

From the top down

Capital market assumptions in the climate crisis



September 2023

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- Past performance is not a reliable indicator of future returns.

Several uncertainties make modelling climate change challenging

Multi-dimensional problem

- **Multiple risks** that are interconnected: climate risks, economic risks, financial risks. Interaction across risks sources can magnify them in a non-linear fashion (feedback loops)
- **Multiple actors** with various roles:
 - **public sector**: governments, regulators with different ambitions globally. Policy trade-off.
 - **private sector**: existing companies (transitioning production process) and new companies (contributing to innovation)
 - **consumers/households**: consumption/investment preferences (energy, products they buy, capital allocation, etc)

Many uncertainties...

- ...about the future path of climate change, and about the energy transition;
- ...about government/central banks' policy parameters, and adaptation by firms and households;
- ...lack of enough historical data on both 1) climate-related disasters (not of the frequency and magnitude that we might experience in the future), and 2) the impact of these events on the economy and markets.

➤ Climate risks may not be priced in (correctly) today

NGFS climate scenarios

From an ‘orderly transition’ to a ‘hot house world’

Category	Scenario	Policy ambition	Policy reaction	Technology change	Carbon dioxide removal	Regional policy variation
Orderly	Below 2°C	1.6°C	Immediate and smooth	Moderate change	Medium-high use	Low variation
	Net Zero 2050	1.4°C	Immediate and smooth	Fast change	Medium-high use	Medium variation
Disorderly	Delayed Transition	1.6°C	Delayed	Slow/fast change	Low-medium use	High variation
	Divergent Net Zero	1.4°C	Immediate but divergent across sectors	Fast change	Low-medium use	Medium variation
Hot House	Nationally Determined Contributions (NDC)	2.6°C	NDCs	Slow change	Low-medium use	Medium variation
	Current policies	3°C +	Non-current policies	Slow change	Low use	Low variation
		Physical risk	Transition risk			

Lower macro-financial risk

Moderate macro-financial risk

Higher macro-financial risk

Source: NGFS, September 2022.

Our approach to modelling climate change impact on asset prices

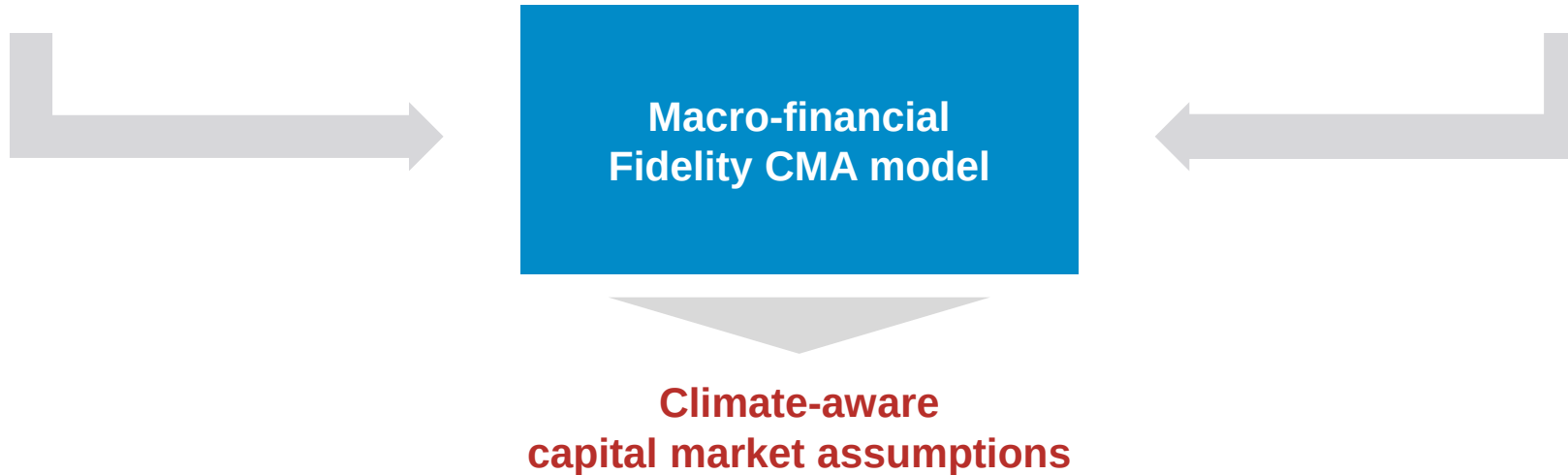
Leveraging bottom-up and top-down information

Qualitative inputs

- Corporate action
 - Technology innovation
 - Policy action
- What is the probability of each climate scenario?

Quantitative inputs

- GDP growth
 - Inflation rate
 - Policy rate
- What is the impact on the economy?



Source: Fidelity International. For illustrative purposes only.

Understanding the transition to net-zero through its 'enablers'

Corporate action

2%

of companies in our coverage that are currently enabling or achieving net-zero

Technological change

20/30%

of world's energy comes from low-carbon energy sources

Policy action

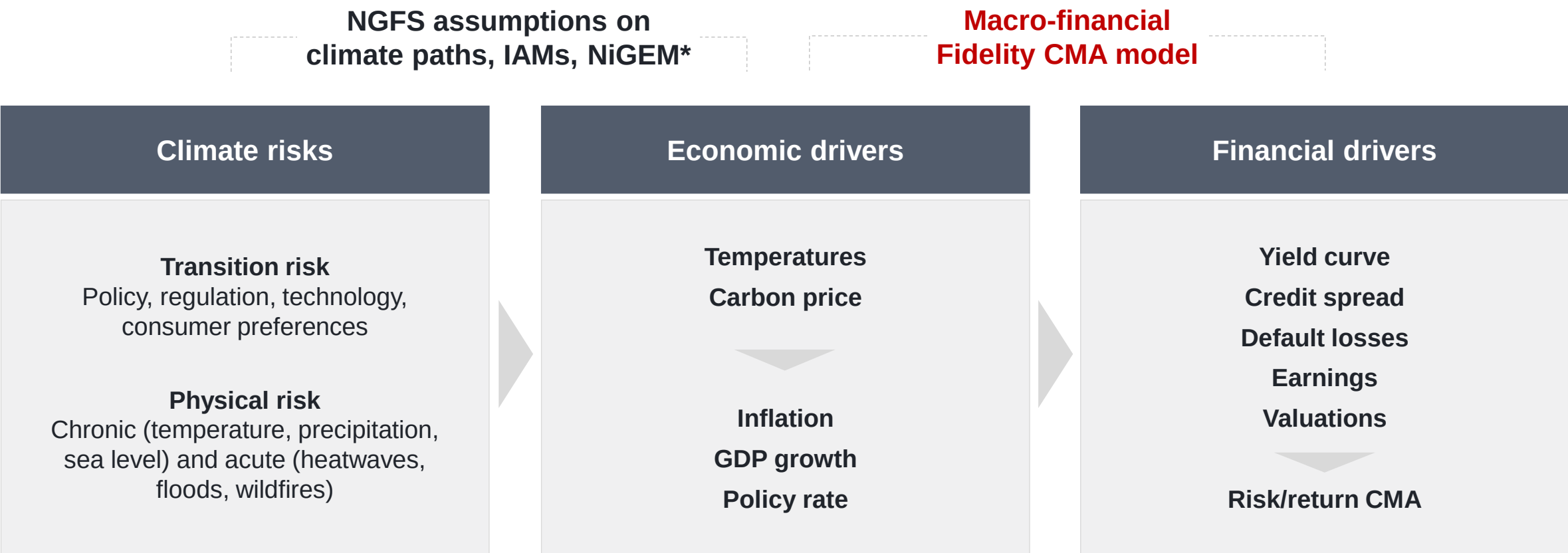
15%

of world's of global GHG emissions covered by carbon pricing initiatives

➤ **Given current information, the disorderly transition is the most likely scenario.**

Source: Fidelity International, UNFCCC. For illustrative purposes only.

From climate risks to financial risks



Source: Fidelity International, March 2023. For illustrative purposes only. *NGFS modelling includes integrated assessment models (IAMs), Kalkuhl & Wenz (KW) damage function, and National Institute Global Econometric Model (NiGEM).

Impact of climate change on the economy and asset returns



In all scenarios, there is a negative effect on **GDP growth**. Impact is higher in the long-term if no action is taken.

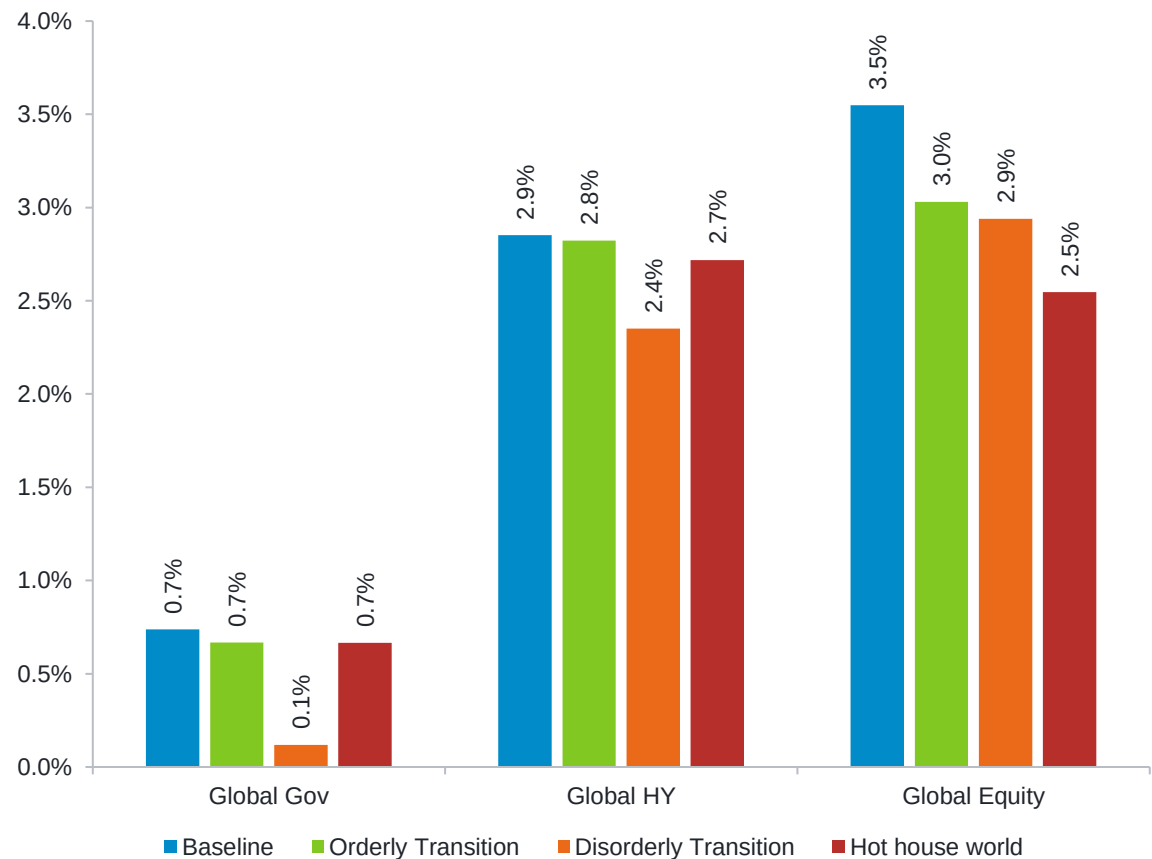


Inflation rate will likely rise globally primarily due to introduction/increase of carbon pricing initiatives.



Policy rates will also likely be affected in the short/medium term as a response to GDP and inflation shocks.

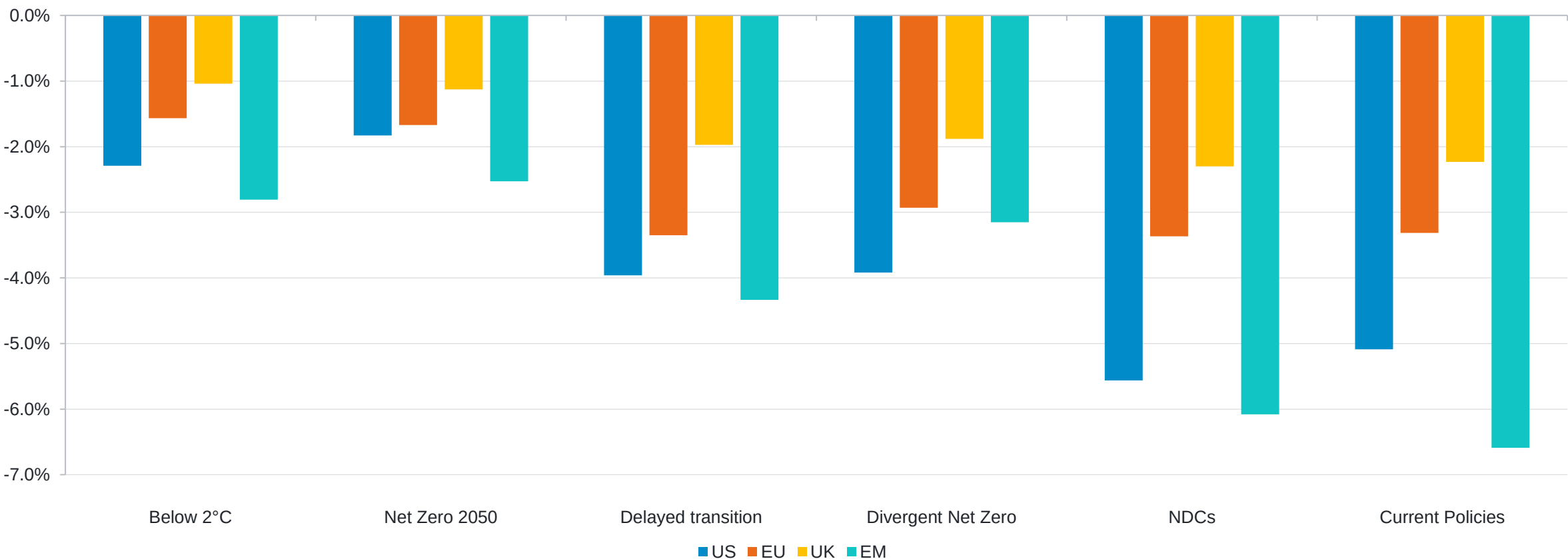
10-year annualised real returns



Source: Fidelity International, March 2023. Assumptions are US-dollar denominated, based on proprietary CMA modelling. Baseline refers to Fidelity's climate-agnostic baseline. For illustrative purposes only. Note: 10-year period is from 28 February 2023 to 27 February 2033.

Climate risks have a negative impact on GDP in all climate scenarios

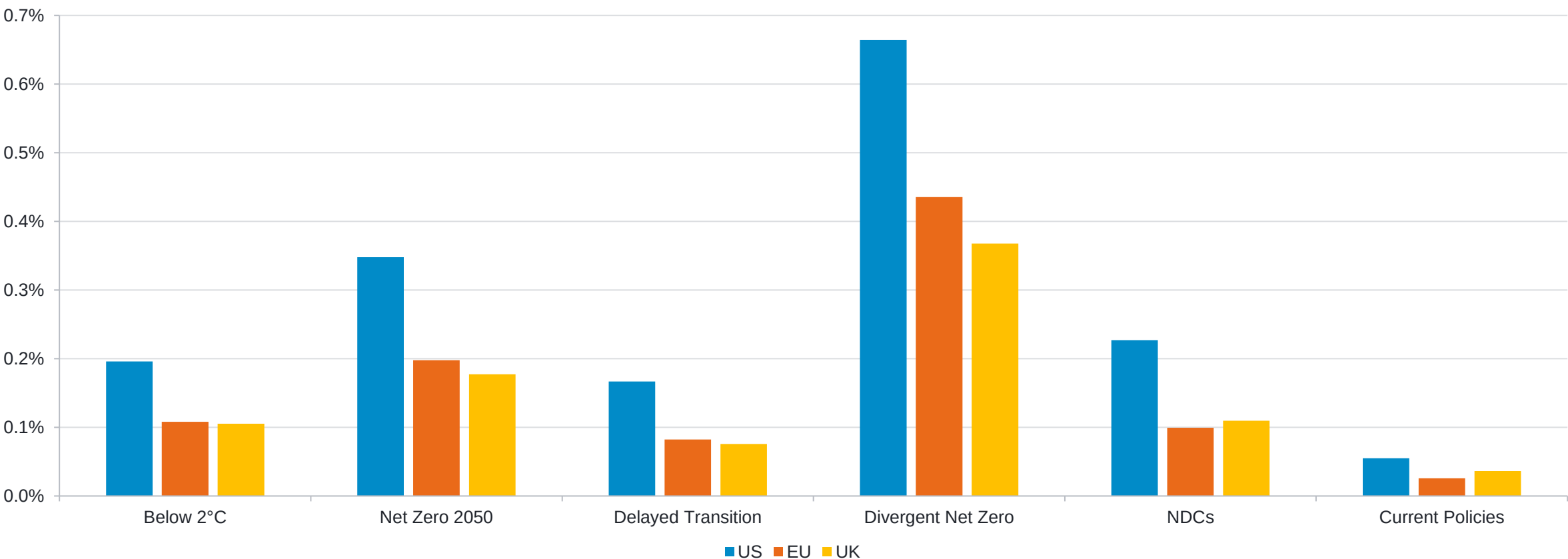
GDP cumulative impact, up to 2050



Source: NGFS, Fidelity International, March 2023. For illustrative purposes only. Note: the period up to 2050 is from 28 February 2023 to 31 December 2050. Baseline refers to Fidelity's climate-agnostic baseline. EU refers to the Economic and Monetary Union (EMU) of the European Union.

Carbon prices contribute to increase in inflation

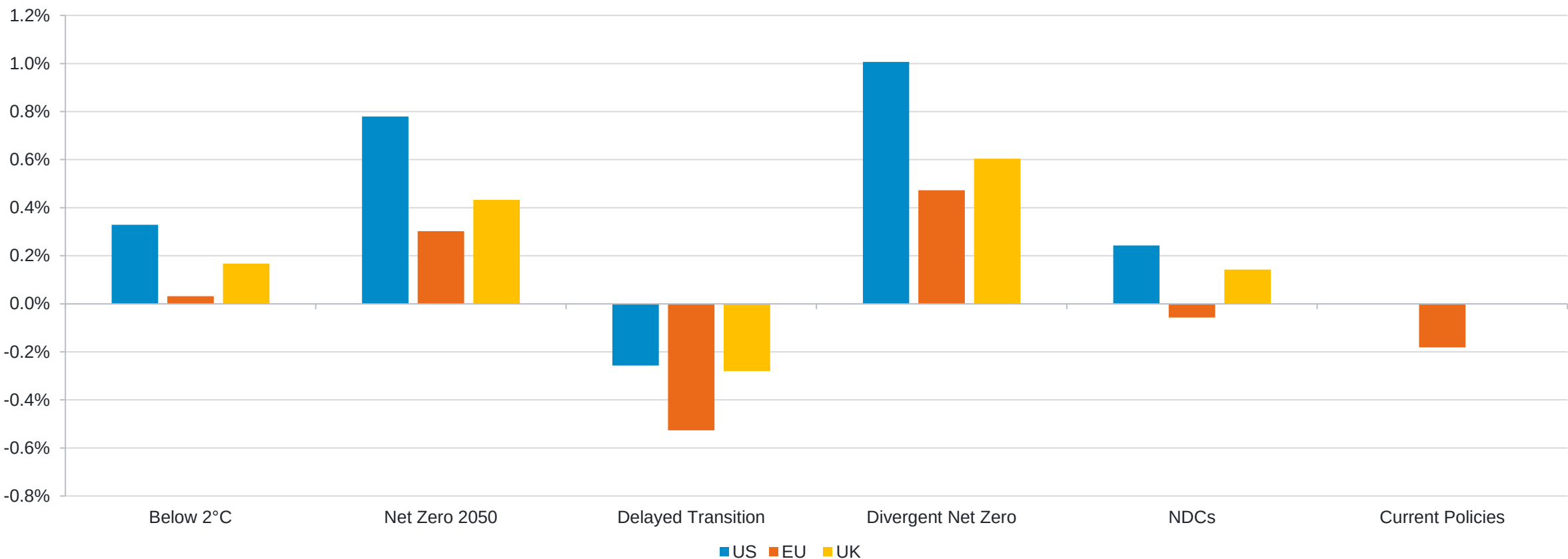
10Y annualised inflation deviation from baseline



Source: Fidelity International, March 2023. Assumptions are based on proprietary CMA modelling. For illustrative purposes only. Note: 10-year period is from 28 February 2023 to 27 February 2033. Baseline refers to Fidelity's climate-agnostic baseline. EU refers to the EMU.

Policy rates are used by central banks to respond to inflation and GDP shocks

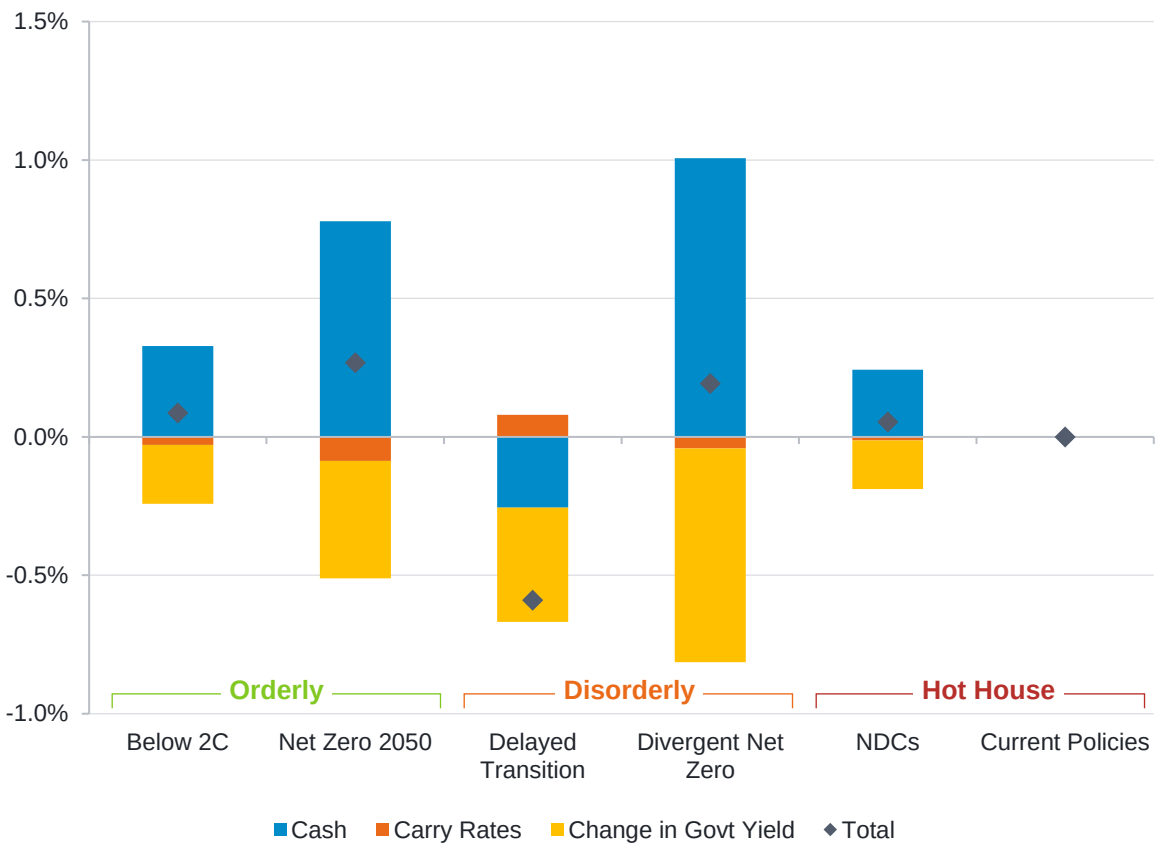
10Y annualised policy rate deviation from baseline



Source: Fidelity International, 2023. For illustrative purposes only. Assumptions are based on proprietary modelling. They reflect the views of investment professionals at Fidelity International. Baseline refers to Fidelity's climate-agnostic baseline. EU refers to the EMU. Note: 10-year period is from 28 February 2023 to 27 February 2033.

Price and income returns tend to offset each other in most scenarios

US Gov. 10Y ann. expected returns deviations from baseline



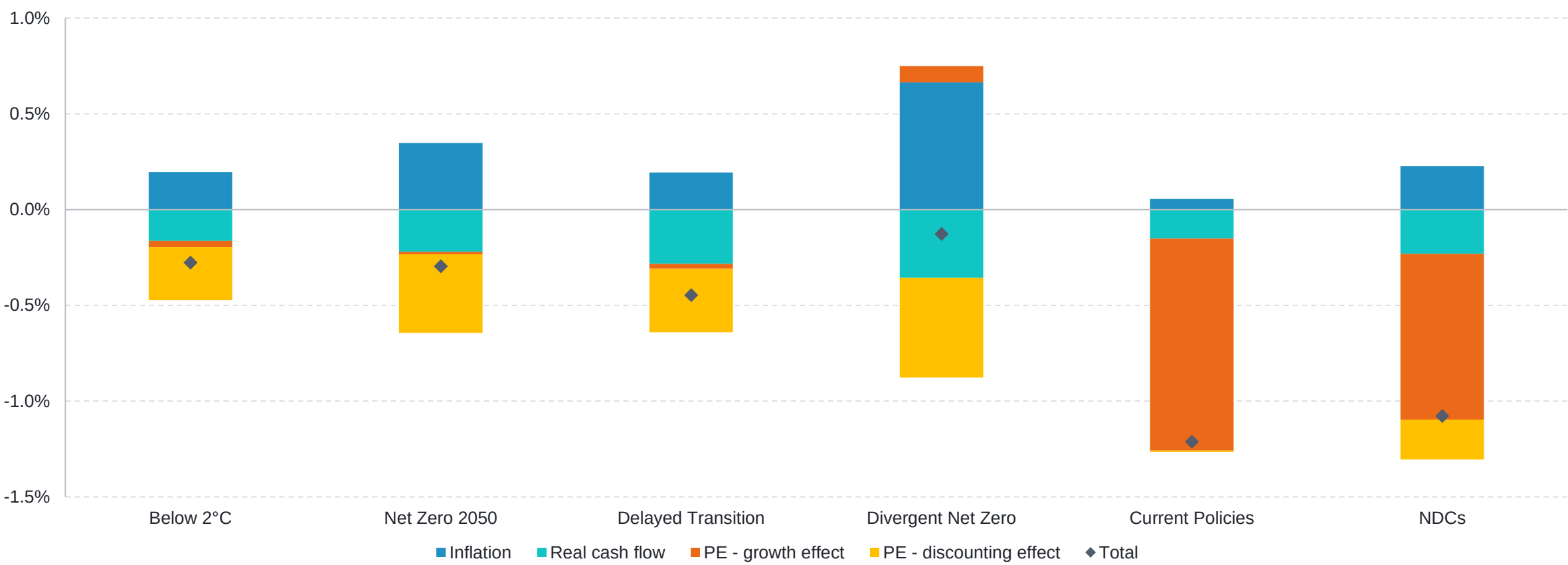
US HY 10Y ann. expected returns deviations from baseline



Source: Fidelity International, March 2023. Assumptions are based on proprietary CMAs modelling. They reflect the views of investment professionals at Fidelity International. For illustrative purposes only. Note: 10-year period is from 28 February 2023 to 27 February 2033.

Valuations and real cash flows drive equity returns down

US equities 10Y annualised expected returns deviation from baseline



Source: Fidelity International, March 2023. Assumptions are based on proprietary CMAs modelling. They reflect the views of investment professionals at Fidelity International. EU refers to the EMU. For illustrative purposes only. Note: 10-year period is from 28 February 2023 to 27 February 2033.

Sharpe ratios fall overall, with divergent net zero scenario faring the worst

Sharpe ratio deviation from baseline

		Global Govt	Global IG	Global HY	EM Sov HC	Global Equity	EM Equity
Orderly	Below 2°C	-0.07	-0.04	-0.02	-0.03	-0.04	-0.03
	Net Zero 2050	-0.15	-0.10	-0.04	-0.07	-0.07	-0.05
Disorderly	Delayed Transition	-0.11	-0.09	-0.05	-0.09	-0.03	-0.03
	Divergent Net Zero	-0.25	-0.20	-0.11	-0.16	-0.09	-0.05
Hot House	NDCs	-0.06	-0.08	-0.05	-0.08	-0.09	-0.07
	Current Policies	-0.01	-0.05	-0.04	-0.06	-0.08	-0.08

Source: Fidelity International, 2023. For illustrative purposes only. Assumptions are based on proprietary modelling. They reflect the views of investment professionals at Fidelity International. Baseline refers to Fidelity's climate-agnostic baseline. The 10-year period is from 28 February 2023 to 27 February 2033.

Appendix

Real returns of global asset classes are negatively affected by climate risks

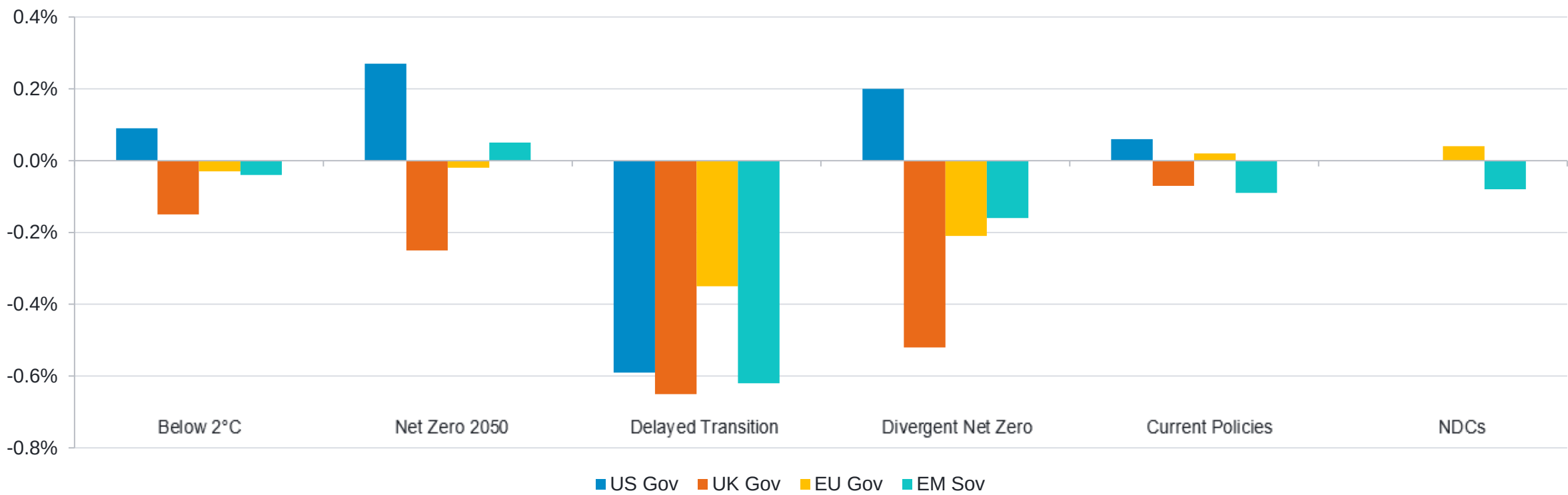
10Y annualised real returns deviation from baseline (USD)

		Cash	Global Govt	Global IG	Global HY	EM Sov HC	Global Equity	EM Equity
Orderly	Below 2°C	0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.4%	-0.6%
	Net Zero 2050	0.4%	-0.1%	0.0%	0.0%	-0.2%	-0.6%	-0.5%
Disorderly	Delayed Transition	-0.4%	-0.7%	-0.6%	-0.6%	-0.7%	-0.5%	-0.5%
	Divergent Net Zero	0.3%	-0.5%	-0.4%	-0.4%	-0.8%	-0.7%	-0.2%
Hot House	NDCs	0.0%	-0.1%	-0.1%	-0.2%	-0.3%	-1.0%	-1.0%
	Current Policies	-0.1%	0.0%	0.0%	-0.1%	-0.1%	-1.0%	-1.4%

Source: Fidelity International, March 2023. Assumptions are based on proprietary CMAs modelling. Baseline refers to Fidelity's climate-agnostic baseline. For illustrative purposes only. Note: 10-year period from 28 February 2023 to 27 February 2033. Global Govt refers to global government bonds. Global IG refers to global investment grade bonds. Global HY refers to global high yield bonds. EM Sov HC refers to emerging market sovereign bonds in hard currency.

Government bond returns are mostly impacted in the disorderly scenarios

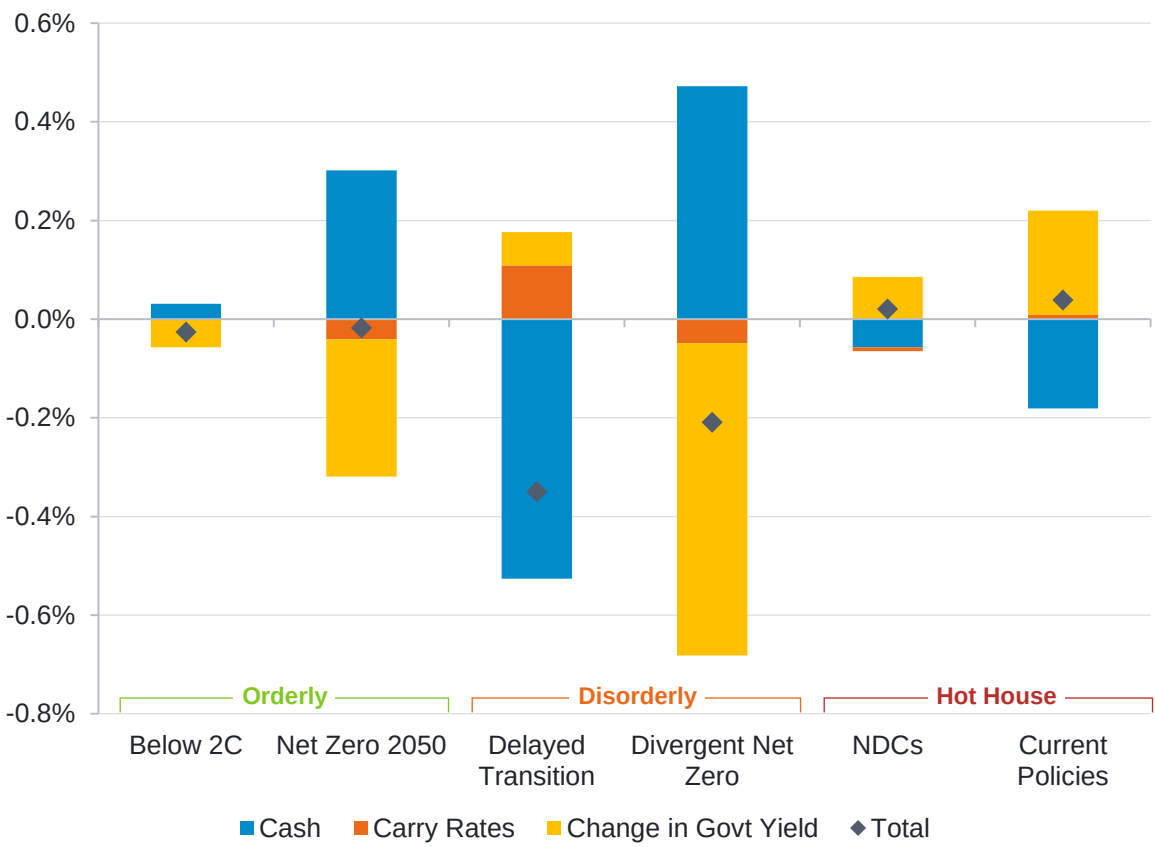
Expected deviations from baseline due to climate change
10Y annualised expected returns, government bonds



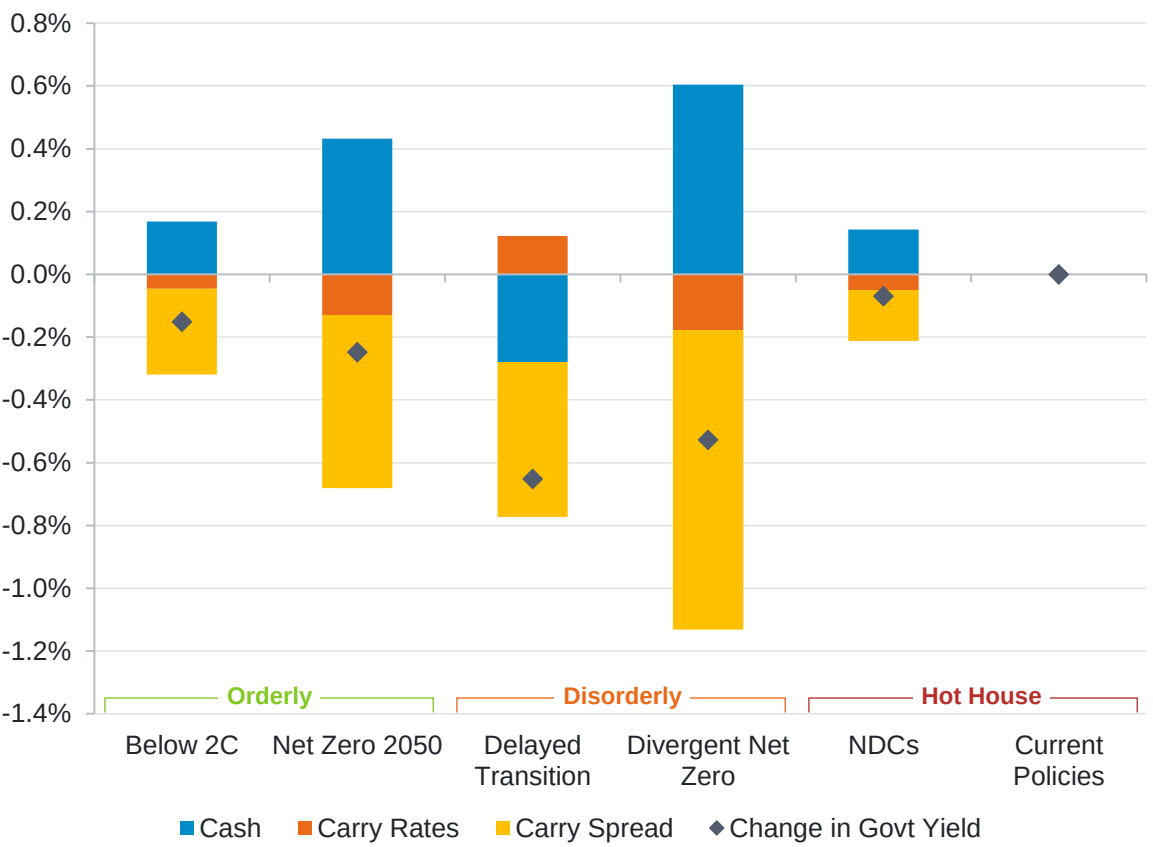
Source: Fidelity International, March 2023. Assumptions are based on proprietary CMAs modelling. They reflect the views of investment professionals at Fidelity International. EU refers to the EMU. For illustrative purposes only. Note: 10-year period is from 28 February 2023 to 27 February 2033.

Price and income returns tend to offset each other in most scenarios

10Y annualised expected returns, EU government bonds



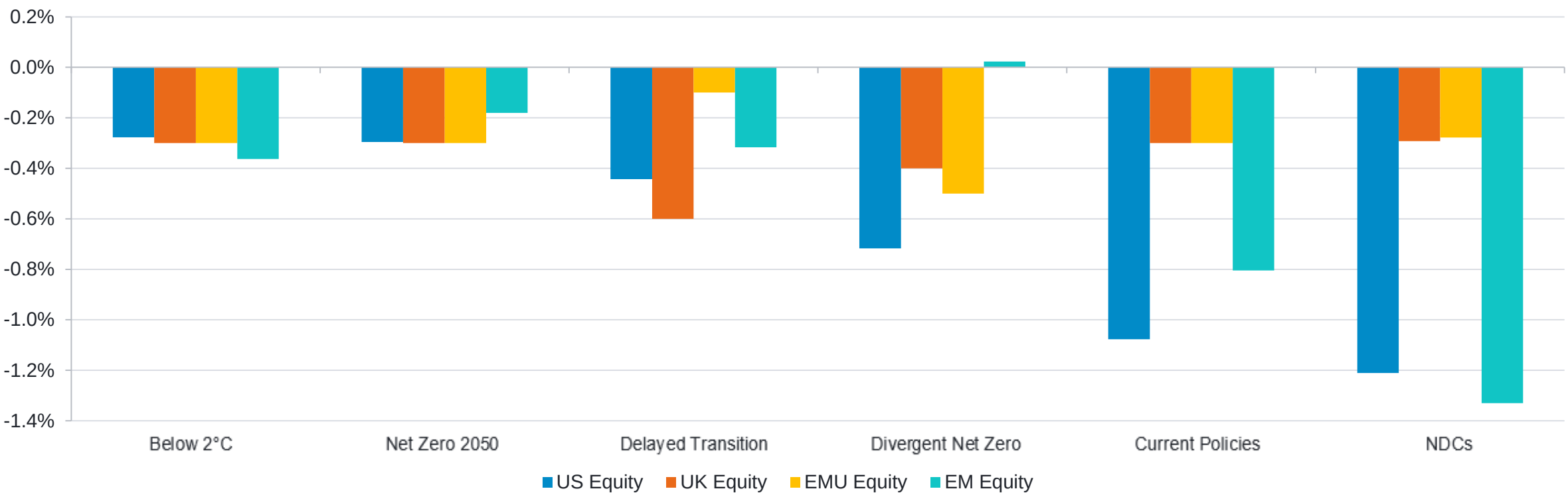
10Y annualised expected returns, UK government bonds



Source: Fidelity International, March 2023. Assumptions are based on proprietary CMAs modelling. They reflect the views of investment professionals at Fidelity International. EU refers to the EMU. For illustrative purposes only. Note: The 10-year period is from 28 February 2023 to 27 February 2033.

Equity returns are negatively impacted in various scenarios and regions

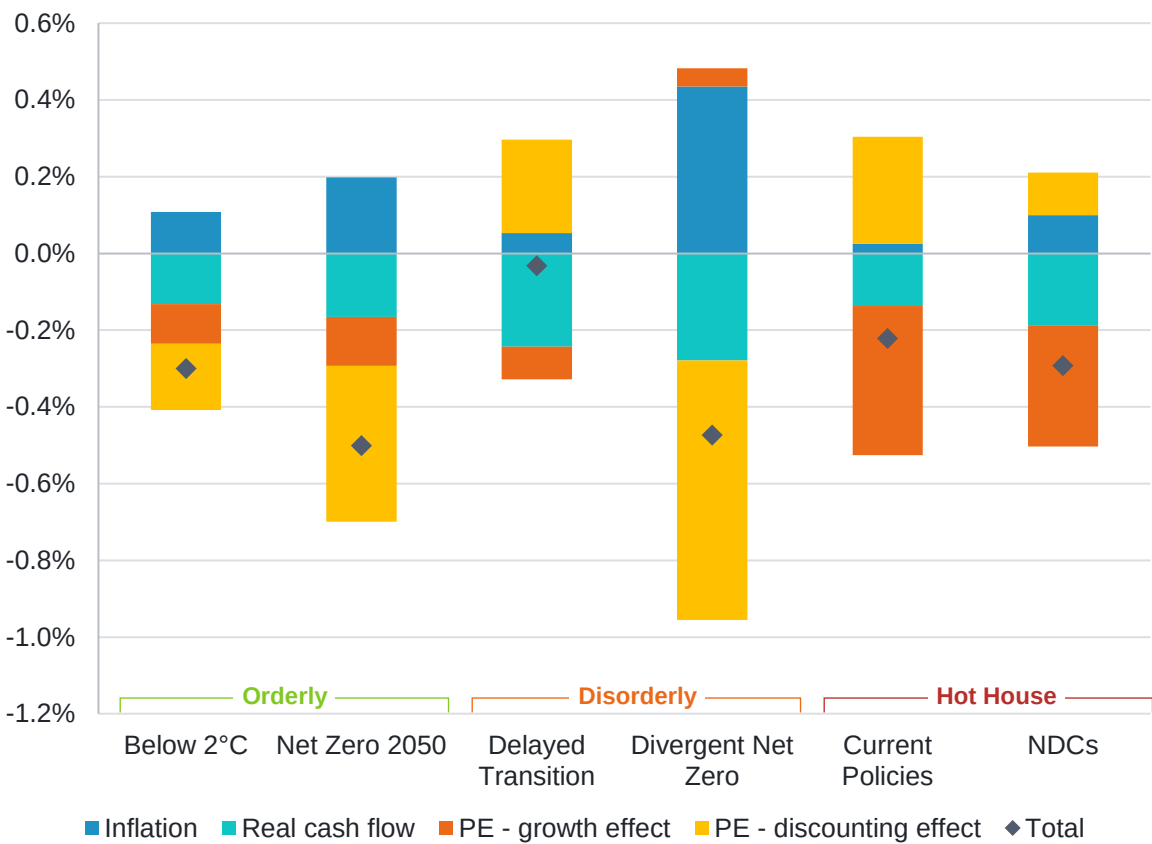
Expected deviations from baseline due to climate change
10Y annualised expected returns, equities



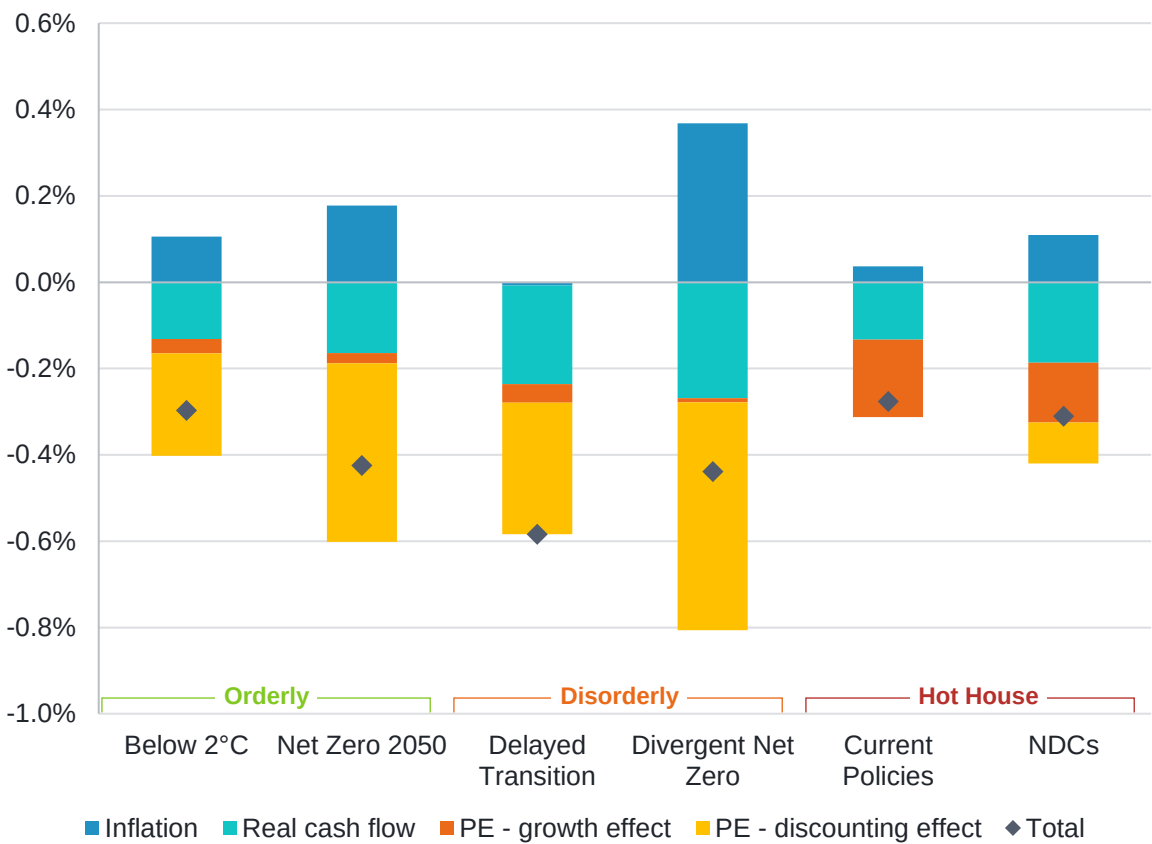
Source: Fidelity International, March 2023. Assumptions are based on proprietary CMAs modelling. They reflect the views of investment professionals at Fidelity International. EU refers to the EMU. For illustrative purposes only. Note: The 10-year period is from 28 February 2023 to 27 February 2033.

Valuations and real cash flows drive equity returns down

10Y annualised expected returns, EU equities



10Y annualised expected returns, UK equities

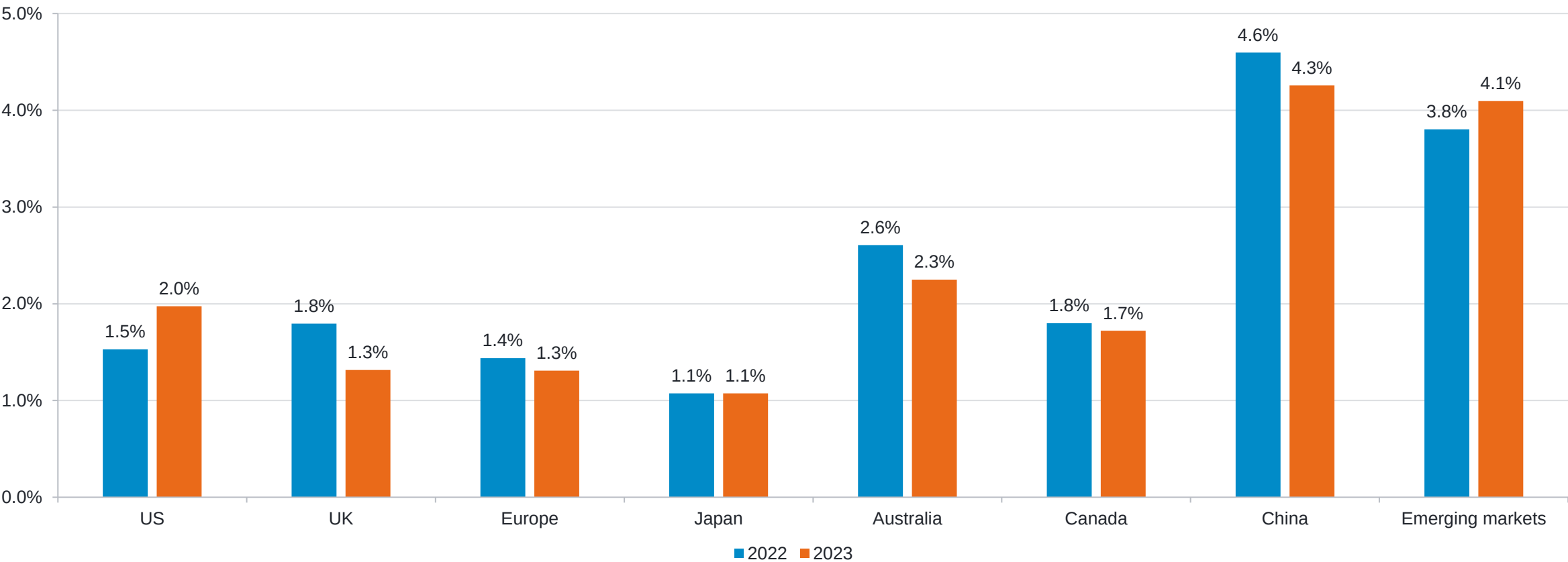


Source: Fidelity International, March 2023. Assumptions are based on proprietary CMAs modelling. They reflect the views of investment professionals at Fidelity International. EU refers to the EMU. For illustrative purposes only. Note: 10-year period is from 28 February 2023 to 27 February 2033.

We expect lower average economic growth over the next 10 years in all regions except the US and EM

Developed market economies will enter mild recessions in the near term but will rebound in 2025

Real GDP growth projections p.a., 10-year horizon



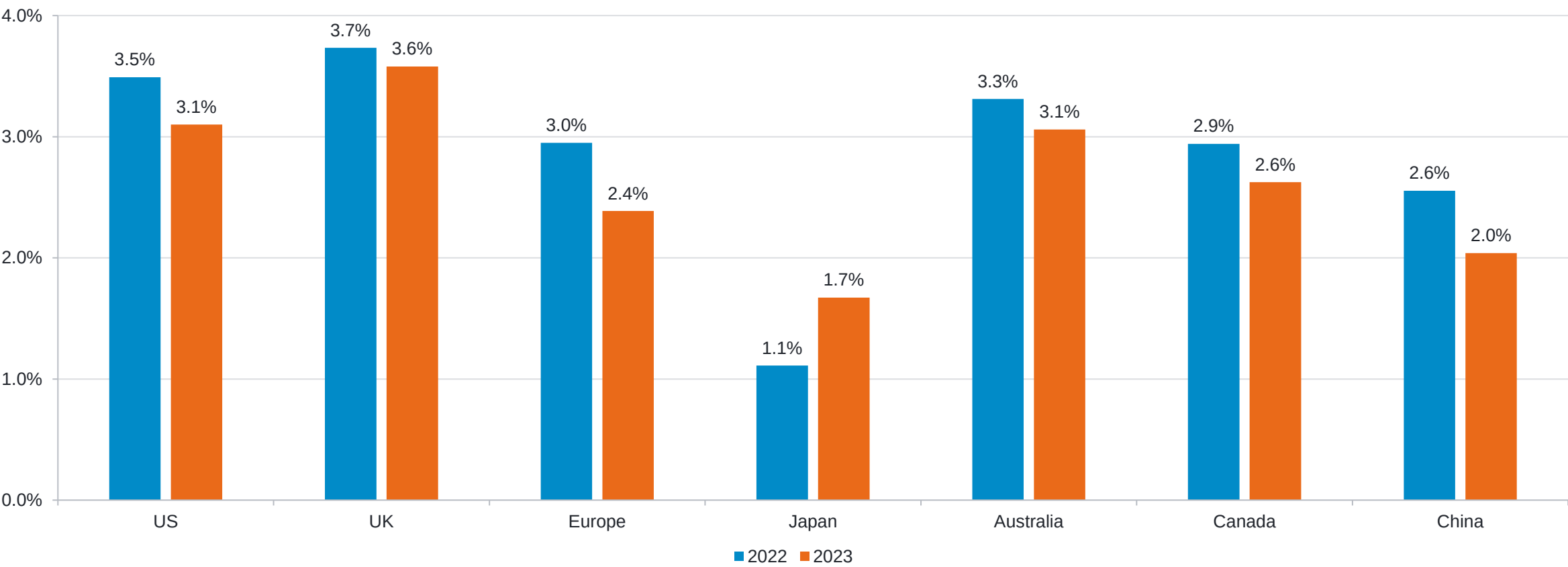
Assumptions are based on proprietary modelling, for illustrative purposes only. They reflect the views of investment professionals at Fidelity International.

Source: Fidelity International, H2 2023.

We anticipate inflation will settle above central bank targets over the medium and long term, especially in the US and UK

Inflation will remain high and volatile over the next few years in major economies

Expected inflation p.a., 10-year horizon



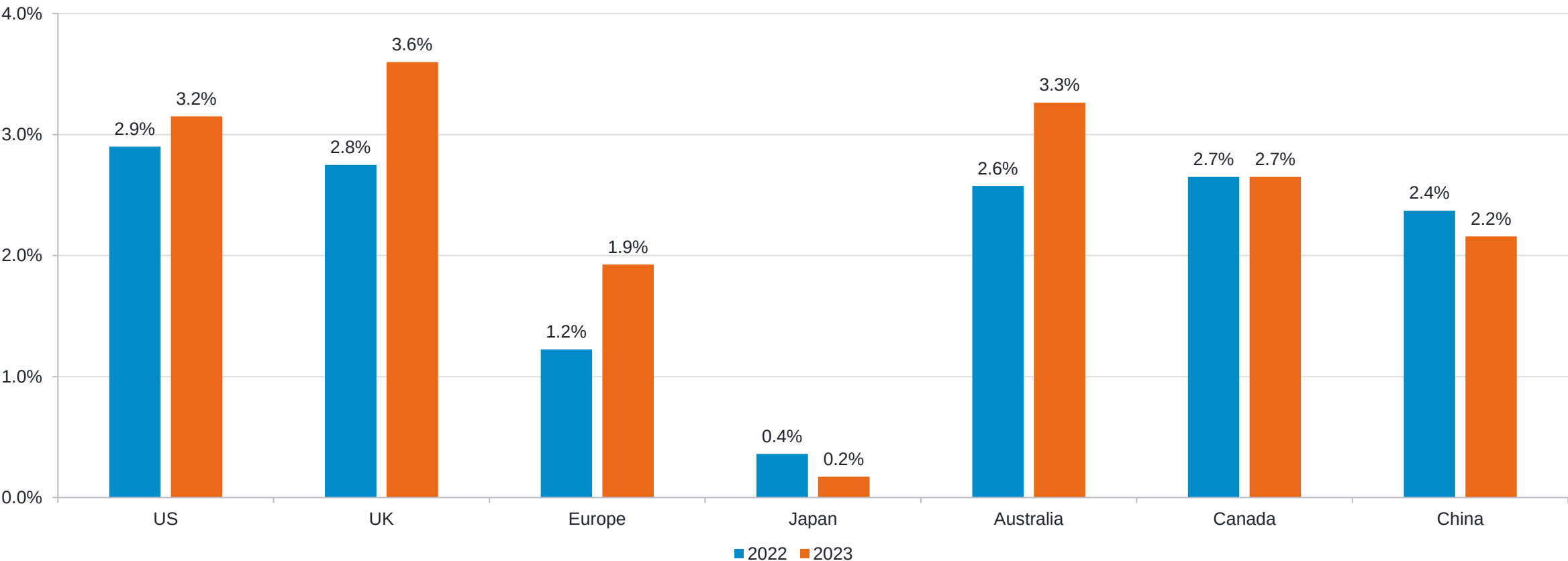
Assumptions are based on proprietary modelling, for illustrative purposes only. They reflect the views of investment professionals at Fidelity International.

Source: Fidelity International, H2 2023.

We expect average cash rates to be higher over the next 10 years

Driven by structurally higher and more persistent inflation

Expected central bank policy rate p.a., 10-year horizon



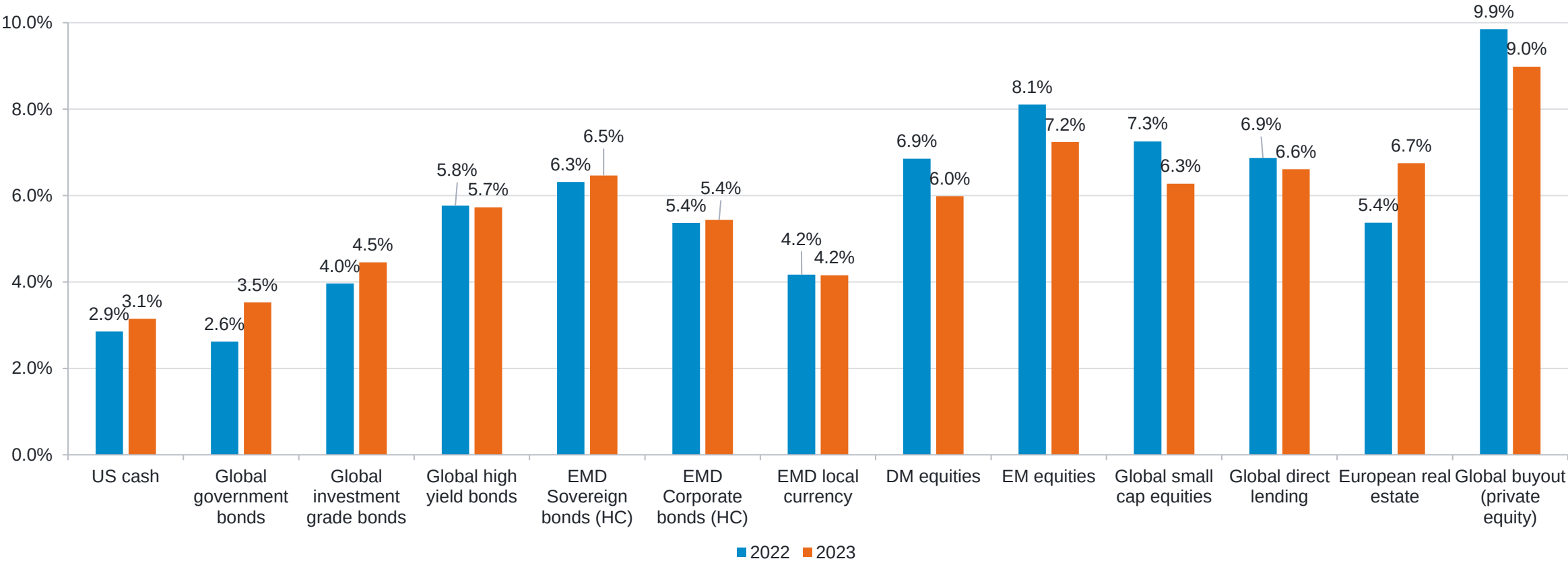
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Source: Fidelity International, H2 2023.

We expect bond returns to be higher and equity returns to be lower than we did last year

Bond returns boosted by higher cash rates, while equity returns hurt by higher starting valuations

Expected total returns p.a. in USD, 10-year horizon (nominal)



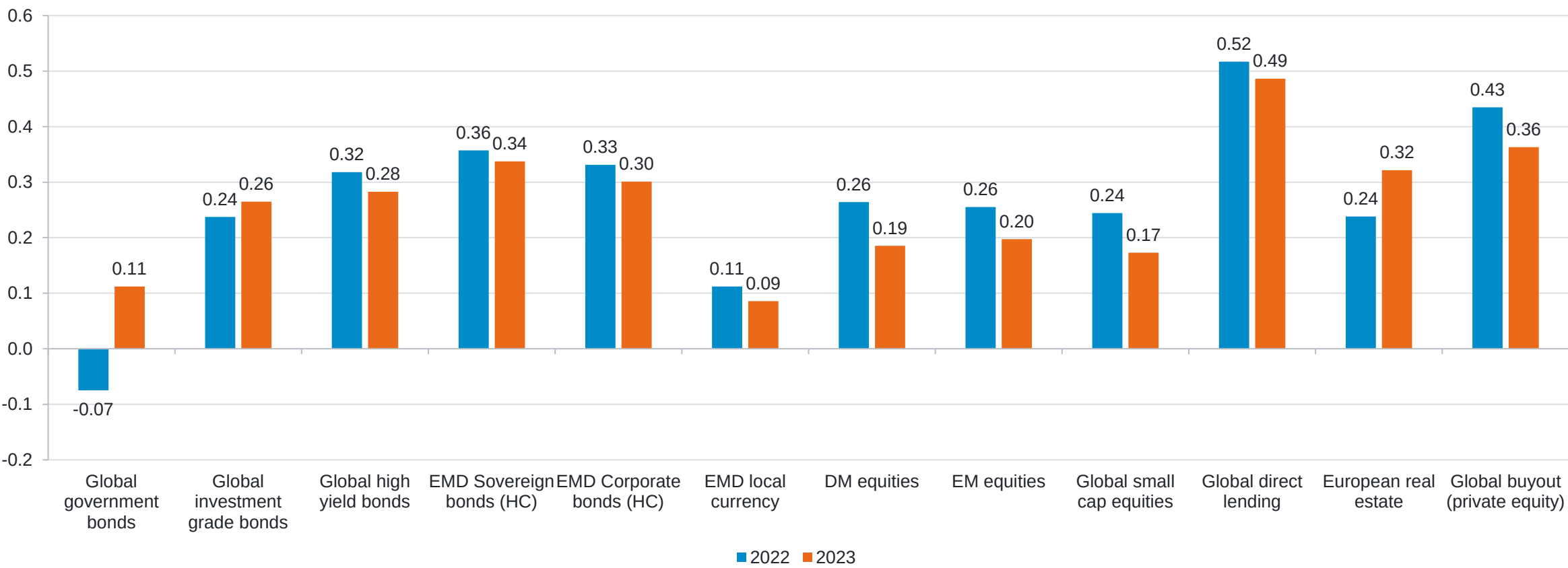
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Source: Fidelity International, reflecting H2 2023 capital market assumptions. Public market returns are gross and private market returns are net of fees. Private market figures assume capital is fully deployed from inception.

Ex-ante Sharpe ratios increase for cash and govt bonds due to higher cash rates

European real estate returns boosted by higher yields

Expected Sharpe ratio in USD, 10-year investment horizon



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Source: Fidelity International, reflecting H2 2023 capital market assumptions. Public market returns are gross and private market returns are net of fees. Private market figures assume capital is fully deployed from inception.

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