Managing government debt at high altitude: velocity, instability and headwinds
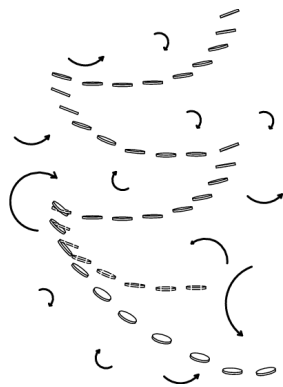
Eddie Casey

Irish Fiscal Advisory Council
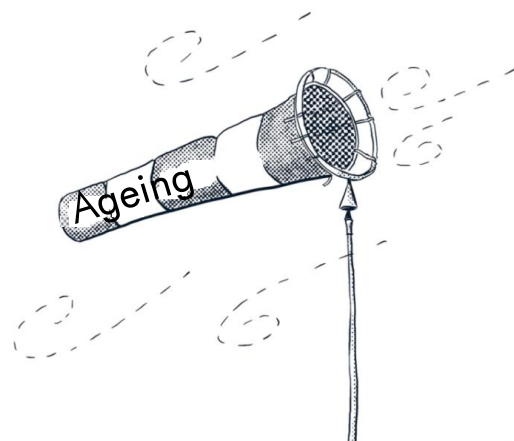
9 February 2021

Velocity

High debt ratios should fall at a fast pace, given the favourable interest-growth (i-g) environment we are in.

Instability

The favourable environment means higher deficits and debt ratios can be sustained.

But with higher debt ratios comes instability – things can change quickly and there is more uncertainty.
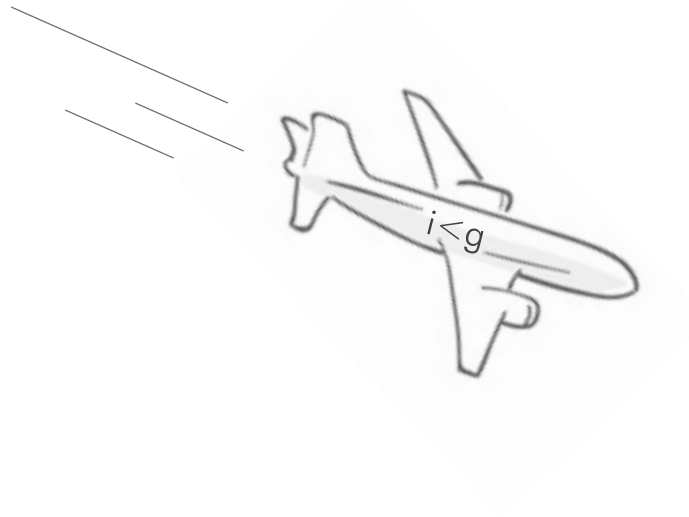
Headwinds

There are many pressures that we know are coming. These include ageing-related costs like pensions.

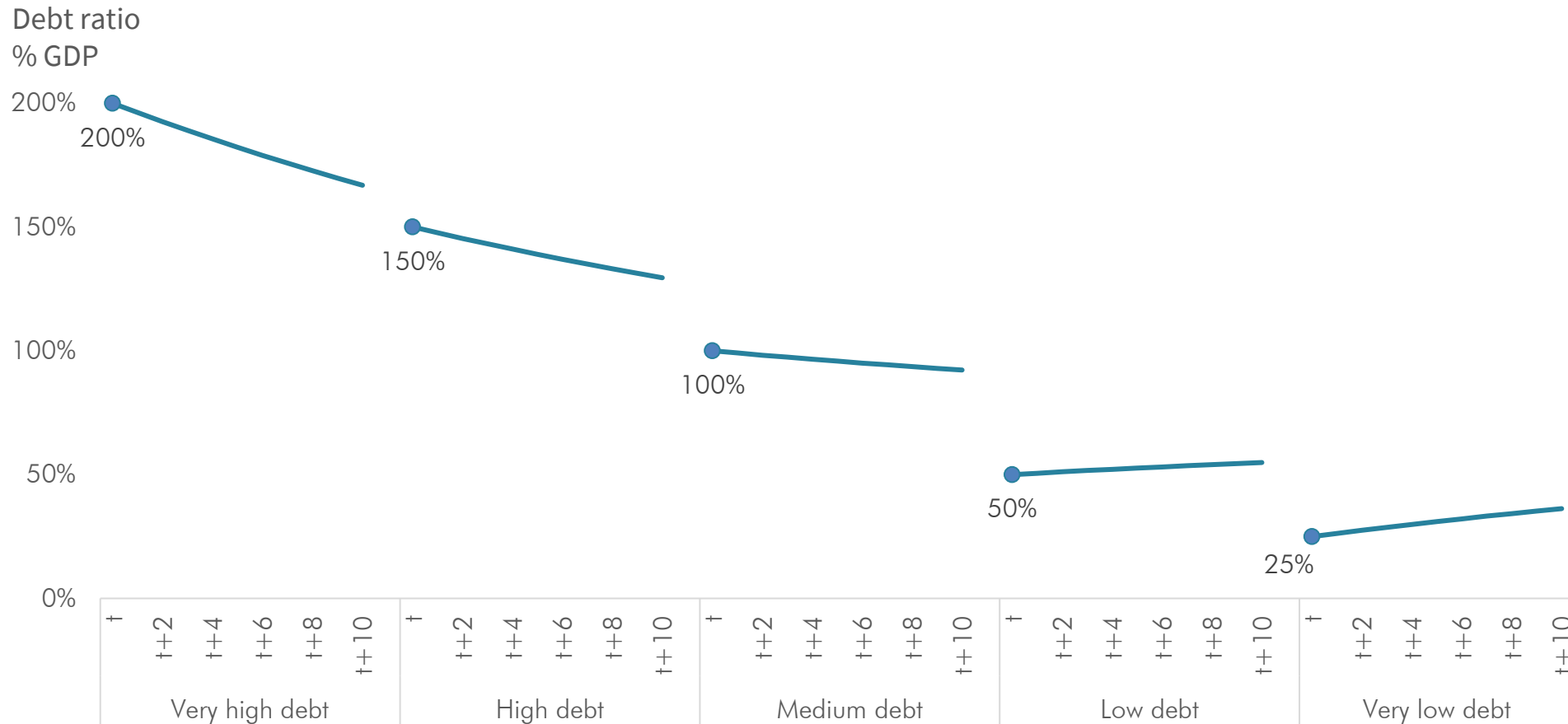These pressures will raise deficits and add to debt further.

Ageing

1 Velocity

High debt ratios should fall at a fast pace, given the favourable interest-growth (i-g) environment we are in.

$i<g$

Velocity:
The counterintuitive, short-run benefits of high debt and i<g

Debt ratio
% GDP

- 200%
- 150%
- 100%
- 50%
- 0%

200%

150%

100%

50%

25%

t · t+2 · t+4 · t+6 · t+8 · t+10 — Very high debt

t · t+2 · t+4 · t+6 · t+8 · t+10 — High debt

t · t+2 · t+4 · t+6 · t+8 · t+10 — Medium debt

t · t+2 · t+4 · t+6 · t+8 · t+10 — Low debt
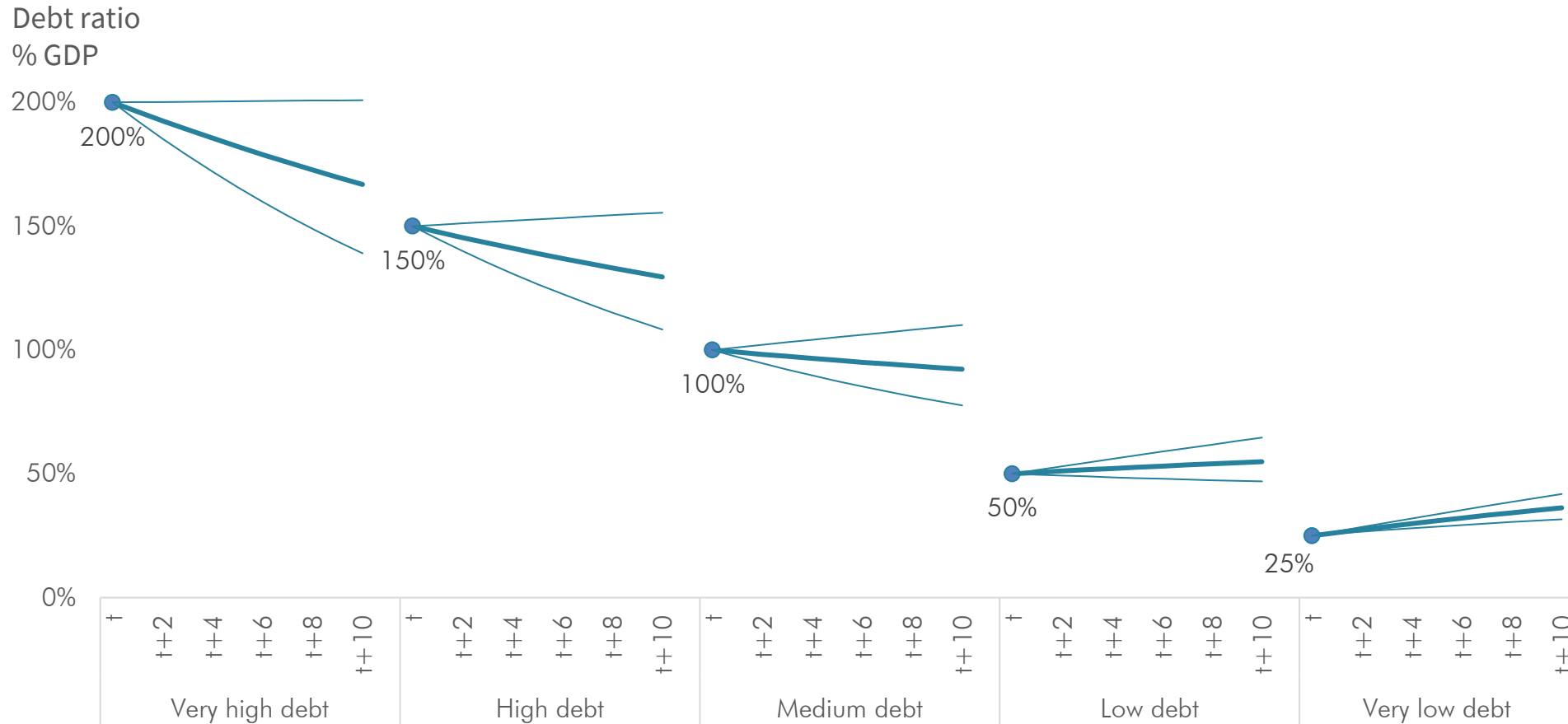
t · t+2 · t+4 · t+6 · t+8 · t+10 — Very low debt

Sources: Own workings.
Notes: For different starting debt ratios, the figure shows how illustrative cases of i<g help higher debt ratios to fall quickly. It assumes i-g = -3%, where i<g helps higher debt ratios to fall quickly, and PB = -2%.

D = debt ratio;

i = interest rate;

g = growth rate;

PB = primary balance

Velocity:
Benefits remain provided i remains <g

Debt ratio % GDP

Very high debt · High debt · Medium debt · Low debt · Very low debt

D = debt ratio;

i = interest rate;

g = growth rate;

PB = primary balance

Velocity:
Long run, it doesn't matter where you start

Debt ratio
% GDP

140%

70%

0%

t	t+100 t+200	t	t+100 t+200	t	t+100 t+200	t	t+100 t+200	t	t+100 t+200
	Very high debt		High debt		Medium debt		Low debt		Very low debt	
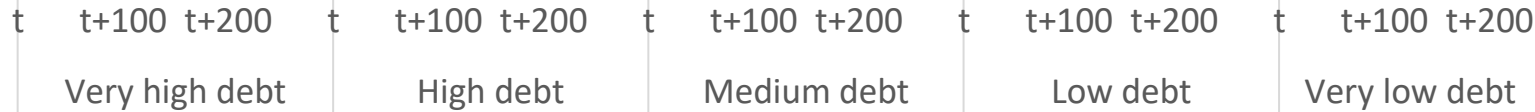
Eventually, debt ratios all stabilise at some level determined by i<g and a given PB

Here it's 70% for i-g=-3% and PB = -2%

D = debt ratio;

i = interest rate;

g = growth rate;

PB = primary balance

Velocity:
Debt ratios will stabilise at certain levels for a given i<g

Debt ratios converged to over the long run, % GDP

		-1	-2	-3	-4	-5	i−g -6
	3	<0	<0	<0	<0	<0	<0
	2	<0	<0	<0	<0	<0	<0
	1	<0	<0	<0	<0	<0	<0
	0	0	0	0	0	0	0
	-1	103	52	34	26	21	17
	-2	206	103	69	52	41	34
	-3	309	155	103	77	62	52
	-4	412	206	137	103	82	69
PB	-5	515	257	172	129	103	86

D = debt ratio;

i = interest rate;

g = growth rate;

PB = primary balance

Notes: The table shows the debt ratios that are converged on over the very long run for a variety of i<g configurations in percentage points and primary balances as % GDP. We assess for over two millennia, though, in a substantive sense, convergence is typically achieved in a century. The exercise assumes that g = 3%. Other assumptions for realistic values of g do not produce substantially different outcomes.

Velocity:
The debt accumulation equation

Change in debt:
$$\Delta D_t = D_{t-1} \frac{(i_t - g_t)}{1 + g_t} - PB_t + SF_t$$
1

To reduce debt:
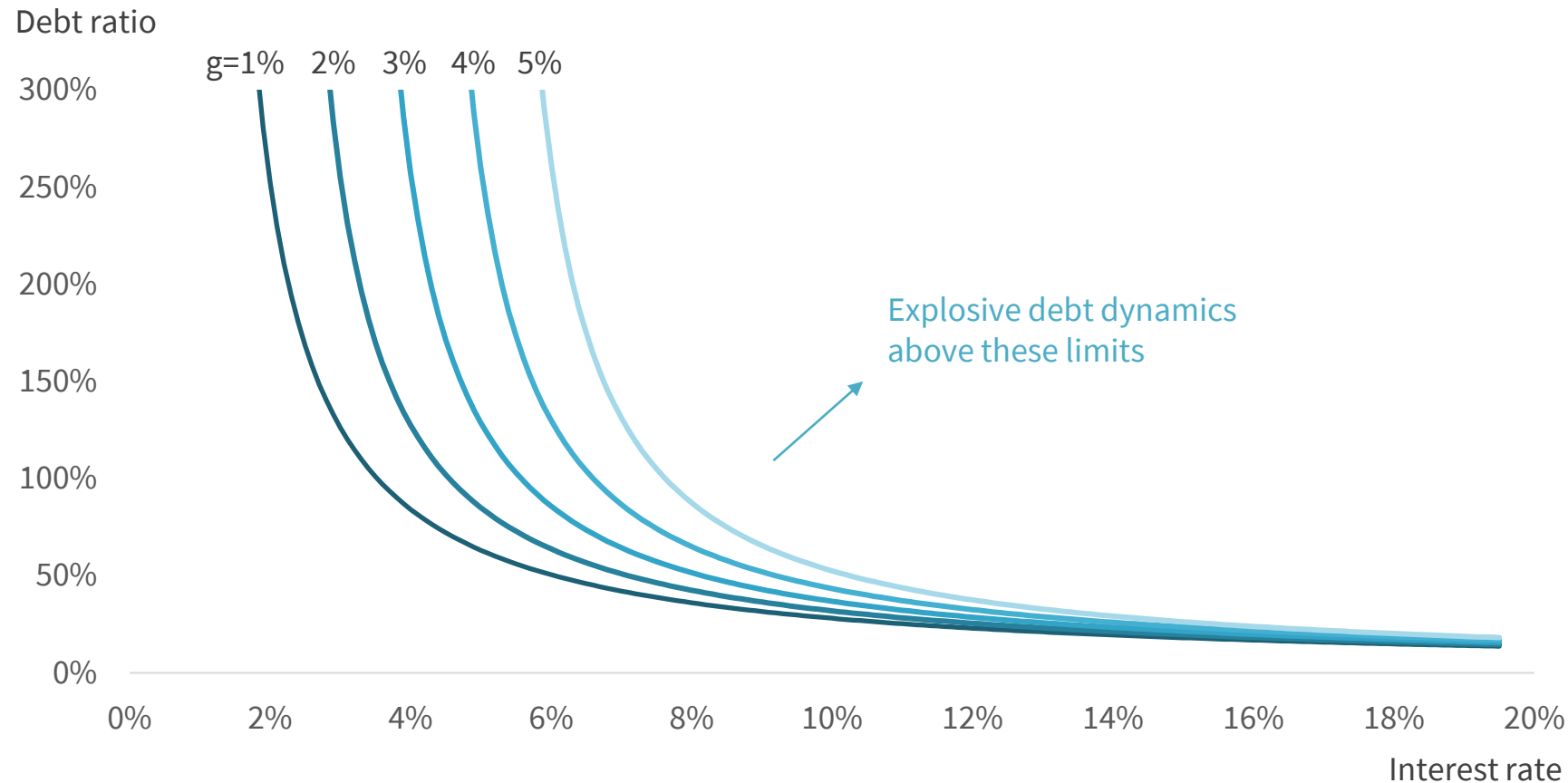$$\Delta D_t \leq 0 \quad if \quad PB_t \geq D_{t-1} \left(\frac{i_t - g_t}{1 + g_t}\right)$$
2

To get a max debt limit:
$$D^{max} = PB^{max} / \left(\frac{i - g}{1 + g}\right)$$
3 *Only relevant if i>g*

D = debt ratio;

i = interest rate;

g = growth rate;

PB = primary balance

SF = stock-flow adjustment (other items that change debt ratio like revaluations; bank recapitalisations, changes in cash balances, etc.)

Velocity:
Debt outer limits are shifted up

Debt limits for different growth & interest rates and a given primary budget balance

Debt ratio

g=1% 2% 3% 4% 5%

Explosive debt dynamics above these limits

300%
250%
200%
150%
100%
50%
0%

0% 2% 4% 6% 8% 10% 12% 14% 16% 18% 20%

Interest rate

Notes: For an assumption that primary balances beyond +2.5% cannot be sustainably achieved, the chart shows corresponding debt ratio limits. That is, levels, where if debt exceeds these, debt will be forever increasing.

D = debt ratio;

i = interest rate;

g = growth rate;

PB = primary balance

Velocity:
This is what many countries now face

Debt-stabilising primary balances

% GDP (GNI* for Ireland)

Debt-stabilising primary
balances have fallen
due to
(1) lower i
(2) higher debt ratios
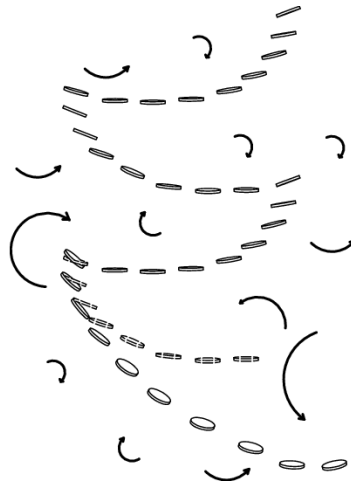
Growth effect
Interest effect
• Debt-stabilising PB

D = debt ratio;

i = interest rate;

g = growth rate;

PB = primary
balance

2 Instability

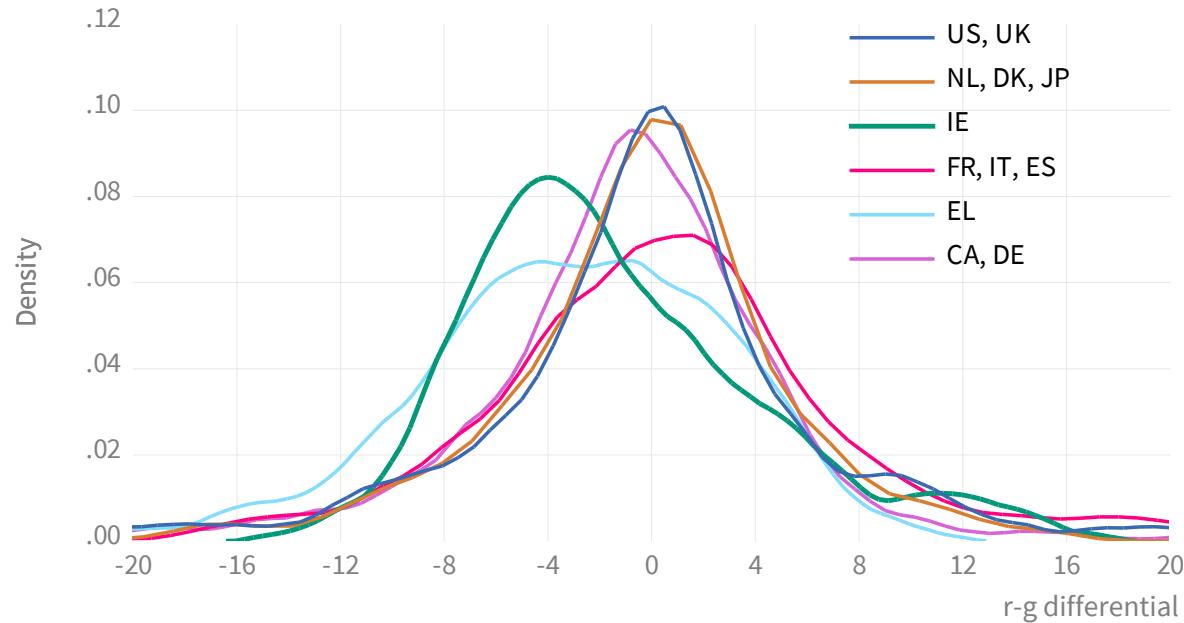The favourable environment means higher deficits and debt ratios can be sustained.

But with higher debt ratios comes instability – things can change quickly and there is more uncertainty.

Instability:
i−g is uncertain

Interest growth rate differentials are wide-ranging

Interest-growth rate (r-g) differentials in percentage points

Interest-growth rate (r-g) differentials in percentage points

Sources: Mauro et al. (2013); own workings.
Notes: The chart shows the distribution of r-g values for the G7 + Ireland, Spain, Greece, Netherlands, and Denmark. The sample period varies. Earliest observations are: UK 1831, Italy 1862, CA/FR/DE/US/DK/NL 1881, ES 1882, FR 1922, DE 1925, EL 1961, IE 1964, and ES 1966.
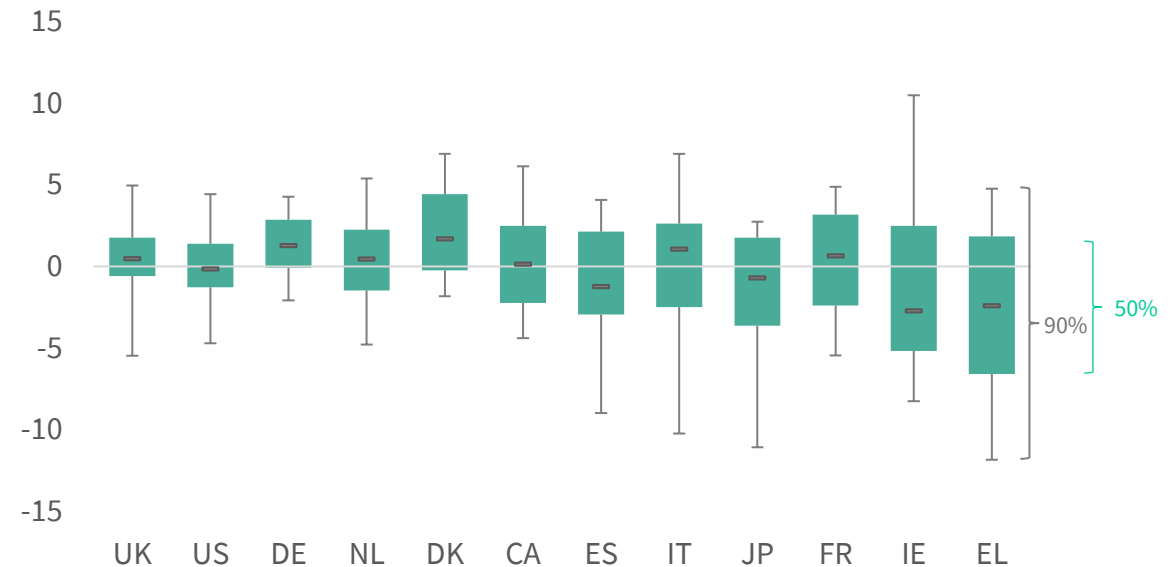
Sources: Mauro et al. (2013); own workings.
Notes: The chart shows the distribution of r-g values for the G7 + Ireland, Spain, Greece, Netherlands, and Denmark for a common sample period of 1966–2011.The middle line shows the median value, the bars show the interquartile range (the middle 50% of outturns), the whiskers show the 5th percentile and 95th percentile, respectively starting from the bottom (the range of which captures 90% of outturns).

Instability:
Surpluses are seldom large

Larger primary surpluses are uncommon

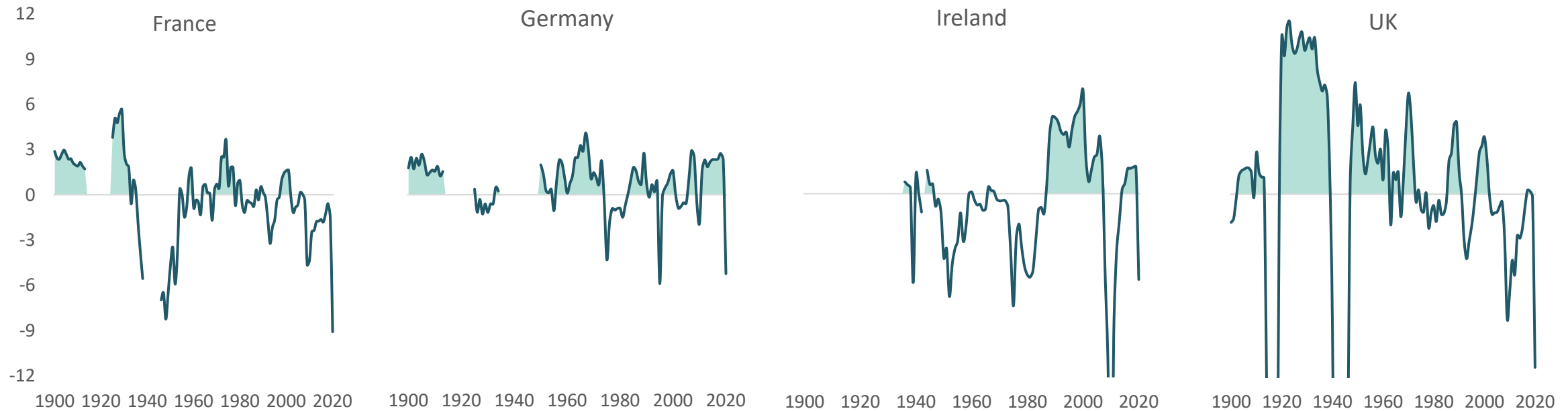Primary balances by share of observations (%)
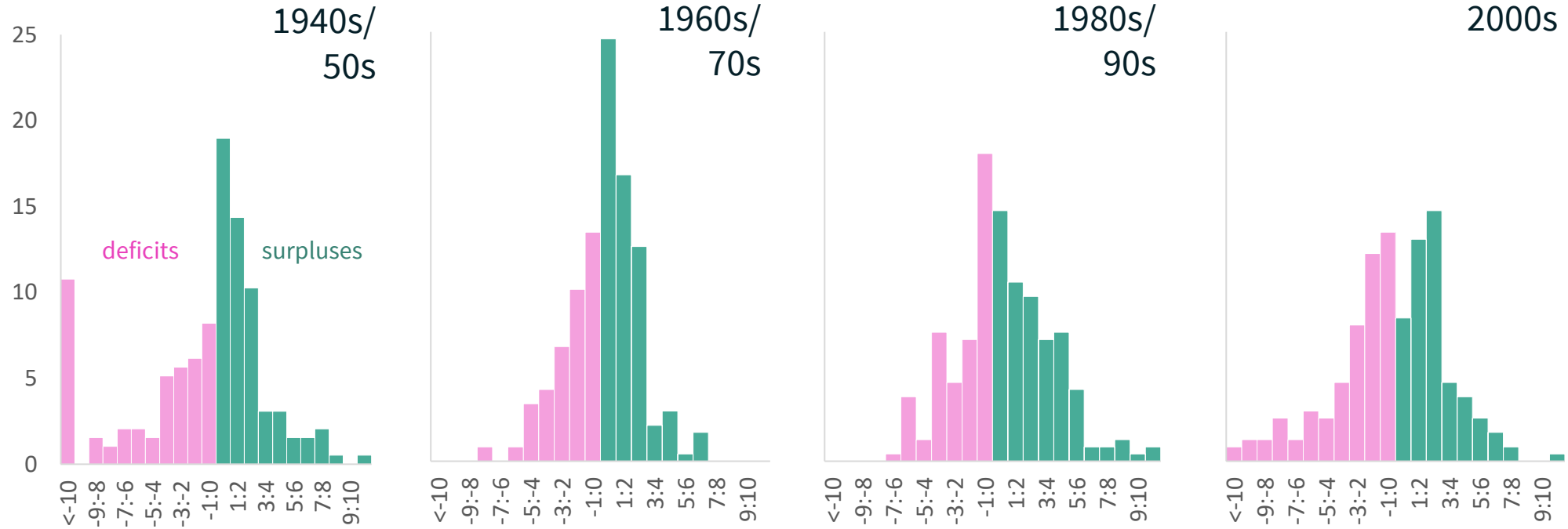
Sources: Mauro et al. (2013); own workings.
Notes: The chart shows the % of years where primary surpluses of given sizes as a % of GDP were run.

Instability:
and large surpluses rarely sustained

Most countries show 1 episode in last 4 decades of primary surpluses > 2.5% GDP for > 2years running

Primary balances (% GDP)

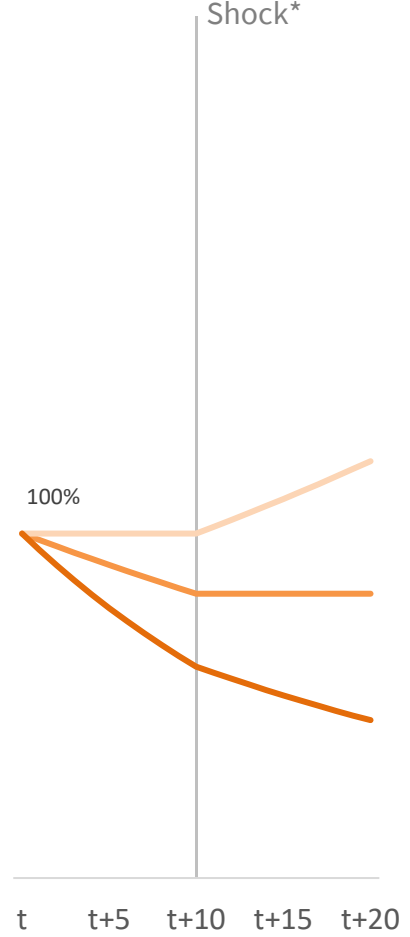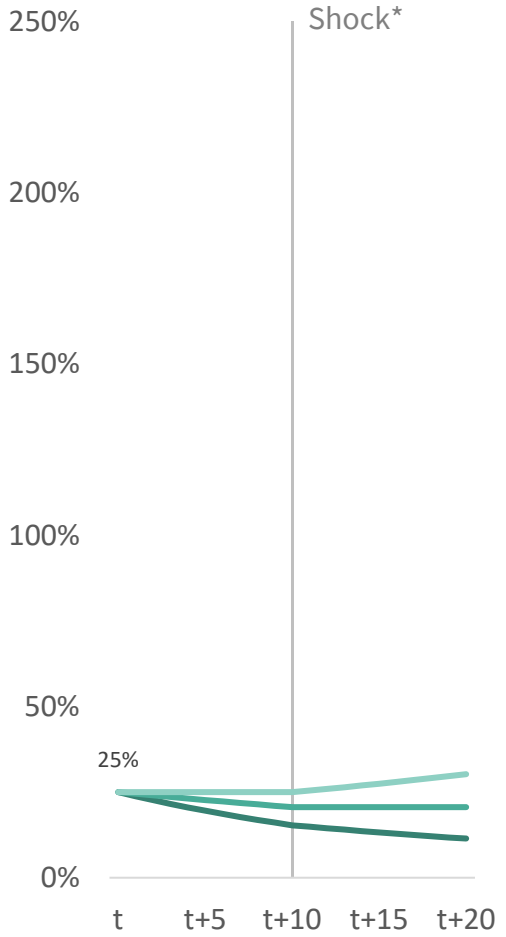France   Germany   Ireland   UK

Sources: Mauro et al. (2013); own workings.
Notes: The chart shows the % of years where primary surpluses of given sizes as a % of GDP were run.

Instability:
What happens when i−g changes?

Debt ratio % GDP

250%   Shock*   Shock*   Shock*

200%

150%

100%

50%

0%

      t   t+5 t+10 t+15 t+20   t   t+5 t+10 t+15 t+20   t   t+5 t+10 t+15 t+20

25%

100%

200%

In all cases, i-g is negative before the shock.

When the shock hits, i-g becomes less favourable by 2pp.

Instability:
How long adjustments might last

Years of 0.5pp adjustments required to stabilise debt after a +2pp i-g shock

9 years

Potentially very large, protracted adjustments required at higher debt ratios

4 years

1 year

Debt = 200%	i-g = 0%
	i-g = -2%
	i-g = -5%
Debt = 100%	i-g = 0%
	i-g = -2%
	i-g = -5%
Debt = 25%	i-g = 0%
	i-g = -2%
	i-g = -5%
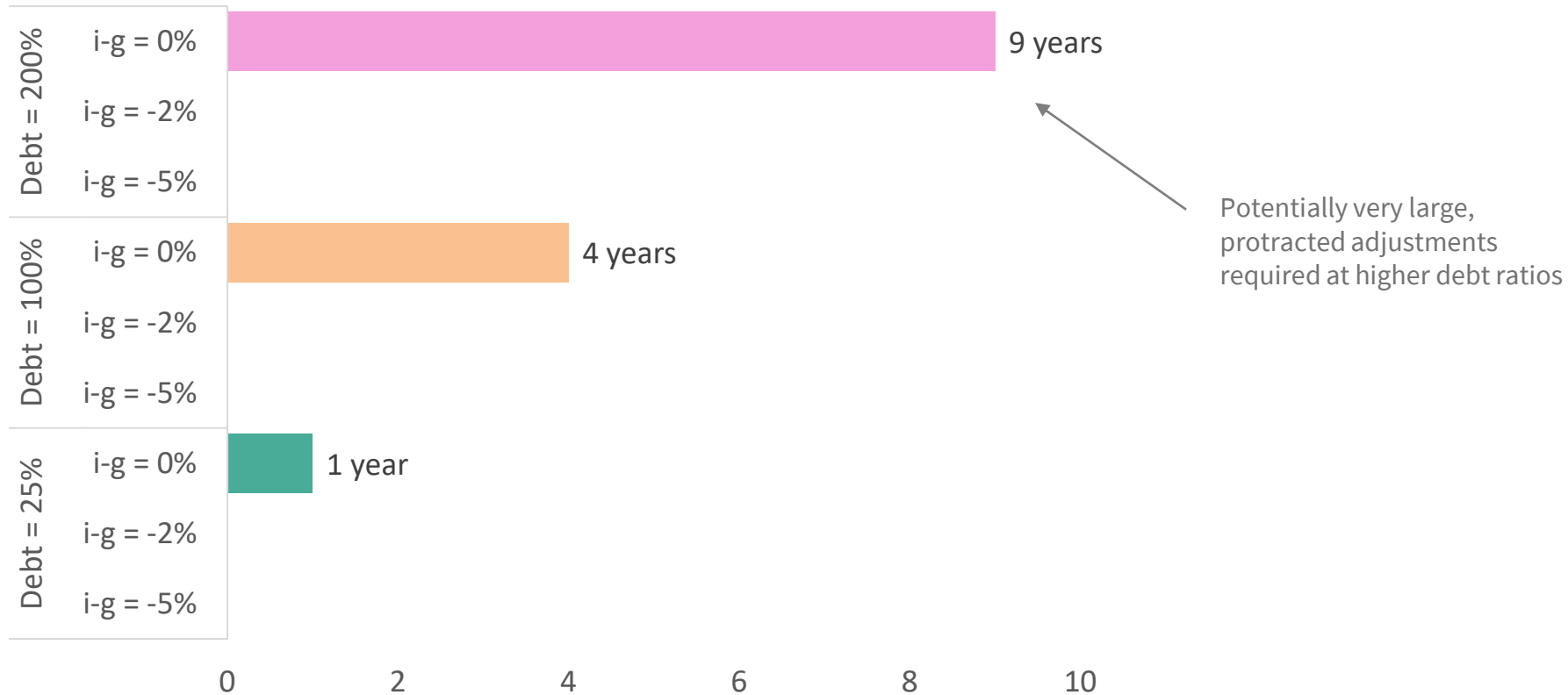
Notes: The chart shows the duration that incremental 0.5 percentage point adjustments might have to be made to the primary balance in structural terms so as to achieve a stable debt ratio following a +2 percentage point shock to the initial i-g configurations shown (consistent with a one percentage point reduction in g and a one percentage point rise in i).

Instability:
Other risks

Recessions

Countries such as Ireland that do not control their own interest rates can end up in situations where adverse shocks unique to them ("asymmetric shocks") do not get ameliorated by accommodative fiscal/monetary policy elsewhere.

Risk premia

There are other reasons that markets can decide that higher interest rates should be charged on borrowings. This can happen quickly, can cause liquidity crises, and can put pressure on the public finances to adjust swiftly.

Low Inflation

Surprises in inflation have also helped debt reduction episodes in the past.

A low inflation environment can also mean that any deep fiscal adjustments have to be in the form of more difficult explicit nominal cuts.
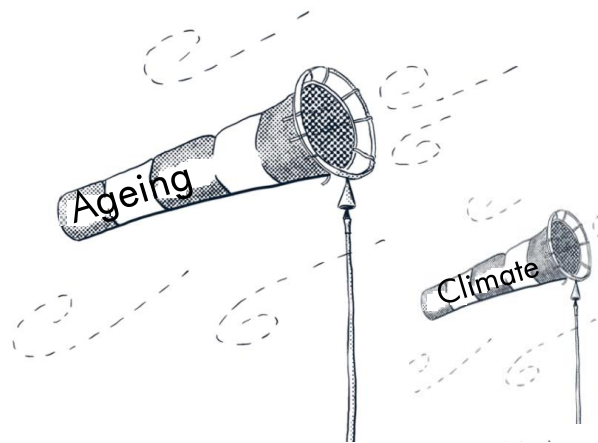
Stock−flow adjustments

Some costs can suddenly be added to government's debt. These include banking recapitalisations, bailouts of corporates or state-owned enterprises.
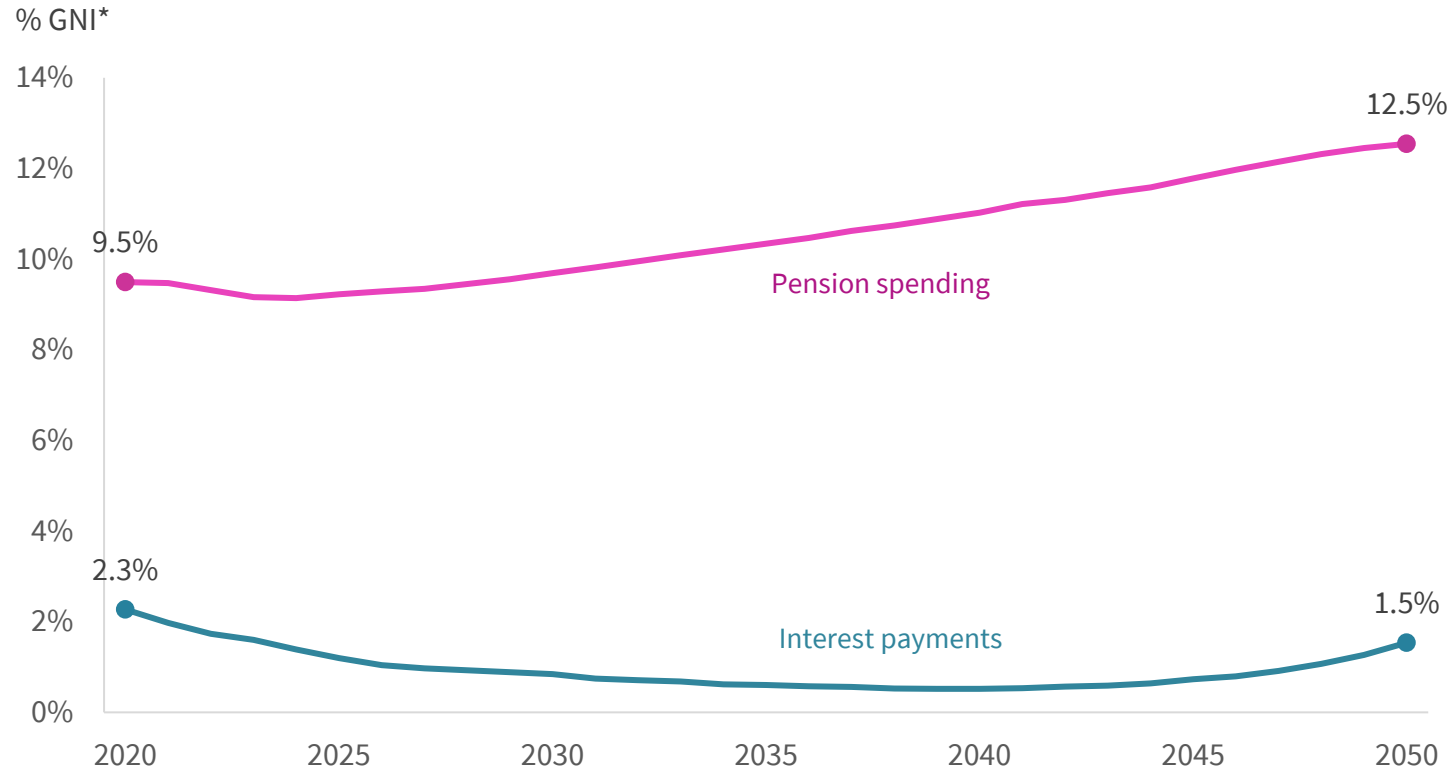
3 Headwinds

There are many pressures that we know are coming. These include ageing-related costs like pensions.

These pressures will raise deficits and add to debt further.

Headwinds:
Pensions costs higher than interest and rising

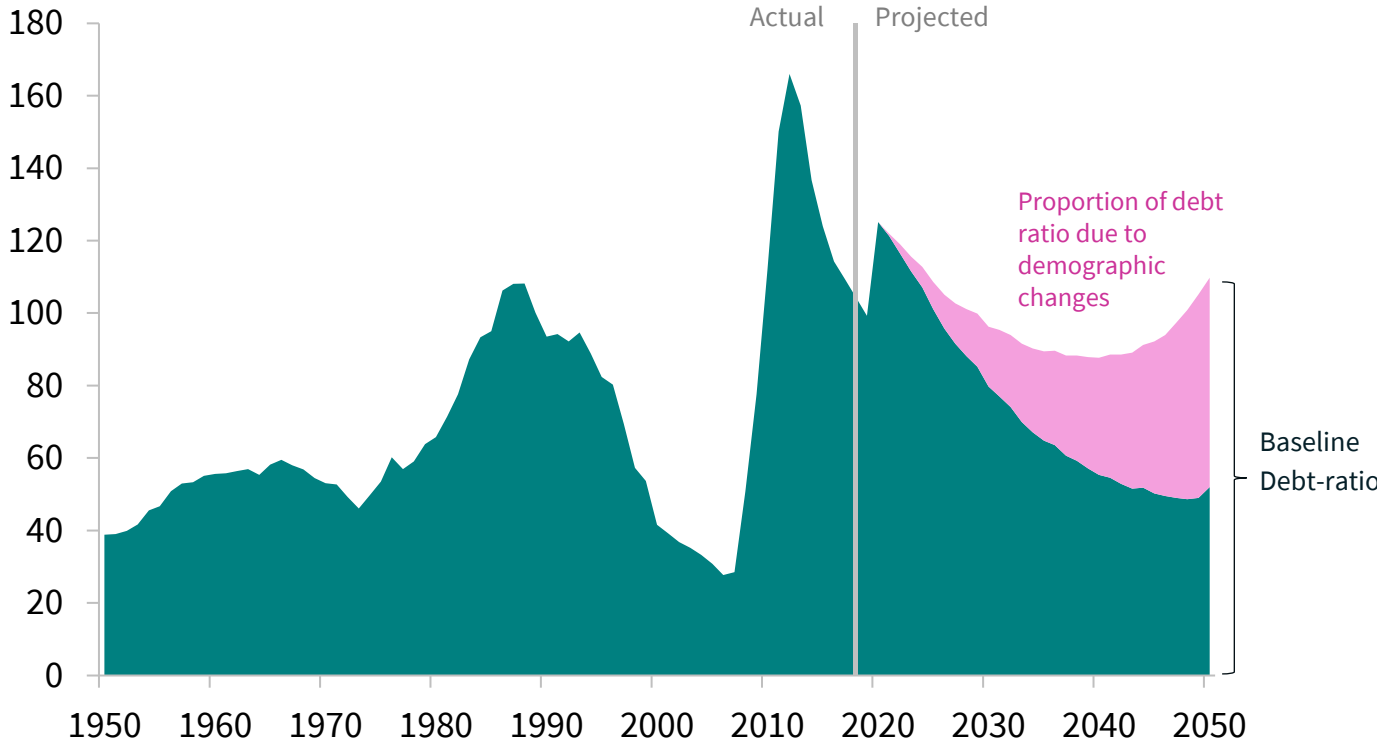**Ireland: Projected pension spending and interest spending**

% GNI*

Pension spending

Interest payments

9.5%

12.5%

2.3%

1.5%

Sources: Fiscal Council (2020) Long-term Sustainability Report.

Headwinds:
Wider ageing costs limit favourable dynamics

## Ageing costs prevent debt ratios from falling

% of GNI*

Under current policies, ageing-related costs will add to Ireland's debt burden, diverting it from a steady decline from 2025 to reach a higher trough before rising again. Around half the debt burden in 2050 would reflect unfunded ageing costs

Sources: Fiscal Council (2020) Long-term Sustainability Report.
Note: The pink shaded region shows the proportion of the baseline debt ratio that can be attributed to an ageing population relative to 2020 demographics.

Headwinds:
This is a widespread phenomenon

## Demographic pressures are expected to add to pensions spending in many European countries

% GDP (GNI* for Ireland), general government pension spending

Accumulated impact of pensions outlays

% GDP (GNI* for Ireland), general government basis, 2020-2050
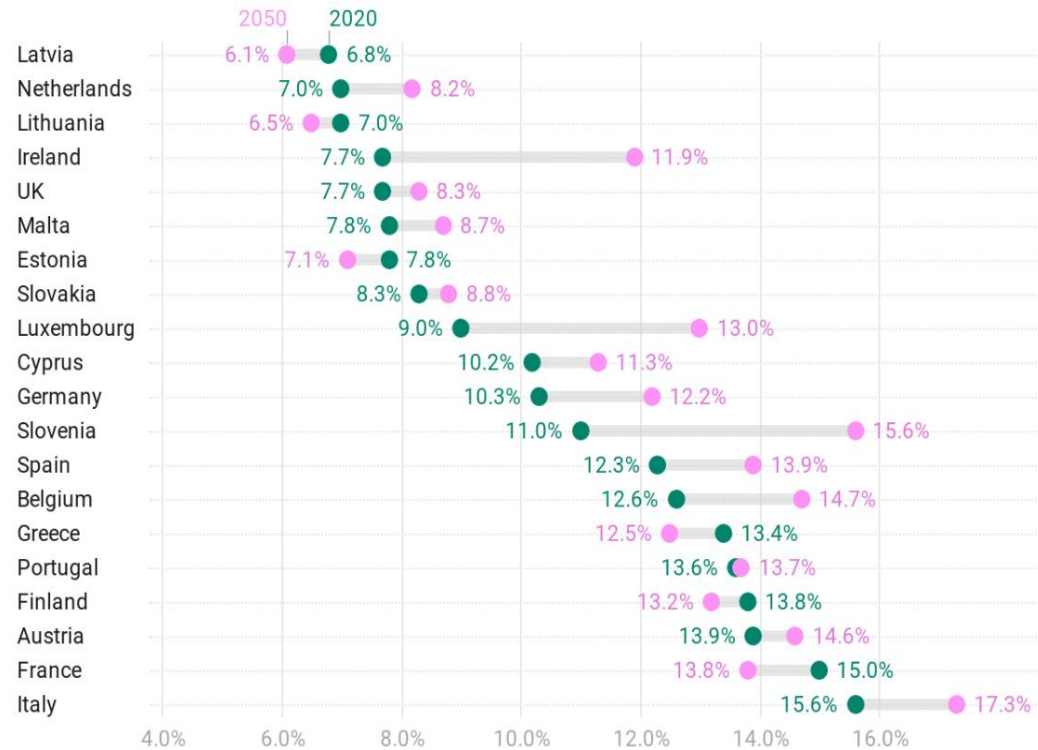
Source: EU Ageing Report, Fiscal Council Long-term Sustainability Report (2020); own workings.
Notes: EU estimates for 2020 were produced before Covid-19 hit and so are free from associated impacts; for Ireland we use the 2019 estimate.
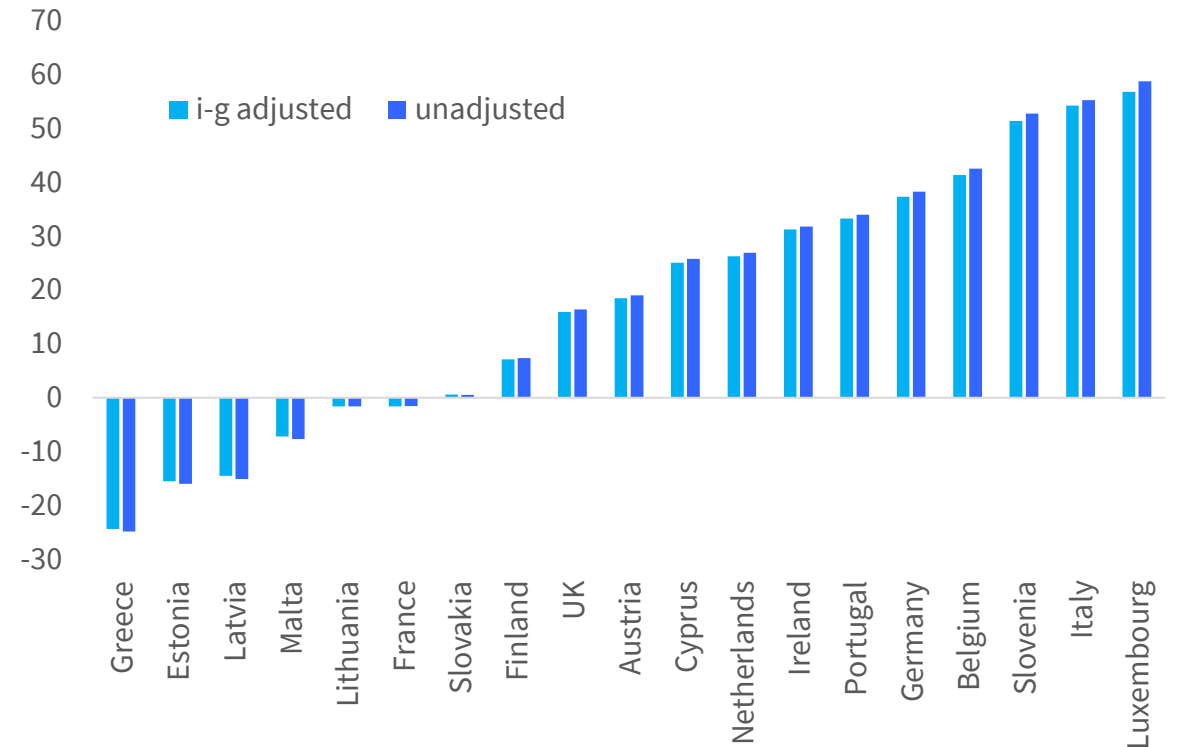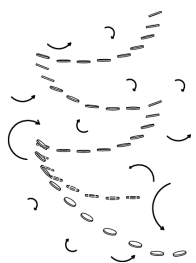
Source: EU Ageing Report, Own workings.
Notes: The figure shows the 'stock' of accumulated pensions outlays from 2020–2050. The i-g adjustment is intended to show the contemporaneous debt dynamics associated with this stock.

Velocity

High debt ratios should fall at a fast pace, given the favourable interest-growth (i-g) environment we are in.

Instability

The favourable environment means higher deficits and debt ratios can be sustained.

But with higher debt ratios comes instability – things can change quickly and there is more uncertainty.

Headwinds

There are many pressures that we know are coming. These include ageing-related costs like pensions.

These pressures will raise deficits and add to debt further.

Thank you

Eddie Casey

Eddie.Casey@FiscalCouncil.ie