Known knowns, known unknowns, and unknown unknowns

What do we *know* about uncertainty?

Nicholas Bloom (Stanford University)

Stockholm, August 2023

Widespread view that uncertainty matters

DJIA ▲ 18437.00 0.57%   S&P 500 ▲ 2149.10 0.45%   Nasdaq ▲ 5209.85 0.31%   U.S. 10 Yr ▼ -31/32 Yield 1.969%   Crude Oil ▼ 44.77 -0.47%   Euro ▼ 1.0943 -0.73%

Nicholas Bloom ▾

THE WALL STREET JOURNAL

The New York Times

The New York Times

At the Front Lines of the Inflation Fight, Uncertainty Reigns

Central bankers and economists gathered and, amid concerns about persistent inflation, wondered about all the things they still don't know.

🎁 Share full article   ↪   🔖   💬 16

Macroeconomic stabilisation
in a volatile inflation environment

ECB FORUM

I have been working on Uncertainty for >25 years (since my PhD)

Uncertainty is hard to measure…..so I'll show four approaches

Uncertainty barometer

Measuring Uncertainty Across Time and Countries

- Financial Market Data

- Newspapers

- World Uncertainty Index

- Survey data

Uncertainty barometer

VIX, 1 month forward S&P500 implied vol: classic uncertainty measure
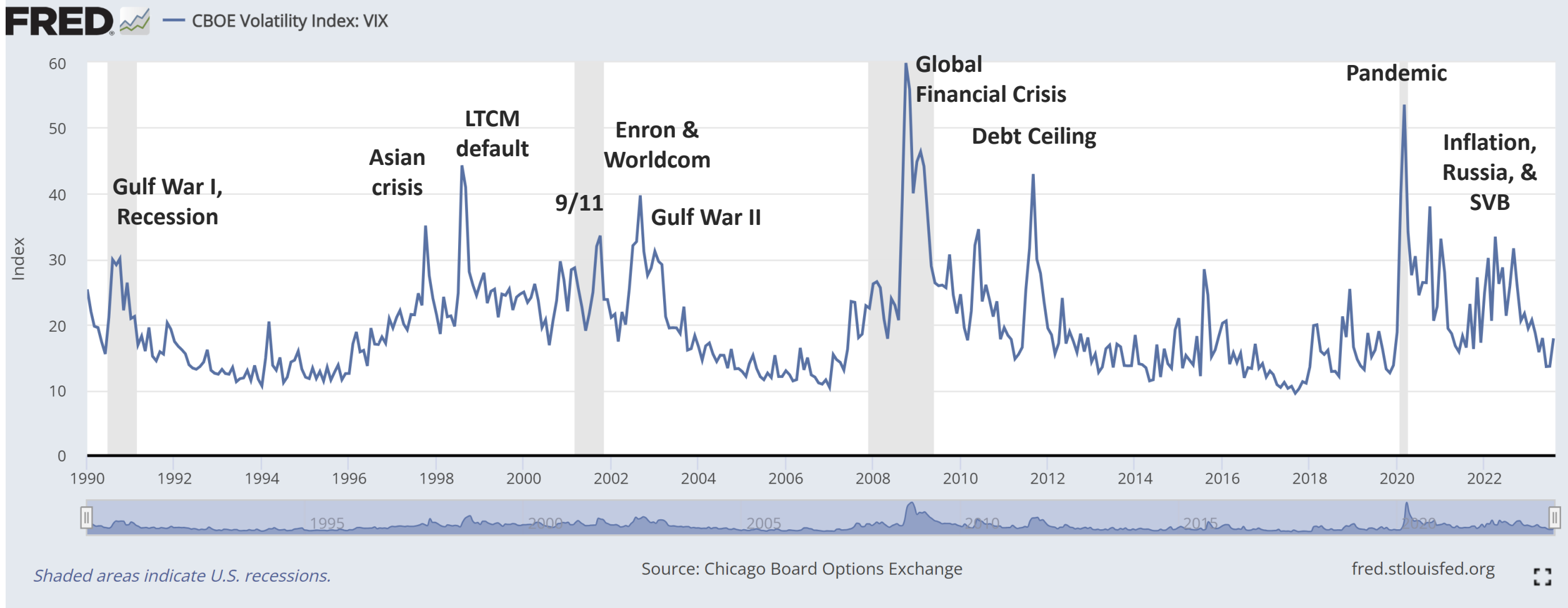
Pros: Daily (available real-time) back to 1990
Cons: Mainly recessions & financials crisis, few emerging/developing countries

Measuring Uncertainty Across Time and Countries

- Financial Market Data

- **Newspapers**

- World Uncertainty Index

- Survey data

Uncertainty barometer

Increasing use of Newspapers as another measure of uncertainty

www.policyuncertainty.com

This proxy for Economic Policy Uncertainty (EPU) comes from computer searches of newspapers

- US index: 10 major papers get monthly counts of articles with:

  E {economic or economy}, and

  P {regulation or deficit or federal reserve or congress or legislation or white house}, and

  U {uncertain or uncertainty}

- Divide the count for each month by the count of all articles

- Normalize and sum 10 papers to get the U.S monthly index

US News-based economic policy uncertainty index
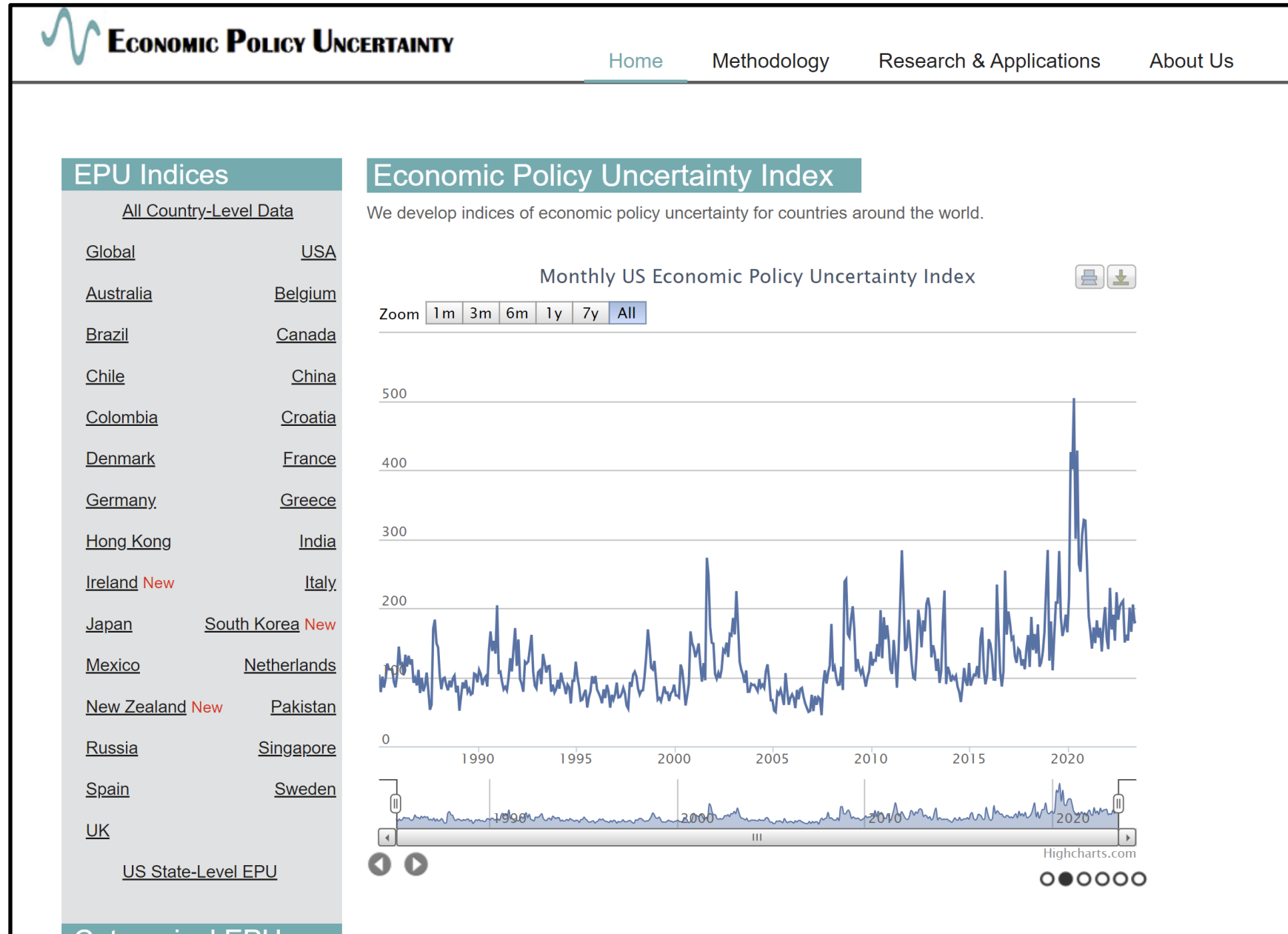
Can focus on areas of uncertainty, e.g. Health or Trade Policy
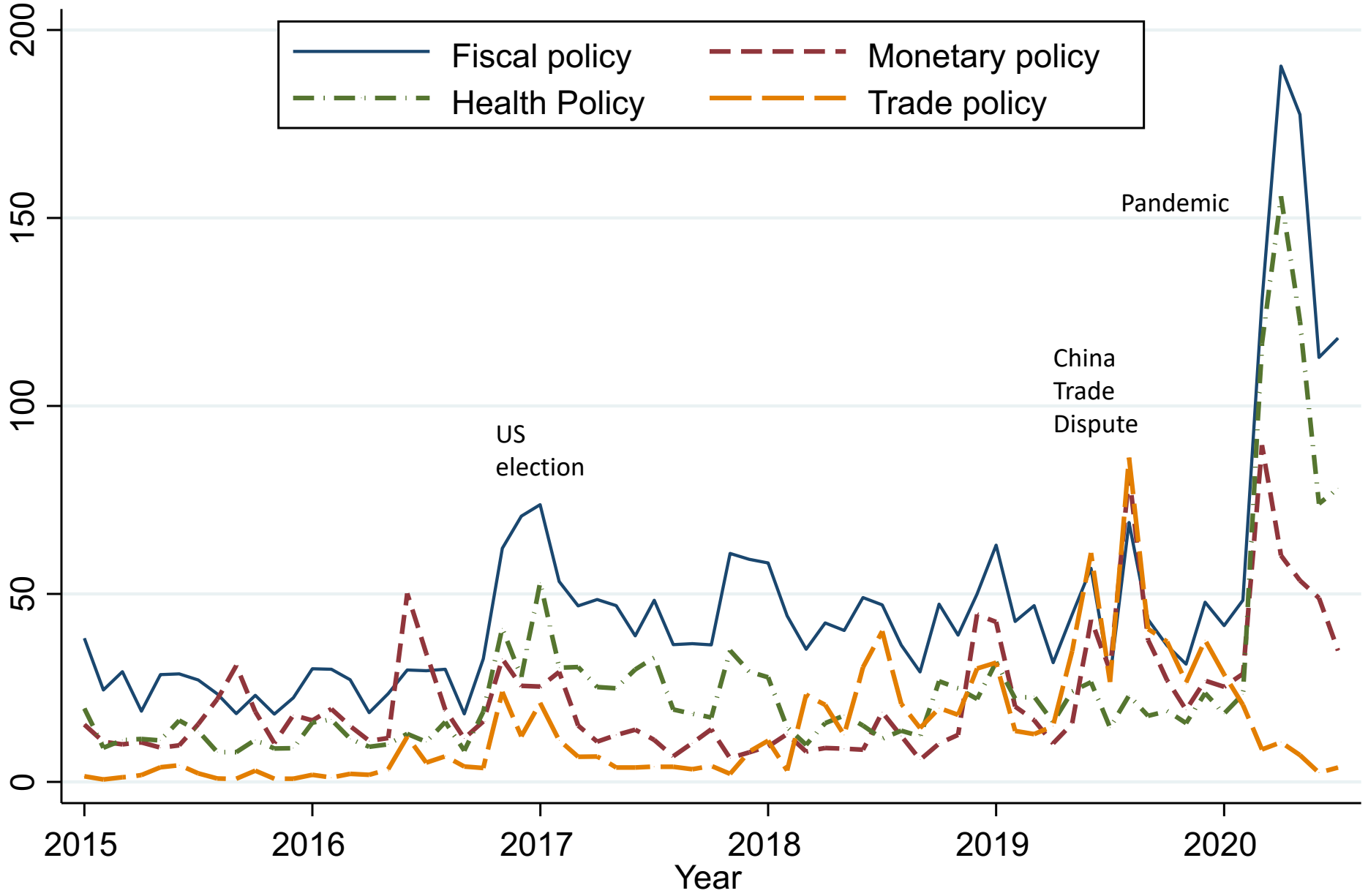
Notes: Weekly values for Economic Policy Uncertainty (EPU) index categories from www.policyuncertainty.com. See Baker, Bloom and Davis (2016) for details of EPU index construction. We plot data from 1 January 2015 to 30 July, with categories showing large rises in 2020 or 2019 plotted. Note that the average of the four plotted categories from 1985-2019 is as follows: Fiscal Policy=45.7, Health=17.7, Monetary Policy=27.1, and Trade Policy=5.7. This highlights how the rise in health policy in 2020 and trade policy in 2019 are particularly striking given their otherwise relatively low level.

Can also use the time series of newspapers to create a Historical EPU
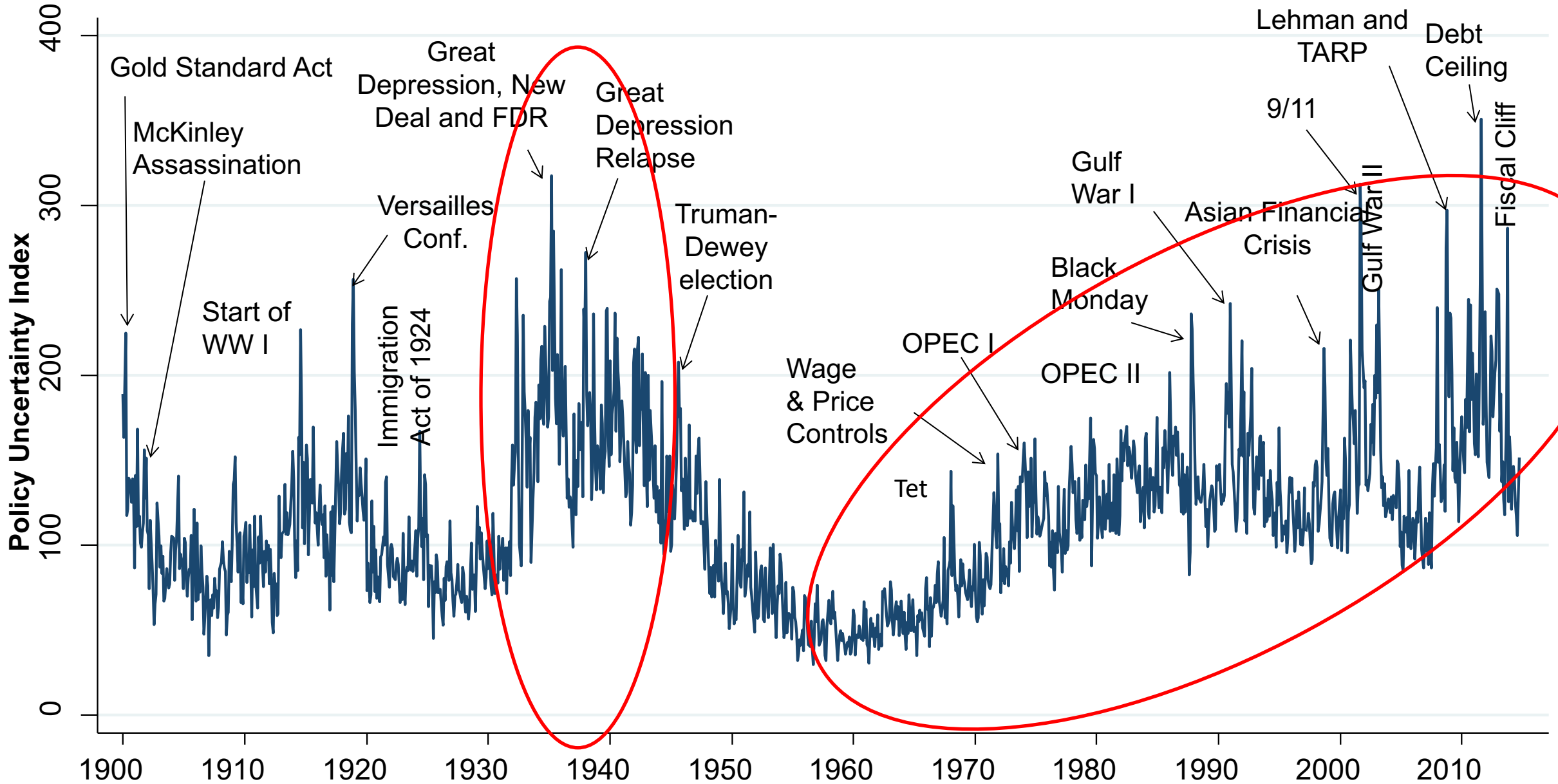
Notes: Index reflects scaled monthly counts of articles in 6 major newspapers (Washington Post, Boston Globe, LA Times, NY Times, Wall Street Journal, and Chicago Tribune) that contain the same triple as in Figure 1, except the economy term set includes "business", "commerce" and "industry" and the policy term set includes "tariffs" and "war". Data normalized to 100 from 1900-2011.

UK Policy Uncertainty Index

ECONOMIC POLICY UNCERTAINTY

Home   Methodology   Research & Applications   About Us

EPU Indices

All Country-Level Data

Global	USA
Australia	Belgium
Brazil	Canada
Chile	China
Colombia	Croatia
Denmark	France
Germany	Greece
Hong Kong	India
Ireland New	Italy
Japan	South Korea New
Mexico	Netherlands
New Zealand New	Pakistan
Russia	Singapore
Spain	Sweden
UK	

US State-Level EPU

Economic Policy Uncertainty Index

We develop indices of economic policy uncertainty for countries around the world.
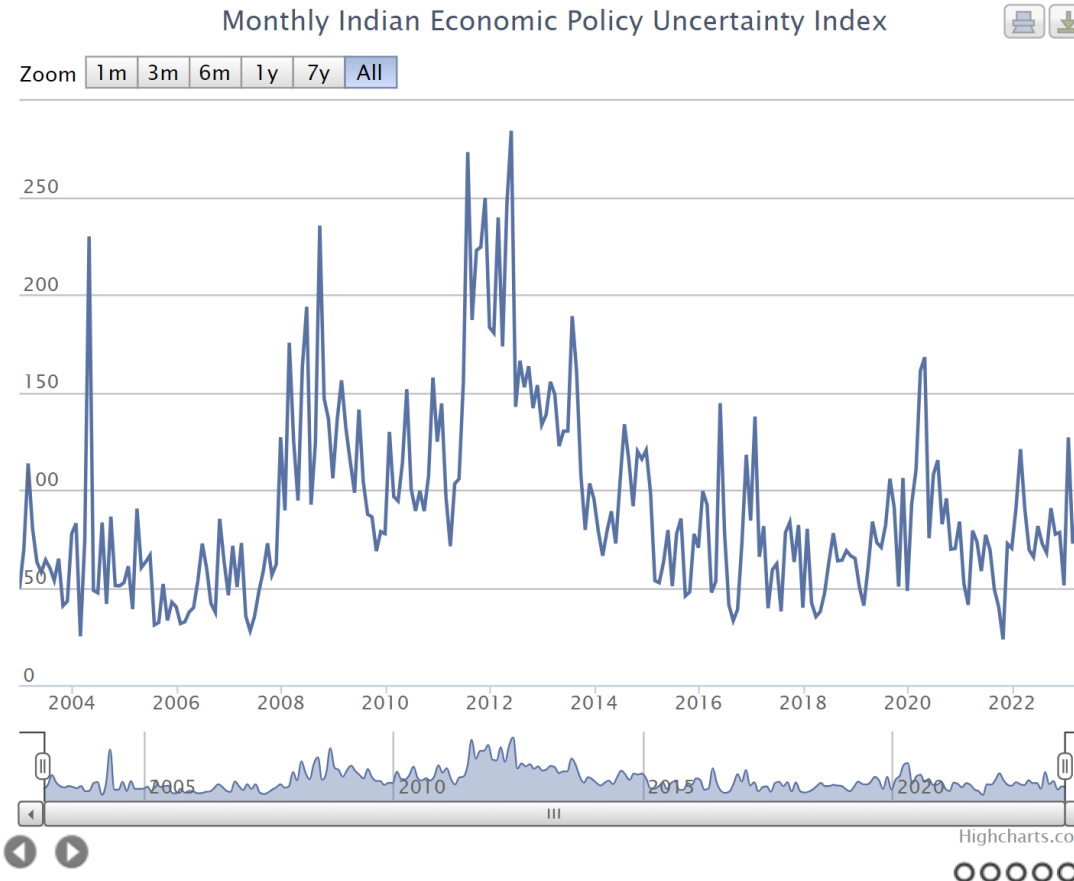
Monthly UK Economic Policy Uncertainty Index

Zoom 1m 3m 6m 1y 7y All

Brexit

Kwarteng-Truss
Mini-budget

500

400

300

200

100

0

−100

2000   2005   2010   2015   2020

Highcharts.com

India Economic Policy Uncertainty Index

North Korean Economic Policy Uncertainty Index

Policy Uncertainty Index

250

200

150

100

50

2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
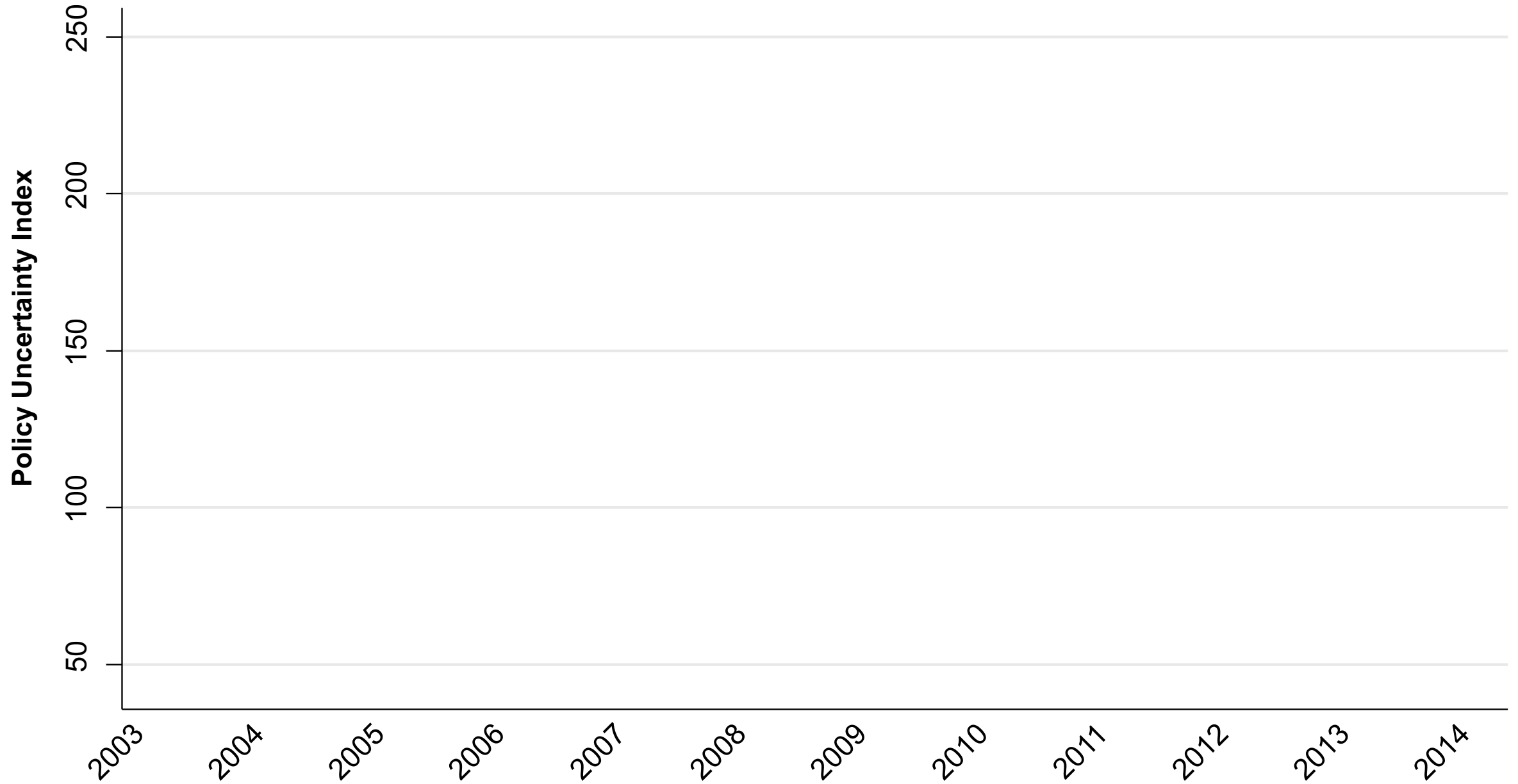
Source: ??? Data from 0 North Korean newspapers

Newspapers:

Pros:

Monthly or Daily (real-time) back to 1900
Provides sub-categories (e.g. health, pandemic)

Cons:

Newspaper bias?
Only for countries with sufficient (free) press

Measuring Uncertainty Across Time and Countries

- Financial Market Data

- Newspapers

- **World Uncertainty Index**

- Survey data

Uncertainty barometer

The World Uncertainty Index covers 143 countries

www.worlduncertaintyindex.com

Uses Economist Intelligence Unit quarterly reports

EUI quarterly reports standard format, mean (and median) of 29 pages.

Monetary policy Having raised its refinancing rate eight times by 25 basis points each since December 2005, to 4% on June 6th 2007, the ECB has since refrained from rate increases. The ECB believes that monetary policy is still on the accommodative side and that inflation risks remain. However, the recent financial market turmoil is likely to mark a turning point. Both actual economic data and confidence indicators since the second quarter of 2007 suggest that growth is slowing, while tighter lending conditions in the interbank markets are likely to bring about a slowing of credit growth to households and firms. The euro is expected to strengthen further against the US dollar, which will reduce inflationary pressure. The Economist Intelligence Unit thus thinks that the next ECB move is likely to be a cut in interest rates, and that this will occur in the early part of 2008. After that, we expect the deceleration in euro area growth to bottom out and the strengthening of the euro to come to an end. In these circumstances, the ECB is expected to keep its interest rates on hold. In the event of our risk scenario of a US recession and asset price falls occurring, the ECB would reduce its rates more significantly.

Economic forecast

International assumptions

International assumptions summary
(% unless otherwise indicated)

	2006	2007	2008	2009
Real GDP growth				
World	5.3	5.1	4.6	4.7
OECD	3.1	2.6	1.8	2.5
EU27	3.0	2.8	2.1	2.2
Exchange rates				
¥:US$	116.2	118.0	107.3	96.3
US$:€	1.256	1.366	1.460	1.328
SDR:US$	0.680	0.652	0.625	0.646
Financial indicators				
¥ 3-month repo rate	0.28	0.62	0.88	1.81
US$ 3-month commercial paper rate	5.03	5.16	4.55	4.73
Commodity prices				
Oil (Brent; US$/b)	65.3	73.3	78.0	72.0
Gold (US$/troy oz)	604.5	696.7	822.5	706.3
Food, feedstuffs & beverages (% change in US$ terms)	16.1	26.7	7.9	-0.9
Industrial raw materials (% change in US$ terms)	49.6	12.8	-3.1	-12.8

Note. Regional GDP growth rates weighted using purchasing power parity exchange rates.

The world economy continued to expand strongly in the first half of 2007, but growth is likely to have cooled slightly since mid-year. This will continue in 2008, before growth picks up a little in 2009. World GDP growth measured at market exchange rates was 4% in 2006 and is forecast at 3.7% in 2007 and 3.1% in 2008, before moving back up to 3.4% in 2009. The slowdown in terms of purchasing power parity (PPP) will be slightly less marked because of the greater relative weight that PPP gives to developing countries, where growth will remain strong. The slowdown reflects a sharp decline in US growth from 2.9% in 2006 to 1.9% in 2007 and 1.5% in 2008, and a more moderate slowdown in the euro area to an estimated 2.6% in 2007 and around 2% in 2008-09.

Domestic politics

Industrial prospects

International relations

Prices and employment

wages (in part because of a relaxation of the legislation on the 35-hour week) as well as tax cuts. A key factor preventing a stronger rebound in consumer spending relates to French households' increasing propensity to save. Despite strong rise in disposable income in 2007, private consumption growth slowed, as households increased savings. Weak consumer confidence could weigh on spending in the near term, although higher savings will provide a cushion for spending later in the outlook period. Investment growth will decelerate in 2008-09. French companies are facing a slowdown in external demand, with relatively high debt levels and sluggish profit growth. Borrowing costs will also remain higher than in recent years (particularly if the recent uncertainty in global financial markets persists). Total domestic demand is expected to grow at a lower rate than in 2007. Although this will cause import growth to slow in 2008, export growth is also expected to be lower as a result of the stronger euro and weaker demand in the EU and US. As a result, net trade is expected to make a small negative contribution to GDP growth in 2008, before becoming more neutral in 2009.

Inflation Inflation (EU harmonised measure) rose to 2.1% in October, from 1.6% in September, partly as a result of base effects. However, inflation in France remains significantly lower than the euro zone average (2.6%), and the outlook seems relatively benign. After averaging 1.6% in 2007, we expect annual average inflation to increase to 2.1% in 2008, as higher energy and foo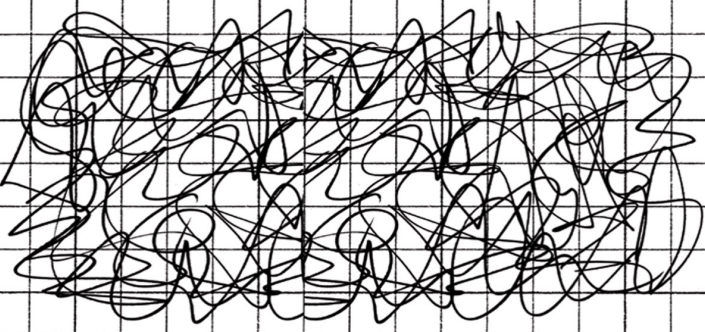d costs feed through to the headline rate. Inflation is expected to fall back to 1.8% in 2009, as base effects become more favourable. A possible risk to the outlook for inflation comes from the labour market. Recent declines in unemployment have yet to lead to a pick-up in wage growth, but surveys suggest that consumers' perception of inflation is much higher than actual inflation. Should this perception persist, pay claims could pick up.

Exchange rates The euro appreciated steadily against the US dollar during 2006 and the first eight months of 2007, before appreciating more sharply in September, after US growth prospects for 2008 weakened and the US Federal Reserve (the central bank) cut official interest rates by 50 basis points. Given recent turmoil in the financial markets, the euro's exchange rate against the US dollar is expected to remain volatile in the coming months. The annual average rate is projected to appreciate from US$1.26:€1 in 2006 to US$1.37:€1 in 2007 and US$1.46:€1 in 2008. However, we expect that as a result of confidence in the US economy recovering the US dollar will then bounce back, leading the euro to depreciate to US$1.33:€1 on average in 2009. There is, however, a risk of a much sharper and more lasting fall in the US dollar against the euro.

External sector The trade balance, which has deteriorated sharply in recent years, will remain in deficit in 2007-09, as the strength of the euro's exchange rate weighs on France's trade competitiveness. The deficit on visible trade will maintain the current account in the red, but the external deficit should remain manageable as a share of GDP, as a result of large surpluses on the services and investment income accounts.

Construction of the World Uncertainty Index from EIU Reports

EIU very standardized process
- Field experts prepare a draft and send it to country experts at headquarters.
- Regional editor to integrate with their own and EIU broader inputs
- Senior editor checks draft to align with overall EIU tone and approach

Pros
- Comparable across countries with a standard process
- Written by country experts for informed professionals

Cons
- Only one EIU report per country per quarter, so limited body of text (noisy)
- Only available quarterly with about 1 month lag

# **Pro** Example China: WUI shows Cultural Revolution (not news EPU)

Cultural revolution

WUI — EPU (right axis) —

Uncertainty related to leadership transitions
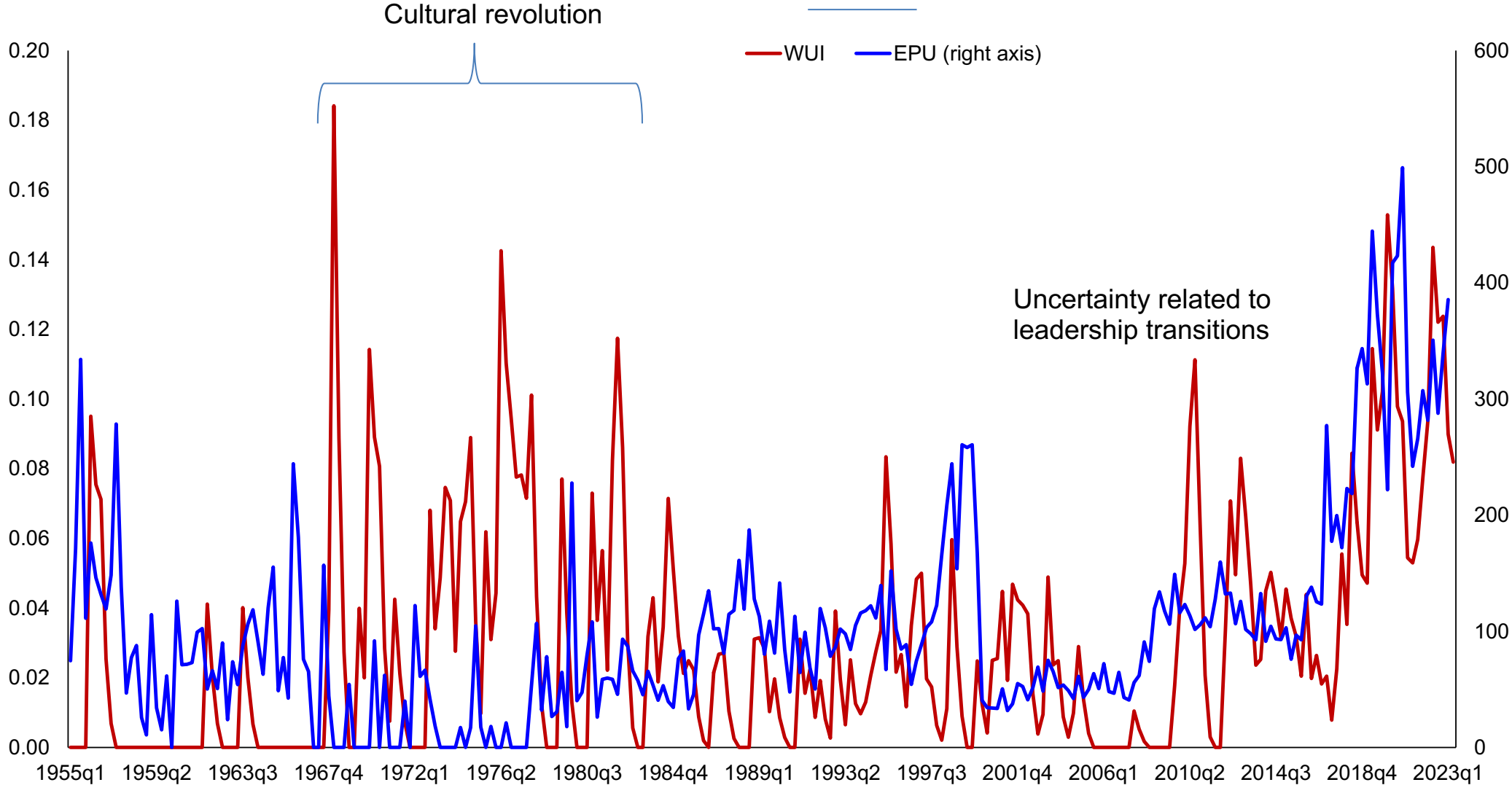
Source: The World Uncertainty Index www.worlduncertaintyindex.com

Fact 1: Global uncertainty has been rising….
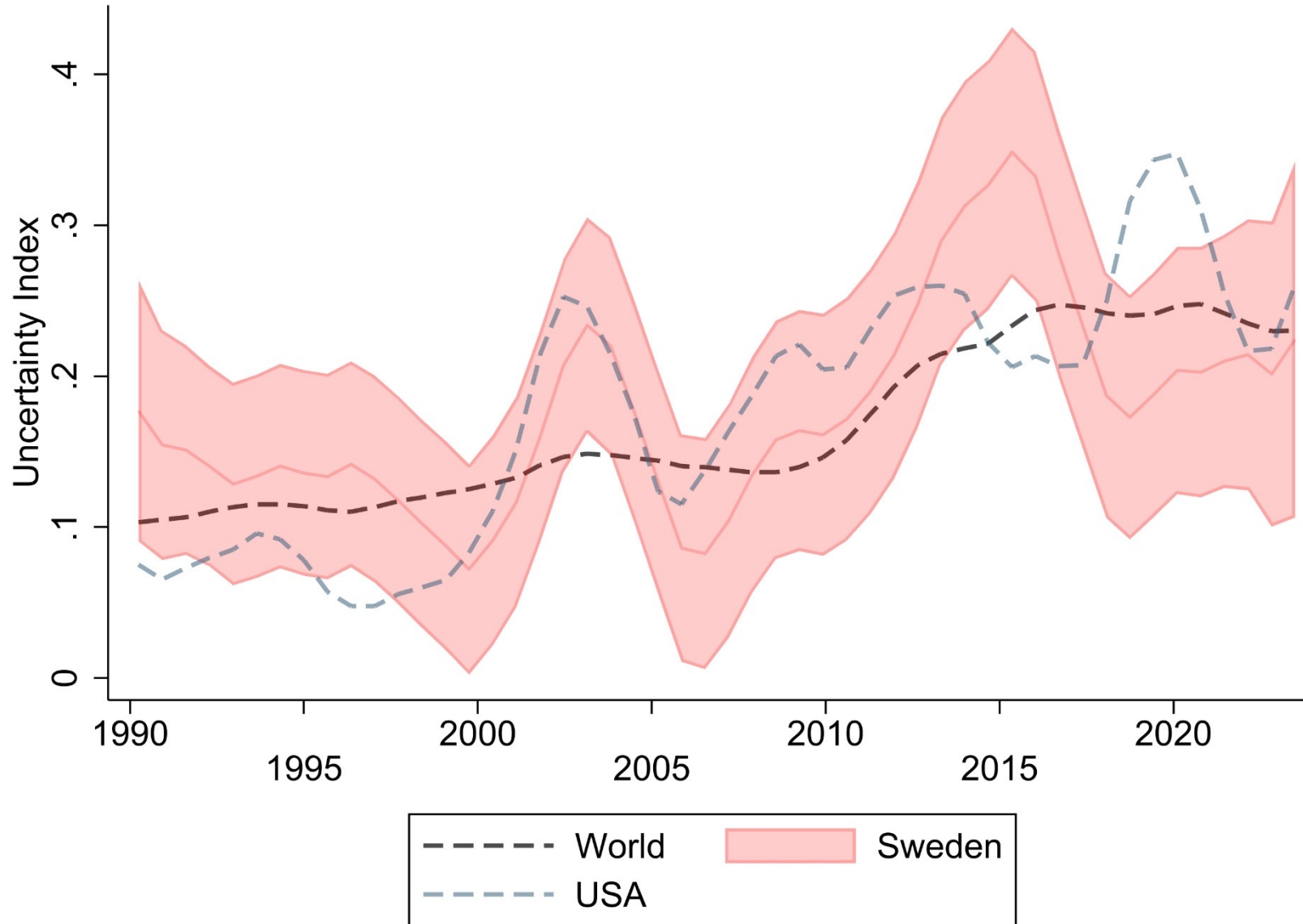
World Uncertainty Index (WUI): Global

Index. GDP weighted average. 1990Q1 to 2023Q2

Print Excel Copy

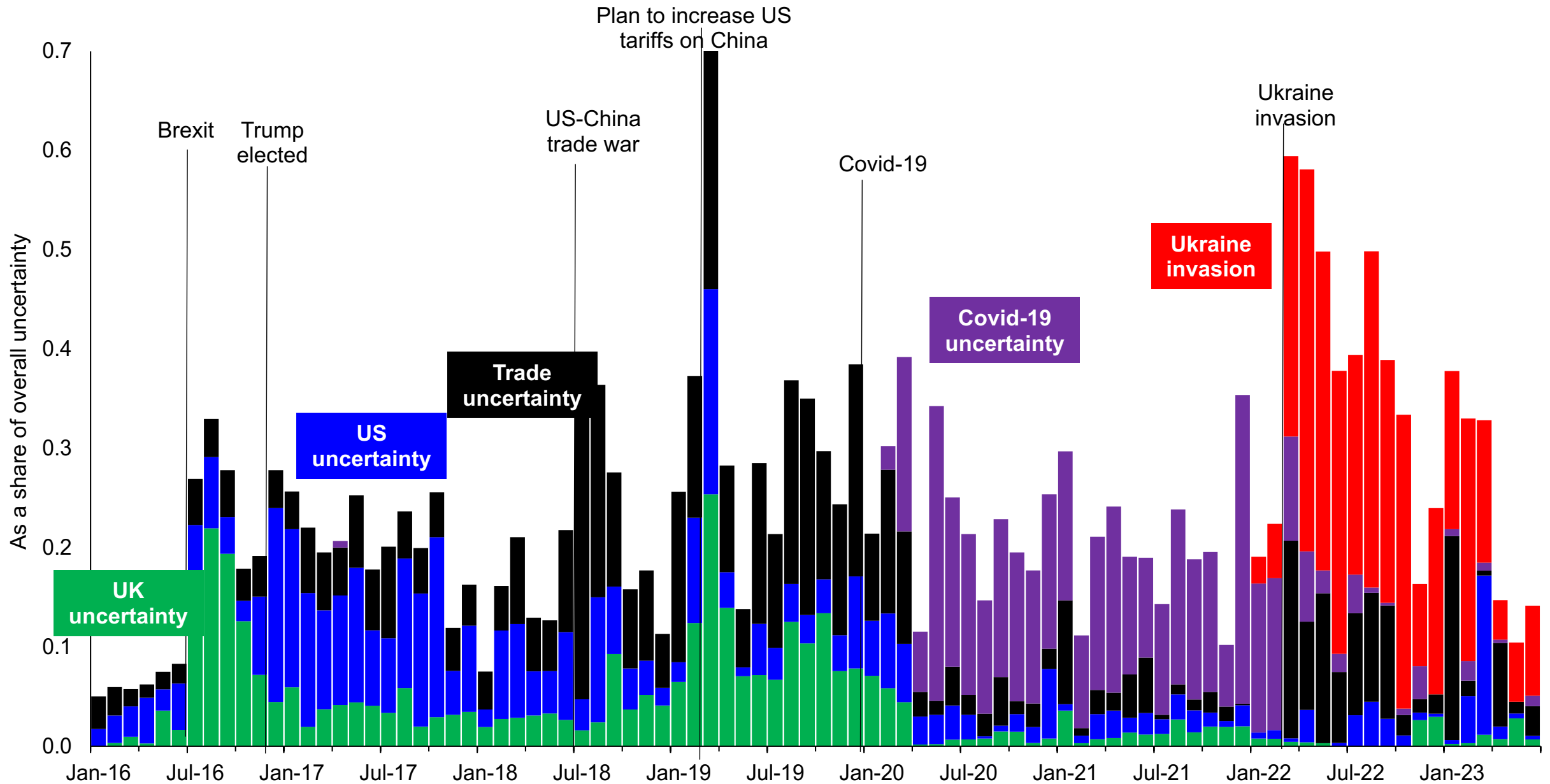Source: https://worlduncertaintyindex.com/
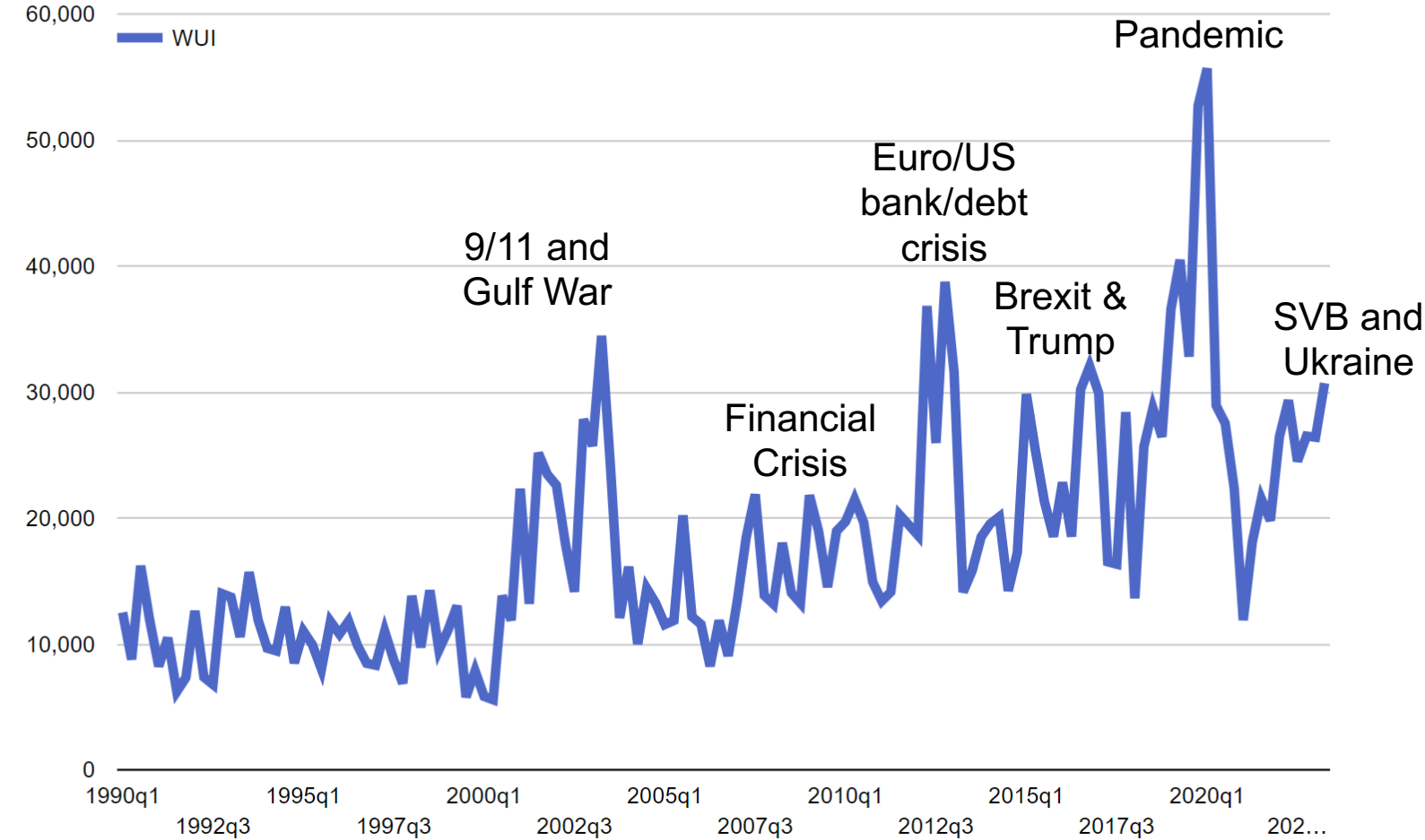
.....including rising in Sweden

Thanks to Bo Becker for the slide using data from www.worlduncertaintyindex.com

Fact 2: The sources of uncertainty change continuously
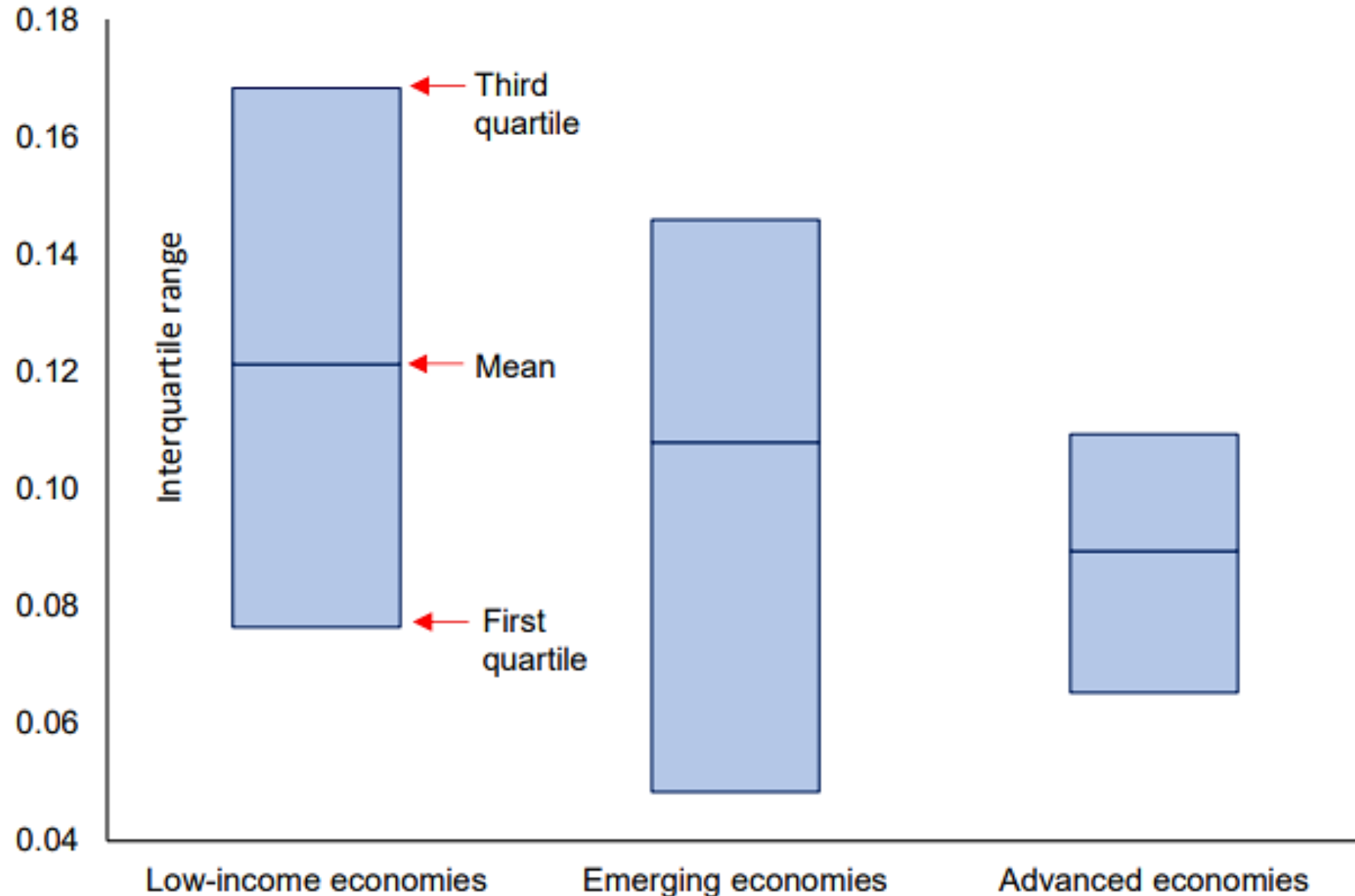

Source: https://worlduncertaintyindex.com/ Note only highlighted sources included (so does not add to the overall index)
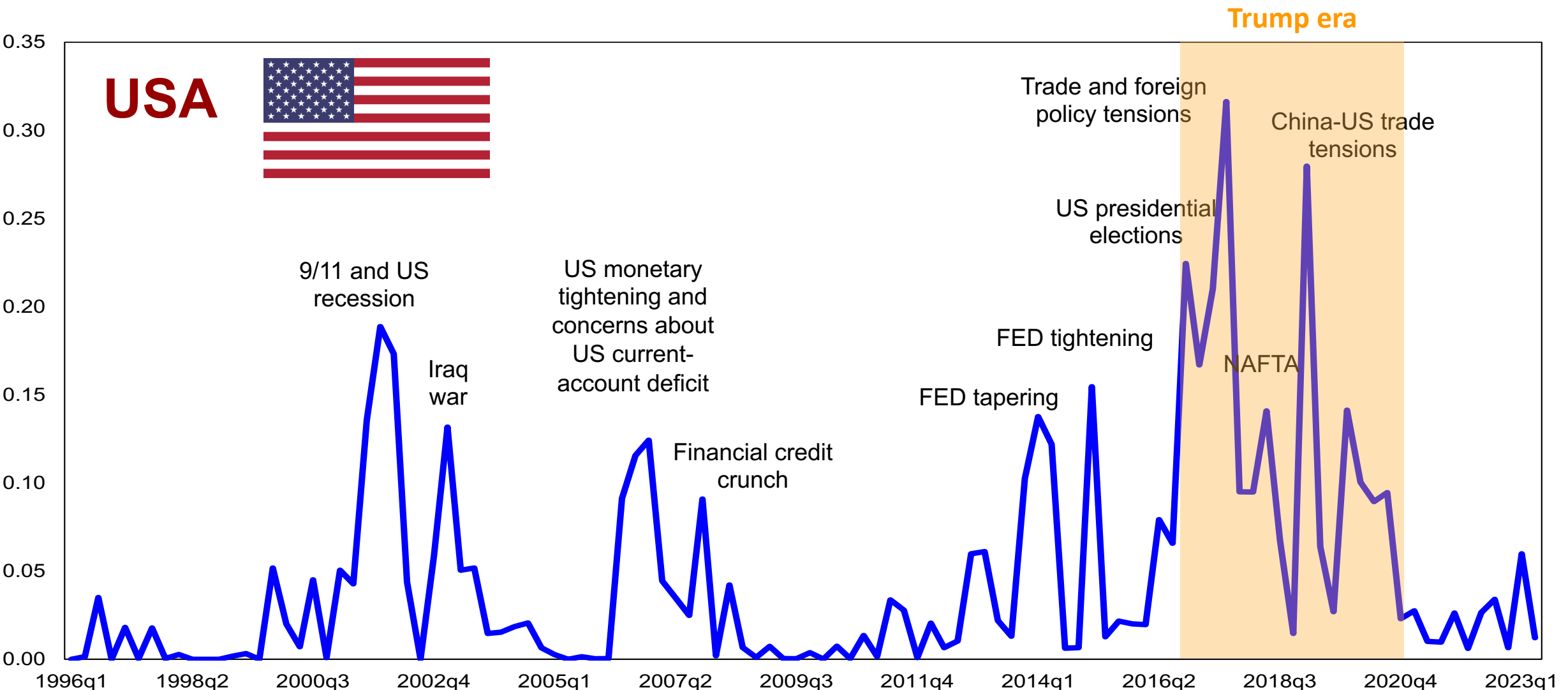
Fact 3: Uncertainty higher in developing economies

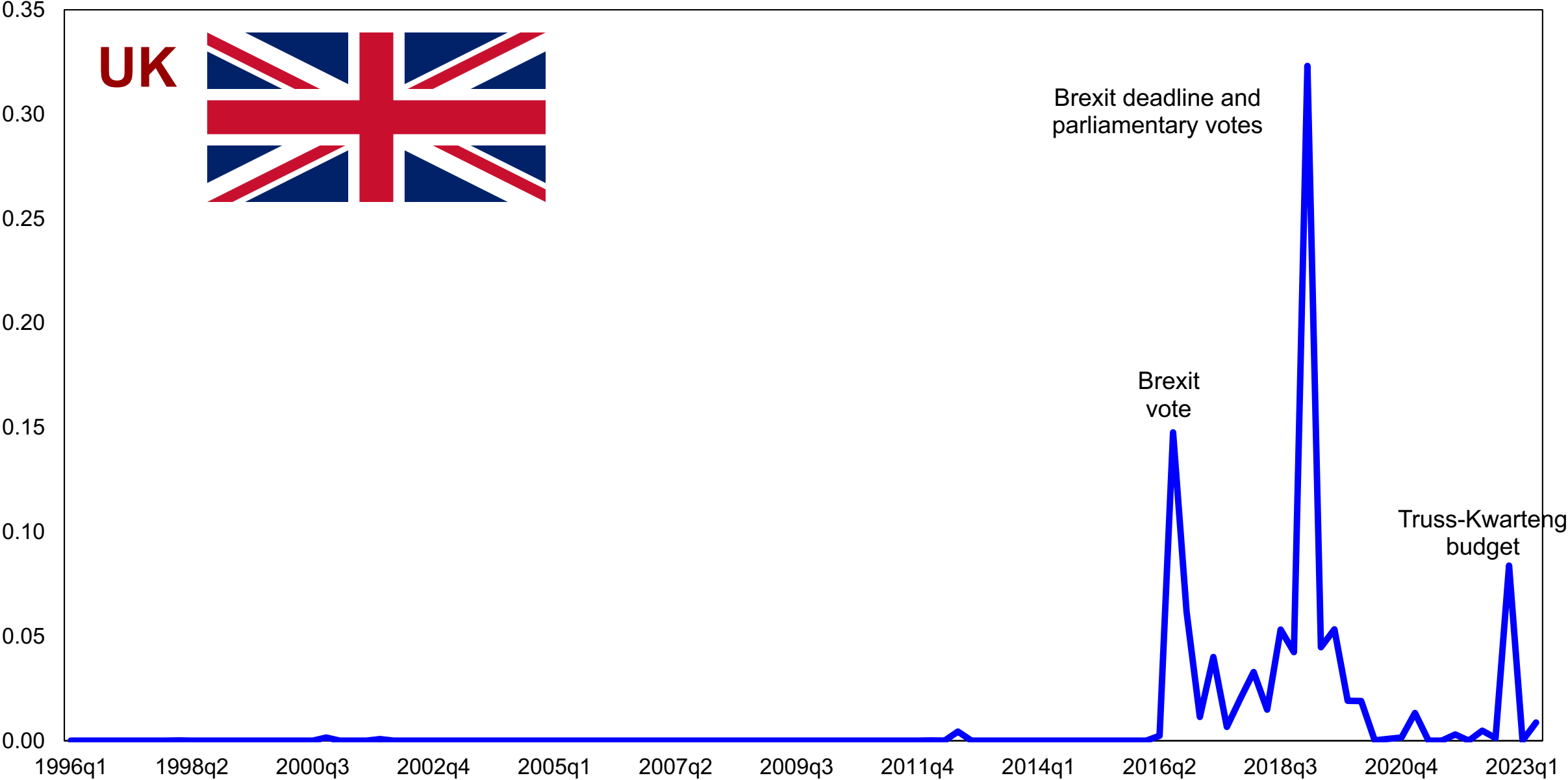Average World Uncertainty Index (WUI) by income group

Source: https://worlduncertaintyindex.com/

Fact 4: Country source of global uncertainty varies – e.g. from the US

Source: Share of all uncertainty words with US focused word in the same sentence https://worlduncertaintyindex.com/ (e.g. USA, Obama, White House etc)

Share of Global Uncertainty from the UK

Source: Share of all uncertainty words with UK focused word in the same sentence https://worlduncert aintyindex.com/ (e.g. UK, Brexit, Truss etc)
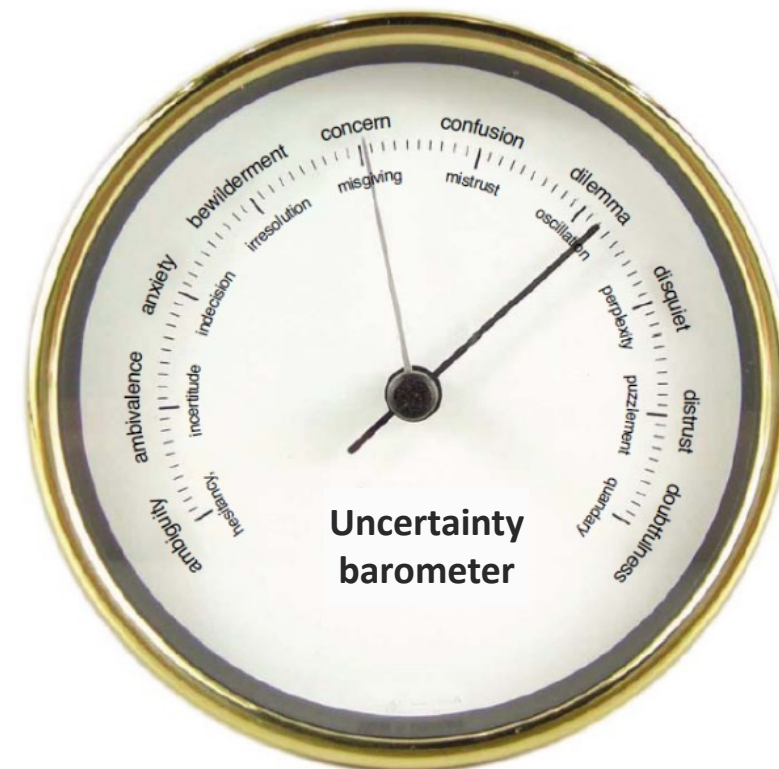
Share of Global Uncertainty from Russia
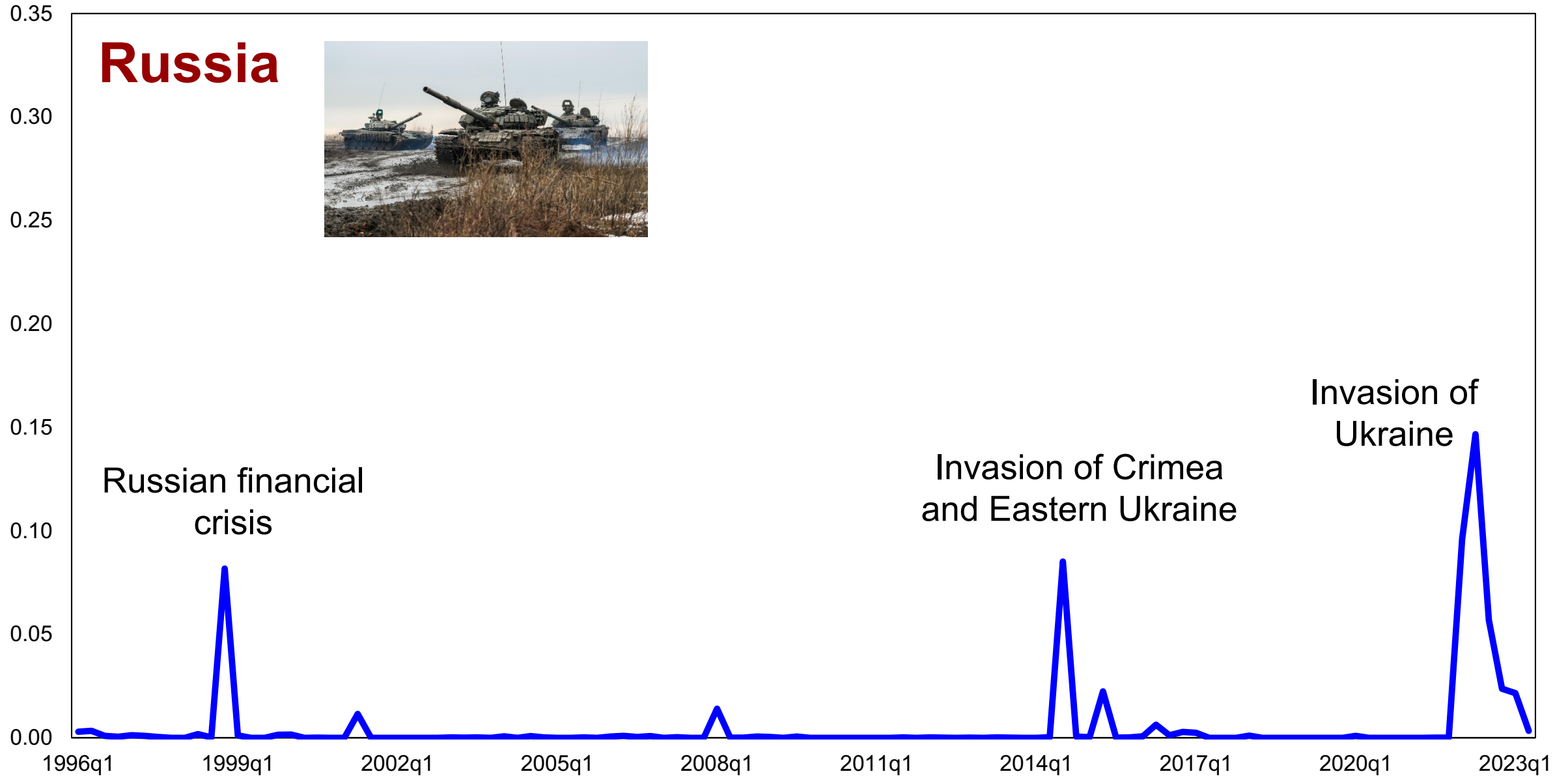
Source: Share of all uncertainty words with Russian focused word in the same sentence https://worlduncertaintyindex.com/ (e.g. Russia, Ukraine etc)

Measuring Uncertainty Across Time and Countries

- Financial Market Data

- Newspapers

- World Uncertainty Index

- **Survey data**

Running a large UK monthly survey of 3,000 firms

Decision Maker Panel
BANK OF ENGLAND

Looking a year ahead from the third quarter of 2020 to the third quarter of 2021, by what % amount do you expect your SALES REVENUE to have changed in each of the following scenarios?

Notes:
a) Please include sales of UK-based businesses only and not from any overseas part of the group.
b) Sales growth scenarios should be ordered from the lowest to the highest.

The LOWEST % change in sales revenue would be about: `0` %

A LOW % change in sales revenue would be about: `3` %

A MIDDLE % change in sales revenue would be about: `5` %

A HIGH % change in sales revenue would be about: `7` %

The HIGHEST % change in sales revenue would be about: `10` %

Decision Maker Panel
BANK OF ENGLAND

Please assign a percentage likelihood (probability) to the % changes in SALES REVENUE you entered (values should sum to 100%)

LOWEST: The likelihood of realising about **0%** would be: `15` %

LOW: The likelihood of realising about **3%** would be: `25` %

MIDDLE: The likelihood of realising about **5%** would be: `30` %

HIGH: The likelihood of realising about **7%** would be: `20` %

HIGHEST: The likelihood of realising about **10%** would be: `10` %

Total `100` %

81% respondents are CFO/CEOs, and 14% are financial managers

Percentage of respondents

Position of DMP respondents
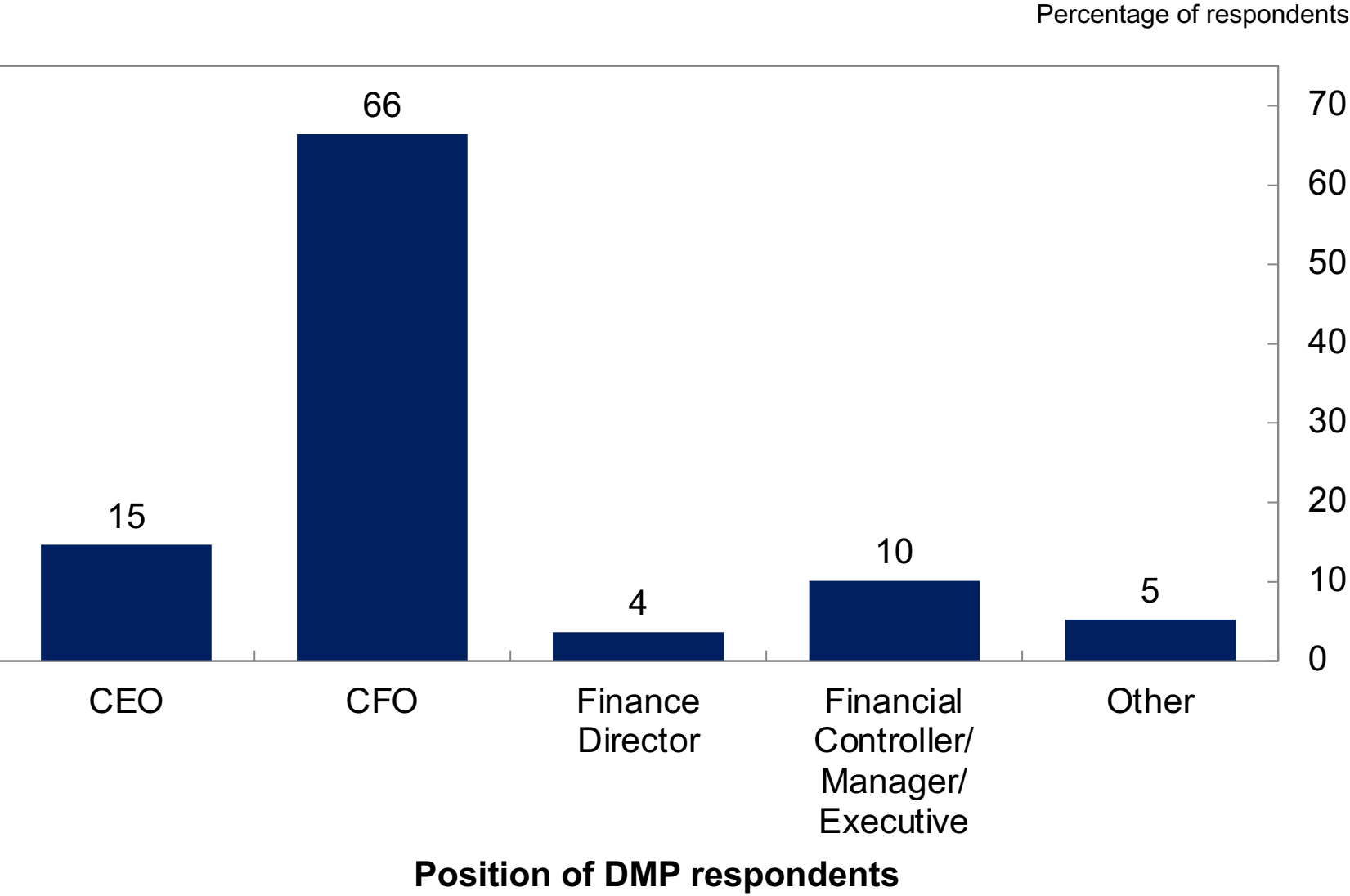
Similar Monthly US survey on 500 firms with the Atlanta Fed

Key questions on sales as follows

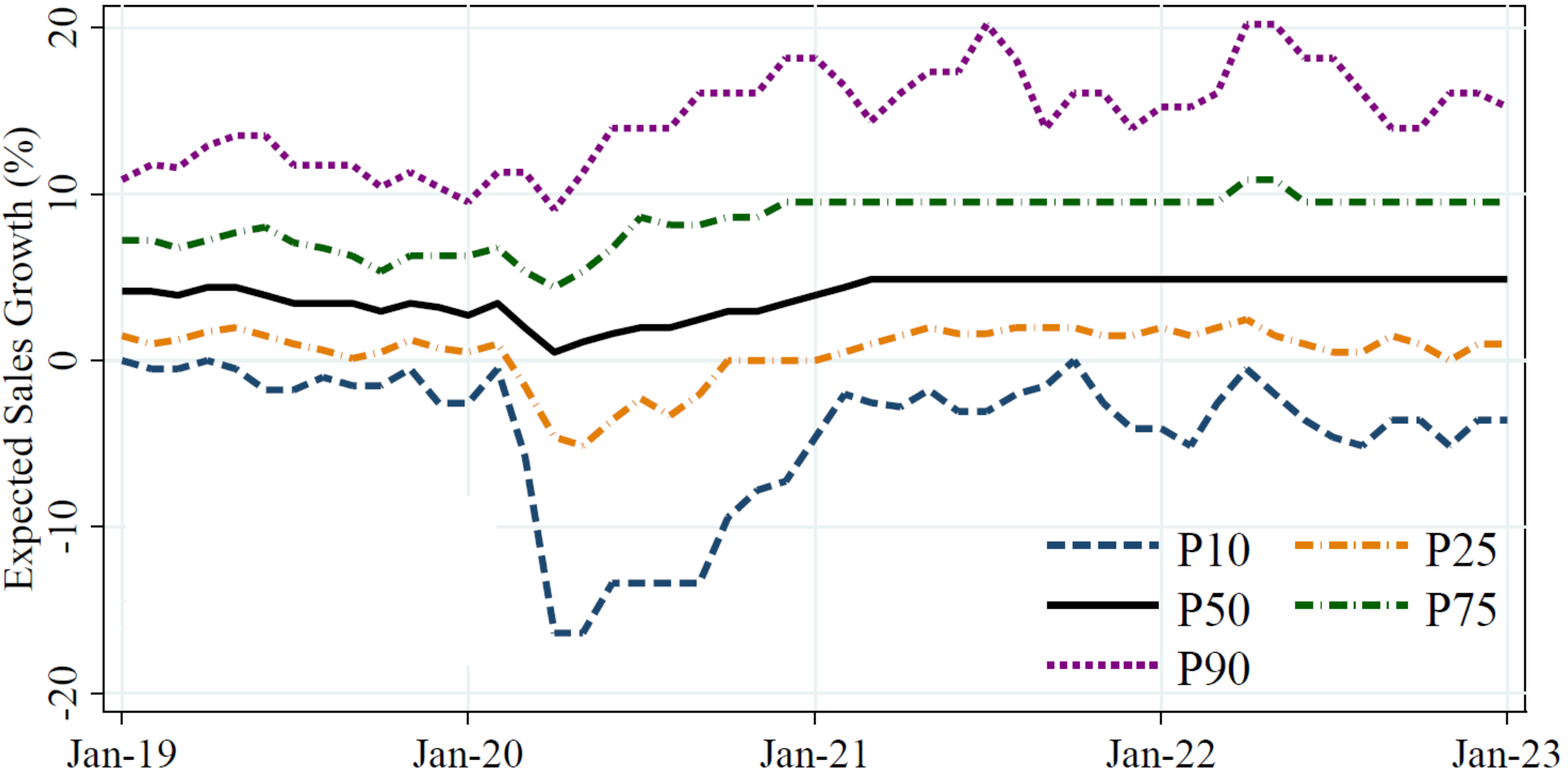|	
Looking ahead, from now to four quarters from now, what approximate percentage sales revenue growth rate would you assign to each of the following scenarios?	Please assign a percentage likelihood to the sales revenue growth rates you entered. (Values should sum to 100%)

The LOWEST percentage sales revenue growth rate would be about:	-10 %
A LOW percentage sales revenue growth rate would be about:	0 %
A MIDDLE percentage sales revenue growth rate would be about:	3 %
A HIGH percentage sales revenue growth rate would be about:	8 %
The HIGHEST percentage sales revenue growth rate would be about:	16 %

|	
LOWEST: The likelihood of realizing a **-10%** sales revenue growth rate would be:	10 %
LOW: The likelihood of realizing a **0%** sales revenue growth rate would be:	20 %
MIDDLE: The likelihood of realizing a **3%** sales revenue growth rate would be:	40 %
HIGH: The likelihood of realizing a **8%** sales revenue growth rate would be:	20 %
HIGHEST: The likelihood of realizing a **16%** sales revenue growth rate would be:	10 %
Total	100 %

Averaging across firms reveals upside and downside risks (US data)

Uncertainty in sales and hiring has fallen back post COVID (US data)
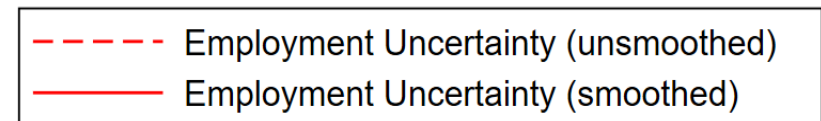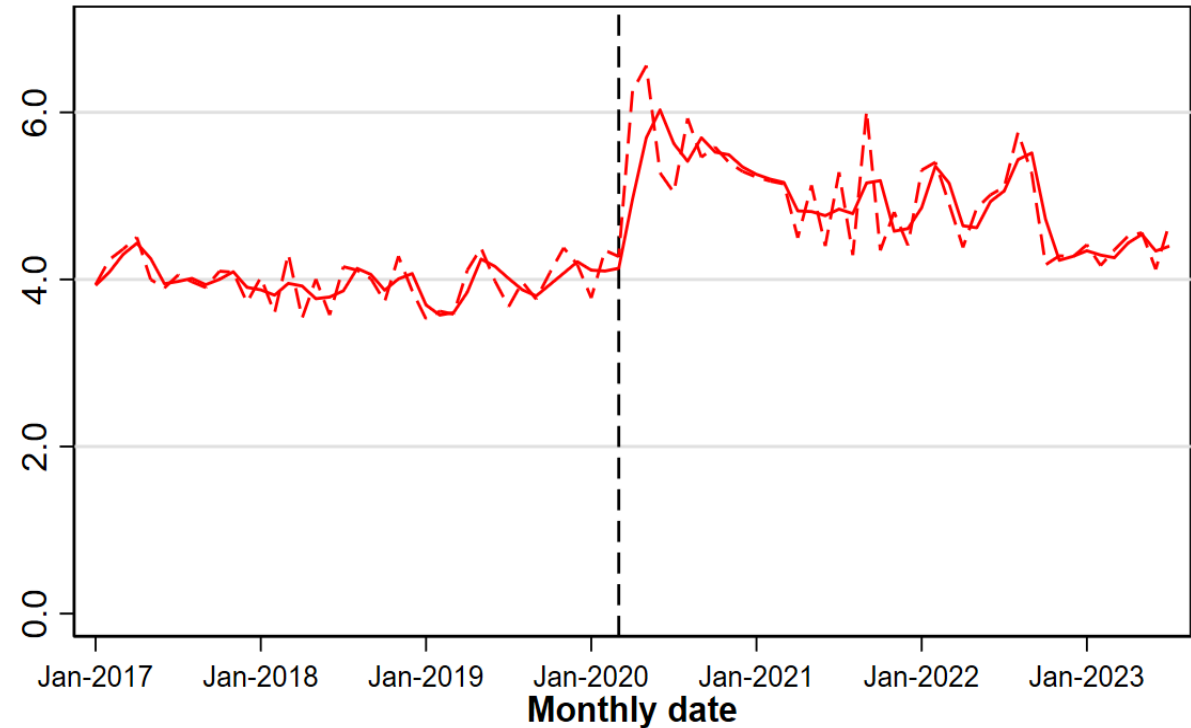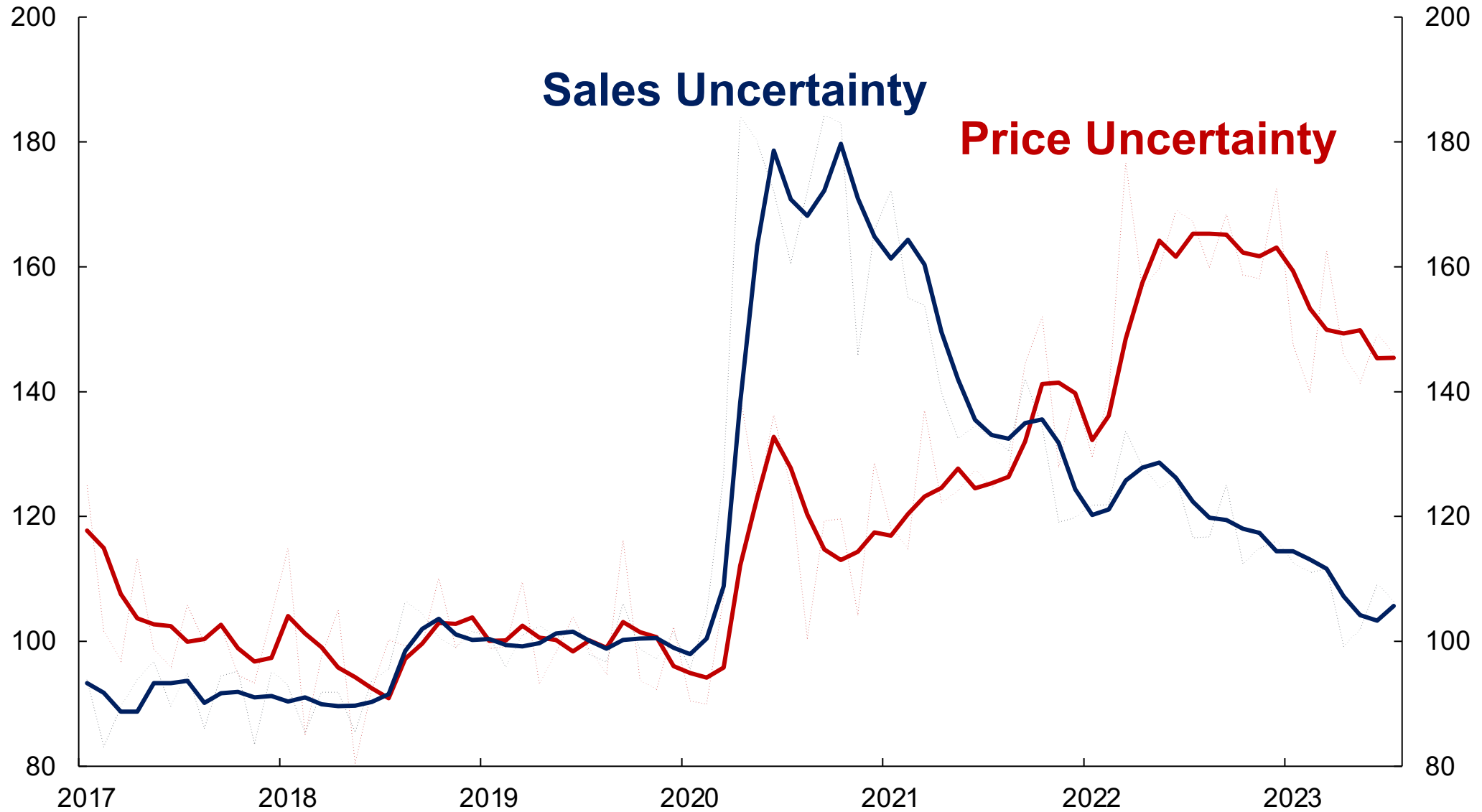

Sales uncertainty
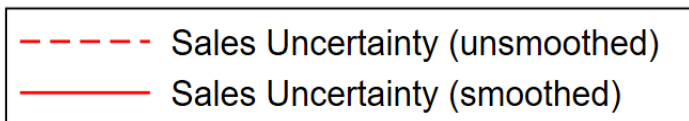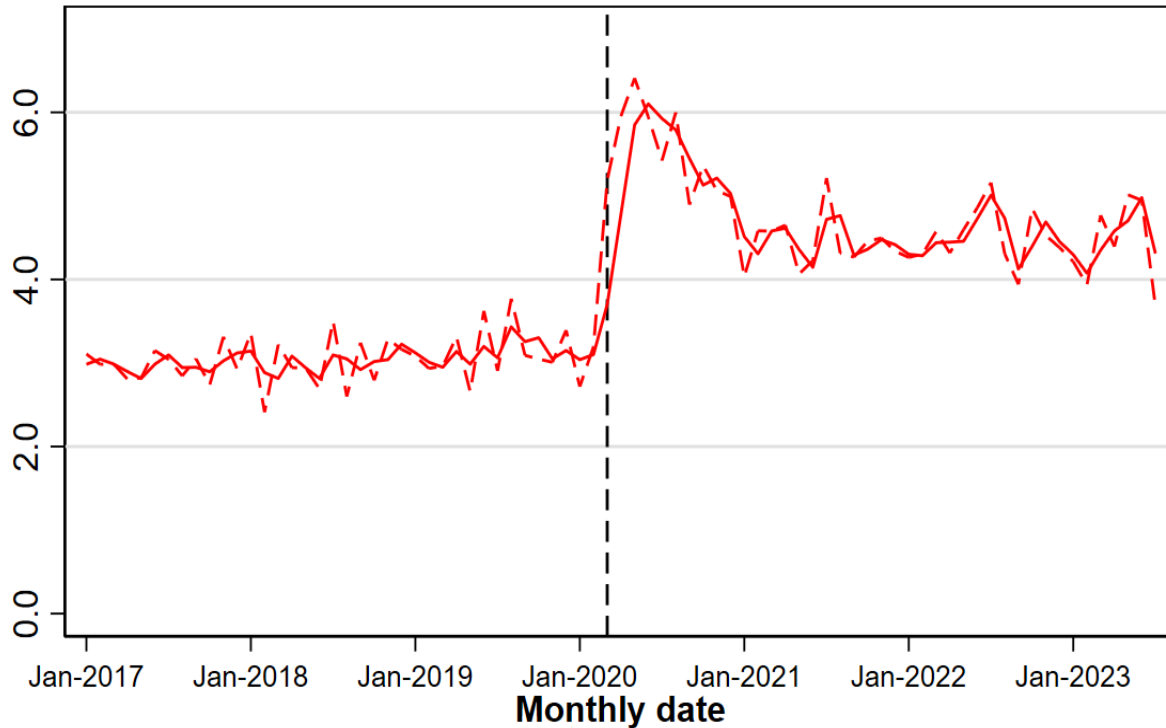
Hiring uncertainty

Source: Survey of Business Uncertainty conducted by the Federal Reserve Bank of Atlanta, Stanford University, and the University of Chicago Booth School of Business. For more information, see "Surveying Business Uncertainty"

Since 2022 a major lingering uncertainty from inflation (prices)

Index (2019=100)
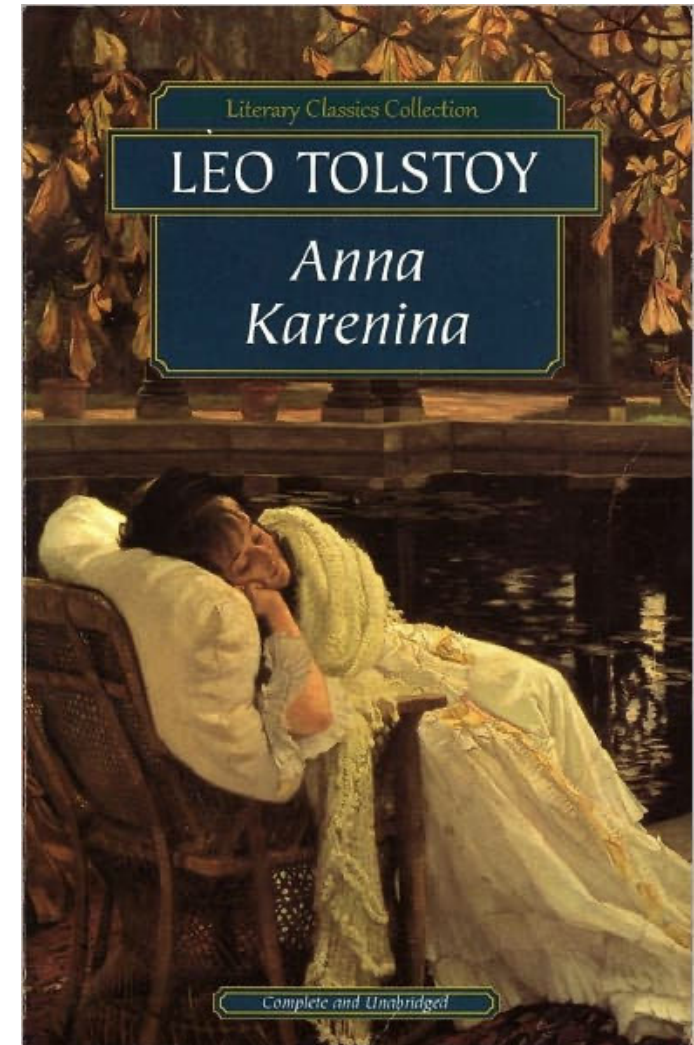

Sales Uncertainty

Price Uncertainty

What about future uncertainty shocks?

The "Anna Karenina" theory of uncertainty

Certain times are all alike; each uncertainty shock is uncertain in its own way

So what to do – three tips from our recent HBR article

1. Follow domestic & global economics and politics

2. Pay for flexibility (e.g. lease vs buy)

3. Use contingency planning
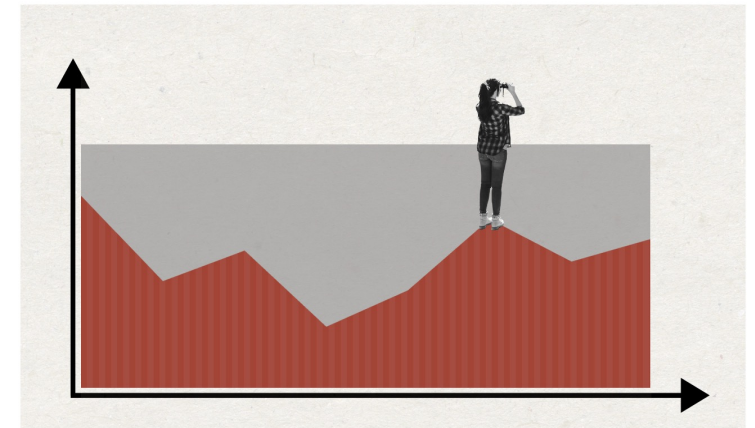

Harvard Business Review

Diversity   Latest   Magazine   Ascend   Topics   Podcasts   Video   Store   The Big Idea

Economics

Visualizing the Rise of Global Economic Uncertainty

by Nicholas Bloom, Hites Ahir, and Davide Furceri

September 29, 2022

HBR Staff/Manuel De Los Reyes Rubio/EyeEm/Lesia_G/Getty Images

Post slides on Linked-In, all research papers on my website

Back-Up Slides

Can also measure types of uncertainty: e.g. Trade Uncertainty

World Trade Uncertainty Index over time

■ Some of the key dates in the US-China trade negotiations

The US calls of December tariffs in anticipation of a deal

Uncertainty related to US-China trade tension

The US and China agree to resume trade talks.

Tariff increase on US$200 billion of imports from China is scheduled to go into effect on March 1. But a delay is announced on February 24.

A tariff truce between the US and the China is annouced.

A series of tariffs by the US and China goes into effect.

A seies of tariffs by the US and China goes into effect. The US also ends tariff exemptions for EU, Canada, and Mexico. EU and Canada imposes tariff on the US.

Uncertainty related to US-China trade tension

The US imposes Safeguard Tariffs as well as steel and aluminium tariffs.

Note: The WTUI index is computed by counting the number of times uncertain (or the variant) is near the following words: protectionism, North American Free Trade Agreement (NAFTA), tariff, trade, United Nations Conference on Trade and Development (UNCTAD) and World Trade Organization (WTO) in EIU country reports. The WTUI is then normalized by total number of words and rescaled by multiplying by 1,000. For the list of countries included in the index, see Table 1. Period covered is 1996Q1 to 2023Q2.

41

Measuring types of uncertainty – e.g. Pandemic Uncertainty

World Pandemic Uncertainty Index over time,
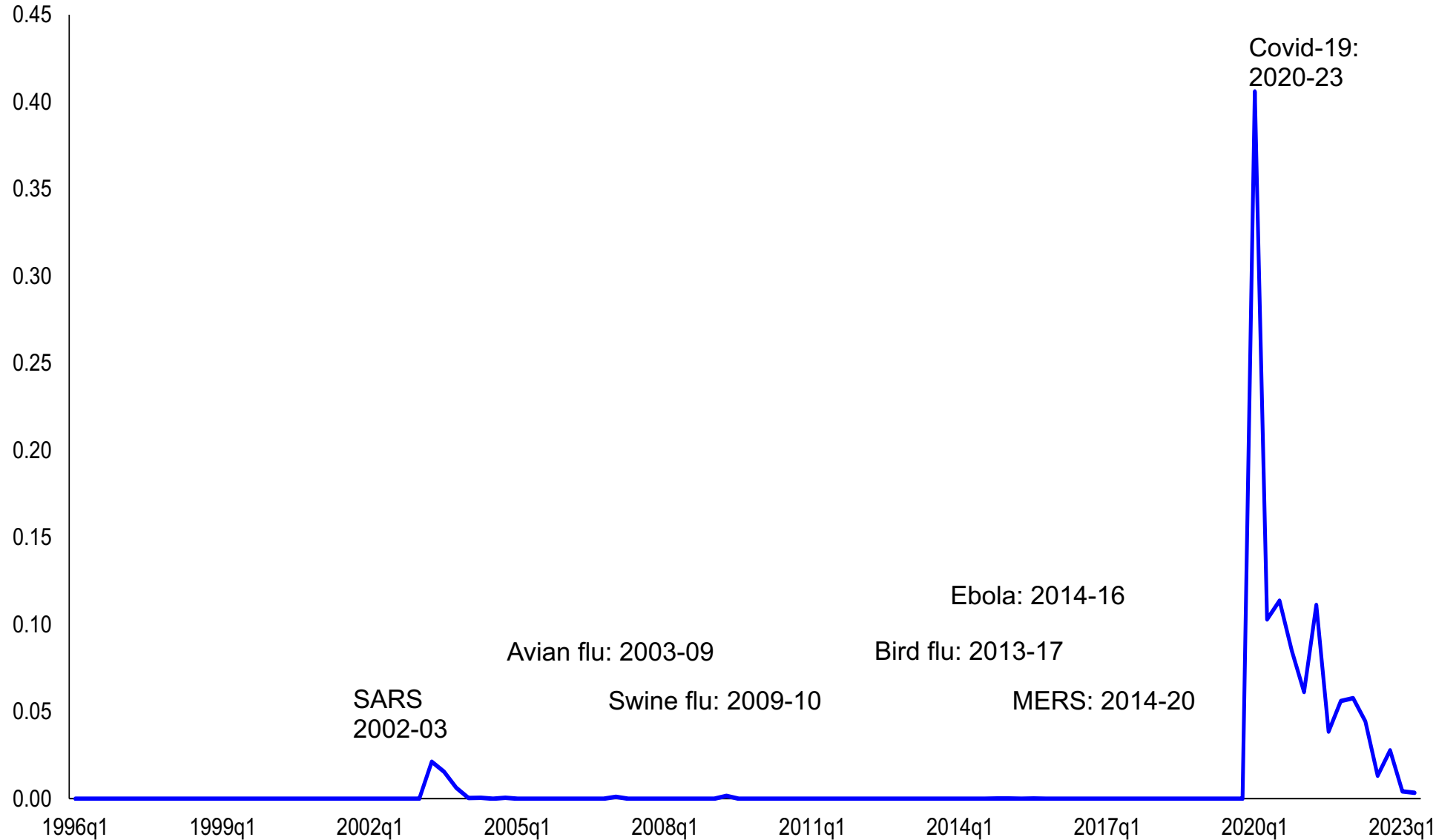
Covid-19: 2020-23

Ebola: 2014-16

Avian flu: 2003-09

Bird flu: 2013-17

SARS 2002-03

Swine flu: 2009-10

MERS: 2014-20

Note: The WPUI index is computed by counting the number of times uncertain (or the variant) is near the following words: Severe Acute Respiratory Syndrome (SARS), Avian flu, H5N1, Swine flu, H1N1, Middle East respiratory syndrome (MERS), Bird fu, Ebola, Coronavirus, Covid-19, Influenza, H1V1, and World Health Organisation (WHO) in EIU country reports. The WPUI is then normalized by total number of words and rescaled by multiplying by 1,000.. Period covered is 1996Q1 to 2023Q2.

Uncertainty shocks are followed by large economic contractions

GDP response to WUI innovations—annual data
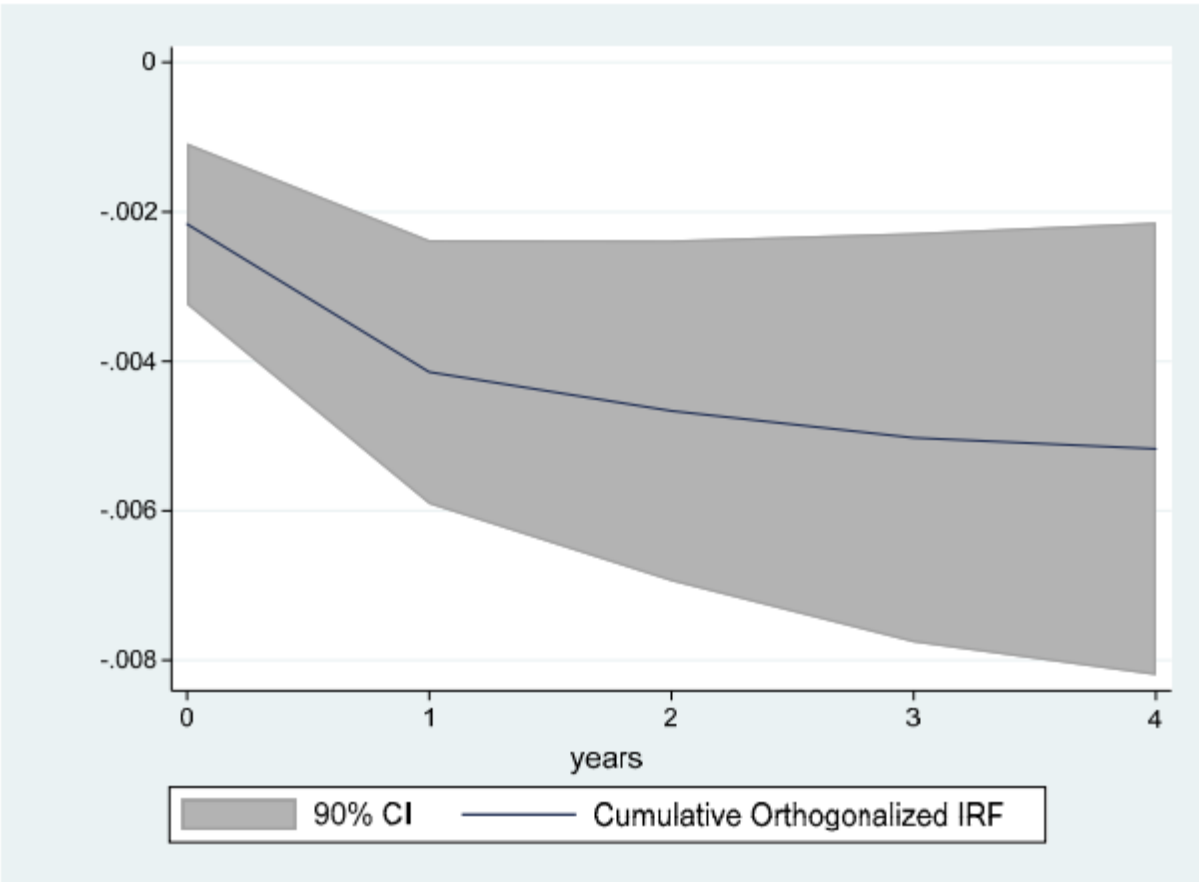
Note: VAR fit to annual data for a panel of 143 countries from 1952 to 2020. Impulse responses of GDP to a one-standard deviation increase in the WUI—equal to the change in average value in the index from 2014 to 2016—based on a Cholesky decomposition with the following order: the WUI and GDP growth. The specification includes two lags of all variables. Country and time fixed effects are included.

GDP response to WUI innovations—IV exogenous elections
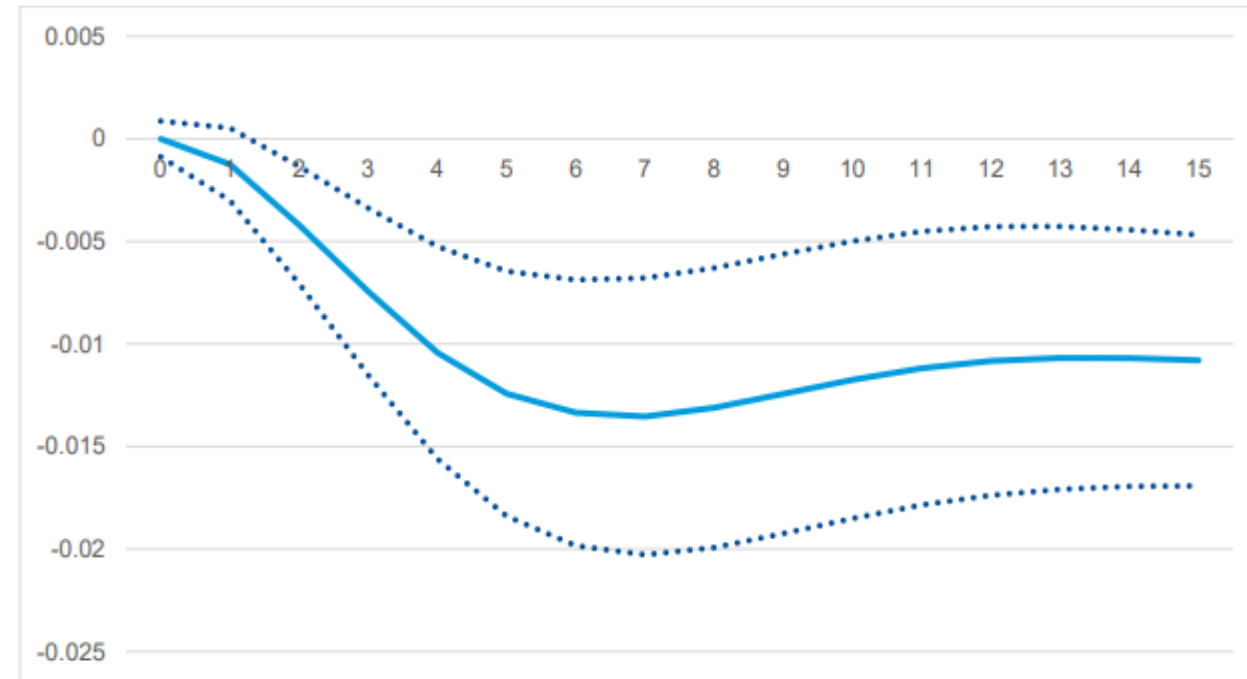
Note: VAR fit to quarterly data for an unbalanced panel of 49 countries from 1970q1 to 2020q4. Impulse responses of GDP to a one-standard deviation increase in WUI—equal to the change in average value in the index from 2014 to 2016—using as instrument exogenous elections and based on a Cholesky decomposition with the following order: exogenous elections, the log of average stock return, the WUI and GDP growth. The specification includes four lags of all variables. Country and time fixed effects are included. First stage:
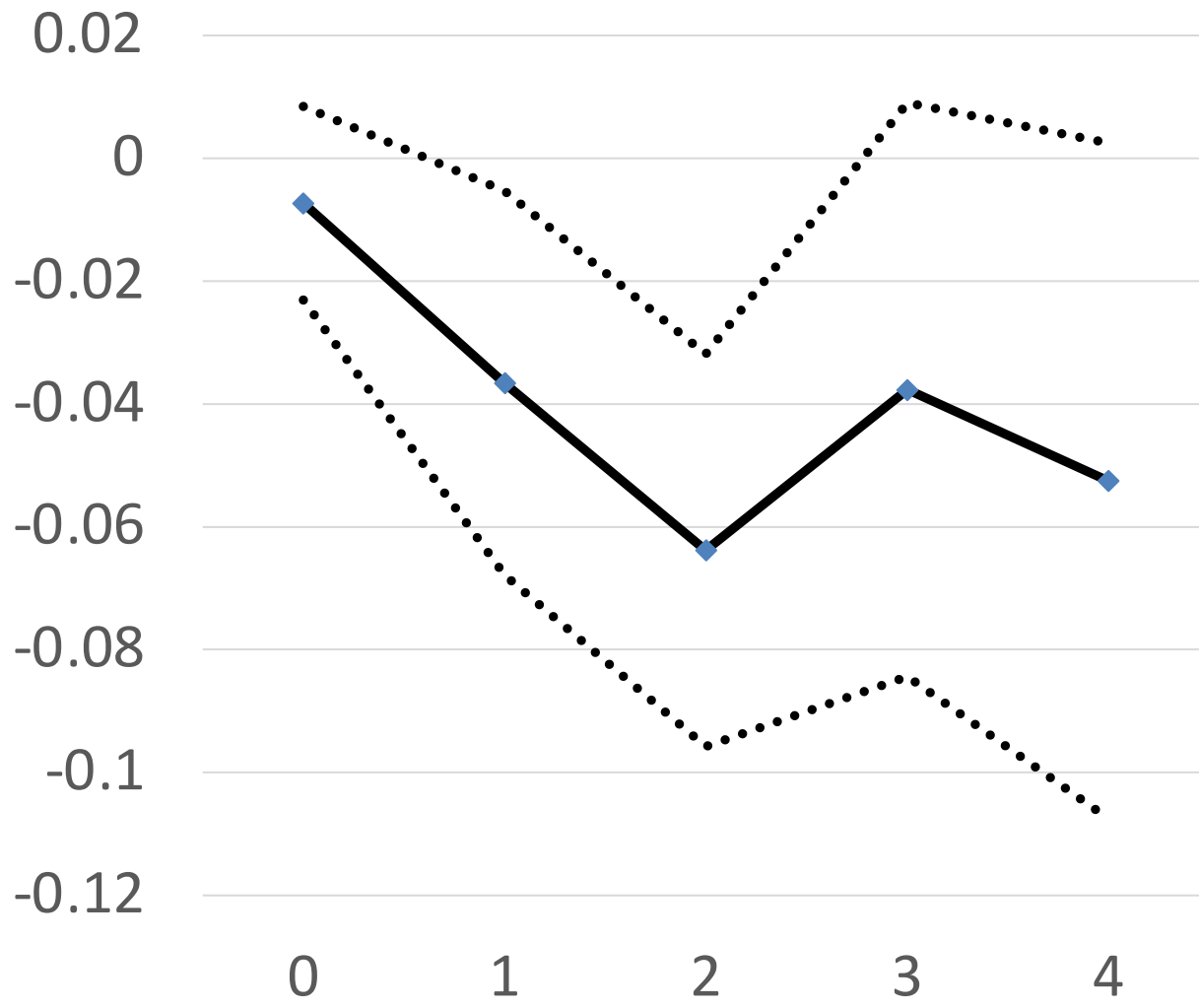
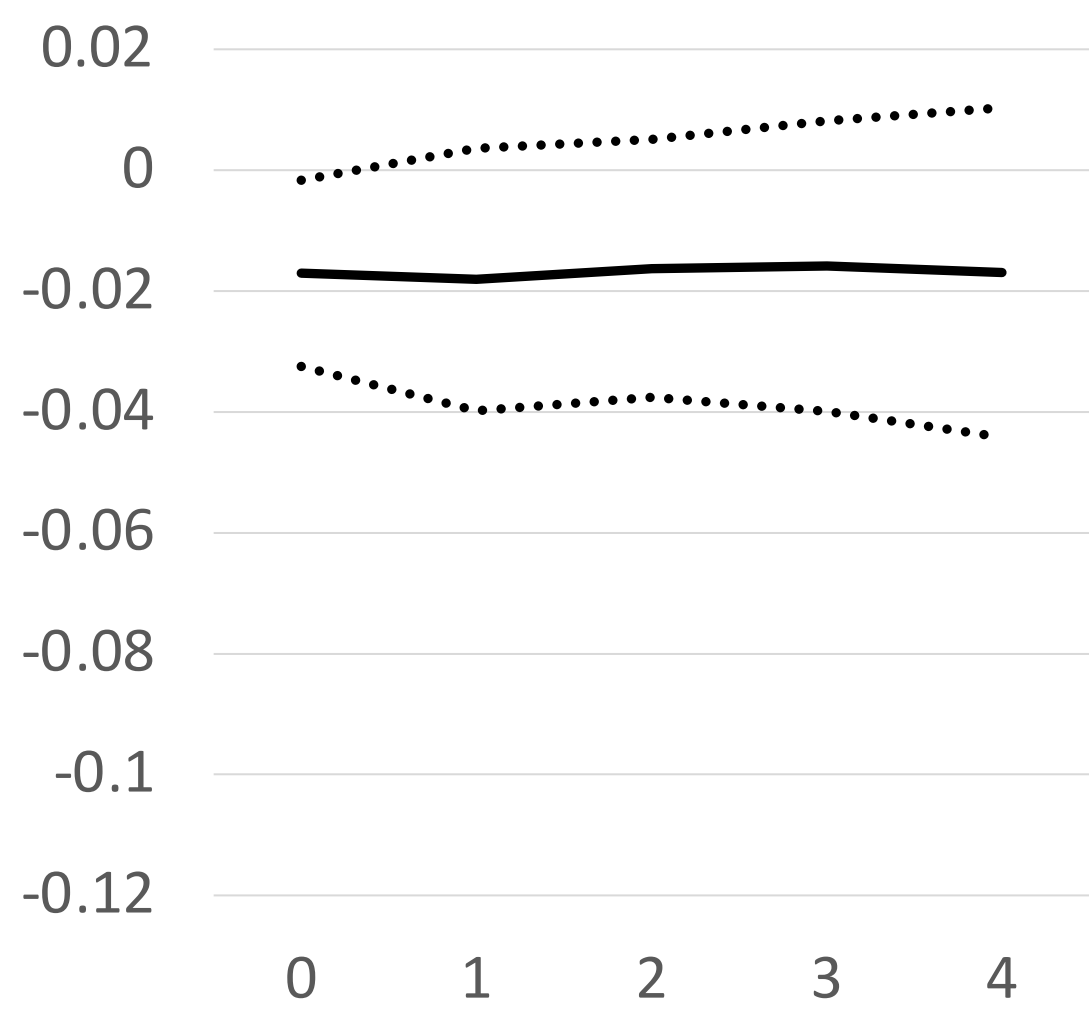$$WUI_{i,t} = 0.185 + 0.099 Exogenous\ elections$$
$$(6.09)$$

t-statistics in parenthesis.

Effects of uncertainty larger with weaker rule-of-law

Below-median rule of law

Above-median rule of law

Note: Response estimated using the local projection method (Jorda 2005) : $y_{i,t+k} - y_{i,t-1} = \alpha_i + \gamma_t + \beta^l D_i WUI_{i,t} + \beta^h (1 - D_i) WUI_{i,t} + \theta' X_{i,t} + \varepsilon_{i,t}$