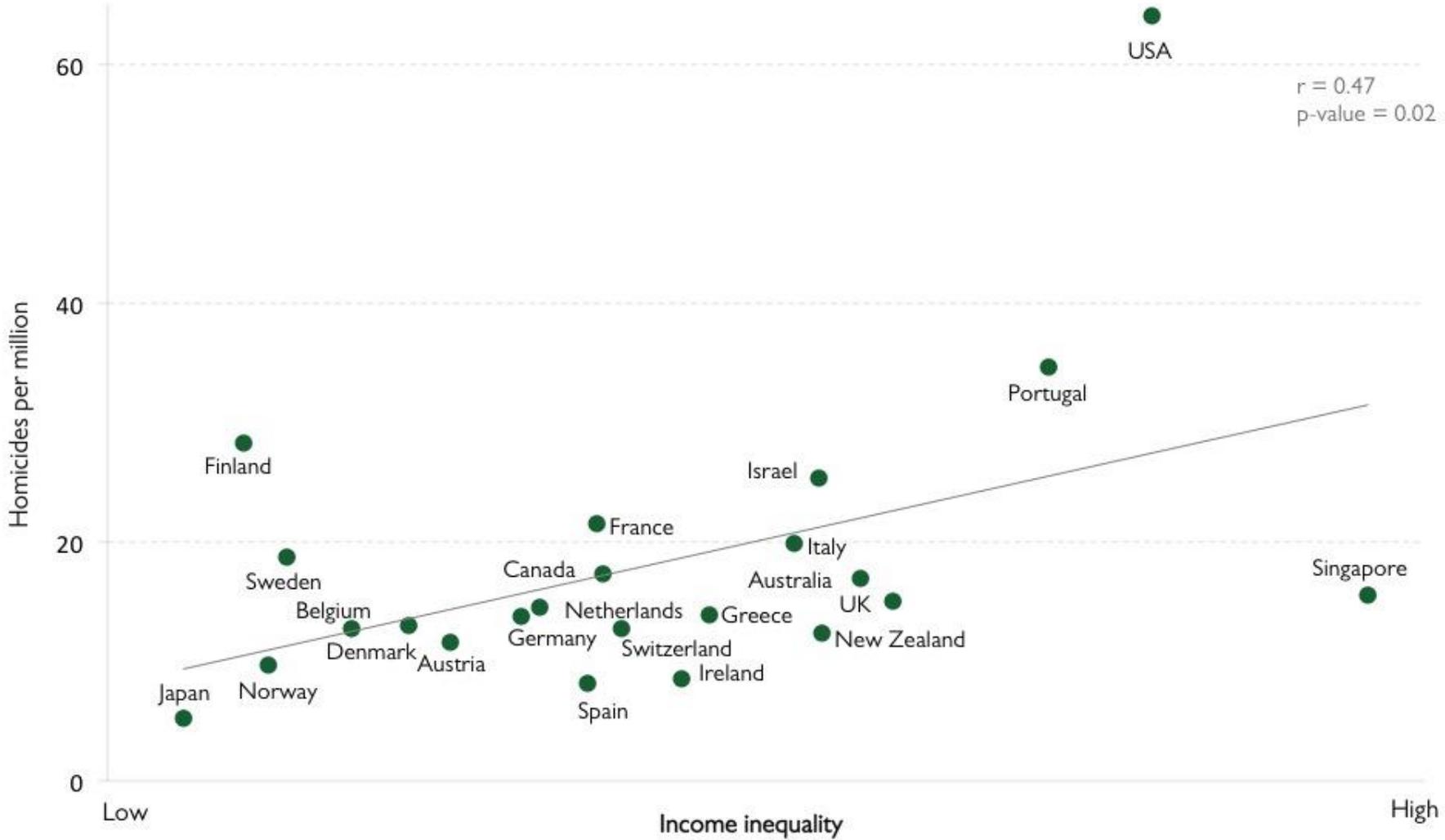
Educational scores are higher in more equal rich countries



Teenage birth rates are higher in more unequal rich countries

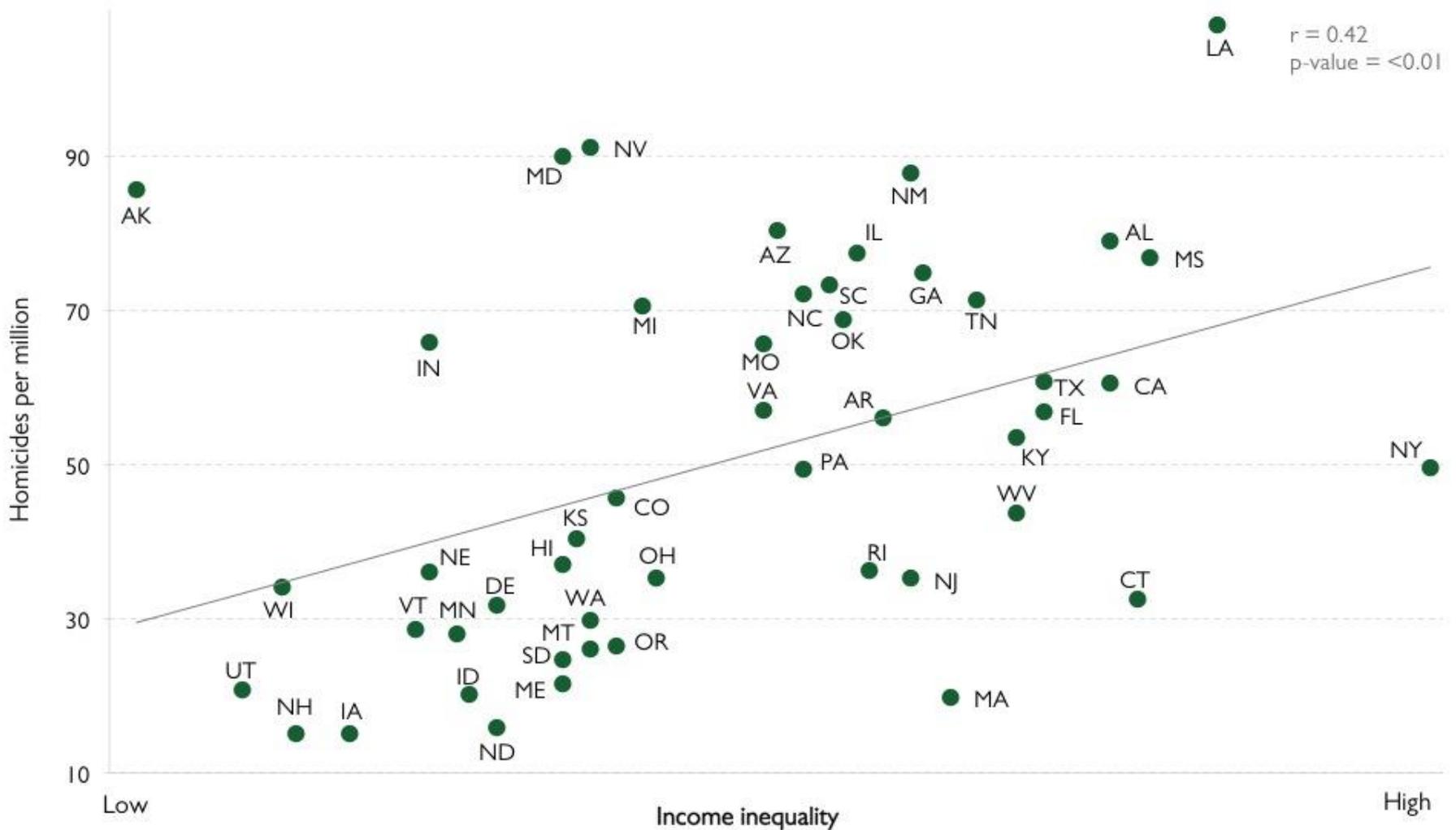


Homicide rates are higher in more unequal rich countries

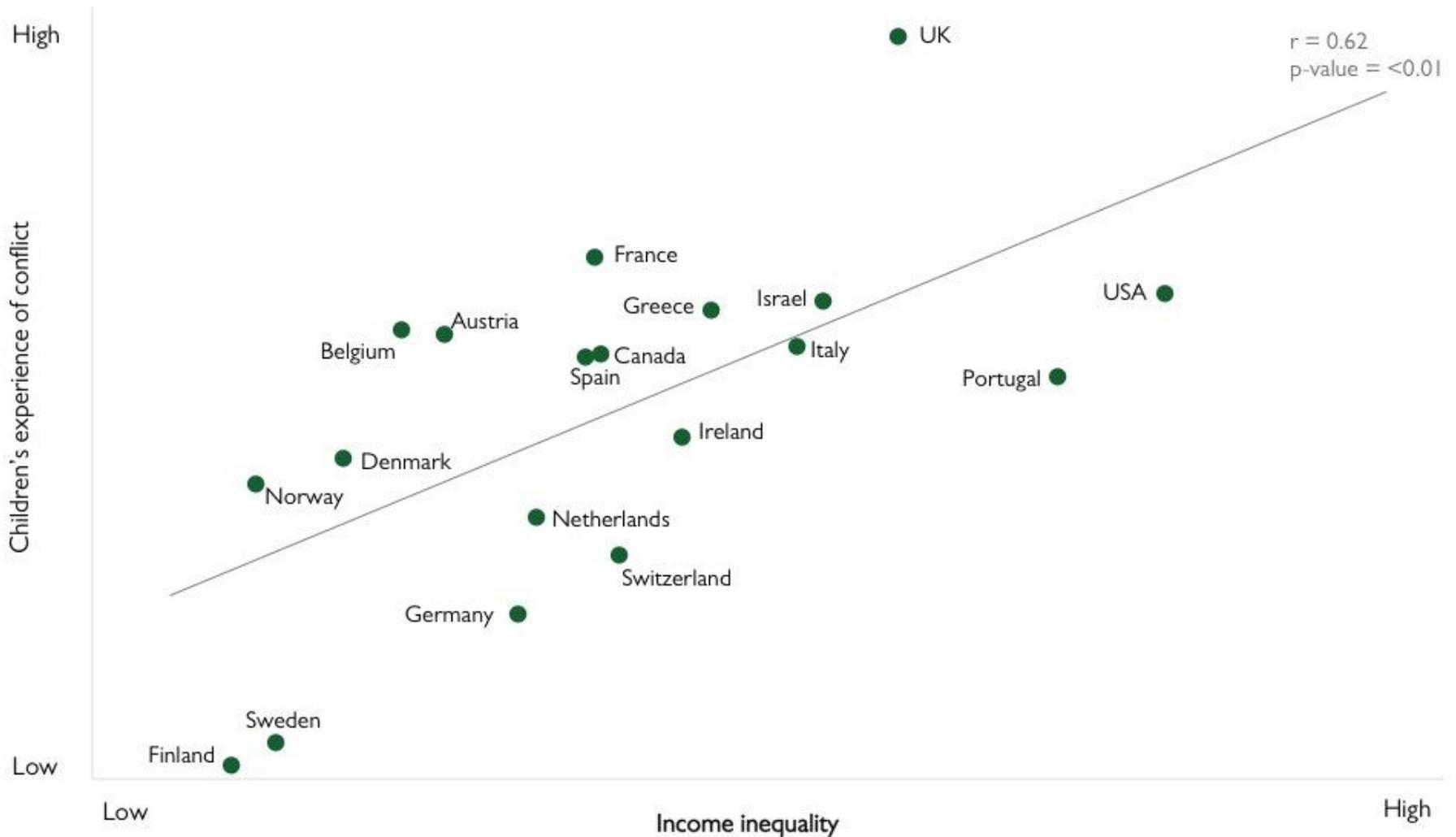


Source: Wilkinson & Pickett, *The Spirit Level* (2009)

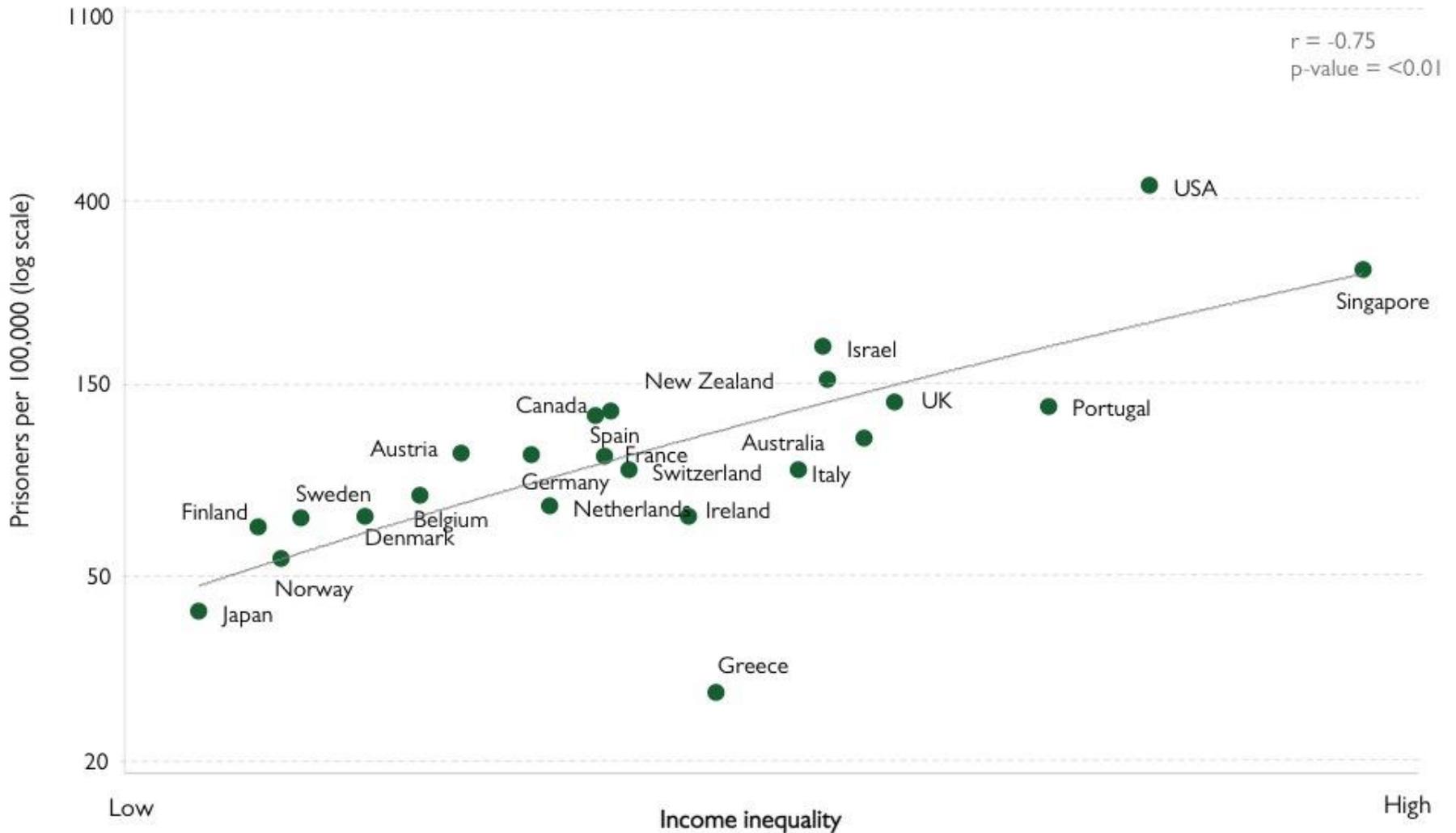
Homicide rates are higher in more unequal US states



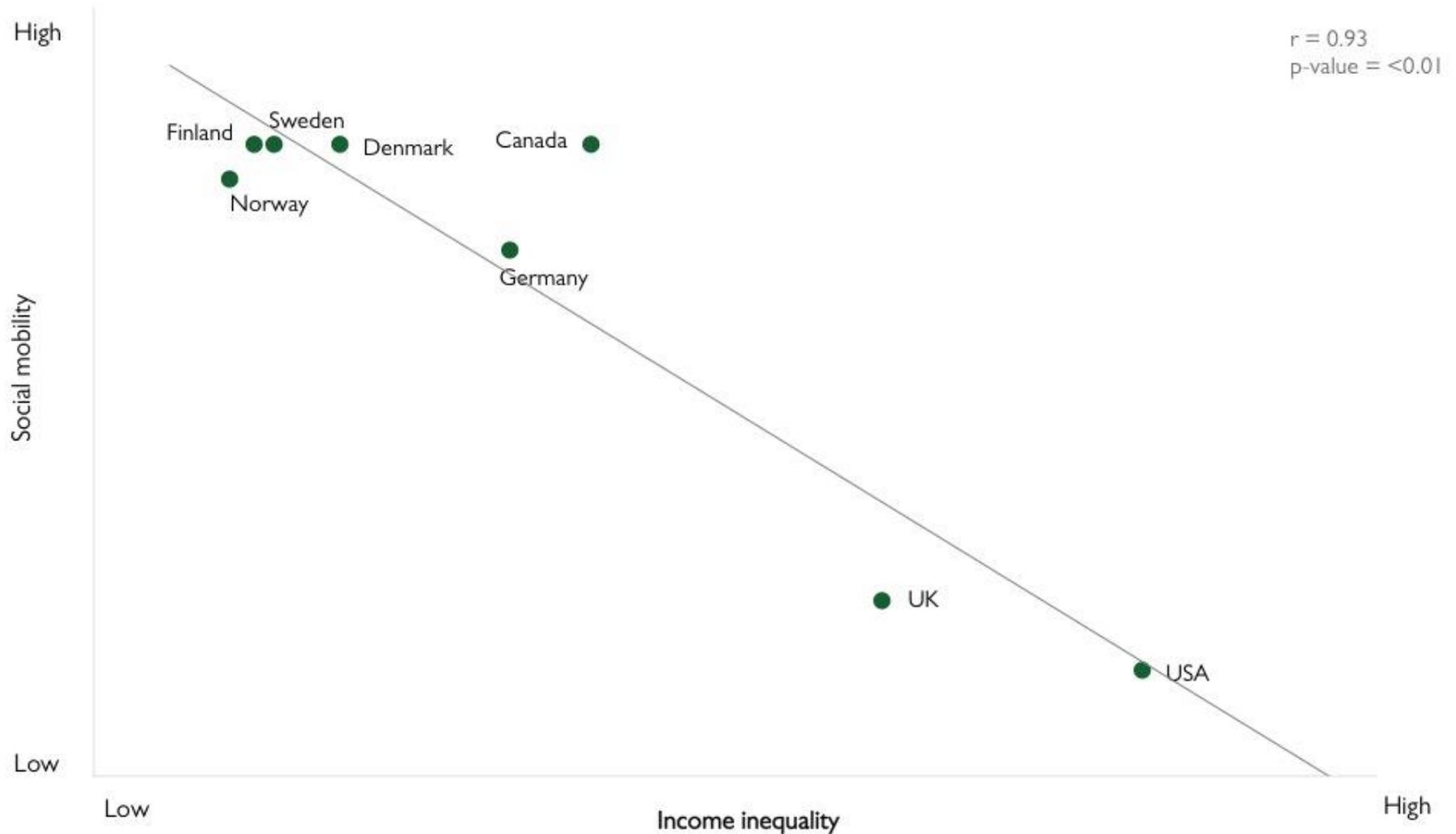
Children experience more conflict in more unequal societies



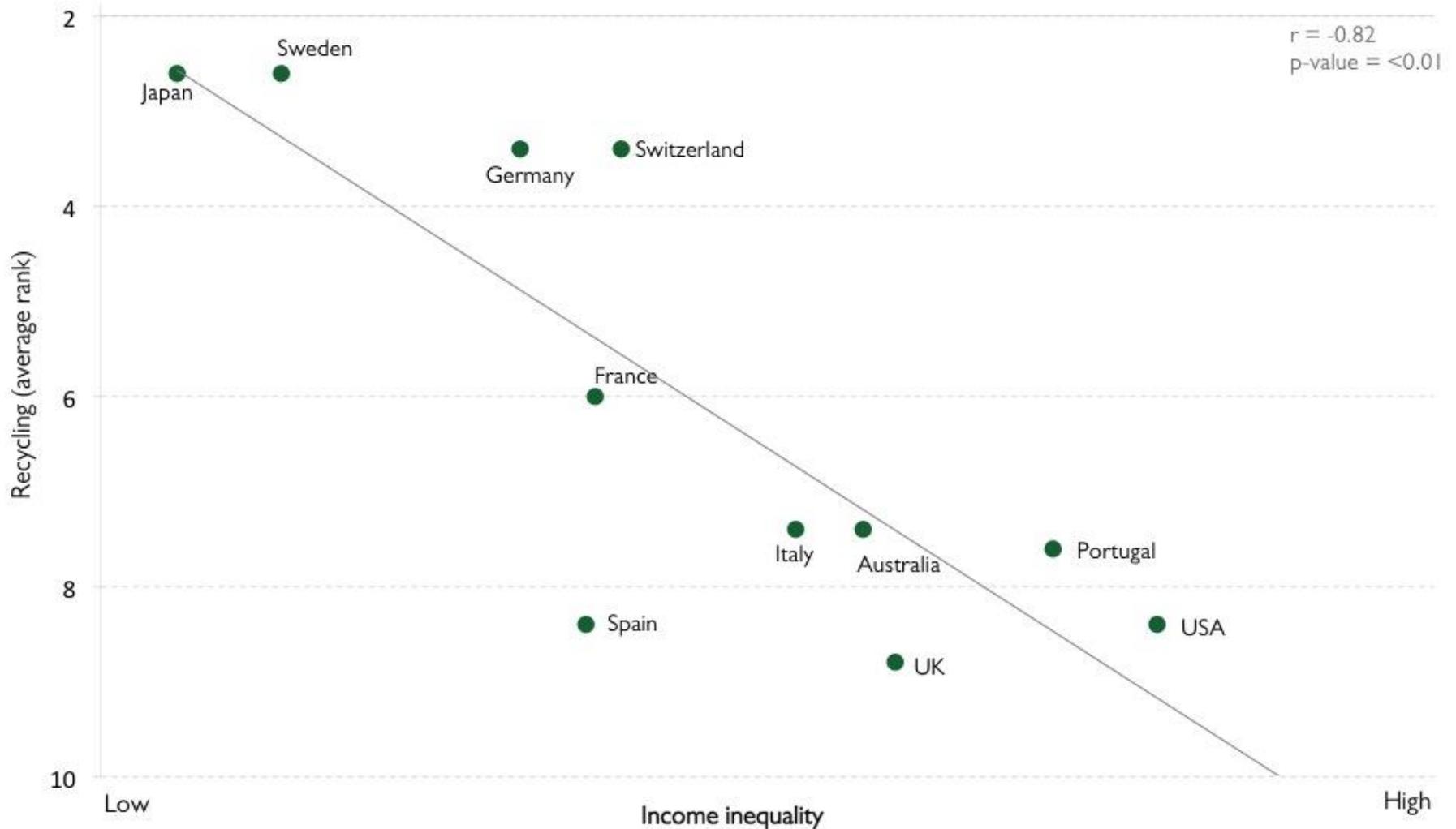
Rates of imprisonment are higher in more unequal countries



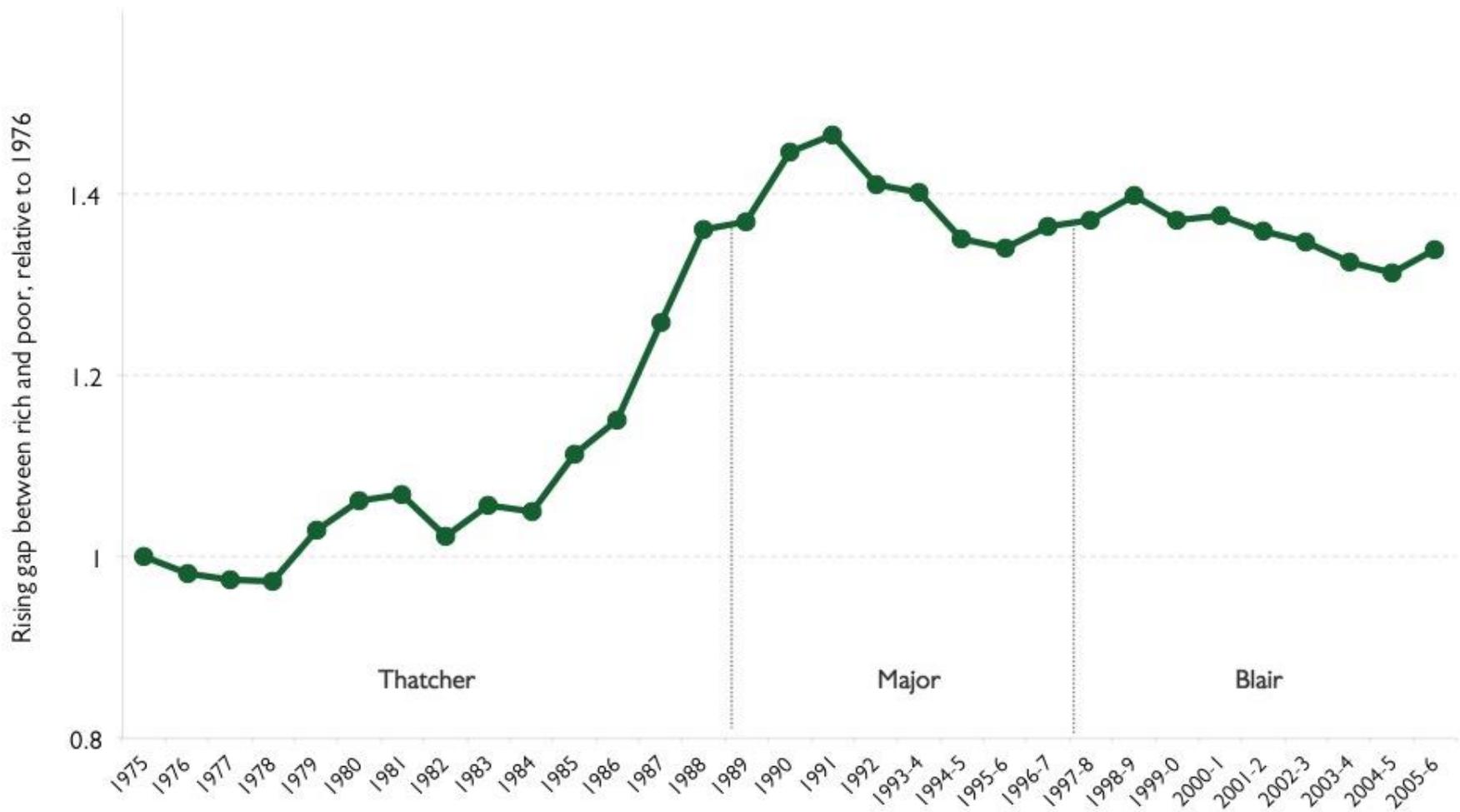
Social mobility is lower in more unequal countries



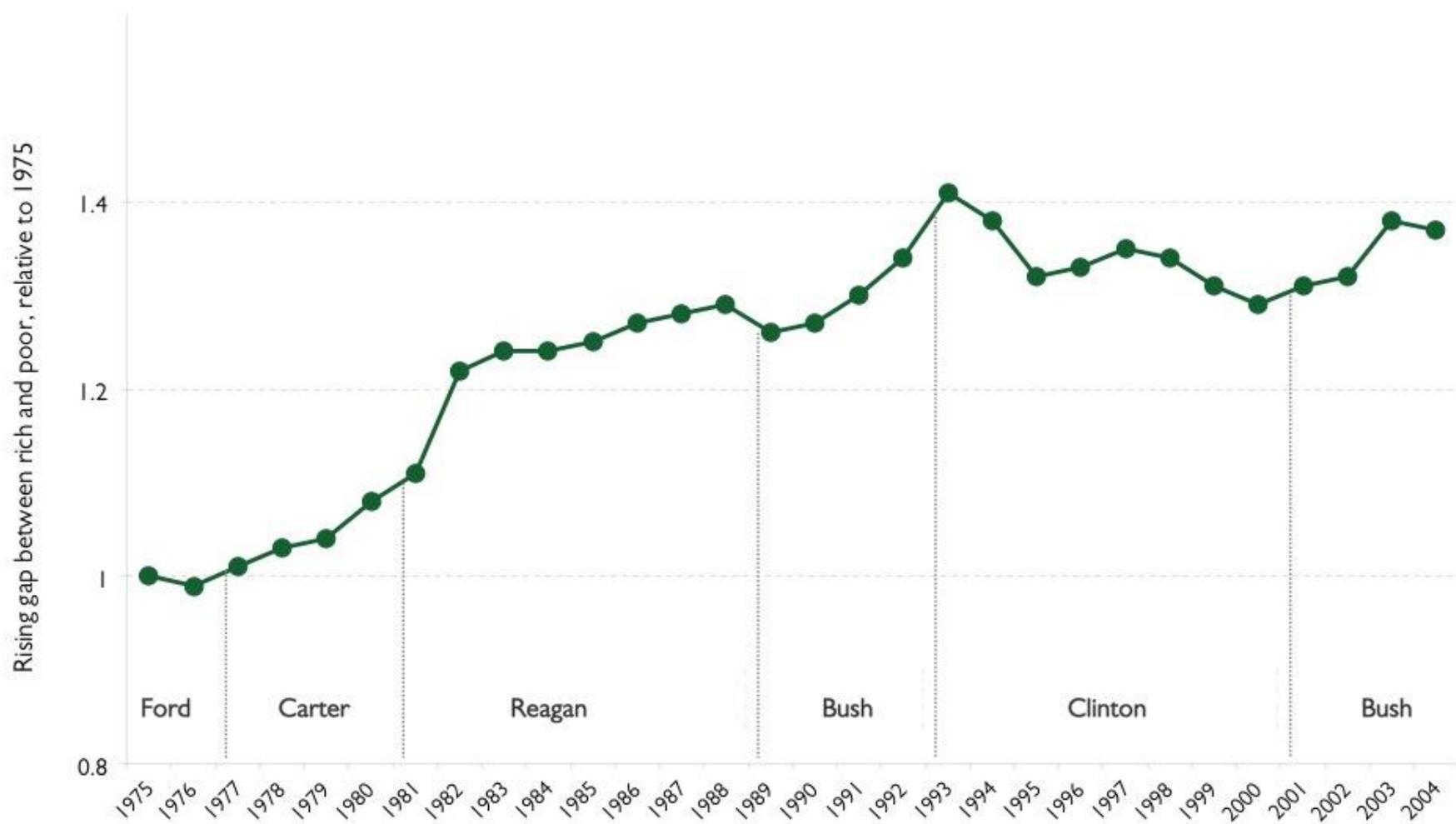
More equal countries rank better (1 is best) on recycling



Trends in UK income inequality 1979 – 2005/06



Trends in US income inequality 1975 – 2005



 THE EQUALITY TRUST

www.equalitytrust.org.uk



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Resources for telling stories with data

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- **Data Skills in Geography**

- <http://www.rgs.org/OurWork/Schools/Data+skills+in+geography/Data+skills+in+geography.htm>



Some additional resources

- Geographers Count: A Report on Quantitative Methods in Geography,
<http://www.tandfonline.com/doi/full/10.11120/elss.2014.00035>
- The Use and Abuse of Statistics
(from Quantitative Geography: the basics),
<https://www.dropbox.com/s/tzc4b252pbtz2ck/chapter2-2.pdf?dl=0>
- Videos and case studies of quantitative geography skills used in the workplace,
<https://quantile.info/careers/>



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