OXFORD ECONOMICS

Global scenarios service: Q2 2016

Separation, stagnation and the outlook for global growth

OXFORD ECONOMICS

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Executive Summary

Risks to the global economy have moderated somewhat over the past three months. Markets have rallied since the turmoil at the beginning of the year and the latest activity data suggest near-term risks of a severe China slowdown have abated. But, as highlighted in our latest *Oxford Economics Global Risk Survey*, other risks have risen to the fore – including the potential for significant disruption from Brexit in the near term and a persistent period of subdued growth over the longer term.

We explore these and other key economic risks in this report:

- *Brexit*: While damaging for UK confidence and activity, Brexit is largely shrugged off by the global economy – our central case in the event of a leave vote. (You can find out more about our assessment of the economic implications of Brexit here.)
- *Brexit fuels EU downturn*: Brexit spills over to the rest of Europe, triggering a further bout of political uncertainty across Europe and reigniting debt sustainability concerns as growth slows.
- *Tighter policies in China weigh on global growth*: The Chinese authorities scale back overly ambitious growth targets and rein in the expansion of credit to a more sustainable trajectory.
- *China hard landing triggers market turmoil*: An investment-led Chinese downturn spills over globally, resulting in market turmoil amid a strengthening dollar and tightening EM credit conditions.
- *Advanced economies slide into secular stagnation*: Central banks are left floundering as demand weakness persists, dragging down potential supply and weighing on growth throughout the forecast.
- *Productivity rebounds globally*: The global recovery shifts up a gear, as a cocktail of influences support both a cyclical and structural upturn in productivity growth.

Overall, the risks to the global economy remain skewed to the downside, albeit to a lesser extent than at the time of our Q1 2016 report. Consistent with this assessment, our latest mean profile for global growth – a weighted average of global growth across our scenarios – continues to lie below our baseline forecast. That is also the case for US bond yields, as shown in the charts below.

Chart 1: World GDP

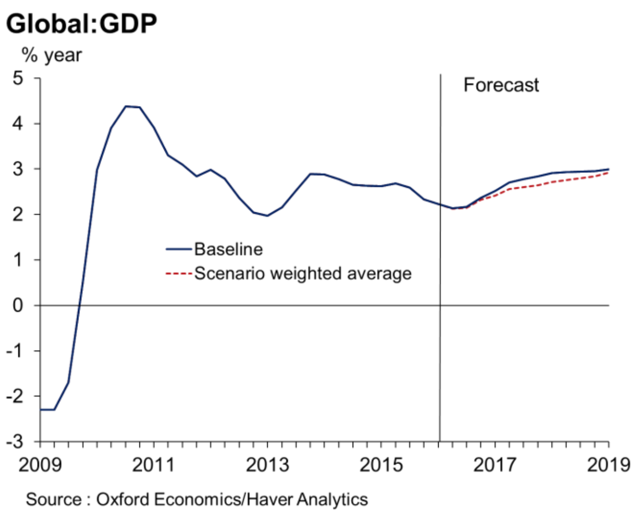
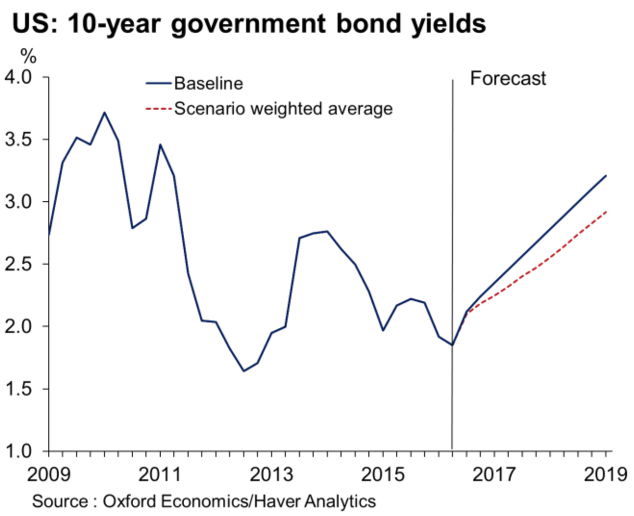


Chart 2: US bond yields



Scenario 1 – Baseline

The Oxford Economics central forecast envisages global growth of 2.2% in 2016, the slowest rate of expansion since 2009 and a little weaker than envisaged three months ago. Activity then picks up in 2017 and the remainder of the forecast period, as growth edges higher across advanced economies (including the US, Japan and the UK) at the same time as recent weakness in Brazil and Russia abates.

The weaker near-term outlook largely reflects a further downward revisions to our growth forecast for the US, to a pace of 1.8% in 2016, from 2% three months ago. By contrast, our 2016 forecast for China has been revised up, to 6.5%, as stimulus measures have succeeded in improving momentum in investment and industry.

Against this backdrop, commodity prices remain relatively subdued, notwithstanding the rally seen since the Q1 2016 report. Oil prices then edge upwards in our baseline as demand/supply equilibrium is gradually restored.

Monetary policy is assumed to remain supportive in this environment and more so than was the case three months ago. In the US, the Fed funds rate is expected to be no higher than 2% at end-2018, revised down from 2.5% this month. But, as policy rates are gradually tightened, 10-year government bond yields rise steadily in major advanced economies. The US dollar continues to appreciate, although its near-term path has weakened in line with the lower profile for policy rates.

Scenario 2 – Brexit

In this scenario, we consider the most likely outcome of Britain voting to leave the EU in the referendum on 23 June. We assign a 15% overall probability to this scenario, although the overall probability of a vote to leave is probably higher.

The government has indicated its intention to trigger Article 50 of the Lisbon Treaty immediately after a vote to leave. This would trigger the process to leave the EU and a two-year negotiation period, running from Q3 2016 to Q2 2018, between the UK and the European Council (EC). In the scenario, it is assumed that it takes the UK longer than two years to negotiate trade deals with the EU and other countries that it currently has trade agreements with through the EU. Therefore, at the end of the two-year negotiation period, the UK reverts to trading under WTO rules.

The immediate aftermath of the leave vote sees a sell-off of UK financial assets and a sharp depreciation in sterling. While the weaker currency provides some support to UK exports during the negotiation period, uncertainty over the future of the UK's relationship with the EU weighs on business and consumer sentiment and depresses UK growth. Similar, but smaller, impacts are felt in a number of European economies. But growth outside of Europe is broadly unaffected.

Overall, the global economy expands by 2.6% in 2017 and 2.8% in 2018, no more than 0.1 percentage points weaker than in the baseline. In financial markets, sterling and the euro react significantly in the short term, declining by 15% and 4% against the dollar respectively. With policy rates generally a little lower for longer, advanced economy government bond yields nudge down slightly. But global equity and commodity markets are only moderately affected and, overall, the market impact is broadly contained.

■ Scenario 3 – Brexit fuels EU downturn

While the previous scenario provides our assessment of the most likely outcome of a UK vote to leave the EU, in this scenario we examine a more adverse case in which the UK referendum fuels a further bout of political and market uncertainty across Europe. We assign an overall probability of 5% to this adverse scenario.

In the scenario, the UK vote to leave adds to the existing strength of populist mood across Europe. In the UK itself, the Scottish National Party uses the Brexit vote to justify a further referendum on Scottish independence. Elsewhere, questions are raised about other European countries' commitment to the EU - and, in some cases, to the Eurozone.

As in our central Brexit scenario, the UK leave vote triggers a fall in confidence in the UK. The immediate aftermath of the referendum vote sees a sell-off of UK financial assets and a sharp depreciation in sterling. UK growth is depressed, notwithstanding an initial strengthening in exports from the weaker currency.

Spillovers to the rest of Europe are larger than in our central Brexit case, however. Amid heightened uncertainty about the future political and economic landscape in Europe, business confidence is hit and near-term investment plans scaled back. Market sentiment is initially jolted, as well. Equity prices decline across the region, weighing on the real economy. With the prospect of slower activity and falling tax revenues adding to fiscal pressure on Eurozone periphery economies, debt sustainability concerns are re-ignited as well and risk premia rise accordingly. The result is a temporary slowing in Eurozone growth, which eases to 1.3% in 2017 and 1.1% in 2018 (compared with 1.7% in the baseline).

Overall, the global economy is more impacted than in the central Brexit scenario. The world economy recovers at a more moderate pace, growing by 2.2% in 2016 and 2.4% in 2017 – around 0.3 percentage points weaker than the baseline. In financial markets, sterling and euro exchange rates react significantly in the short term, as in the central Brexit scenario; at the same time, safe haven flows provide an additional boost to the US dollar. Global equity markets dip initially, by around 3% in the aftermath of the leave vote. Commodity markets are also affected temporarily. But, as growth recovers in Europe after 2017 and market concerns abate, equity and commodity markets both recover.

■ Scenario 4 – Tighter policies in China weigh on global growth

The relative strength of Chinese economic growth at the beginning of 2016 owed a lot to a major credit impulse. But recently there have been signs that the leadership wishes to stress that the need to undertake structural reforms and tackle rising leverage remains on their radar.

In this scenario, we consider what might happen if China's policymakers recognise the unsustainability of the current debt trajectory, deciding to relax their overly ambitious growth targets and rein in the expansion of credit, supported by structural reforms to support activity over the longer term. We assign a probability of 15% to this scenario.

Under the scenario, credit growth is gradually reduced and the ratio of credit to GDP peaks in late 2021. Investment expenditure, which accounts for 70% of increase in the stock of credit since 2008, is hit in particular. But the authorities avoid any abrupt property, equity or FX corrections. And spillovers to the rest of the world are contained compared with a more adverse scenario – such as the China hard landing examined next.

The overall result is a delay to the anticipated pickup in the pace of global economic expansion. World GDP growth is steady, at 2.3% in 2017, compared with the baseline rise to 2.7%. But there are marked differences in the impact on GDP across countries. In financial markets, Asian and commodity exporter currencies depreciate, owing to the fall in oil and other commodity prices and the uncertain outlook for the Chinese economy. Advanced economy government bond yields weaken as policy rates remain low for longer. And global equity prices weaken, remaining depressed throughout the forecast period.

- **Scenario 5 – China hard landing triggers market turmoil**

While recent Chinese activity data suggest that the government's stabilising measures are proving successful, the risk of a China hard landing has not dissipated altogether. Under this scenario, we consider the potential for a slowing Chinese economy to combine with US policy tightening and trigger a significant market reaction. We assign a 5% probability to this scenario.

In the scenario, we assume that vulnerabilities in China and emerging markets more broadly build throughout the remainder of this year, as non-performing loans in China start to rise and the relatively low oil price environment increases vulnerabilities in commodity producers. With the full scale of the deterioration in the external environment not yet apparent, the Fed continues along the policy tightening path and dollar appreciation results, hitting those emerging markets most exposed to dollar strength. But as emerging market data continue to weaken, particularly in China, capital flight out of emergers accelerates and triggers a period of market turmoil.

Overall, the global economy is severely impacted. World GDP growth falls back to just 1.5% in 2017 and 1.4% in 2018, compared with 2.7% and 2.9% in the baseline. In financial markets, exchange rates react significantly in an increasingly risk-off environment, with the euro and yen appreciating alongside the dollar as they act as safe havens during the turmoil. Advanced economy bond yields generally weaken as capital flows to safe assets and policy rates remain low for longer, while the risk premium on emerging market debt rises and pushes up EM yields. Global equity prices tumble, before economic recovery takes hold over the latter part of the forecast.

We are pleased to present the China Hard Landing scenario results for an expanded selection of 80 economies, made possible through the recent expansion of the Oxford Global Economic Model.

- **Scenario 6 – Advanced economies slide into secular stagnation**

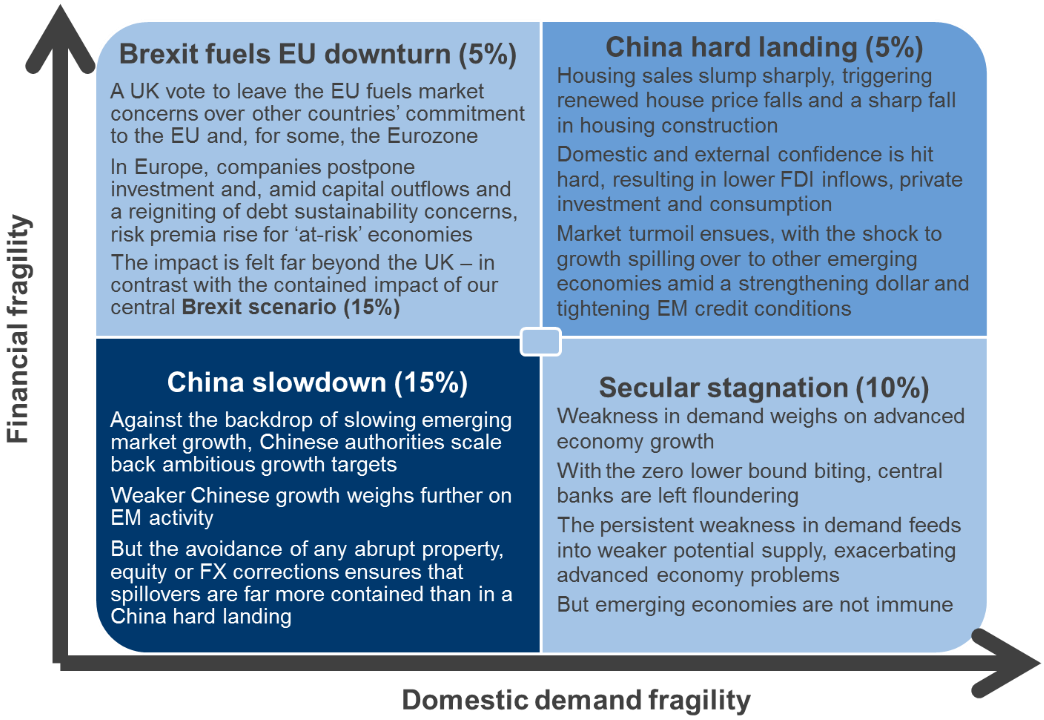
Against the backdrop of the disappointing performance of advanced economies following the financial crisis, we consider in this scenario the implications of further persistent weakness. In particular, we explore the possibility that demand weakness impacts supply potential and low growth becomes engrained across advanced economies. We attach a 10% probability to this scenario playing out.

In the scenario, the subdued demand environment leads firms to scale back both investment plans and new job hires. With the resulting labour market softness constraining earnings growth and weighing on consumer confidence, households cut back on spending and increase savings. Policymakers find themselves constrained – on the monetary side, by the already low levels of policy rates and, fiscally, by ongoing concerns over public indebtedness. As weakness in demand persists, potential output growth fades, held back by slowing capital accumulation and labour market hysteresis effects.

Growth slows steadily throughout the forecast – and not only among advanced economies. Emerging markets also suffer, as export performance disappoints in line with the weaker global demand. As a result, global GDP rises at a modest 2.3% pace in 2017 (compared with 2.7% in the baseline) and growth remains subdued throughout the remainder of the forecast.

In financial markets, advanced economy bond yields decline as policy rates remain low for longer. Equity prices are pushed down throughout the forecast, and exchange rates realign, as weaker commodity demand weighs on commodity exporters and capital chases comparatively better returns outside of developed markets.

Figure A: Summary of downside scenarios



- **Scenario 7 – Productivity rebounds globally**

One salient feature of the global economic landscape following the financial crisis has been the remarkably subdued performance of productivity growth. In this scenario, we consider the possibility of a productivity growth rebound, supporting a sustained global economic recovery. We attach a 15% probability to this scenario.

In the scenario, the global demand outlook steadily improves. Governments with fiscal room invest in infrastructure projects. As tight labour markets begin to feed through to wages, earnings growth surprises on the upside and supports increased consumer spending. Business investment also picks up, supported by an easing in credit conditions as the recovery solidifies. As activity picks up to meet increased demand, a cyclical recovery in productivity gains pace.

At the same time, a number of additional factors more structural in nature drive productivity growth higher. Earlier investment in ICT gradually becomes more fruitful, as firms adjust their processes and workforce skills. Renewed falls in the relative cost of capital spur additional investment in the latest technology. And structural reforms are also implemented in some countries, providing a further boost to growth over the medium term.

The result is a sustained period of improved global growth. World GDP rises by 3.1% in 2017 and 3.5% in 2018, around 0.5 percentage points above the pace envisaged in the baseline. But the impact across countries varies markedly, in part reflecting countries' investment behaviour in the past and their scope for fiscal stimulus in the future.

In financial markets, equities gain globally. The dollar appreciates as the Fed tightens policy more quickly and the US benefits from its relative productivity improvement; meanwhile, emerging market currencies generally appreciate, as the risk-on environment leads to capital inflows. At the same time, commodity prices rise in step with increased demand; by the end of the forecast, oil prices have returned to $100 per barrel.

The analysis in this report is supplemented by a range of additional information. Excel and chart pack data – including for key asset price variables – can be downloaded here. And full scenario data results are available for 46 countries on the GSS databank.

Asset performance under each scenario*	Equities (% change)	Bond yields (% point difference)	Short rates (% point difference)	Currencies (% change)
Baseline (50%)				
China	9.4	0.3	0.1	-1.7
Eurozone	19.9	0.8	0.0	-4.1
UK	14.6	1.0	0.5	1.7
Japan	19.5	0.0	-0.1	-7.6
US	15.4	0.9	1.2	5.1
Brexit (15%)**				
China	8.7	0.3	0.1	-1.6
Eurozone	18.1	0.8	0.0	-4.5
UK	-1.7	0.5	-0.5	-8.9
Japan	19.8	0.0	-0.1	-7.5
US	15.0	0.8	1.1	5.7
Brexit fuels EU downturn (5%)				
China	4.2	0.2	0.1	-1.2
Eurozone	2.1	1.0	-0.6	-7.4
UK	-2.6	0.5	-0.5	-9.5
Japan	17.0	-0.1	-0.1	-7.5
US	10.6	0.7	0.6	6.5
Tighter policies in China weigh on global growth (15%)				
China	3.4	-0.4	-1.1	-2.6
Eurozone	12.4	0.7	-0.6	-4.0
UK	9.0	0.7	0.0	1.6
Japan	15.1	-0.4	-0.5	-7.3
US	9.0	0.3	0.6	5.6
China hard landing triggers market turmoil (5%)				
China	-24.1	-1.3	-1.9	-9.5
Eurozone	12.2	0.4	-0.6	3.0
UK	6.8	0.5	0.0	12.2
Japan	6.8	-0.6	-0.5	6.4
US	4.5	-0.4	-0.1	8.9
Advanced economies slide into secular stagnation (10%)				
China	4.2	-1.0	-1.1	-1.9
Eurozone	11.0	0.1	-0.6	-3.4
UK	11.9	0.2	-0.5	1.6
Japan	15.1	-0.6	-0.5	-6.6
US	11.1	-0.1	0.1	5.2
Productivity rebounds globally (15%)				
China	15.8	0.8	0.1	-2.2
Eurozone	23.9	0.9	0.0	-4.6
UK	17.6	1.1	0.6	1.3
Japan	24.2	0.1	-0.1	-8.2
US	21.5	1.1	1.5	4.6

*Performance between 2016 Q1 and 2018 Q1. Equity indices used for each country are as follows: China - Shanghai Stock Price Index; Eurozone - Euro Stoxx 50; UK - FTSE All Share; Japan - Topix Composite; US -Wilshire 5000 Price Index. Bond yields are all based on 10 year government bonds. All currencies are based against the dollar except for the US which uses the Broad-Based index, and are calculated so that a positive number shows an appreciation and a negative number shows a depreciation.
**Brexit is a UK focused scenario and can occur with any of the scenarios analysied. As a result, the probabilities in this table sum to greater than 100.

Alternative GDP growth forecasts	2015	2016	2017	2018	2019	2020	2021
Oxford Baseline Forecast (50%)							
US	2.4	1.8	2.3	2.3	2.1	2.1	2.0
Eurozone	1.5	1.6	1.7	1.7	1.6	1.5	1.5
China	6.9	6.5	6.2	5.9	5.7	5.6	5.4
World	2.6	2.2	2.7	2.9	2.9	2.9	2.9
UK	2.3	2.0	2.3	2.2	2.0	2.3	2.7
Brexit (15%*)							
US	2.4	1.7	2.3	2.3	2.1	2.1	2.0
Eurozone	1.5	1.6	1.6	1.5	1.5	1.5	1.5
China	6.9	6.5	6.1	5.9	5.7	5.6	5.4
World	2.6	2.2	2.6	2.8	2.9	2.9	2.9
UK	2.3	1.9	1.6	1.4	2.0	2.2	2.3
Brexit fuels EU downturn (5%)							
US	2.4	1.7	2.1	2.2	2.2	2.3	2.1
Eurozone	1.5	1.6	1.3	1.1	1.6	1.7	1.6
China	6.9	6.5	5.8	5.8	6.0	5.7	5.4
World	2.6	2.2	2.4	2.7	2.9	3.0	3.0
UK	2.3	1.9	1.2	1.1	2.0	2.4	2.6
Tighter policies in China weigh on global growth (15%)							
US	2.4	1.7	2.1	2.1	2.3	2.1	2.0
Eurozone	1.5	1.5	1.4	1.4	1.6	1.6	1.6
China	6.9	6.3	5.3	4.8	4.8	4.7	4.8
World	2.6	2.2	2.3	2.4	2.7	2.8	2.9
UK	2.3	1.9	2.1	1.9	1.9	2.5	2.7
China hard landing triggers market turmoil (5%)							
US	2.4	1.8	1.3	1.1	2.4	2.6	2.2
Eurozone	1.5	1.6	0.8	0.5	1.4	1.9	1.9
China	6.9	6.3	2.7	3.5	5.0	5.4	4.8
World	2.6	2.2	1.5	1.4	2.6	3.2	3.1
UK	2.3	1.9	1.7	1.3	1.9	2.4	2.7
Advanced economies slide into secular stagnation (10%)							
US	2.4	1.6	1.8	1.8	1.7	1.5	1.3
Eurozone	1.5	1.5	1.2	0.9	0.7	0.7	0.7
China	6.9	6.4	5.7	5.3	5.1	5.2	5.3
World	2.6	2.2	2.3	2.4	2.4	2.4	2.5
UK	2.3	1.9	1.9	1.5	1.5	1.5	1.5
Productivity rebounds globally (15%)							
US	2.4	1.8	2.8	3.1	3.1	3.2	3.0
Eurozone	1.5	1.6	2.1	2.3	2.3	2.0	1.9
China	6.9	6.5	6.9	6.7	6.1	5.8	5.6
World	2.6	2.3	3.1	3.5	3.5	3.4	3.3
UK	2.3	2.0	2.5	2.5	2.5	2.7	2.9

World GDP growth at 2010 prices and market exchange rates
*Brexit is a UK focused scenario and can occur with any of the scenarios analysed. As a result, the probabilities in this table sum to greater than 100.

1 Baseline scenario

The Oxford Economics central forecast for global growth has fallen further since our previous report. This section summarises the key features of the forecast (further details of which are provided in May's World Economic Prospects); risks around this baseline are examined in subsequent sections.

Key features

The key features of the baseline scenario may be summarised as follows:

- The Oxford Economics central forecast envisages world growth of 2.2% in 2016, the **slowest rate of global expansion since 2009** and a little weaker than envisaged three months ago. Growth picks up in 2017 and the remainder of the forecast period, as growth edges higher across advanced economies (including the US, Japan and UK) at the same time as recent weakness in Brazil and Russia abates.
- The **weaker near-term outlook largely reflects a further downward revisions to our growth forecast for the US**, as prospects for investment and consumer spending have weakened. We now anticipate GDP growth of 1.8% in 2016, down from 2% three months ago. As discussed below, this weaker profile is accompanied by corresponding downgrades to our forecasts for US monetary policy tightening and the dollar exchange rate.
- **Prospects for Japan have also deteriorated**, in part reflecting recent strengthening in the yen. We anticipate growth of just 0.1% in 2016, compared with 0.8% at the time of the Q1 2016 report. Against this backdrop, we expect the planned 2017 consumption tax rise to be postponed.
- **The outlook for Eurozone activity has been more stable.** Growth of 1.6% remains in prospect for 2016, with Q1 GDP data confirming our earlier expectations that the Eurozone recovery regained momentum at the beginning of 2016. German activity rebounded at its fastest rate for two years in Q1 2016 and 1.7% is anticipated for the year as a whole.
- By contrast, **our 2016 forecast for China has been revised up**, to 6.5%, as stimulus measures have succeeded in improving momentum in investment and industry.
- **Inflationary pressures remain muted**. Global inflation remains at or below 3% throughout the forecast.
- With the outlook for global activity moderating, **commodity prices remain relatively subdued**, notwithstanding the rally seen since the Q1 2016 report. Oil prices then edge upwards in our baseline as demand/supply equilibrium is gradually restored.
- **Monetary policy is assumed to remain supportive** in this environment and more so than was the case three months ago. In the US, the Fed funds rate is no higher than 2% at end-2018, revised down from 2.5% this month.
- As policy rates are gradually tightened, however, 10-year **government bond yields rise steadily in major advanced economies**.
- **The US dollar continues to appreciate**, although its near-term path has weakened in line with the weaker profile for policy rates.
- **Global equites gain**, though cross-country differences are marked. In the US, with equities overvalued and relative valuations are not appealing for long-term investors. The S&P rises only modestly this year. In the Eurozone and Japan, where equities are strongly undervalued, the outlook is more positive.

Oxford Economics' Baseline Forecasts

	2014	2015	2016	2017	2018	2019	2020	2021
Real GDP								
North America								
United States	2.4	2.4	1.8	2.3	2.3	2.1	2.1	2.0
Canada	2.5	1.2	1.4	2.1	2.3	2.2	2.1	2.0
Europe								
Eurozone	0.9	1.5	1.6	1.7	1.7	1.6	1.5	1.5
Germany	1.6	1.5	1.7	1.9	1.7	1.5	1.1	1.1
France	0.2	1.2	1.5	1.6	1.7	1.6	1.6	1.6
Italy	-0.3	0.6	1.0	1.3	1.2	1.0	0.9	0.9
UK	2.9	2.3	2.0	2.3	2.2	2.0	2.3	2.7
EU27	1.4	1.8	1.8	2.0	1.9	1.8	1.8	1.8
Asia								
Japan	-0.1	0.6	0.1	0.5	0.7	0.3	0.3	0.8
China	7.2	6.9	6.5	6.2	5.9	5.7	5.6	5.4
India	7.0	7.3	7.4	7.2	7.0	6.8	6.5	6.3
World	2.7	2.6	2.2	2.7	2.9	2.9	2.9	2.9
World 2005 PPPs	3.3	3.0	3.0	3.5	3.7	3.6	3.6	3.6
World trade	2.9	1.5	1.5	4.1	4.4	4.4	4.3	4.2
Inflation (CPI)								
North America								
United States	1.6	0.1	1.3	2.2	2.1	2.2	2.3	2.2
Canada	1.9	1.1	1.3	2.0	2.2	2.1	2.0	2.0
Europe								
Eurozone	0.4	0.0	0.3	1.5	1.7	1.9	1.9	1.9
Germany	0.9	0.2	0.6	1.9	2.0	2.0	2.0	1.9
France	0.5	0.0	0.1	1.3	1.6	2.0	2.0	2.0
Italy	0.3	0.0	0.1	1.5	1.5	1.7	1.9	1.8
UK	1.5	0.1	0.6	1.4	1.8	1.9	1.9	2.0
EU27	0.5	0.0	0.4	1.5	1.7	1.9	1.9	1.9
Asia								
Japan	2.7	0.8	-0.1	0.6	0.8	1.8	1.4	1.1
China	2.0	1.4	2.3	2.1	2.6	2.8	2.8	2.8
India	6.6	4.9	5.3	5.1	5.3	5.2	5.0	4.7
World	3.2	2.8	2.7	2.9	2.9	3.0	2.9	2.8
Exchange Rates								
US$ Effective	78.4	91.1	91.9	93.6	94.0	92.7	91.0	89.0
$/€	1.33	1.11	1.10	1.06	1.07	1.10	1.13	1.15
¥/$	105.9	121.0	112.2	119.0	124.9	125.0	124.7	123.1
Commodity Prices								
Brent oil ($/bl)	99.0	52.4	38.4	42.5	50.4	58.9	67.5	75.2

2 Brexit

In this scenario, we consider the most likely impact of Britain voting to leave the EU in the referendum on 23 June.

The government has indicated its intention to trigger Article 50 of the Lisbon Treaty immediately after a vote to leave. This would initiate the process to leave the EU and a two-year negotiation period, running from Q3 2016 to Q2 2018, between the UK and the European Council (EC). In the scenario, it is assumed that it takes the UK longer than two years to negotiate trade deals with the EU and other countries that it currently has trade agreements with through the EU. Therefore, at the end of the two-year negotiation period, the UK reverts to trading under WTO rules.

The immediate aftermath of the leave vote sees a sell-off of UK financial assets and a sharp depreciation in sterling. While the weaker currency provides some support to UK exports during the negotiation period, uncertainty over the future of the UK's relationship with the EU weighs on business and consumer sentiment and depresses UK growth. Similar, but smaller, impacts are felt in a number of European economies. But growth outside of Europe is broadly unaffected.

Overall, the global economy expands by 2.6% in 2017 and 2.8% in 2018, no more than 0.1 percentage points weaker than in the baseline. In financial markets, sterling and the euro react significantly in the short term, declining by 15% and 4% against the dollar respectively. With policy rates generally a little lower for longer, advanced economy government bond yields nudge down slightly. But global equity and commodity markets are only moderately affected and, overall, the market impact is broadly contained.

We assign a 15% probability to this scenario[1]. The scenario was quantified using the Oxford Global Economic Model[2].

Assumptions

The main assumptions of this scenario are as follows:

- **Equities and debt decline** in value immediately following the vote. UK equities immediately decline by around 5%, bottoming out in Q1 2017, over 7% below the Q2 2016 value. The impact on UK bond yields of a modest rise in the risk premium on UK debt is offset by expectations of a lower policy rate and inflation in the medium-term.
- **Sterling also weakens**. Currently, option prices suggest that market participants place a much greater weight on sterling depreciating than appreciating, with the cost of insuring against a depreciation particularly high around the time of the referendum. Using option prices as a proxy for likely moves in sterling in the event of Brexit, this implies a depreciation of around 15% to $1.19 in the immediate aftermath of the referendum. A modest rally then leaves sterling around 11% below the baseline by early 2017, before gradually regaining ground in the latter part of the forecast.

[1] Note, Brexit is a UK focused scenario and can occur with any of the scenarios analysed. As a result, the probabilities included in the GSS sum to greater than 100%. Please see our previous research briefing on scenario probabilities for more information.

[2] The Oxford Global Economic Model is a fully integrated general equilibrium model used for forecasting and 'what if' analysis. The model now covers 80 economies in detail including the US, Japan, most EU economies, China, India and other leading emerging markets. It also gives headline indicators for another 30 economies. The model provides a rigorous and consistent structure for analysis and forecasting, and allows the implications of alternative global scenarios and policy developments to be readily analysed and quantified, taking into account all of the linkages between economies – e.g. through trade volumes and prices, financial markets and capital flows, oil and commodity prices, exchange rates etc.

- **We assume a deterioration in UK confidence** in Q3 2016, equivalent to around a third of the size of the shock experienced during the global financial crisis and calibrated to be consistent with our expectation that corporate and investor sentiment would be more adversely affected by Brexit than consumer confidence. The initial shock halves in size over the following seven quarters.
- **The UK leaves the EU, reverting to Most Favoured Nation (MFN) trade status**, limiting migration and receiving a fiscal boost from the cancellation of contributions to the EU budget.
- **The reversion to MFN tariff levels in Q3 2018 increases the cost of imports** between the UK and the rest of Europe, and between the UK and other countries with which the UK has a trade deal via the EU, dampening overall levels of trade volumes. These trade shocks are calibrated using outputs from the GTAP (Global Trade Analysis Project) model.
- **Population growth slows from Q3 2018** as migration inflows are restricted, reducing the labour supply by 0.6% relative to our baseline projection by the end of 2021.
- **The Bank of England cuts rates to 0%**, but holds off from undertaking more QE. Rates only rise again once growth begins to stabilise and inflationary pressures appear on the horizon, in 2019.
- **The EU experiences modest confidence effects** as well as a small decline in the value of the euro against the dollar.

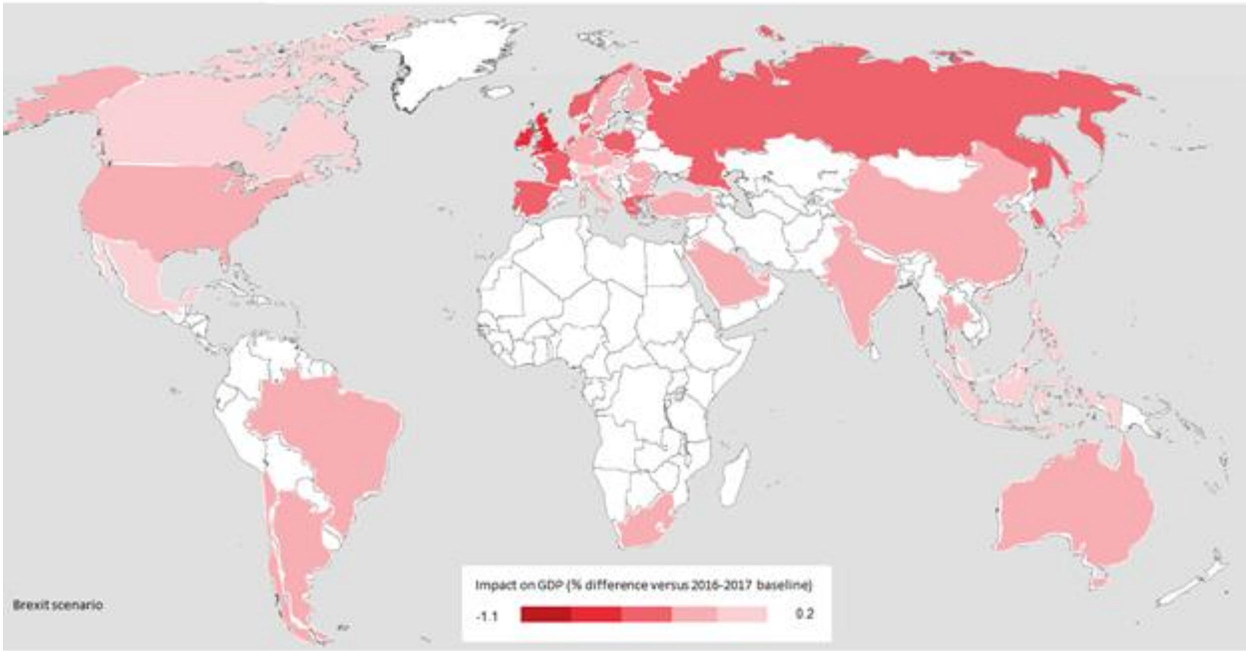
Real economy results

The real economy results of this scenario may be summarised as follows:

- **Global growth recovers a little less strongly in the near term,** to 2.6% in 2017 and 2.8% in 2018, compared with 2.7% and 2.9% in the baseline.
- The countries that suffer the largest hit to GDP are:
  - **The UK itself**, as declines in business investment and consumer spending more than offset an initial boost to exports from a weaker currency.
  - **The UK's major trading partners, in particular Ireland**, as the depreciation of sterling dents their competitiveness and UK demand for their exports wanes.
- As a result, **UK growth slows to 1.9% in 2016,** 1.6% in 2017, and 1.4% in 2018, before recovering during the latter part of the forecast period.
- **UK domestic demand weakens** due to economic uncertainty and a decline in the value of the pound, which dents purchasing power. Consumer expenditure is over 5% below baseline by 2021.
- **The initial boost to UK exports from the devaluation reverses** once sterling recovers and MFN tariff levels are introduced on UK exports from Q3 2018.
- **Unemployment initially rises** as cautious firms cut back on hiring. While the pickup in activity during 2018-2020 helps to foster a recovery in private employment, employment levels still remain 1.3% below base by the end of the five-year projection, weighing on aggregate private consumption in the UK. But the recovery in employment, combined with a reduction in the labour supply stemming from border controls, results in the unemployment rate declining in the latter part of the forecast.
- **Eurozone growth slows modestly**, to 1.6% in 2017 and 1.5% in 2018, as business confidence and a deterioration in trade modestly dampen growth. Other EU countries are also required to increase their contributions to plug the hole in the EU budget left by the UK's exit; the resulting paring back of other government expenditure weighs on aggregate demand in those economies.

- **Growth outside of Europe is broadly unaffected.** Non-European exports are modestly weaker than in the baseline, reflecting in part a loss of relative competitiveness as the euro and pound depreciate. But, with price pressures a little weaker, monetary policy remains looser than in the baseline, providing some support to domestic demand.

Figure 2.A: Cross-country GDP impact in Brexit scenario

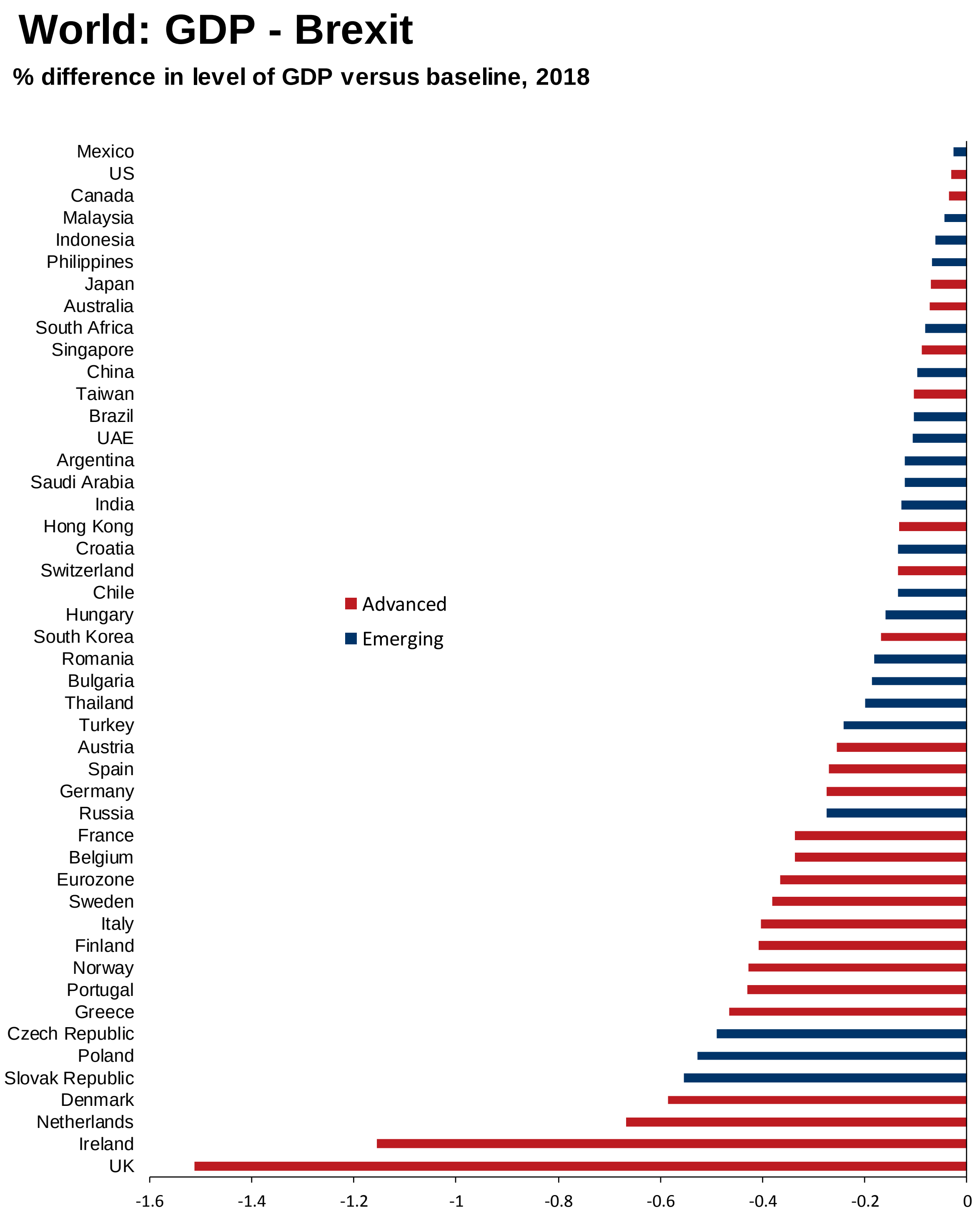


Commodity and asset market results

The commodity and asset market results of this scenario may be summarised as follows:

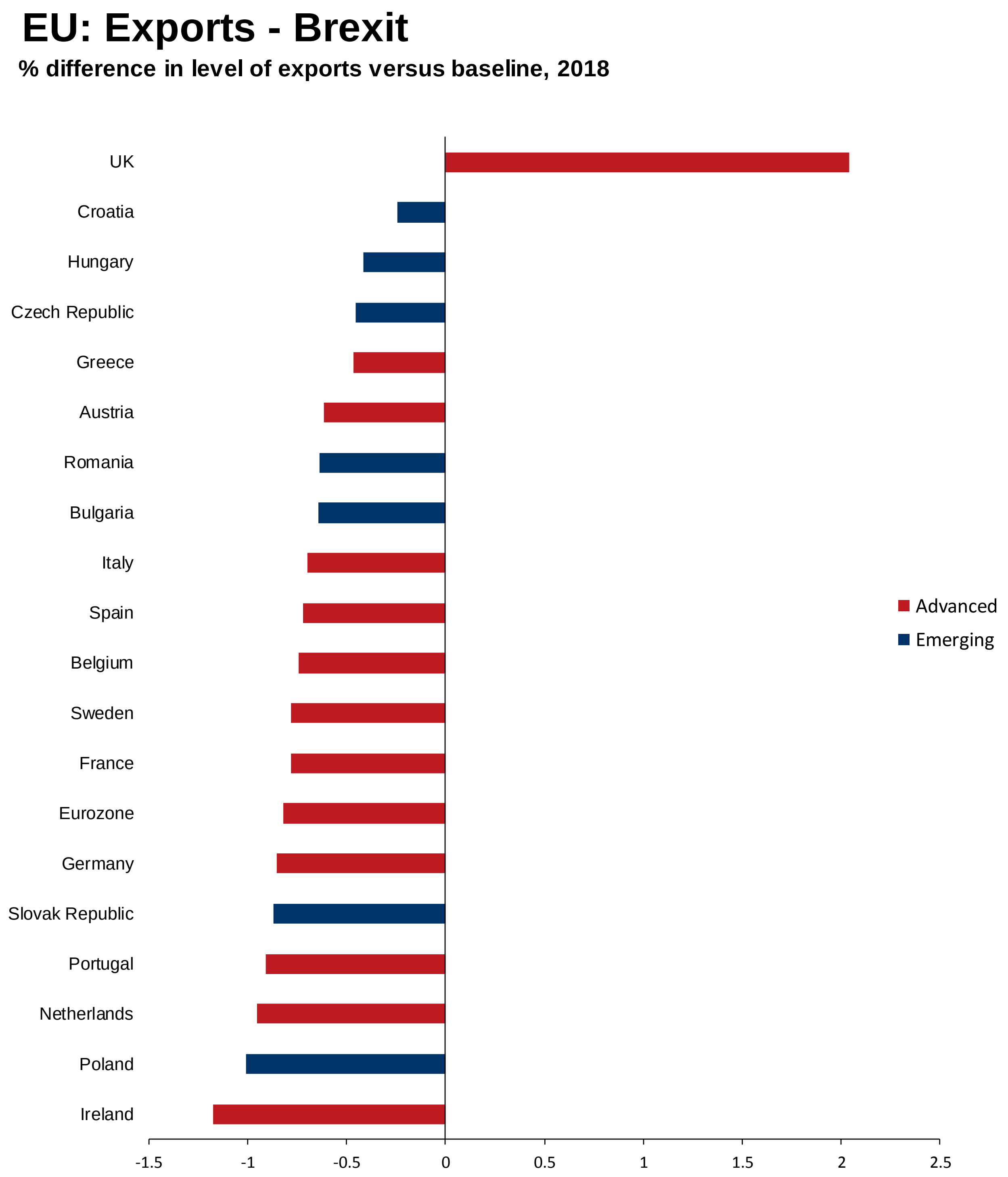
- **Oil and commodity prices are barely affected by the exit of Britain from the EU.** Oil prices nudge down $1½ per barrel below baseline in the first couple of quarters after the referendum, recovering close to base soon after.
- **Sterling and the euro react significantly in the short term**, with a 15% decline in the value of the pound against the dollar and a 4% decline in the euro. A number of other countries closely linked to the Eurozone also see a modest depreciation against the greenback.
- **The profile for European policy rates is also weaker than in the baseline.** The Bank of England looks beyond the initial inflationary pressures stemming from the depreciation of the pound and cuts Bank Rate to 0%, where it remains until Q4 2019. While the ECB does not undertake any additional policy loosening, it delays the Eurozone tightening cycle until Q4 2019 (nine months later than in our baseline) in the face of moderately weaker growth and lower core inflation.
- **Beyond Europe, the impact on policy rates is limited**, although the Fed does push back its policy tightening path by one quarter.
- **Advanced-economy government bond yields nudge down slightly** as policy rates remain low for longer and inflationary pressures moderate.
- **Global equity prices dip slightly on the referendum results**, largely weighed down by the decline in UK equities. By 2021, the Dow Jones Global Index is just 0.4% below base.

Figure 2.B: Cross-country GDP impact of Brexit scenario



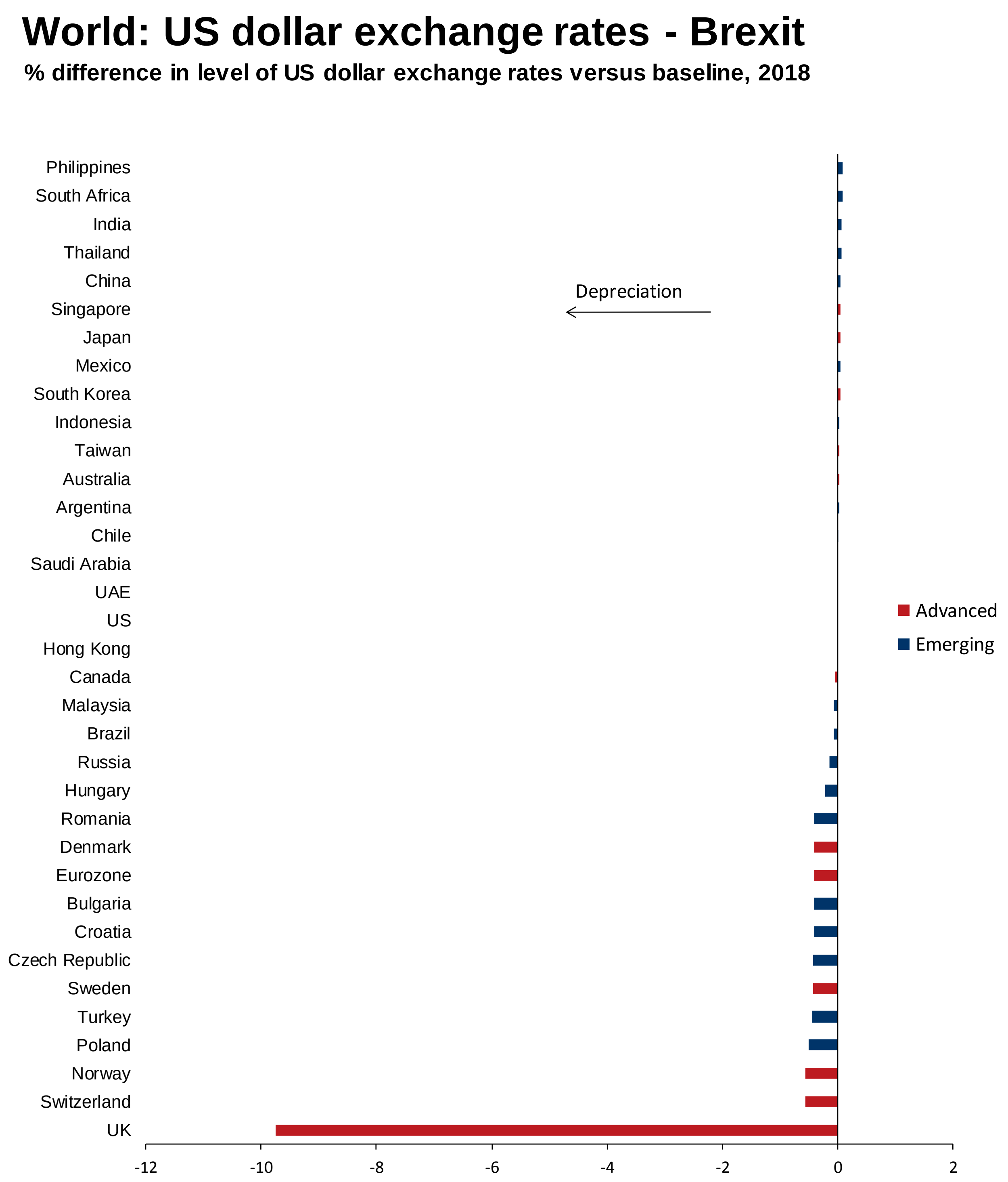
Source : Oxford Economics

Figure 2.C: Cross-country exports impact of Brexit scenario



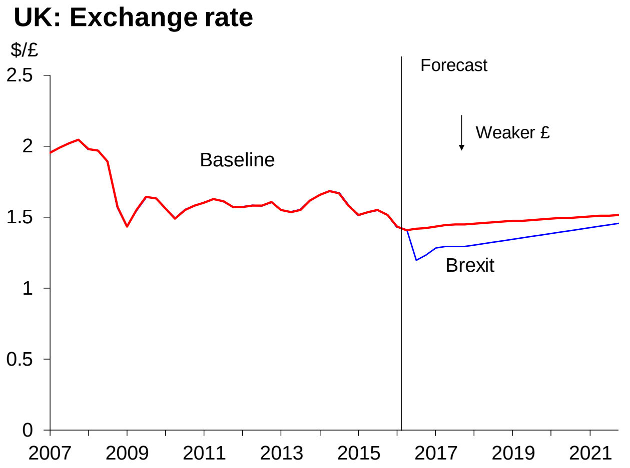
Source : Oxford Economics

Figure 2.D: Cross-country exchange rate impact of Brexit scenario



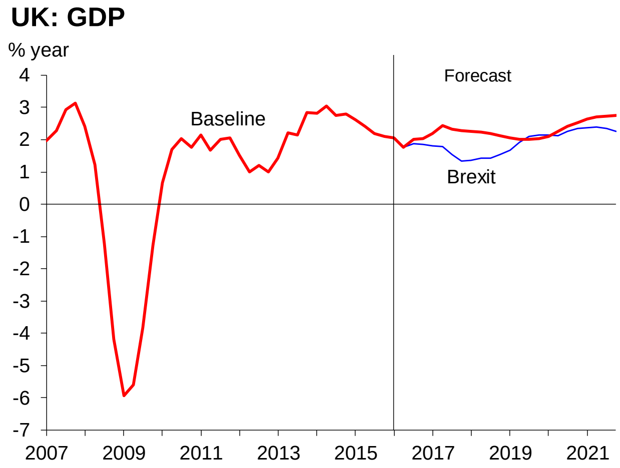
Source : Oxford Economics

Chart 2.1: UK exchange rate



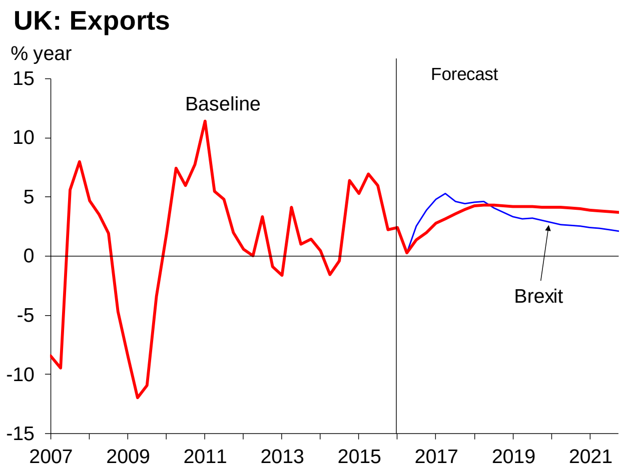
Source : Oxford Economics/Haver Analytics

Chart 2.2: UK GDP



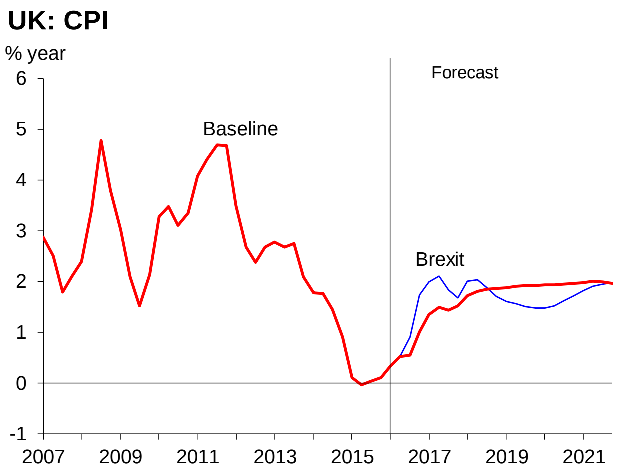
Source : Oxford Economics/Haver Analytics

Chart 2.3: UK exports



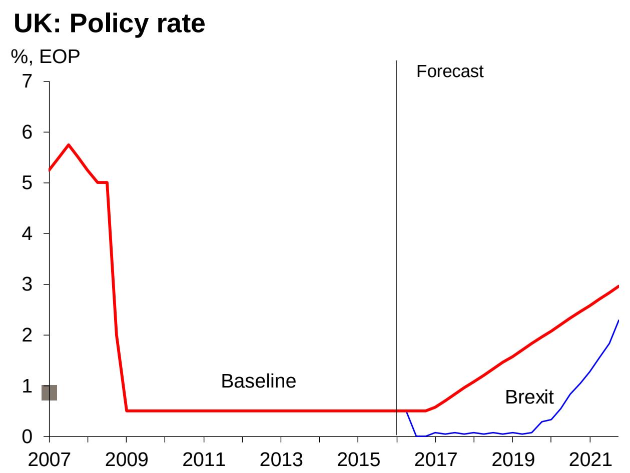
Source : Oxford Economics/Haver Analytics

Chart 2.4: UK inflation



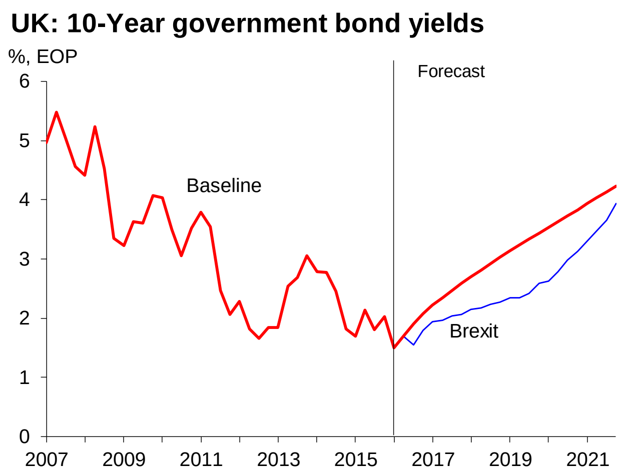
Source : Oxford Economics/Haver Analytics

Chart 2.5: UK policy rate



Source : Oxford Economics/Haver Analytics

Chart 2.6: UK bond yields



Source : Oxford Economics/Haver Analytics

Chart 2.7: World GDP

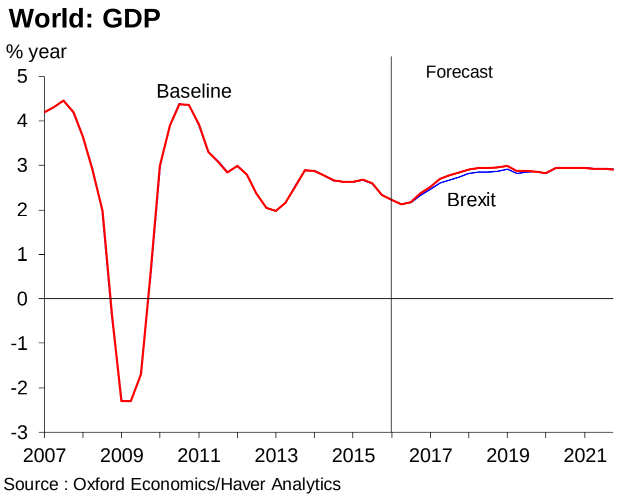


Chart 2.8: Eurozone GDP

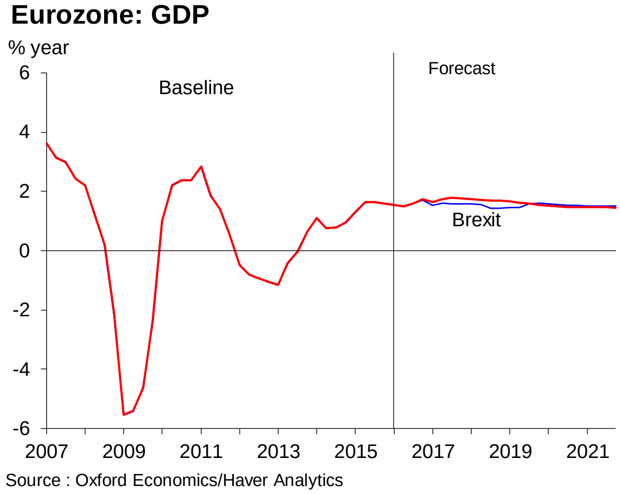


Chart 2.9: Eurozone policy rate

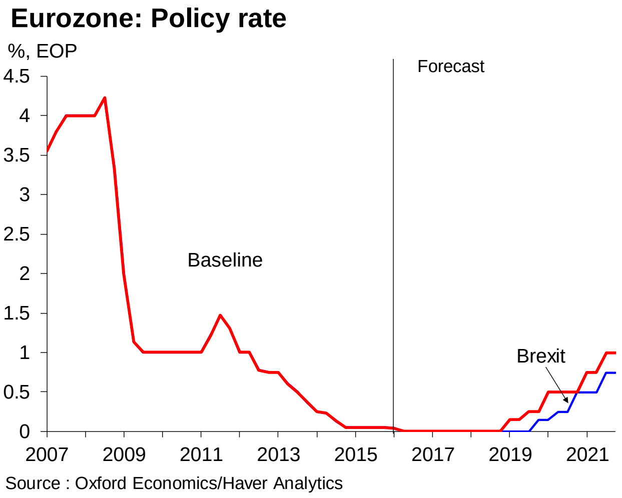


Chart 2.10: Eurozone exchange rate

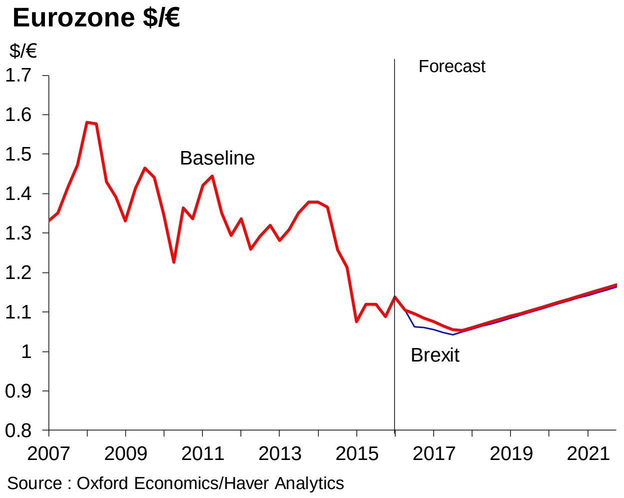


Chart 2.11: Eurozone equity rate

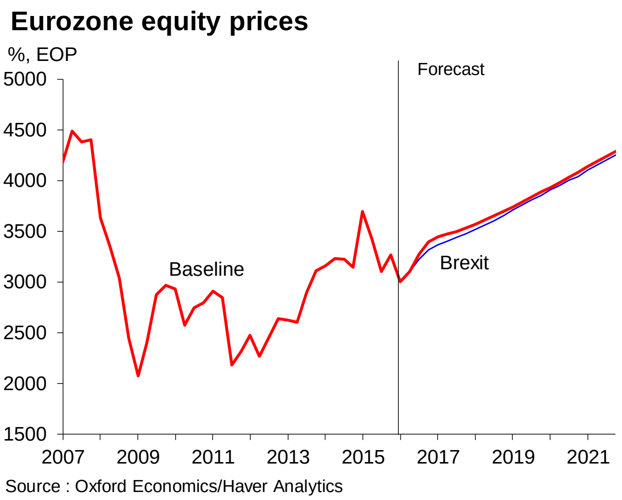
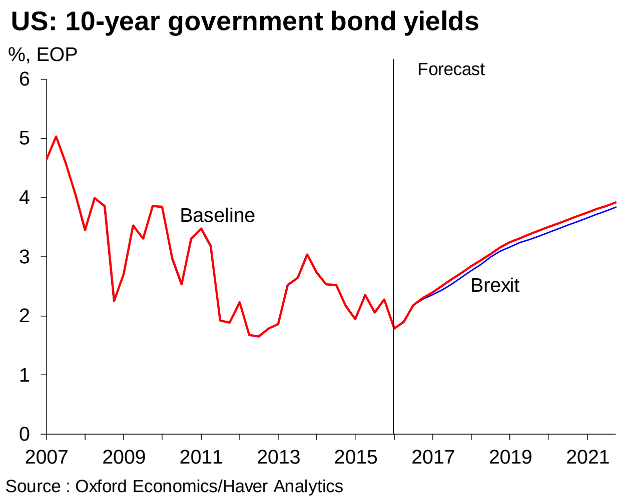


Chart 2.12: US bond yields



3 Brexit fuels EU downturn

While the previous scenario provides our assessment of the most likely outcome of a UK vote to leave the EU, in this scenario we examine a more adverse case in which the UK referendum fuels a further bout of political and market uncertainty across Europe.

In the scenario, the UK vote to leave adds to the existing strength of populist mood across Europe. In the UK itself, the Scottish National Party uses the Brexit vote to justify a further referendum on Scottish independence. Elsewhere, questions are raised about other European countries' commitment to the EU - and, in some cases, to the Eurozone itself.

As in our central Brexit scenario, the UK leave vote triggers a fall in confidence in the UK. The immediate aftermath of the referendum vote sees a sell-off of UK financial assets and a sharp depreciation in sterling. UK growth is depressed, notwithstanding an initial strengthening in exports from the weaker currency.

Spillovers to the rest of Europe are larger than in our central Brexit case, however. Amid heightened uncertainty about the future political and economic landscape in Europe, business confidence is hit and near-term investment plans are scaled back. Market sentiment is initially jolted, as well. Equity prices decline across the region, weighing on the real economy. With the prospect of slower activity and falling tax revenues adding to fiscal pressure on Eurozone periphery economies, debt sustainability concerns are re-ignited as well and risk premia rise accordingly. The result is a temporary slowing in Eurozone growth, which eases to 1.3% in 2017 and 1.1% in 2018 (compared with 1.7% in the baseline).

Overall, the global economy is more impacted than in the central Brexit scenario. The world economy recovers at a more moderate pace, growing by 2.2% in 2016 and 2.4% in 2017 – around 0.3 percentage points weaker than the baseline. In financial markets, sterling and euro exchange rates react significantly in the short term, as in the central Brexit scenario; at the same time, safe haven flows provide an additional boost to the US dollar. Global equity markets dip initially, by around 3% in the aftermath of the leave vote. Commodity markets are also affected temporarily. But, as growth recovers in Europe after 2017 and market concerns abate, equity and commodity markets both recover.

We assign an overall probability of 5% to this adverse Brexit scenario, implying a 1 in 4 likelihood in the event of Brexit.

Assumptions

In addition to the assumptions outlined in the previous scenario ('Global Brexit impact is contained'), this scenario makes the following assumptions:

- **The UK vote to leave the EU prompts a further bout of political uncertainty in Europe**. In the UK, the Scottish National Party uses the Brexit vote to justify a further referendum on Scottish independence. Elsewhere in Europe, the Brexit vote adds to the existing strength of populist mood across the EU; referendums on EU membership are held in a number of countries across the region.
- **Confidence falls sharply in the UK and the EU** after the British vote to leave the EU. Major European equity markets weaken significantly as a result; consumer and, in particular, investment spending is hit across Europe.
- **The scale of the shocks varies markedly across countries** according to the presence of anti-European sentiment (as reflected in recent polls or votes), trade linkages to the UK and on general economic vulnerability. Hence, confidence shocks are larger in Ireland and Southern Europe than in Germany or France. But these shocks are temporary and gradually abate over the forecast period.
- The loss of confidence, and the prospect of a further period of subdued growth, triggers a rise in risk premia on Eurozone periphery debt as **debt sustainability concerns are reignited**.

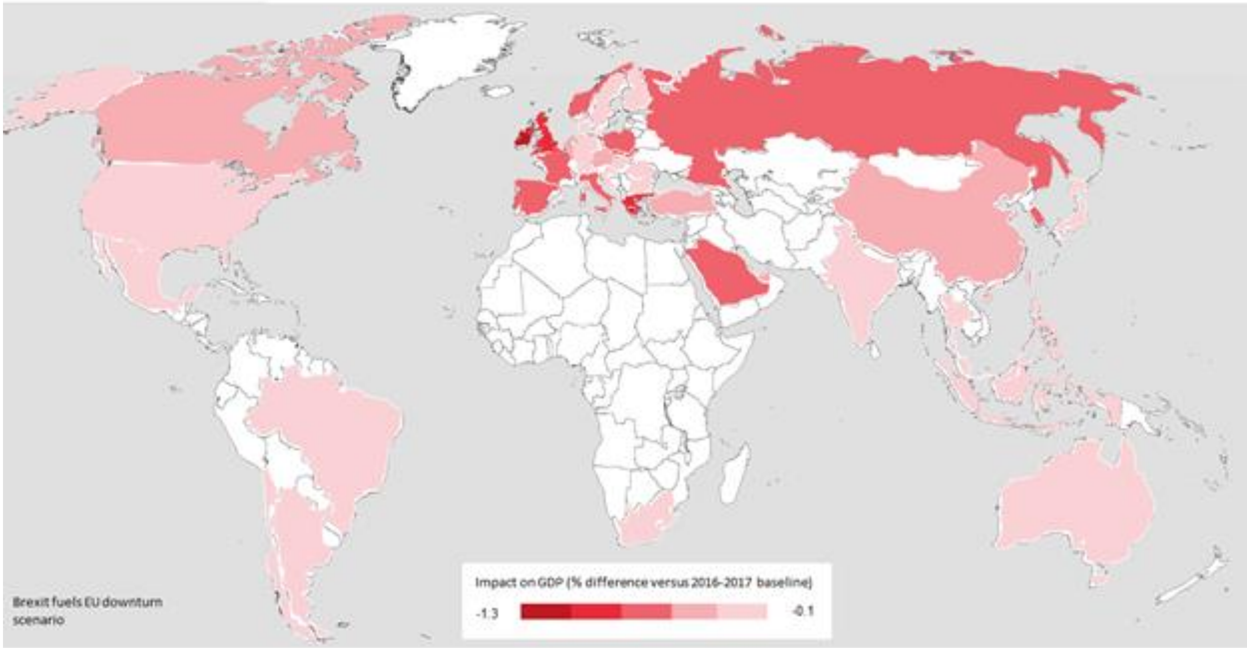
- **The Bank of England cuts rates to zero**, but holds off from undertaking more QE. **The ECB delays the start of its tightening cycle even further**, with the first rate hike not seen until 2021.

Real economy results

The real economy results of this scenario may be summarised as follows:

- **Global growth recovers less strongly in the near term,** to 2.4% in 2017 and 2.7% in 2018, compared with 2.7% and 2.9% in the baseline.
- The countries that suffer the largest hit to GDP are:
  - **The UK itself**, as declines in business investment and consumer spending more than offset an initial boost to exports from a weaker currency.
  - **The UK's major trading partners, in particular Ireland**, as the depreciation of sterling dents their competitiveness and UK demand for their exports wanes.
  - **Vulnerable European periphery economies, such as Greece and Portugal**, where debt sustainability concerns are reignited.
  - **Other European economies**, as capital spending and export volumes slow under the weight of declining business confidence and weaker demand across the region.
- As a result, **UK growth slows** to 1.2% in 2017 and 1.1% in 2018, 1.1 percentage points weaker than in the baseline.
- **Eurozone growth eases** to 1.3% in 2016 and 1.1% in 2017. After the temporary slump in 2016 and 2017, GDP growth gradually recovers, but remains 0.7% below the baseline at the end of 2021.
- **Consumer spending weakens in the Eurozone**, against a backdrop of falling confidence and negative wealth effects from declining asset prices. In 2017, private consumption grows by 0.8%, around 0.8 percentage points lower than in our baseline scenario.
- **Eurozone investment growth remains relatively subdued**, at 1.6% in 2017 (down from 3.2% in the baseline), as weak business confidence dampens capital spending. Although investment growth recovers, its level is still 1% below baseline by 2021.
- **Eurozone countries export growth slows** to 2.6% on average from 2017-2019 (3.3% in the baseline). Amid weakening domestic demand, import growth is also depressed across the region (2.4% in 2017 compared with 3.9% in the baseline).
- **Within the Eurozone, Ireland's economy suffers most.** GDP growth in 2017 is 2.3%, 0.8 percentage points weaker than in the baseline.
- **Beyond Europe, GDP impacts are more muted.** Commodity producers are affected to some extent, amid weaker demand across Europe's major commodity-importing nations. Chilean GDP, for example, is 0.3% down relative to baseline by 2017.
- **Global CPI inflation also weakens modestly**, to a rate 0.3 percentage points below baseline in 2017.

Figure 3.A: Cross-country GDP impact of Brexit EU downturn scenario



Commodity and asset price results

The commodity and asset price results of this scenario may be summarised as follows:

- **Oil and other commodity prices are hit by the weaker growth in Europe**. Oil prices fall to $35.5 per barrel during 2017, remaining below baseline throughout the forecast. Metals prices decline by 3.5% below baseline in 2017 and remain relatively subdued throughout the forecast period.
- **Global exchange rates react significantly in the short term**: Most currencies appreciate against the British pound and, to a slightly lesser extent, the euro. Safe haven flows provide an additional boost to the US dollar.
- **House prices in the UK and EU economies are pushed down**. The UK, Ireland and Spain are impacted most.
- **Global equity prices also decrease.** The MSCI World share price index drops 3% in the aftermath of Brexit. With projected recoveries in the UK and Eurozone economies contributing to rising confidence levels post-2017, share prices gradually move back towards the baseline.

Figure 3.B: Cross-country GDP impact of Brexit EU downturn scenario

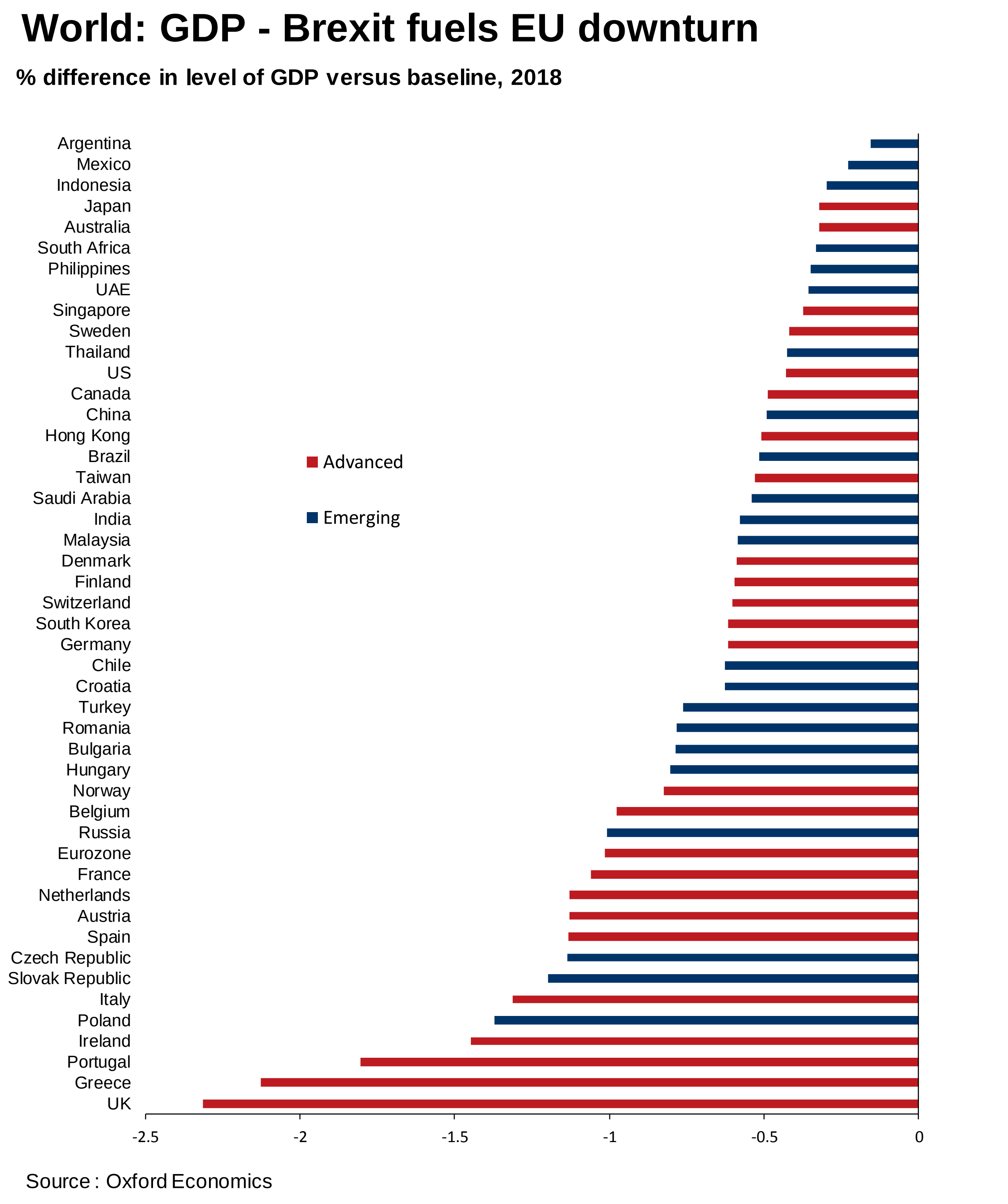
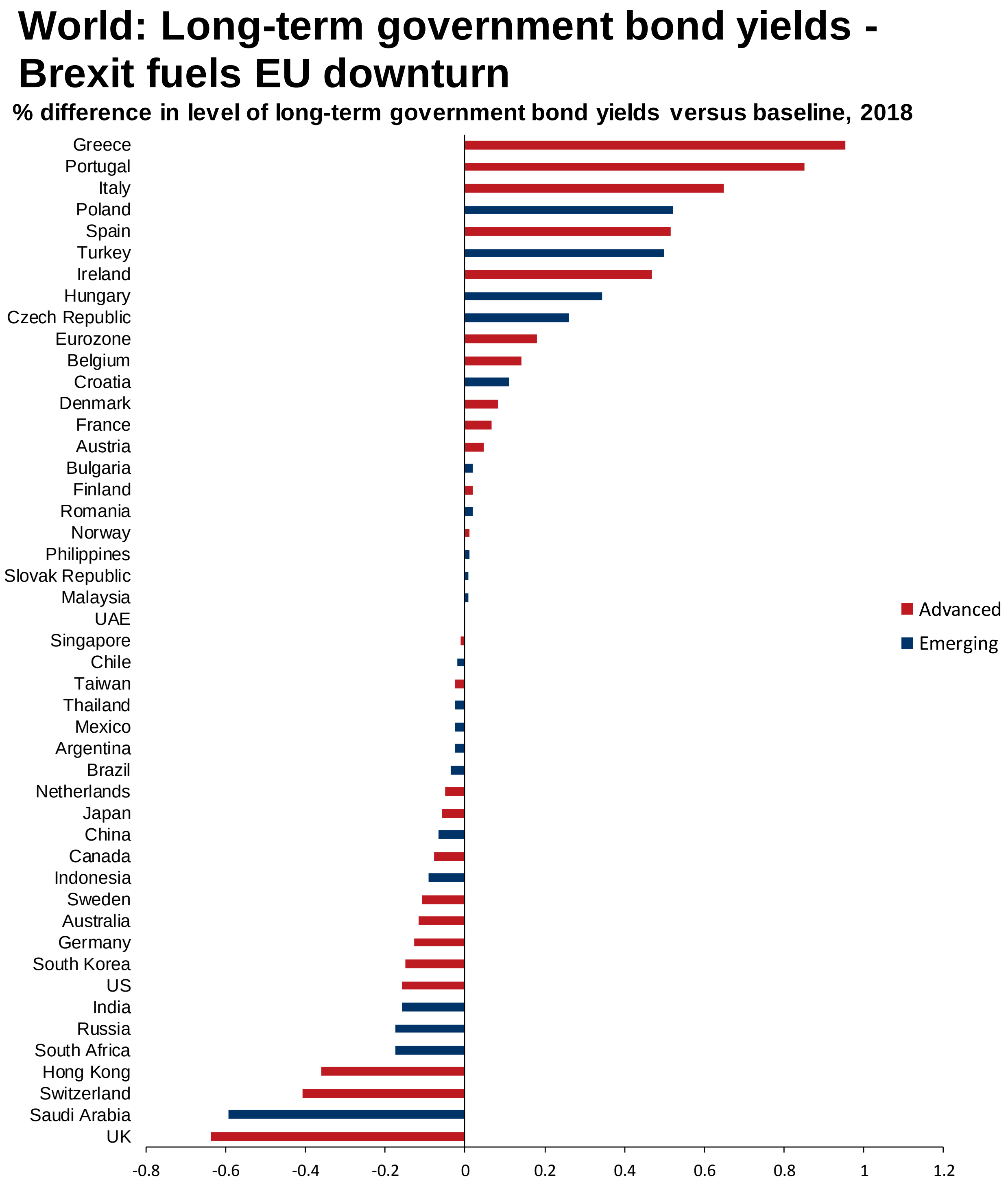
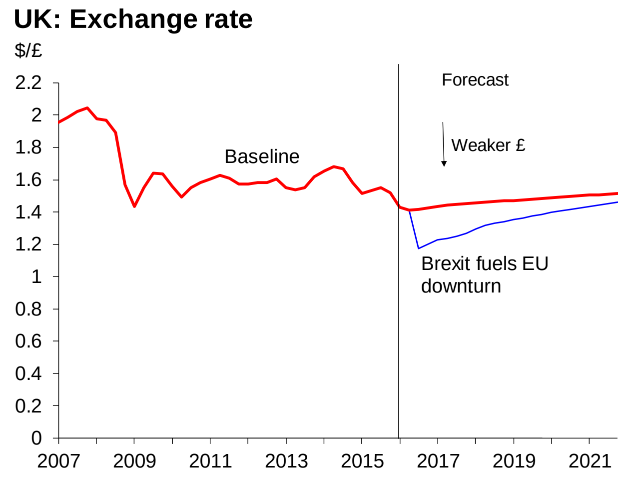


Figure 3.C: Cross-country bond yield impact of Brexit fuels EU downturn scenario



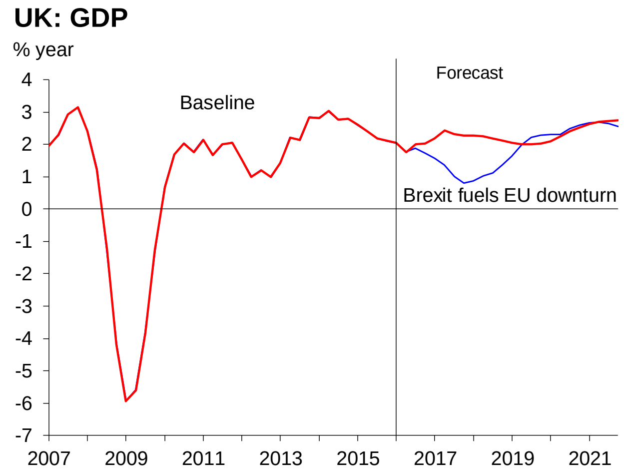
Source : Oxford Economics

Chart 3.1: UK exchange rate



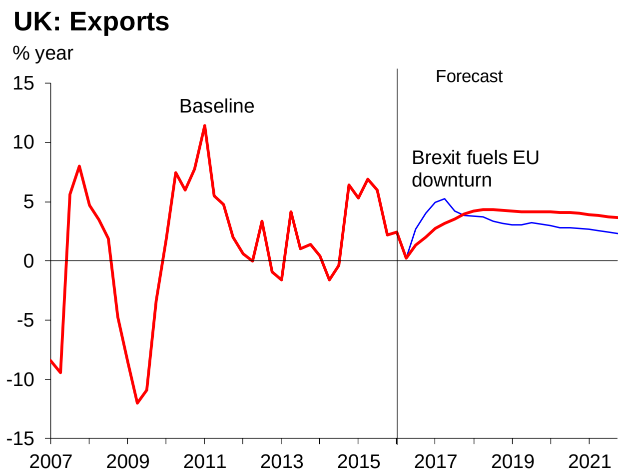
Source : Oxford Economics/Haver Analytics

Chart 3.2: UK GDP



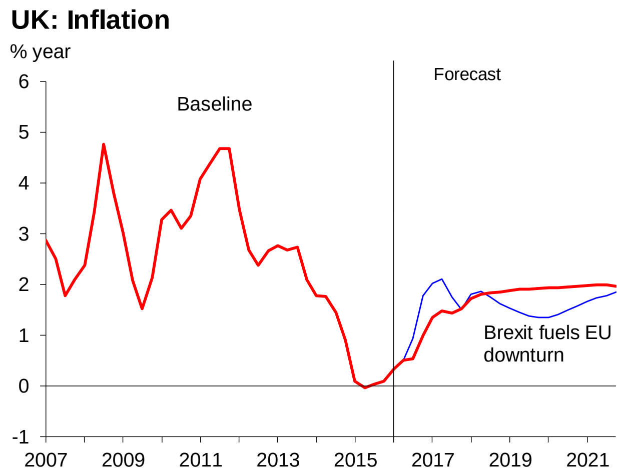
Source : Oxford Economics/Haver Analytics

Chart 3.3: UK exports



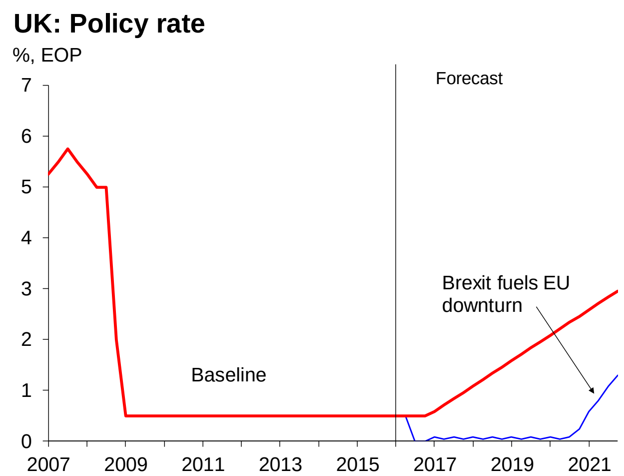
Source : Oxford Economics/Haver Analytics

Chart 3.4: UK inflation



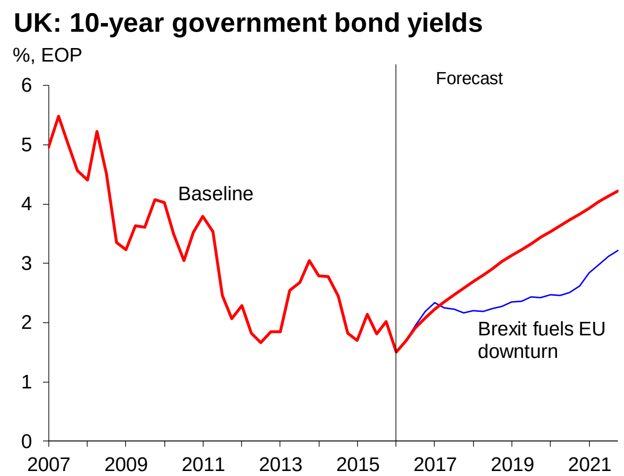
Source : Oxford Economics/Haver Analytics

Chart 3.5: UK policy rate



Source : Oxford Economics/Haver Analytics

Chart 3.6: UK bond yields



Source : Oxford Economics/Haver Analytics

Chart 3.7: World GDP

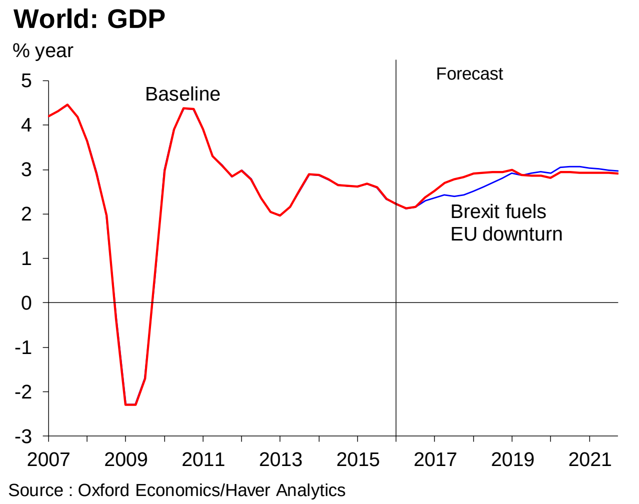


Chart 3.8: Eurozone GDP

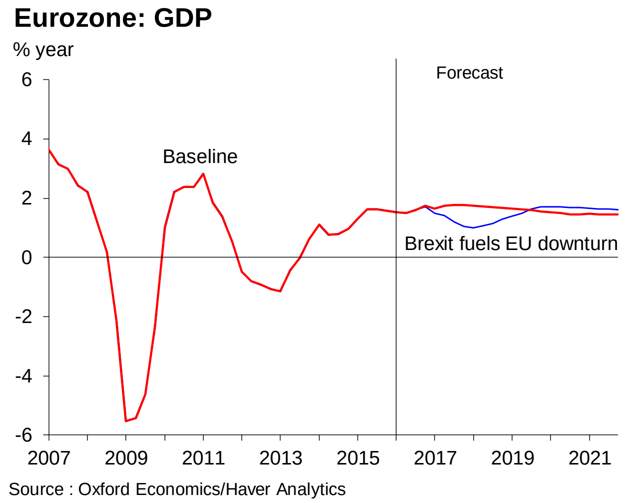


Chart 3.9: Eurozone government balance

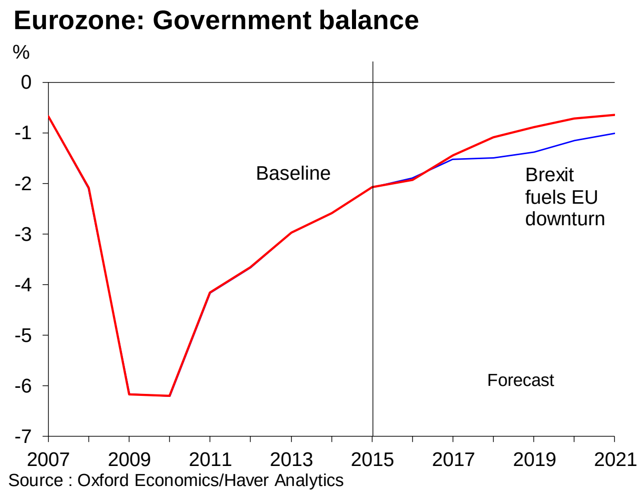


Chart 3.10: Greece government balance

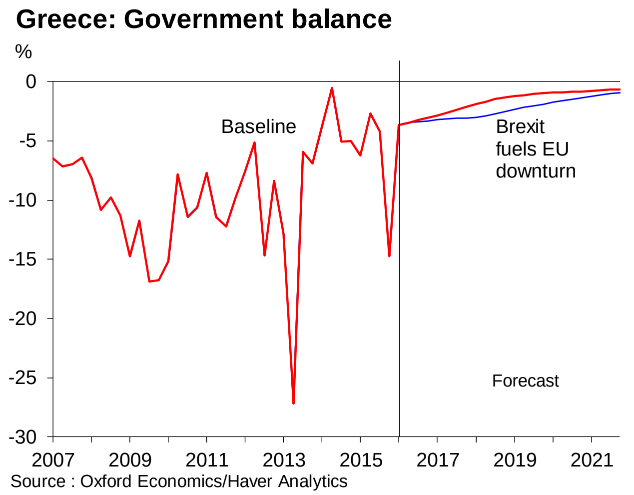


Chart 3.11: Eurozone policy rate

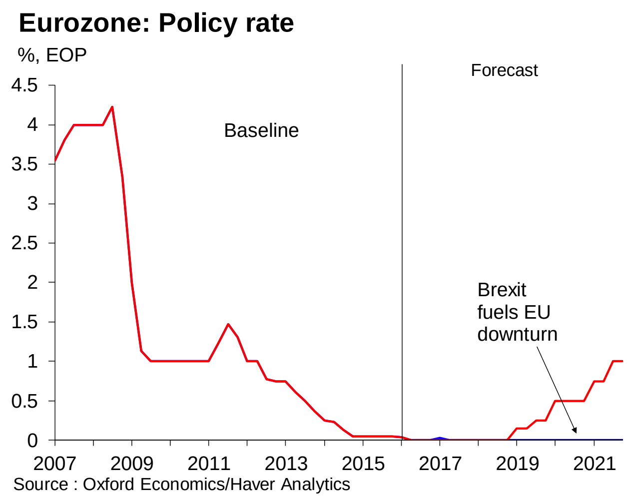


Chart 3.12: Eurozone exchange rate

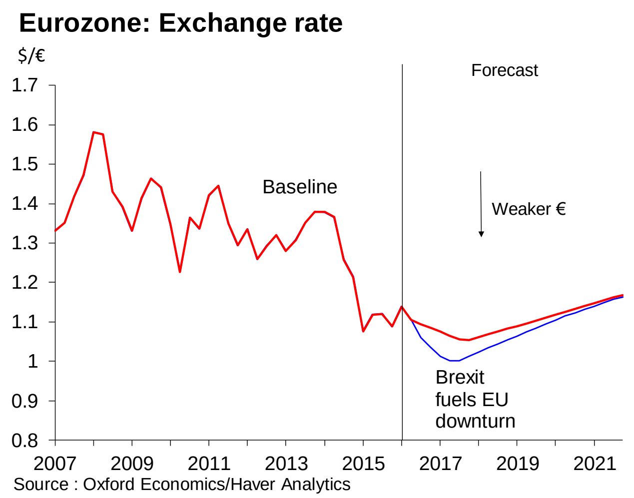
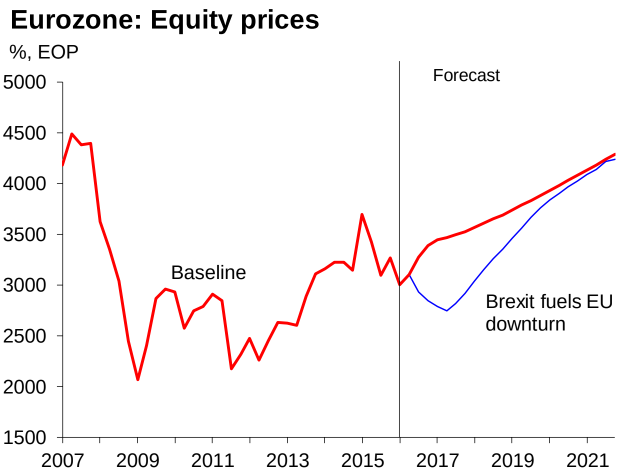
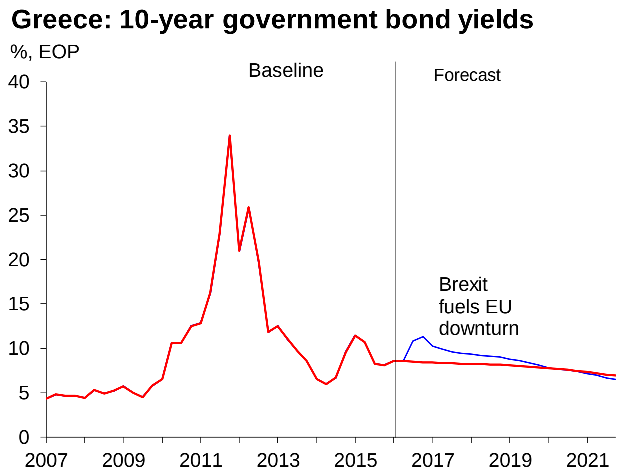


Chart 3.13: Eurozone equity prices



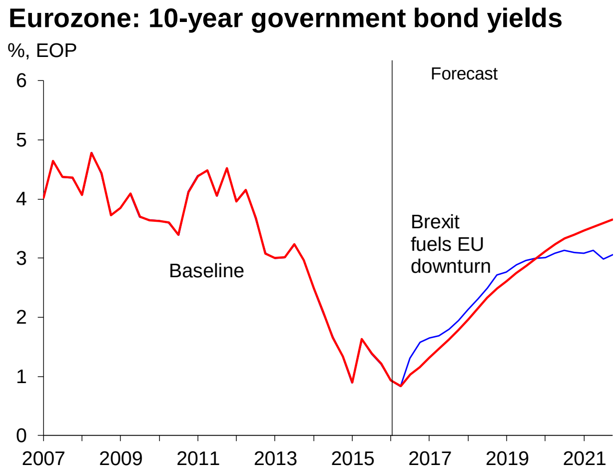
Source : Oxford Economics/Haver Analytics

Chart 3.14: Greece bond yields



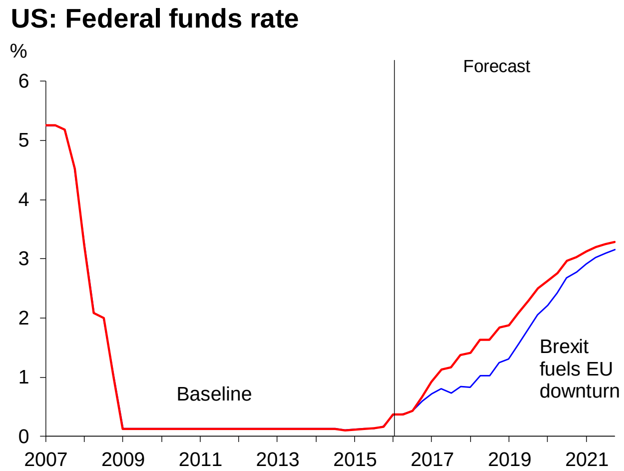
Source : Oxford Economics/Haver Analytics

Chart 3.15: Eurozone bond yields



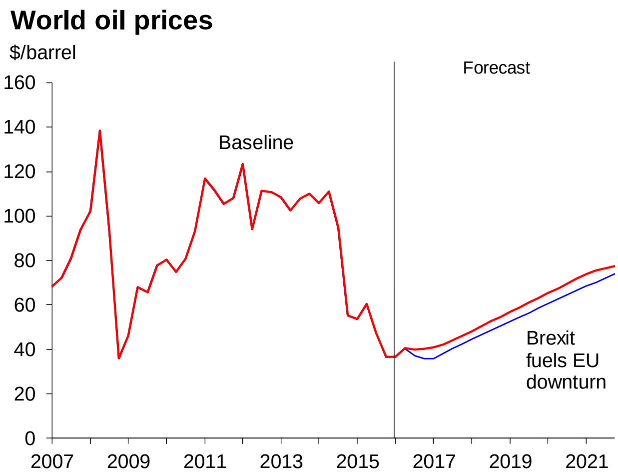
Source : Oxford Economics/Haver Analytics

Chart 3.16: US bond yields



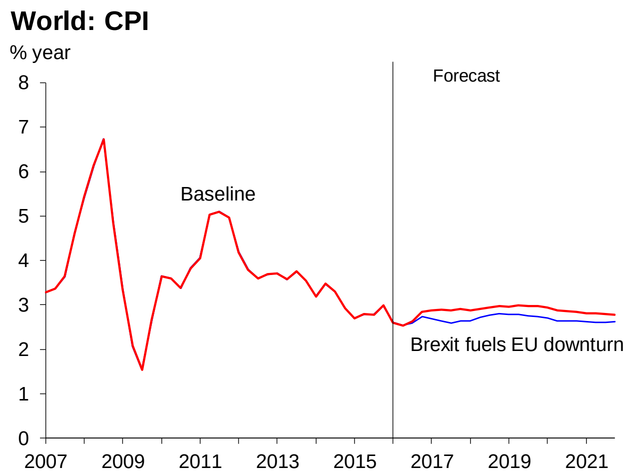
Source : Oxford Economics/Haver Analytics

Chart 3.17: World oil prices



Source : Oxford Economics/Haver Analytics

Chart 3.18: World inflation



Source : Oxford Economics/Haver Analytics

4 Tighter policies in China weigh on global growth

The relative strength of Chinese economic growth at the beginning of 2016 owed a lot to a major credit impulse. But recently there have been signs that the leadership wishes to stress that the need to undertake structural reforms and tackle rising leverage remains on their radar. In this scenario, we consider what might happen if China's policymakers recognise the unsustainability of the current debt trajectory, deciding to relax their overly ambitious growth targets and rein in the expansion of credit, supported by structural reforms to support activity over the longer term.

Under the scenario, credit growth is gradually reduced and the ratio of credit to GDP peaks in late 2021. Investment spending, which accounts for 70% of increase in the stock of credit since 2008, is hit in particular. But the authorities avoid any abrupt property, equity or FX corrections. And spillovers to the rest of the world are contained compared with a more adverse scenario – such as the China hard landing examined next.

The overall result is a delay to the anticipated pickup in the pace of global economic expansion. World GDP growth is steady, at 2.3% in 2017, compared with the baseline rise to 2.7%. But there are marked differences in the impact on GDP across countries. In financial markets, Asian and commodity exporter currencies depreciate, owing to the fall in oil and other commodity prices and the uncertain outlook for the Chinese economy. Advanced economy government bond yields weaken as policy rates remain low for longer. And global equity prices weaken, remaining depressed throughout the forecast period.

We assign a 15% probability to this scenario.

Assumptions

The key assumptions for the scenario are as follows:

- **The Chinese credit-to-GDP ratio peaks in late 2021**, reflecting the authorities' shift in policy away from overly ambitious growth targets towards reining in leverage. Investment spending slows accordingly.
- **The Chinese authorities embark on structural reforms**, including measures to improve the allocation of capital and increase the contribution of equity financing.
- **Non-performing loans on banks' balance are recognised much more quickly**, peaking at 10% of total loans, as weaker economic activity affects companies' profits and some developers are allowed to fail in light of the wider aim to improve the allocation of capital. NPLs are also hived into asset management companies, peaking at just below 4% of private sector loans, to help banks clean up their balance sheets.
- **The announcement of the new Chinese policy stance causes some initial market disruption.** Credit spreads begin to widen in emerging markets, as capital flows into safe haven assets, and credit conditions tighten slightly in advanced economies. However, financial conditions normalise from 2017 onwards as it becomes clear that China can avoid a hard landing of the economy.

Real economy results

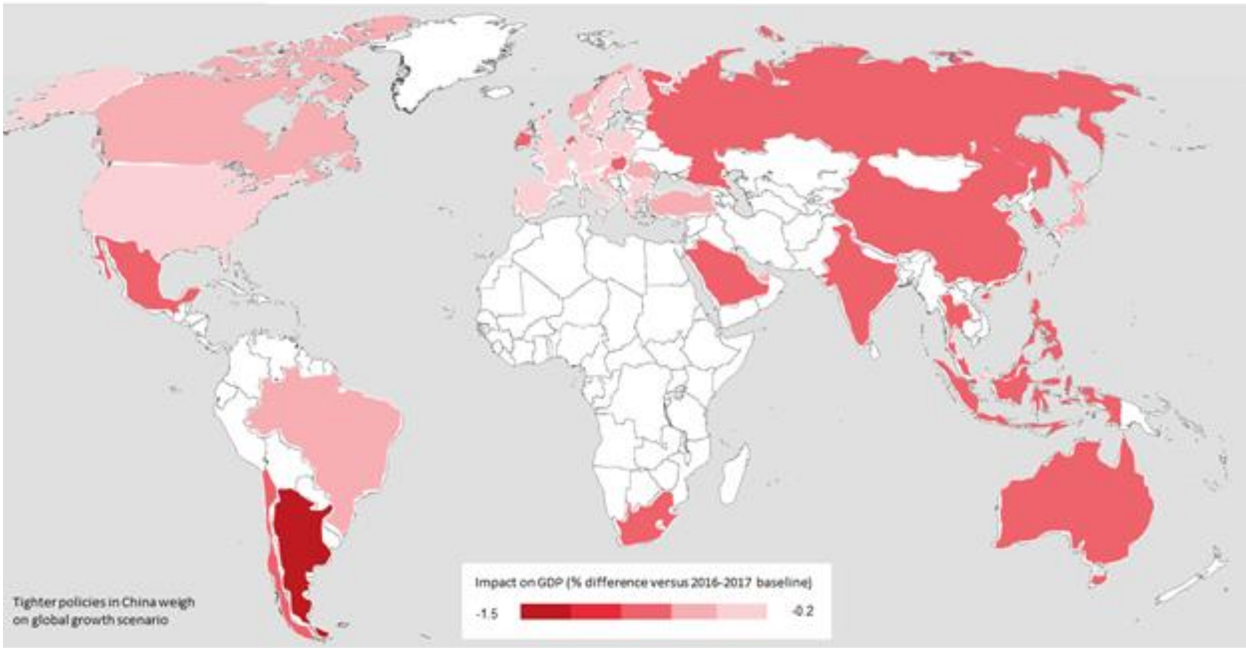
The real economy results of this scenario may be summarised as follows:

- **Global activity is moderately impacted**. GDP growth remains below 2.5% in 2017 and 2018, before recovering slowly to our medium-term baseline pace of 2.9%.
- The countries that suffer the largest hit to GDP are:
  - **China itself**, as business investment decelerates sharply.

- **Commodity producers**, such as Chile and Russia, as oil and other commodity prices weaken at the same time as global trade growth slows.
- **China's Asian neighbours**, such as Hong Kong and Singapore, as global trade growth slows.

- As a result, **growth in China slows** steadily, to 6.3% in 2016, 5.3% in 2017, 4.8% in 2018 and, with investment growth coming to a halt in 2019, remains below 5% thereafter. By the end of the decade, output is 3.7% below baseline, depressing CPI inflation and weakening earnings growth further.
- **Across emerging markets as a whole**, growth slows to 3.3% in 2016 and 3.6% in 2017 and rises no higher than 4.2% in the latter part of the forecast.
- Among advanced economies, **Eurozone recovery stalls**. GDP growth eases to 1.4% in 2017 and 2018.

Figure 4.A: Cross-country GDP impact of China slowdown scenario



Commodity and asset market results

The commodity and asset market results of this scenario may be summarised as follows:

- **Commodity prices are hit in the short term** following the announcement of the policy shift in China. Oil prices remain around 7% below baseline at the end of the scenario; metals prices are similarly subdued.
- **Commodity producers and Asian economies depreciate the most** in the near term, although movements are limited. Chinese authorities keep the CNY relatively stable against the US dollar, in order to dampen global spillovers and stem capital outflows.
- **Advanced-economy government bond yields weaken as policy rates remain low for longer**. The Fed still hikes rates this year. But, as global demand weakens, it then keeps the Fed funds rate below 1% until 2018. The ECB cuts the deposit rate to -1% by mid-2017 and keeps it at that level throughout the rest of the scenario; the Bank of England waits until 2019 before gradually hiking rates.
- **Global equity prices weaken.** The MSCI World share price index falls 4% below baseline in 2017; with global demand and earnings subdued, stock markets remain below baseline throughout the forecast.

Figure 4.B: Cross-country GDP impact of China slowdown scenario

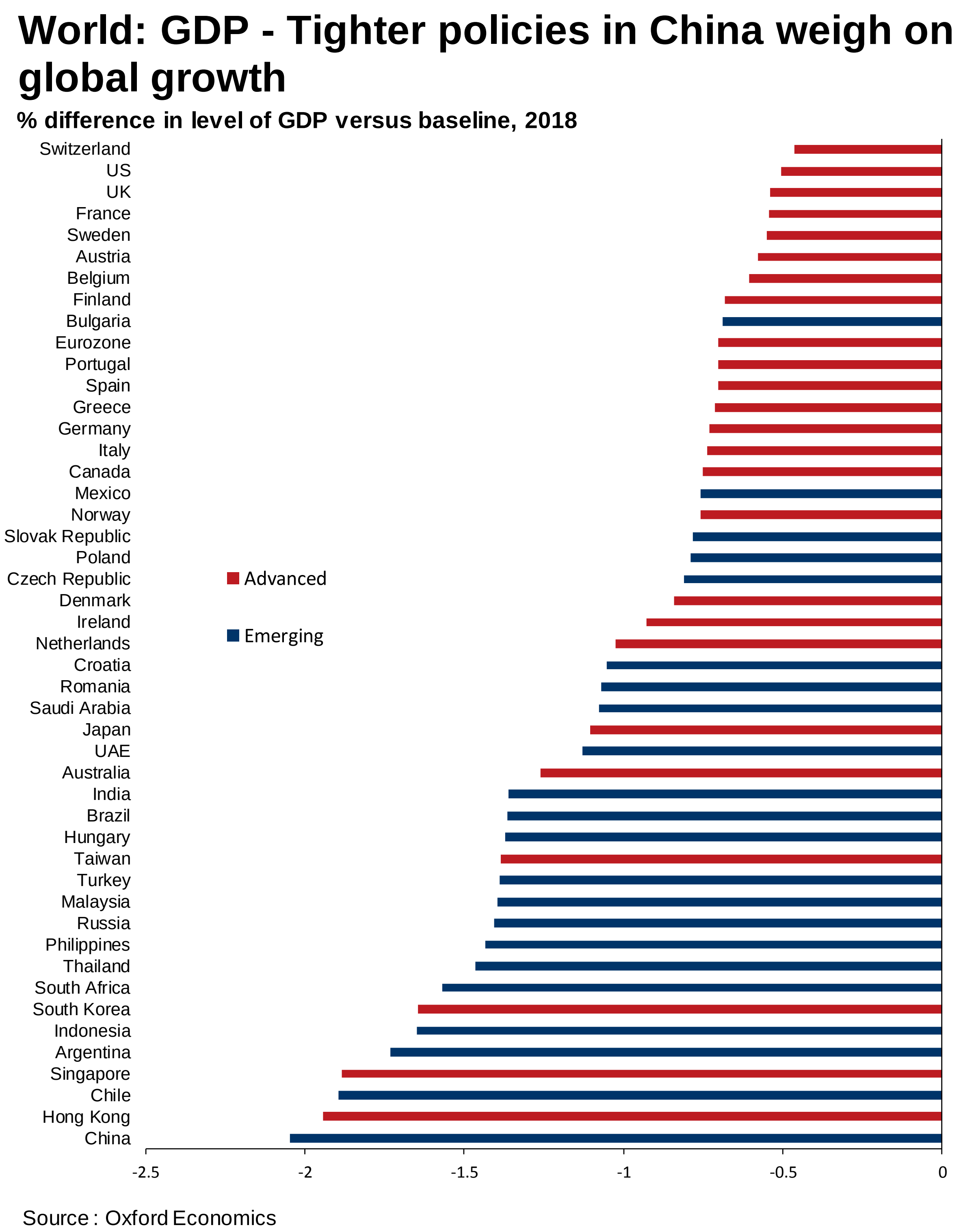


Figure 4.C: Cross-country exchange rate impact of China slowdown scenario

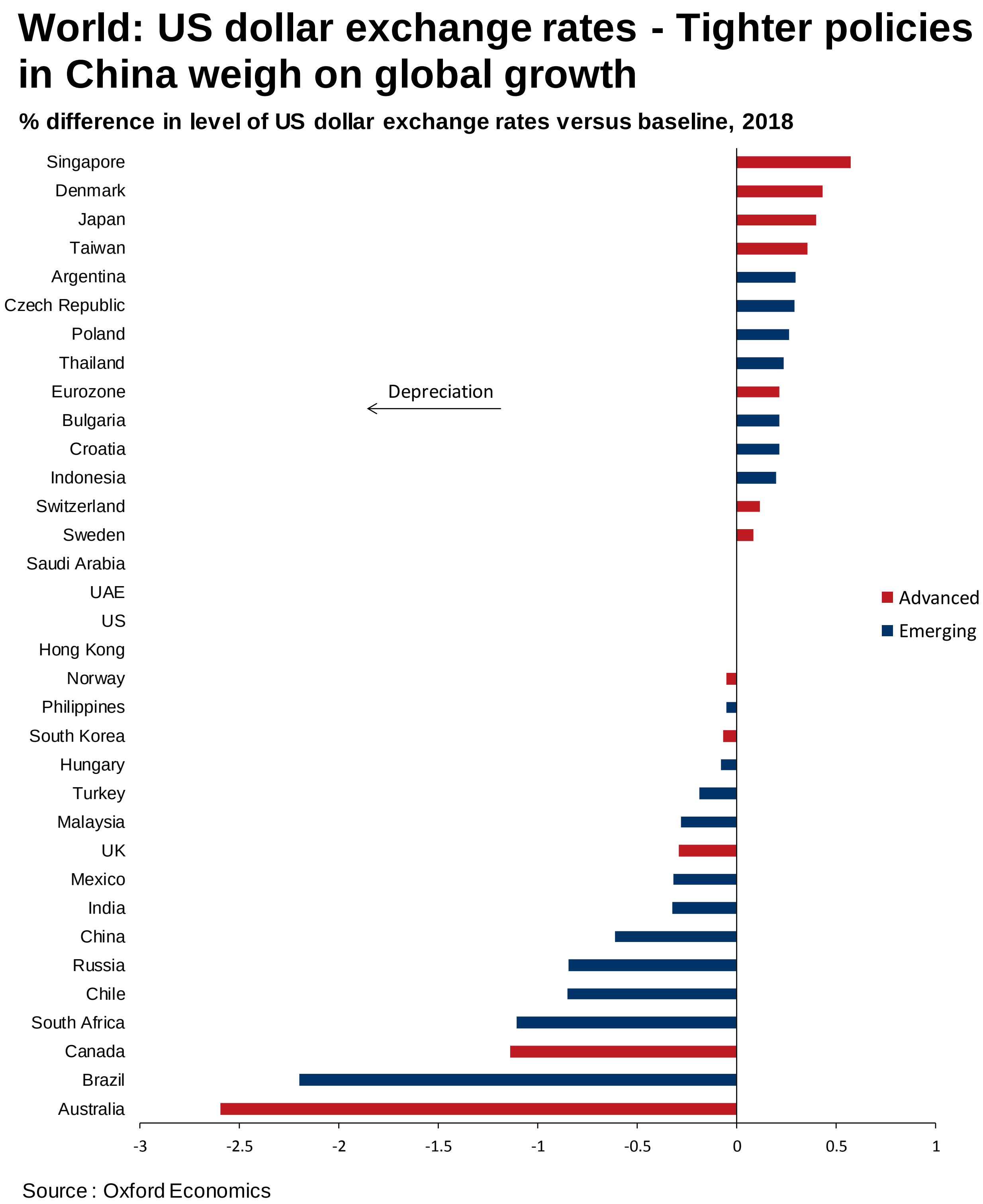
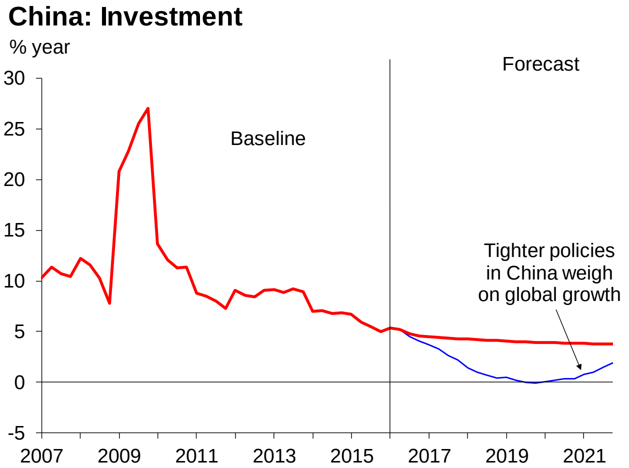
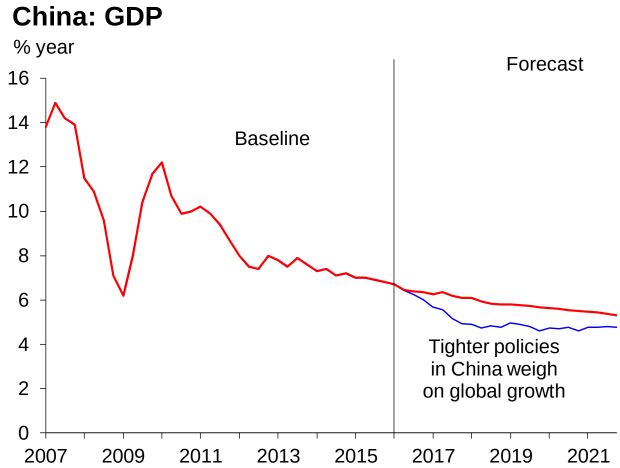


Chart 4.1: Chinese investment



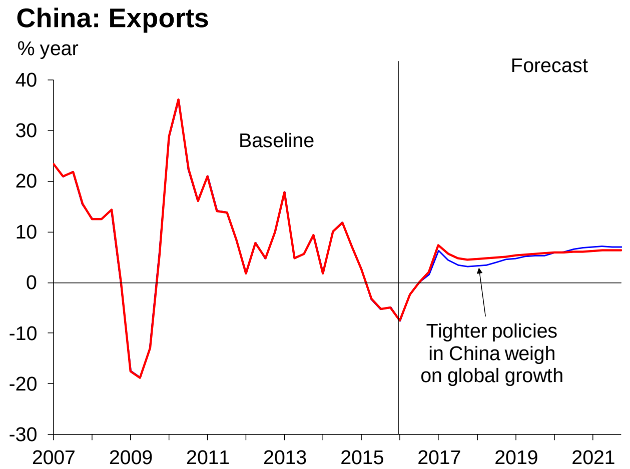
Source : Oxford Economics/Haver Analytics

Chart 4.2: Chinese GDP



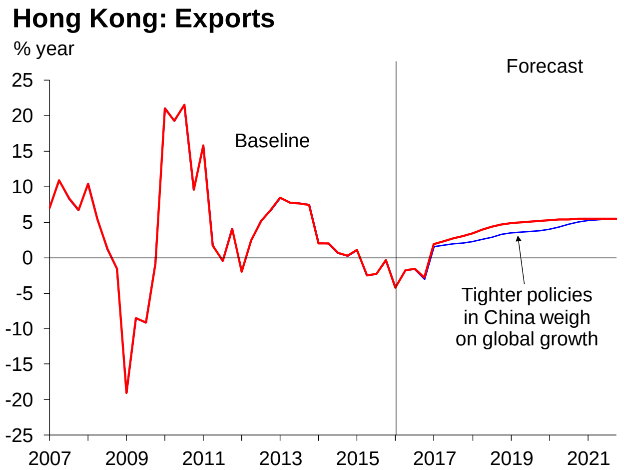
Source : Oxford Economics/Haver Analytics

Chart 4.3: Chinese exports



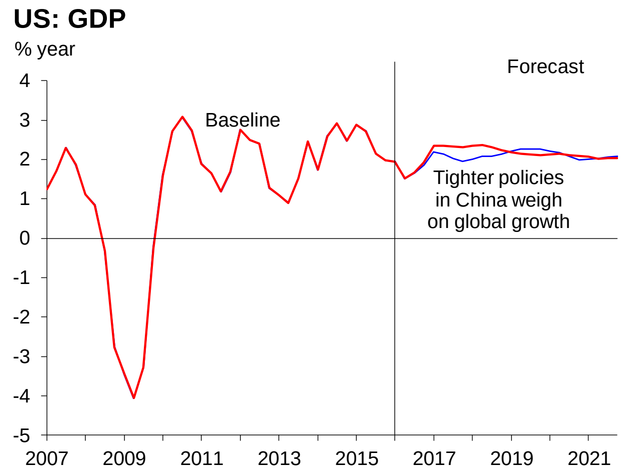
Source : Oxford Economics/Haver Analytics

Chart 4.4: Hong Kong exports



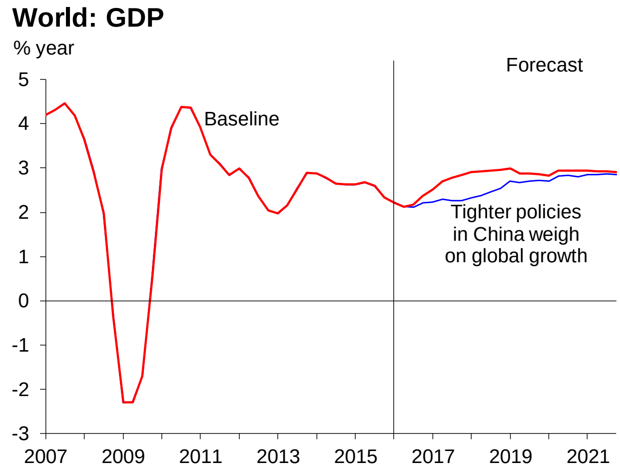
Source : Oxford Economics/Haver Analytics

Chart 4.5: US GDP



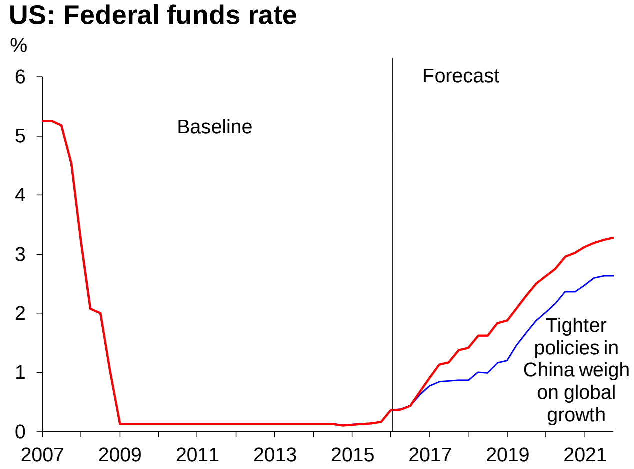
Source : Oxford Economics/Haver Analytics

Chart 4.6: World GDP



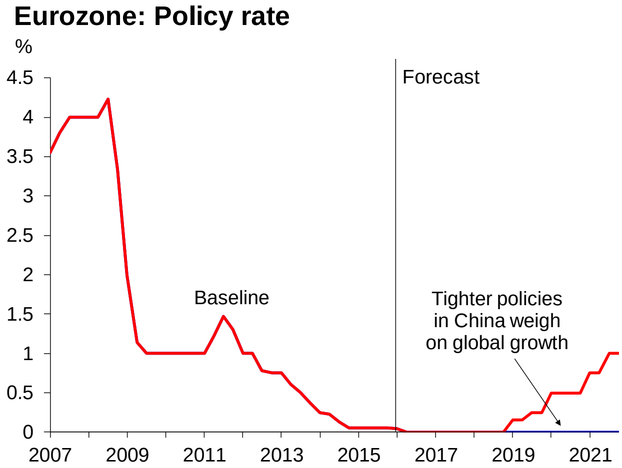
Source : Oxford Economics/Haver Analytics

Chart 4.7: US policy rate



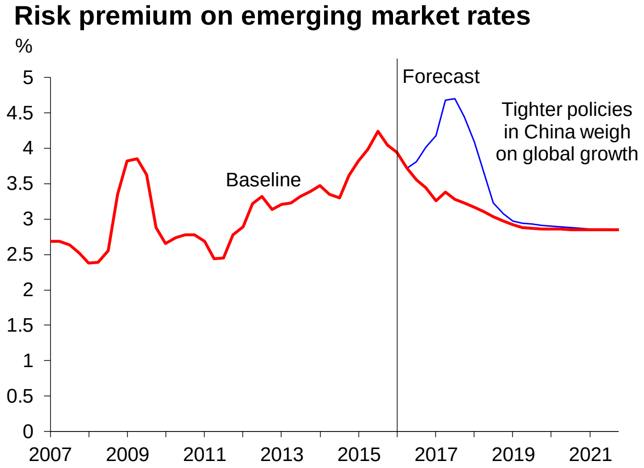
Source : Oxford Economics/Haver Analytics

Chart 4.8: Eurozone policy rate



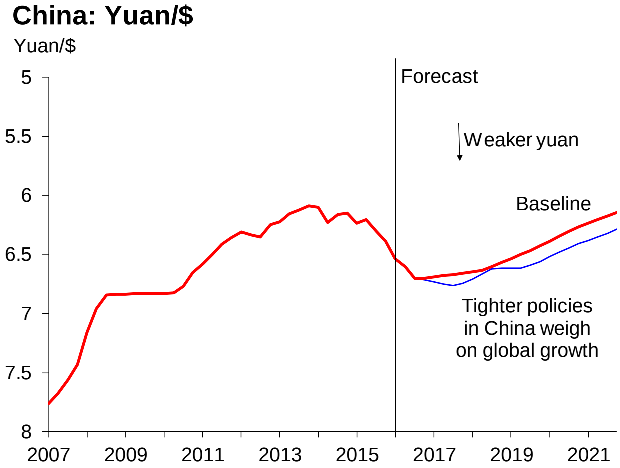
Source : Oxford Economics/Haver Analytics

Chart 4.9: Emerging market interest rates



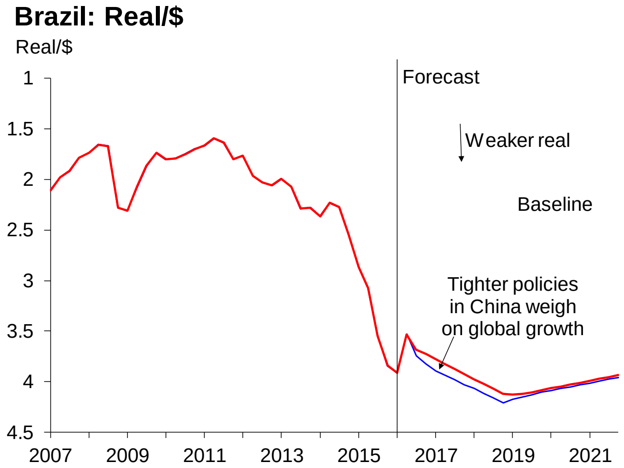
Source : Oxford Economics/Haver Analytics

Chart 4.10: Chinese exchange rate



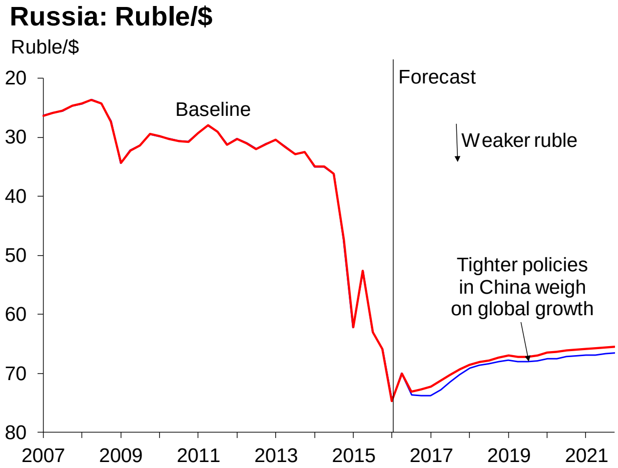
Source : Oxford Economics/Haver Analytics

Chart 4.11: Brazilian exchange rate



Source : Oxford Economics/Haver Analytics

Chart 4.12: Russian exchange rate



Source : Oxford Economics/Haver Analytics

Chart 4.13: Australian exchange rate

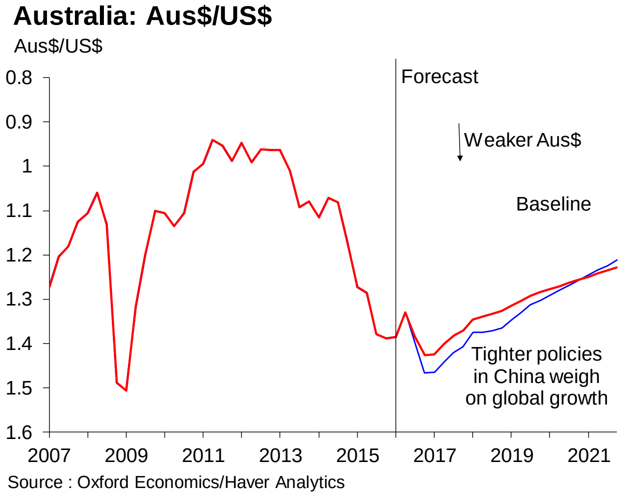


Chart 4.14: US bond yields

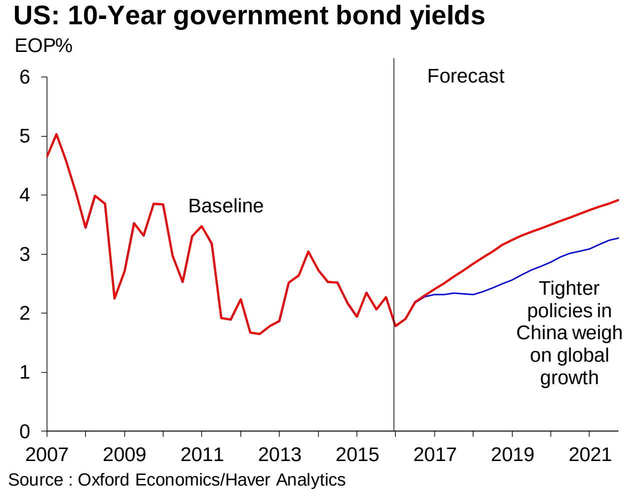


Chart 4.15: US equity prices

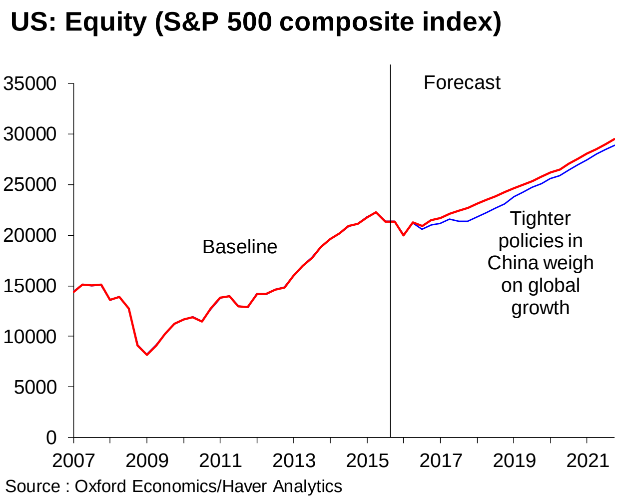


Chart 4.16: World metals price

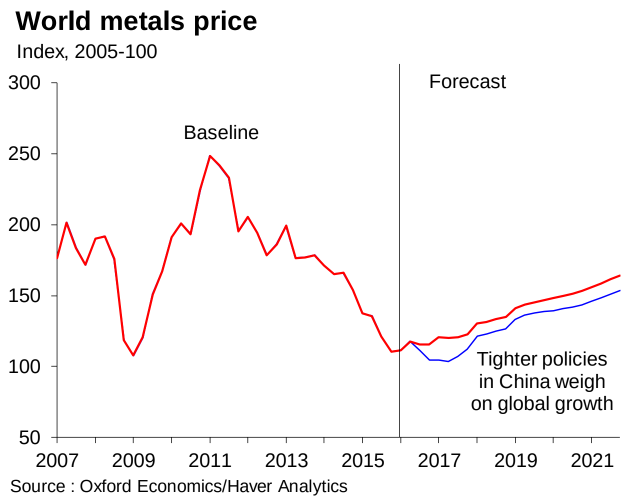


Chart 4.17: World oil prices

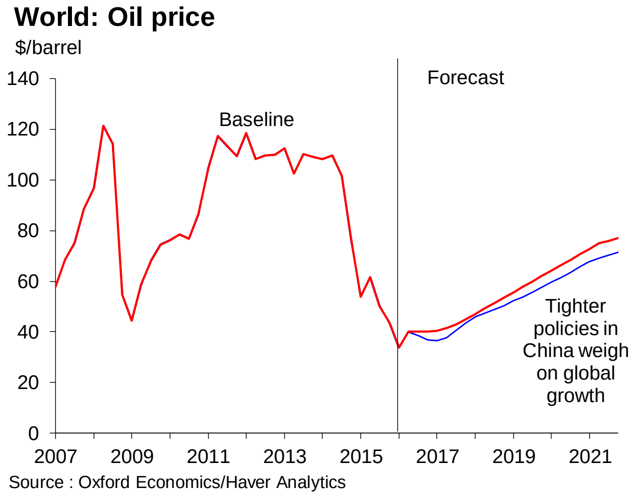
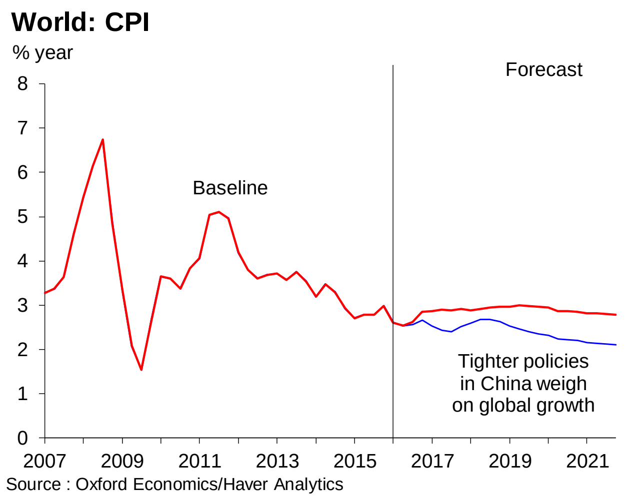


Chart 4.18: World inflation



5 China hard landing triggers market turmoil

While recent Chinese activity data suggest that the government's stabilising measures are proving successful, the risk of a China hard landing has not dissipated altogether. Under this scenario, we consider the potential for a slowing Chinese economy to combine with US policy tightening and trigger a significant market reaction.

In the scenario, we assume that vulnerabilities in China and emerging markets more broadly build throughout the remainder of this year, as non-performing loans in China start to rise and the relatively low oil price environment increases vulnerabilities in commodity producers. With the full scale of the deterioration in the external environment not yet apparent, the Fed continues along the policy tightening path and dollar appreciation results, hitting those emerging markets most exposed to dollar strength. But as emerging market data continue to weaken, particularly in China, capital flight out of emergers accelerates and triggers a period of market turmoil.

Overall, the global economy is severely impacted. World GDP growth falls back to just 1.5% in 2017 and 1.4% in 2018, compared with 2.7% and 2.9% in the baseline. In financial markets, exchange rates react significantly in an increasingly risk-off environment, with the euro and yen appreciating alongside the dollar as they act as safe havens during the turmoil. Advanced economy bond yields generally weaken as capital flows to safe assets and policy rates remain low for longer, while the risk premium on emerging market debt rises and pushes up EM yields. Global equity prices tumble, before economic recovery takes hold over the latter part of the forecast.

We assign a 5% probability to this scenario.

Assumptions

The key assumptions for the scenario are as follows:

- **China data disappoint throughout 2016, with a contraction in housing construction and rising corporate defaults.** Non-performing loans on banks' balance sheets rise ½pp above baseline by the end of 2016 as poor quality investments turn sour and later peak at 3pp above baseline in 2019.
- Two events combine to shake investor sentiment about China and EM vulnerability more broadly. First, **the Fed hike in December leads to a dollar appreciation against emerging market currencies,** as expectations of further US tightening are realigned, prompting a risk-off trade.
- Second, **particularly weak data for China are published shortly after the Fed decision,** cementing market pessimism about China.
- **Chinese equity prices drop** by around 20% in early 2017, a similar sized fall to that seen at the beginning of this year, and the market shock reverberates throughout global equity markets. Consumer and business confidence is assumed to deteriorate globally, as the outlook for the world economy worsens.
- **Chinese residential house prices contract**, by 9% from peak to trough, against our baseline view of a gradual recovery in prices, amid renewed declines in sales volumes.
- **Private consumption and earnings growth** slow much faster than we envisage in our baseline as the continued housing slump hits confidence hard and, with around half of household wealth tied up in housing, wealth effects take a toll on spending.
- **A loss of external confidence** dampens FDI inflows to 25% below baseline by 2017.

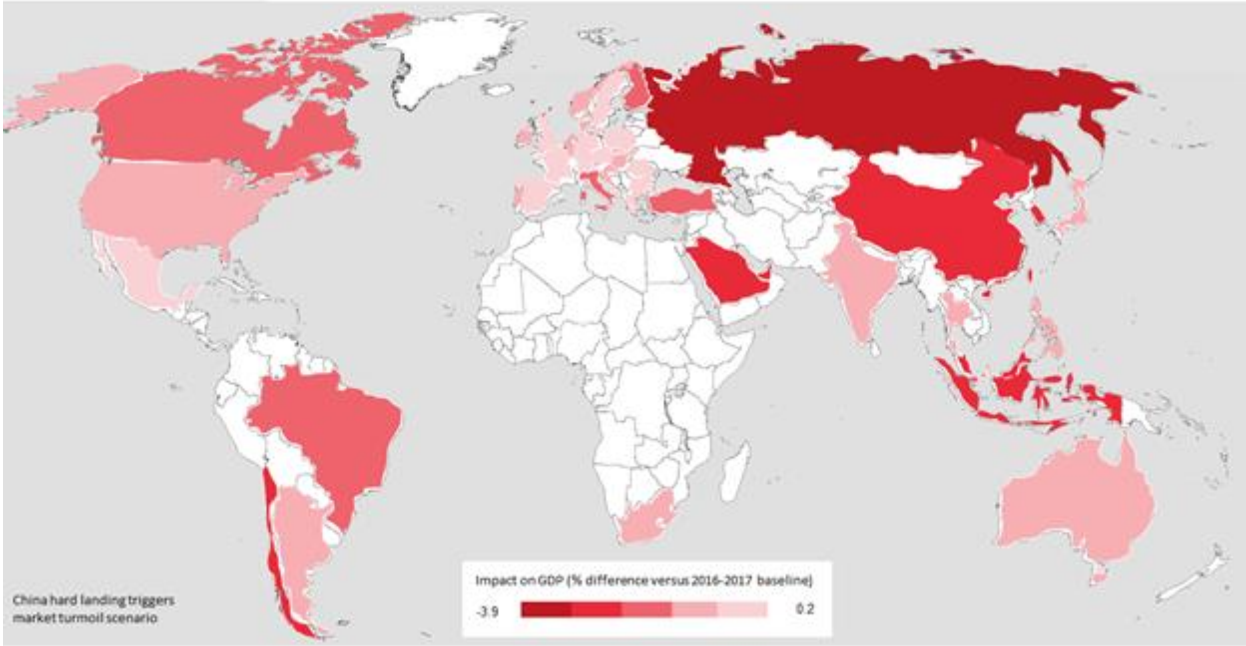
- **Bank lending slows sharply** as balance sheets are repaired and demand for more credit weakens. The rationing of credit further depresses investment and GDP growth as smaller private companies, which are more productive than state-owned enterprises, struggle to access finance.
- The **Chinese central bank allows the currency to weaken substantially.** The yuan falls 10% below baseline by the end of 2017, as financial capital outflows rise sharply, leading the authorities to abandon their stable currency approach in order to stop FX reserves from falling. Global exchange rate responses are calibrated in the short term using as a benchmark the past two episodes of stronger CNY depreciation (in August 2015 and the beginning of this year).
- **Capital outflows from emerging markets surge as the risk-off trade intensifies,** placing further downward pressure on EM currencies. As commodity prices fall in response to a slowing Chinese economy and expectations of lower demand, there is an increase in corporate defaults and credit downgrades in EMs.

Real economy results

The real economy results of this scenario may be summarised as follows:

- **Global growth weakens significantly**, dropping below 1½% for four quarters.
- The countries that suffer the largest hit to GDP are:
  - **China itself**, where real estate investment weakens sharply alongside housing demand, at the same time as inward investment from overseas is declining.
  - **Commodity producers**, such as Russia, Saudi Arabia and Chile, as oil and other commodity prices weaken.
  - **China's Asian neighbours**, such as South Korea, Hong Kong and Singapore, as trade slows in the region and beyond.
  - **Emerging markets, particularly those most exposed to dollar strengthening** – such as Malaysia, Chile, Turkey and Russia. A higher risk premium on emerging market debt prompts their cost of borrowing to rise and some emergers are also forced to raise rates to defend their currencies, exacerbating existing vulnerabilities.
  - **Economies where currency appreciation weighs on competitiveness**, most notably Japan.
- **Growth in China slows to 2.7% in 2017** and 3.5% in 2018. By the end of the forecast, output is around 7% below baseline – and investment expenditure 13% below – depressing CPI inflation and weakening earnings growth further.
- As a whole, **emerging markets are hit more severely than advanced economies**. Emerging market growth slows to 2.1% in 2017 and 2.7% in 2018.
- Among advanced economies, **Japan is hit relatively hard**. Compared with the baseline for 2018, the yen gains approximately 12% against the dollar and 3.1% is knocked off the level of GDP.
- **In the Eurozone recovery stalls**. Growth falls to 0.8% in 2017 and 0.5% in 2018. Consumer prices remain subdued as a stronger euro and sluggish demand intensify downward pressure on prices. CPI inflation remains well below the 2% target throughout the forecast period.
- **Lower commodity prices and weaker demand dampen global inflation**, which slows to 1.7% in 2017.

Figure 5.A: Cross-country GDP impact of China hard landing scenario



Commodity and asset market results

The commodity and asset market results of this scenario may be summarised as follows:

- **Oil and commodity prices are hit by the weaker growth in China** and other emerging markets. Oil prices fall as low as $22 per barrel during 2017 and are still almost 20% below at the end of the forecast. Metals prices fall sharply and remain similarly depressed relative to baseline.
- **Global exchange rates react significantly during 2017** in an increasingly risk-off environment. By assumption (see above), the euro and yen initially appreciate strongly, as they act as safe havens during the turmoil. Emerging market currencies depreciate as the December Fed hike prompts capital flight, with Russia and Brazil for example experiencing substantial depreciations.
- Over the remainder of the forecast, when exchange rates are assumed to evolve in line with fundamentals, further emerging market depreciation ensues as fears grow of a slowdown in China and EMs more generally. Those **emerging markets with weak economic fundamentals are sold off even more**; by 2019, the Russian rouble has fallen 20% relative to baseline against the dollar.
- **Global equity prices tumble.** The MSCI World share price index falls by 5% during 2017 amid the market turmoil; with global demand and earnings subdued, stock markets remain below baseline throughout the forecast. Beyond China, double-digit percentage falls are seen in early 2017 in Russia, under the weight of sharply slowing activity. In the US, the S&P also declines in early 2017, by 9%.
- **The Chinese central bank lowers its benchmark lending rate sharply**, reaching a floor of 2% by the end of 2018, as it speeds up rate cuts to stimulate demand and lower debt servicing costs.
- Among advanced economies, **the Fed reverses course**, cutting rates in Q2 2017 and, in light of weaker US GDP growth and CPI inflation, keeping rates on hold until mid-2019. The ECB keeps the refi rate on hold through the forecast period; the Bank of England waits until end-2019 before gradually hiking rates.

- **Advanced-economy government bond yields generally weaken** as capital flows to safe assets and policy rates remain low for longer. By contrast, **the risk premium on emerging market debt increases**, pushing up yields.

Figure 5.B: Cross-country GDP impact of China hard landing scenario

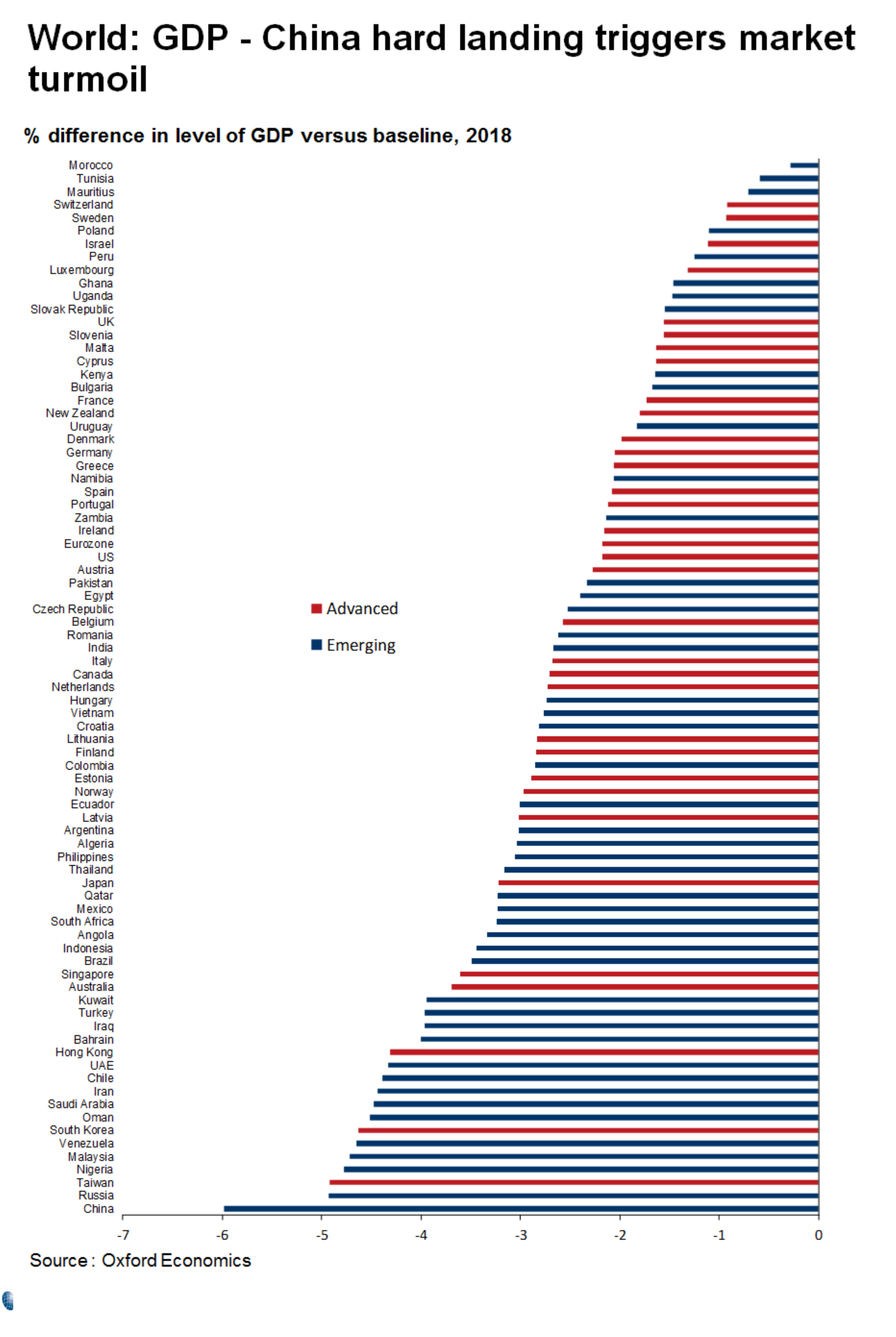


Figure 5.C: Cross-country exchange rate impact of China hard landing scenario

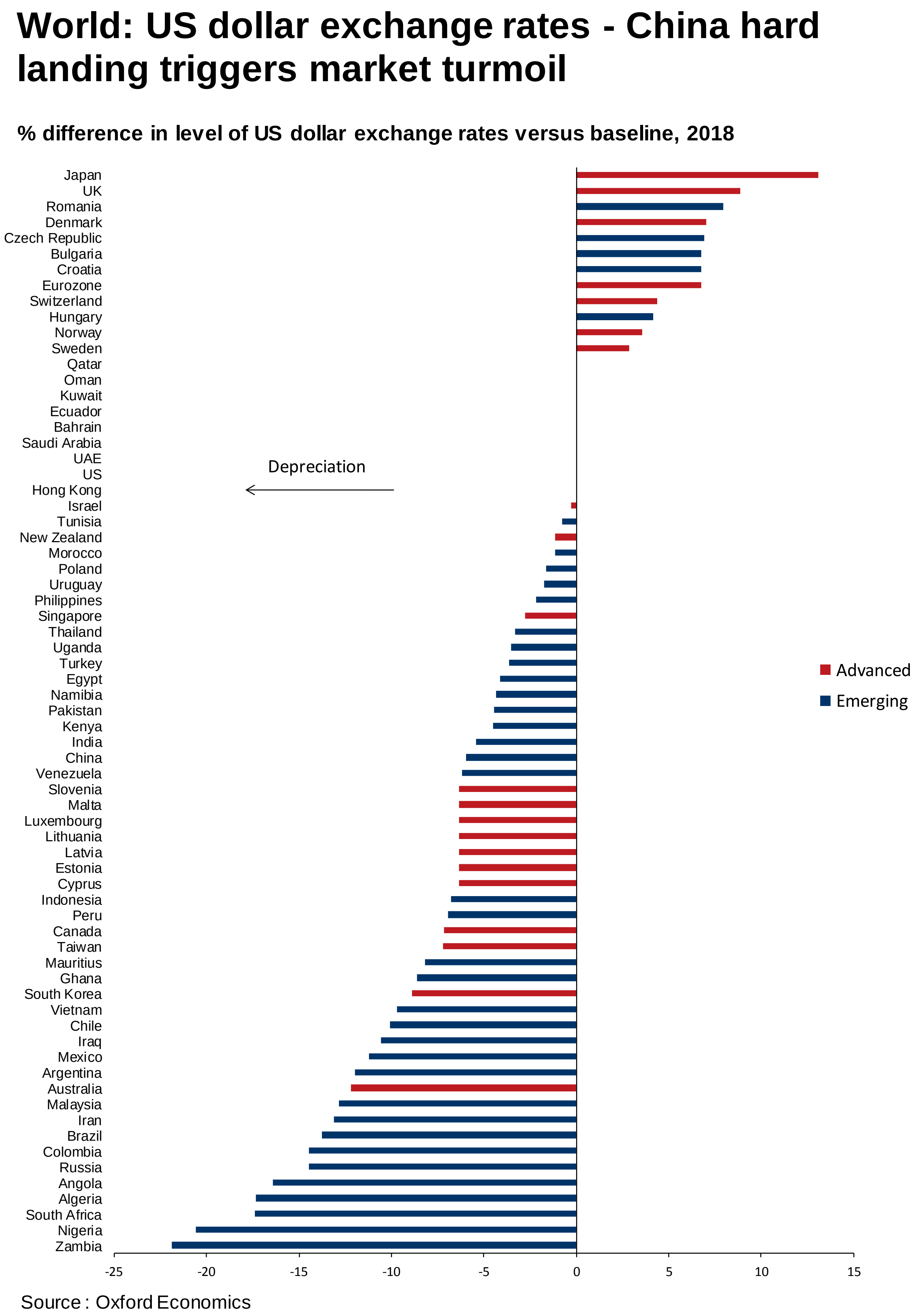


Chart 5.1: Chinese investment

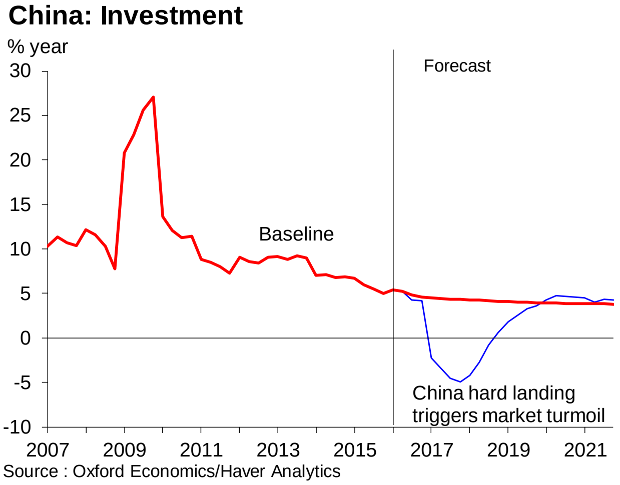


Chart 5.2: Chinese GDP

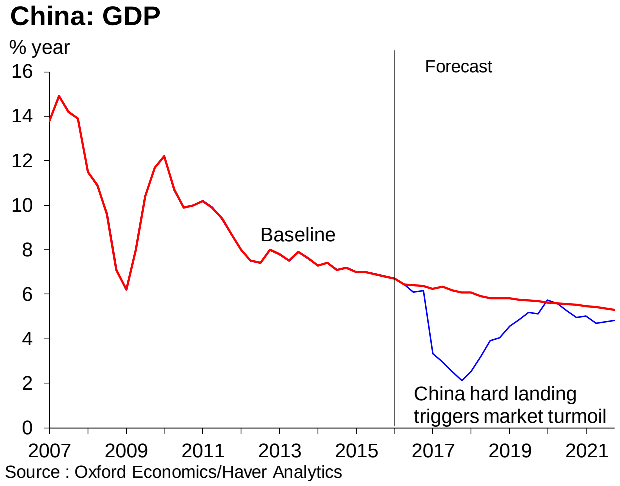


Chart 5.3: Chinese exchange rate

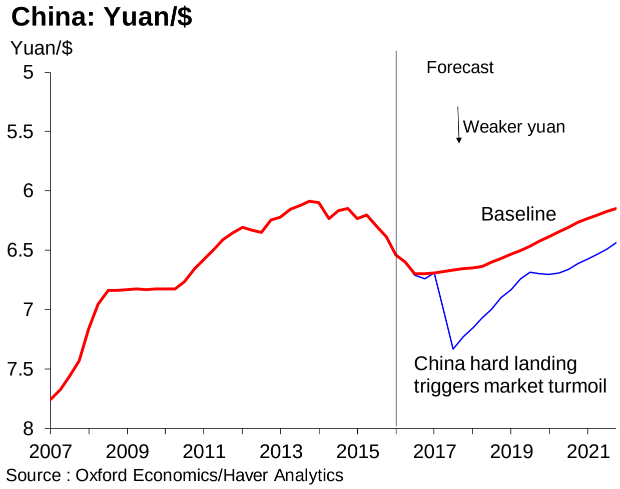


Chart 5.4: World GDP

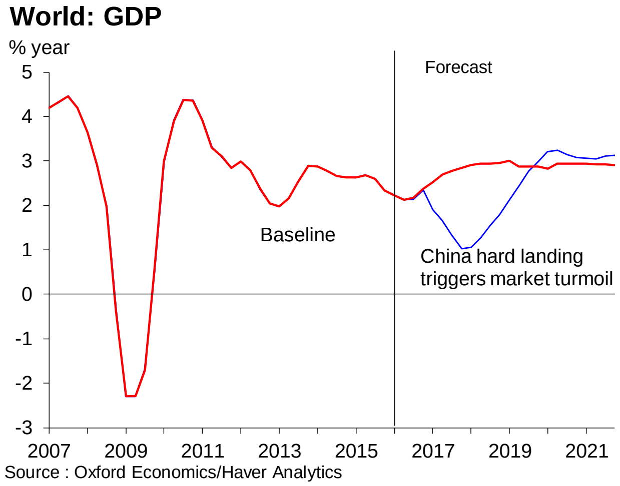


Chart 5.5: US GDP

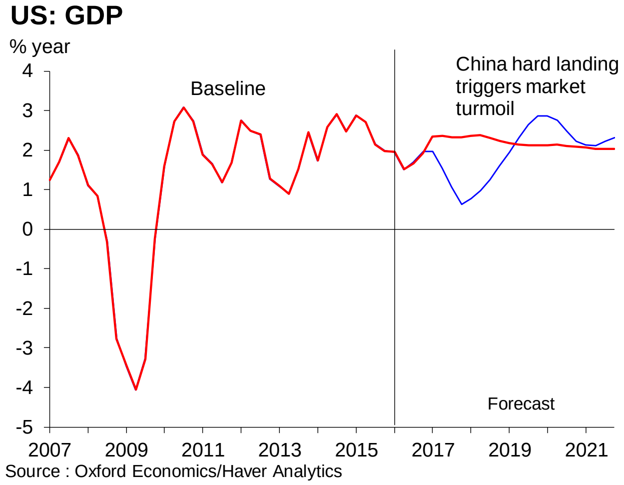


Chart 5.6: Eurozone policy rate

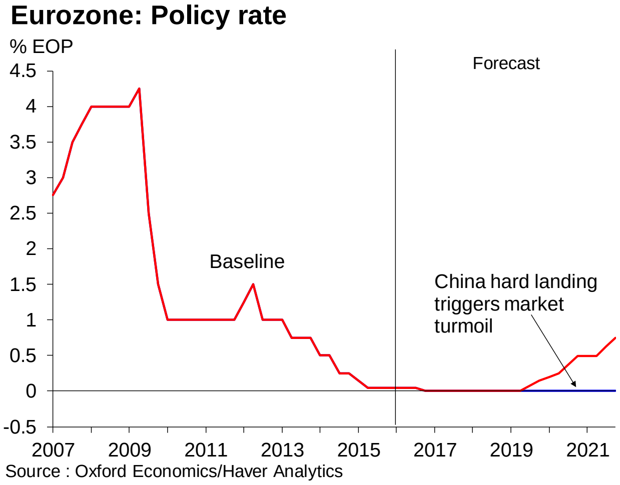
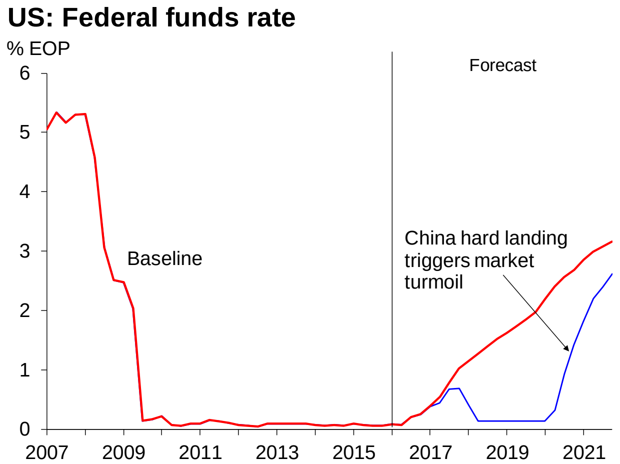
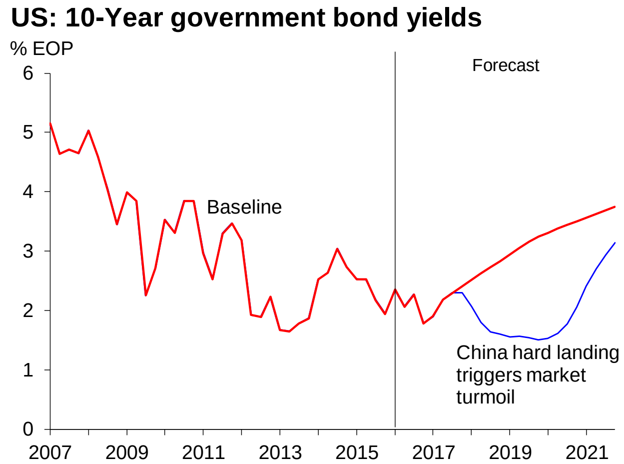


Chart 5.7: US policy rate



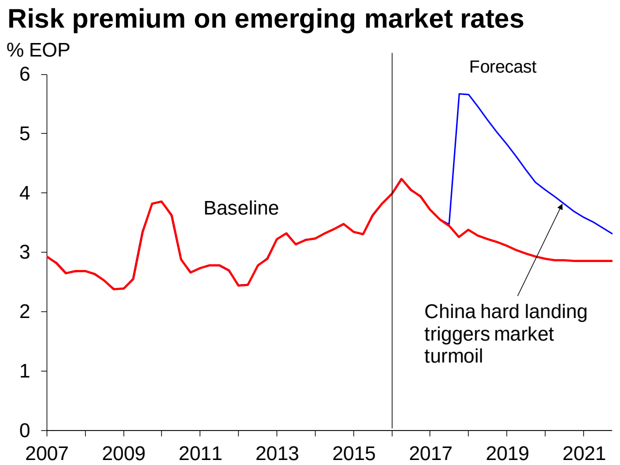
Source : Oxford Economics/Haver Analytics

Chart 5.8: US bond yields



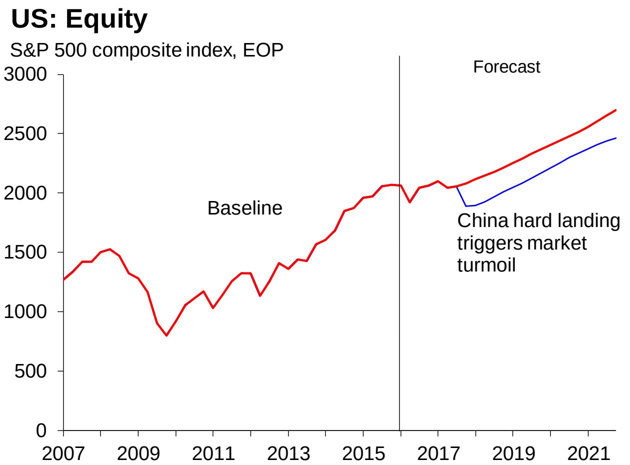
Source : Oxford Economics/Haver Analytics

Chart 5.9: Emerging market interest rates



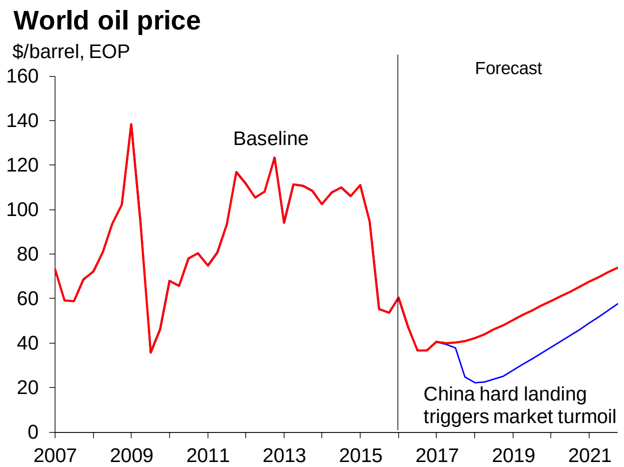
Source : Oxford Economics/Haver Analytics

Chart 5.10: US equity prices



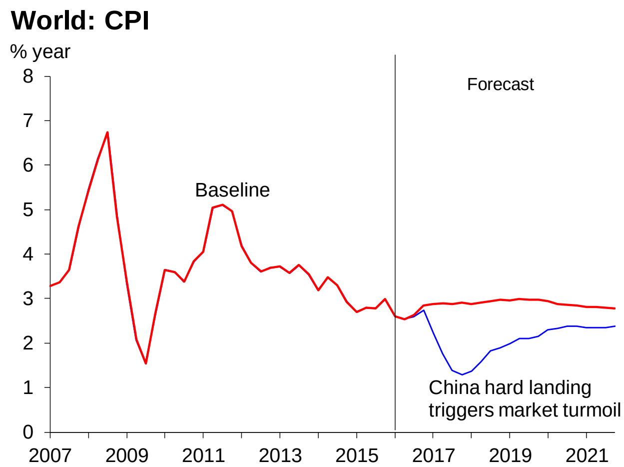
Source : Oxford Economics/Haver Analytics

Chart 5.11: World oil prices



Source : Oxford Economics/Haver Analytics

Chart 5.12: World inflation



Source : Oxford Economics/Haver Analytics

6 Advanced economies slide into secular stagnation

Against the backdrop of the disappointing performance of advanced economies following the financial crisis, we consider in this scenario the implications of further persistent weakness. In particular, we explore the possibility that demand weakness impacts supply potential and low growth becomes engrained across advanced economies.

In the scenario, the subdued demand environment leads firms to scale back both investment plans and new job hires. With the resulting labour market softness constraining earnings growth and weighing on consumer confidence, households cut back on spending and increase savings. Policymakers find themselves constrained – on the monetary side, by the already low levels of policy rates and, fiscally, by ongoing concerns over public indebtedness. As weakness in demand persists, potential output growth fades, held back by slowing capital accumulation and labour market hysteresis effects.

Growth slows steadily throughout the forecast – and not only among advanced economies. Emerging markets also suffer, as export performance disappoints in line with the weaker global demand. As a result, global GDP rises at a modest 2.3% pace in 2017 (compared with 2.7% in the baseline) and growth remains subdued throughout the remainder of the forecast.

In financial markets, advanced economy bond yields decline as policy rates remain low for longer. Equity prices are pushed down throughout the forecast. And exchange rates realign, as weaker demand weighs on commodity exporters and capital chases better returns outside of developed markets.

We attach a 10% probability to this scenario playing out.

Assumptions

The key assumptions for the scenario are as follows:

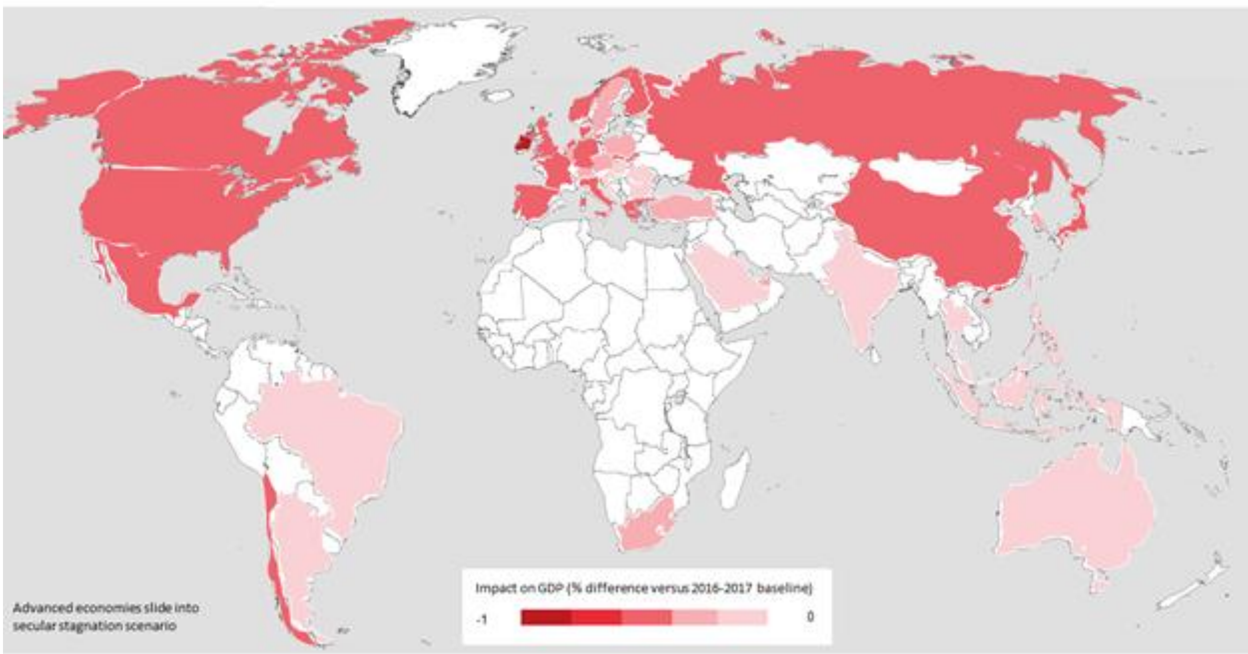
- In advanced economies, slackening demand persists for several quarters. **Disappointing labour market performance** is associated with weaker-than-expected income growth and subdued consumer confidence. Households in turn rein in spending and increase savings.
- **A deteriorating demand outlook leads to lower business investment**; hiring plans are scaled back as well, weighing further on the softness in the labour market.
- **Potential supply slows**, exacerbating the earlier impact of the crisis. Weaker investment drags on growth in the capital stock, while also entailing a weaker rate of total factor productivity growth insofar as new capital embodies new technology. The natural rate of unemployment rises through hysteresis effects.
- Given the already low level of policy rates, and policymakers' reticence to embark on even greater balance sheet expansion, **central banks are left with limited options.** At the same time, **large fiscal stimulus packages are avoided** given a preponderance of debt in most advanced economies.
- **Capital flows away from advanced economies**, in response to actual and anticipated shifts in relative productivity across the globe. **Advanced economy currencies depreciate as a result**, with the boost to external competitiveness acting to temper the impact on activity from weaker domestic demand.

Real economy results

The real economy results of this scenario may be summarised as follows:

- Overall, **world GDP growth falls to 2.3% in 2017** (compared with 2.7% in the baseline) and remains subdued throughout the forecast. World GDP growth averages 2.5% in 2018-21 (2.9% in the baseline). The level of world output is 2.8% below baseline by 2021.
- The countries that suffer the largest hit to GDP are:
  - **Peripheral Eurozone economies**, which most closely resemble Japan in the 1990s based on key indicators. GDP in Portugal, Italy, Spain, and Greece all fall more than 3% below baseline by 2021.
  - **Other advanced economies** – including elsewhere in the Eurozone and in the UK – where scope for further expansion of conventional monetary policy is limited.
  - **Commodity exporting emerging markets**, such as Russia and Chile, as commodity prices weaken during the first few years of the forecast.
  - **Countries that have disappointed most relative to expectations for growth at the beginning of the decade**, including those in the Eurozone periphery and the US.
- **In the advanced economies, GDP slows steadily**, expanding by 1.5% and 1.4% in 2017 and 2018 (compared with 2.0% in the baseline) and averaging just 1.2% in 2019-2021. In level terms, advanced economies' output is 3% below baseline by the end of the forecast in 2021.
- As global trade slows, **emerging markets are affected as well**, albeit less markedly**.** GDP growth stays below baseline for the whole forecast period and, in level terms, output is 1.7% below baseline by 2021.
- **Global inflation slows** steadily, to 1.4% by 2021 (compared with 2.8% in the baseline).

Figure 6.A: Cross-country GDP impact in secular stagnation scenario



Commodity and asset market results

The commodity and asset market results of this scenario may be summarised as follows:

- **Oil and commodity prices are hit by weaker demand across the developed world**. Oil prices slide below $35 per barrel during 2017 and remain below baseline. Metals prices are hit even more severely.
- **House and equity prices in both developed and emerging economies are pushed down**. Economies on the Eurozone's periphery are most impacted. But, even in the US, equities end the forecast 15% below the baseline.
- **Bond yields edge lower as policy tightening is postponed across the advanced economies**. In the US, the Fed funds rate remains below 1% throughout the forecast period; in the Eurozone, tightening is postponed beyond the five-year horizon.

Figure 6.B: Cross-country GDP impact of secular stagnation scenario (2018)

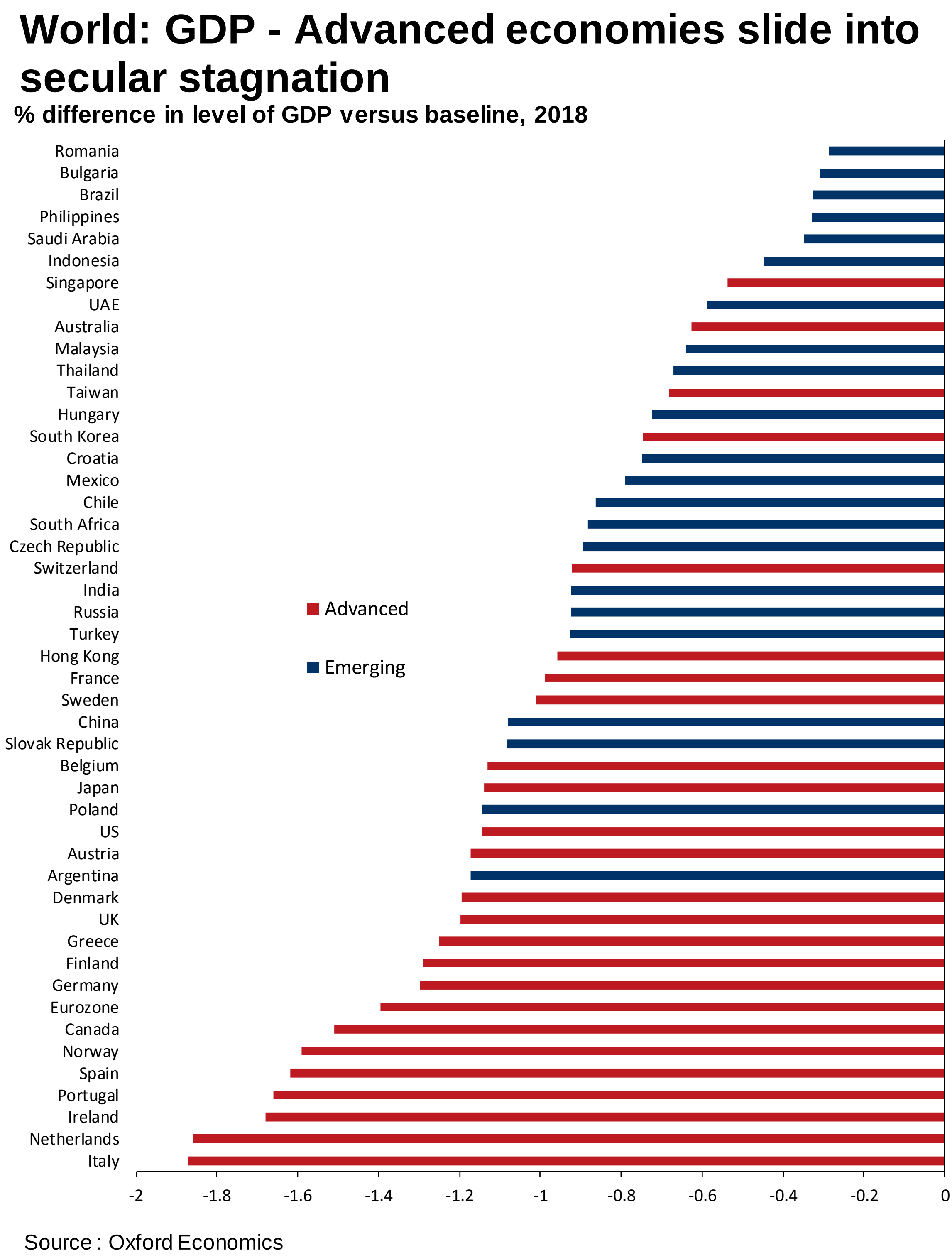


Figure 6.C: Cross-country GDP impact of secular stagnation scenario (2021)

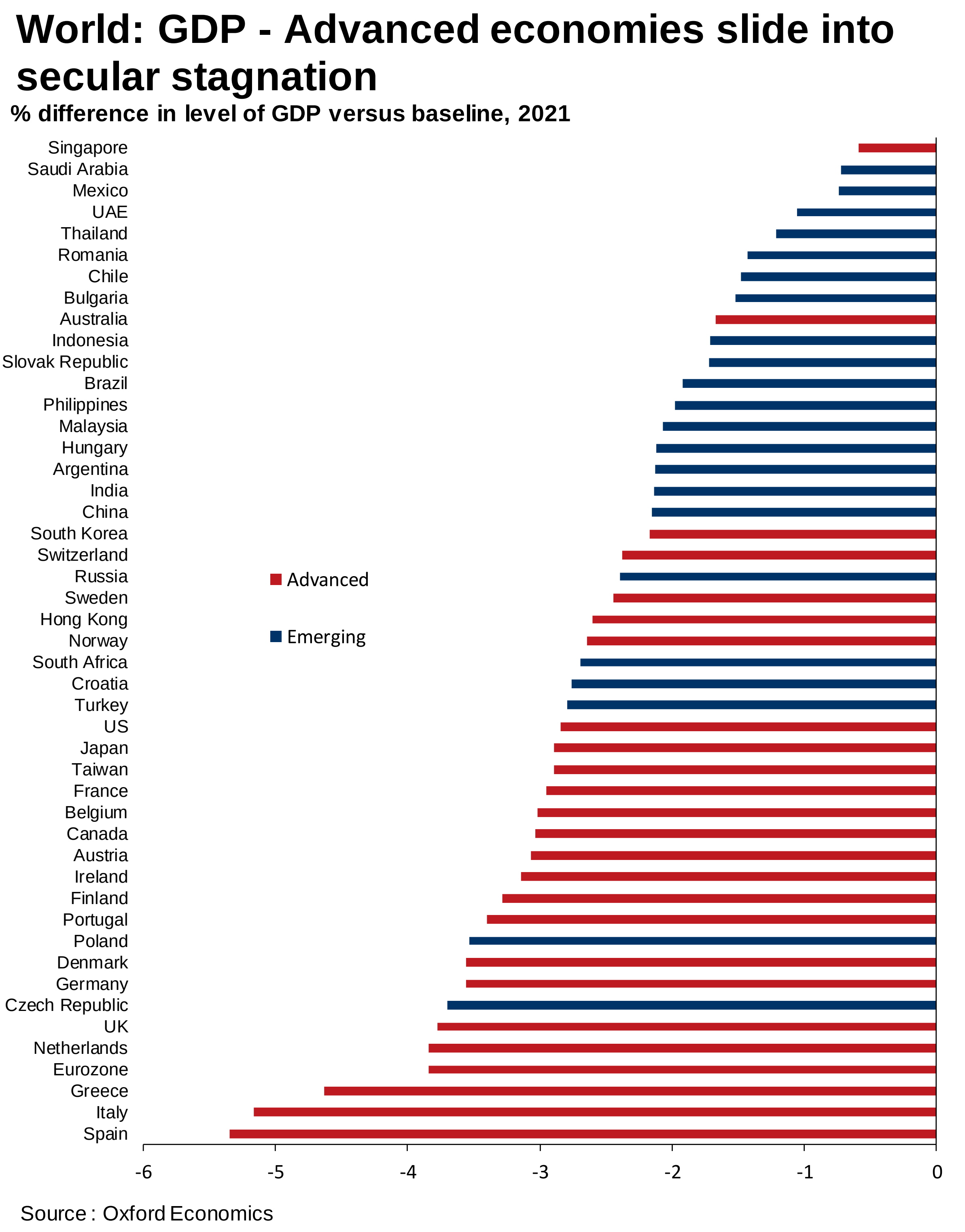


Figure 6.D: Cross-country exchange rate impact of secular stagnation scenario

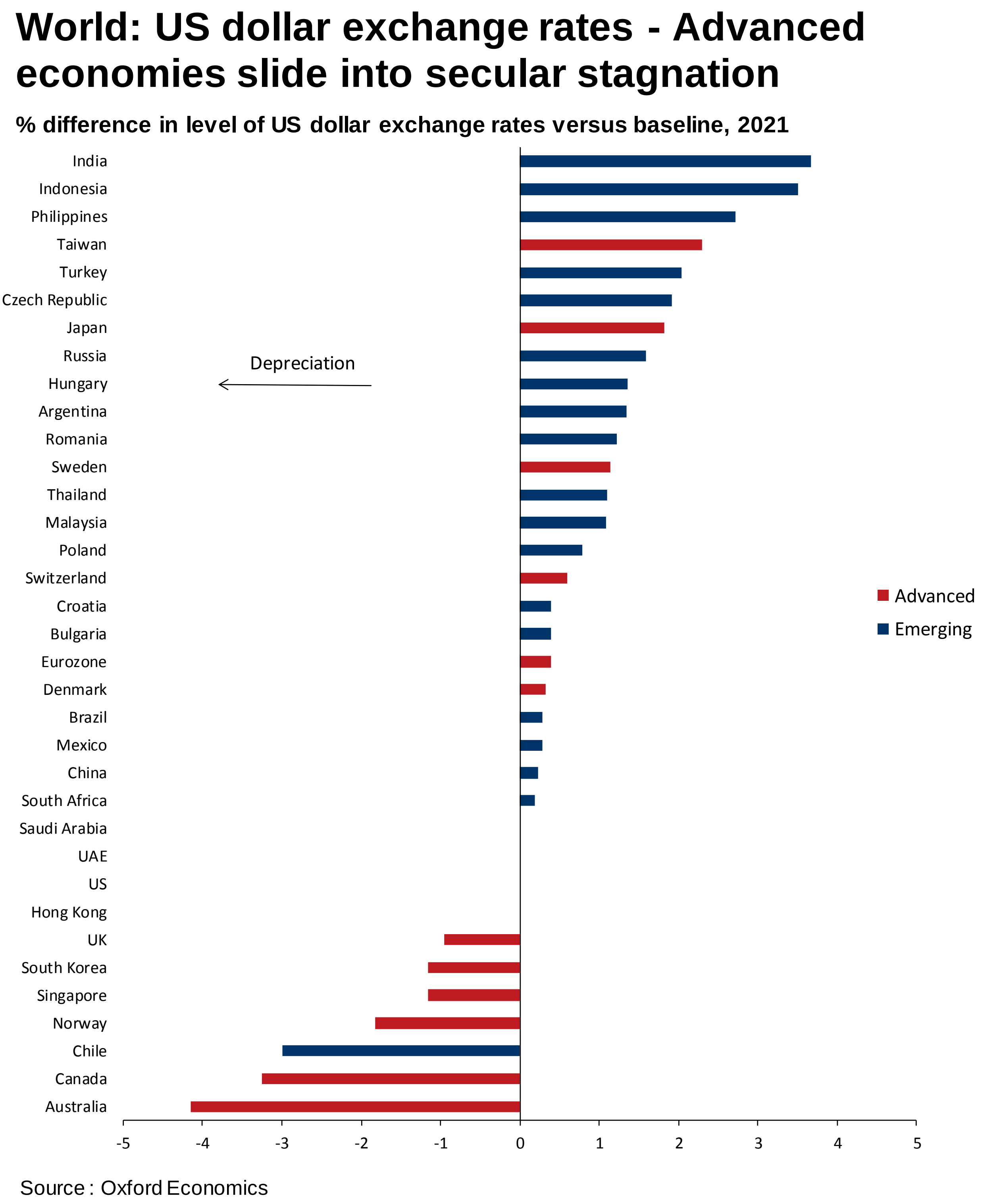


Chart 6.1: World GDP

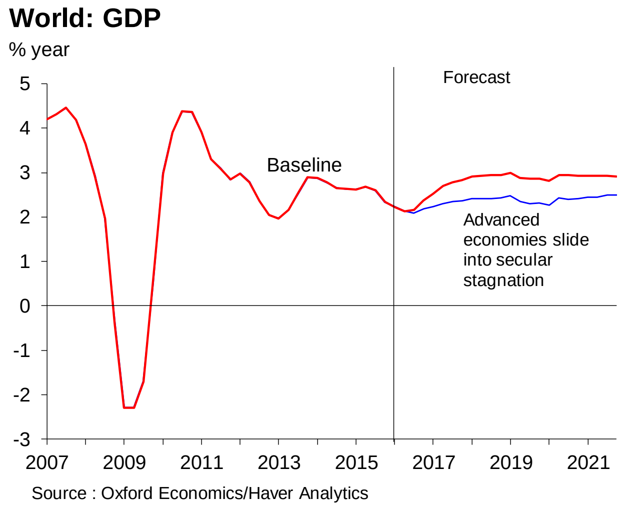


Chart 6.2: US GDP

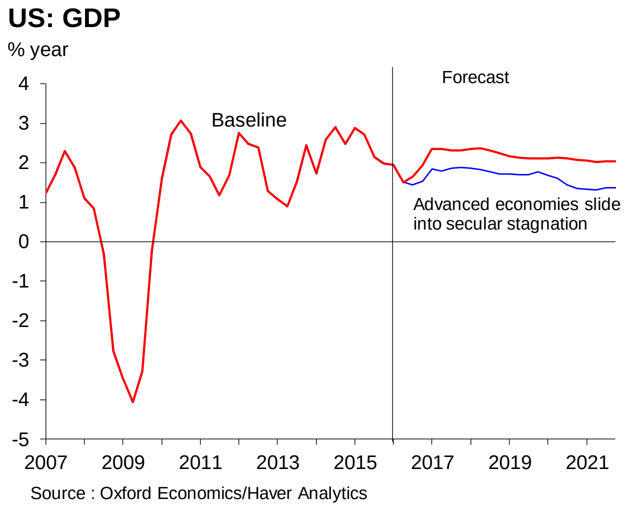


Chart 6.3: Japanese GDP

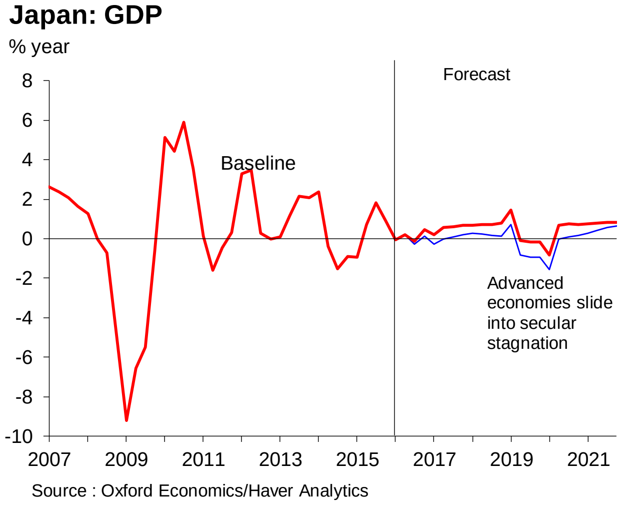


Chart 6.4: Eurozone GDP

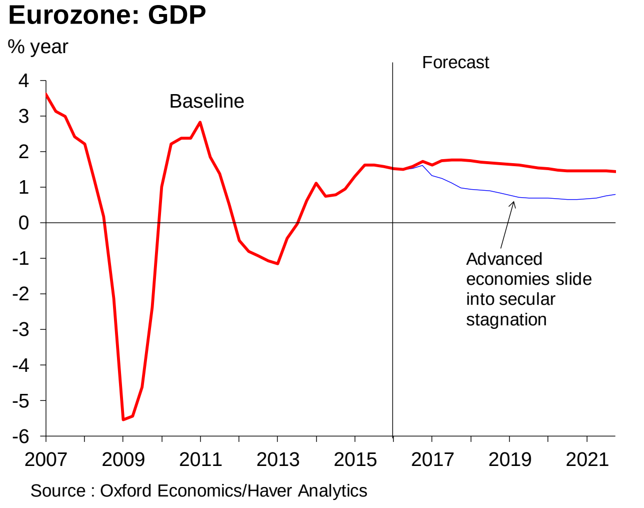


Chart 6.5: Eurozone productivity

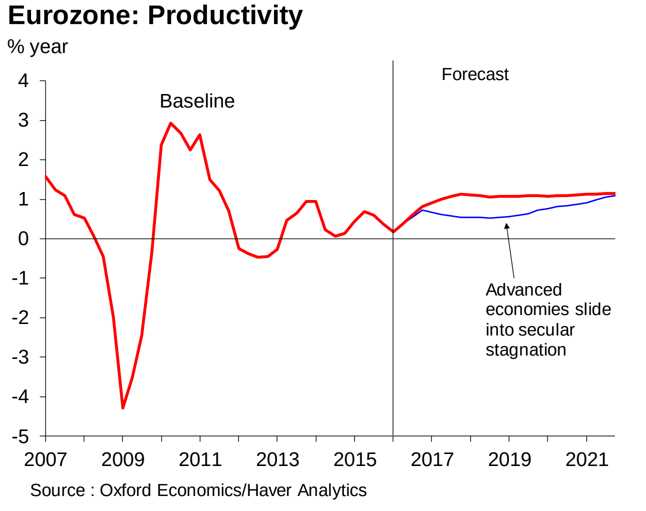


Chart 6.6: World inflation

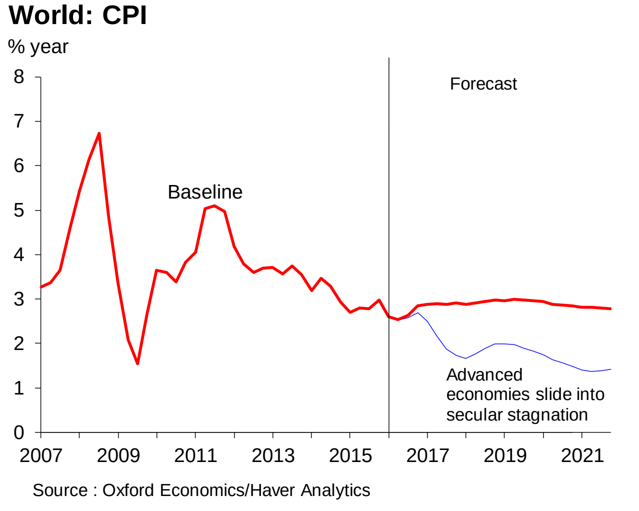
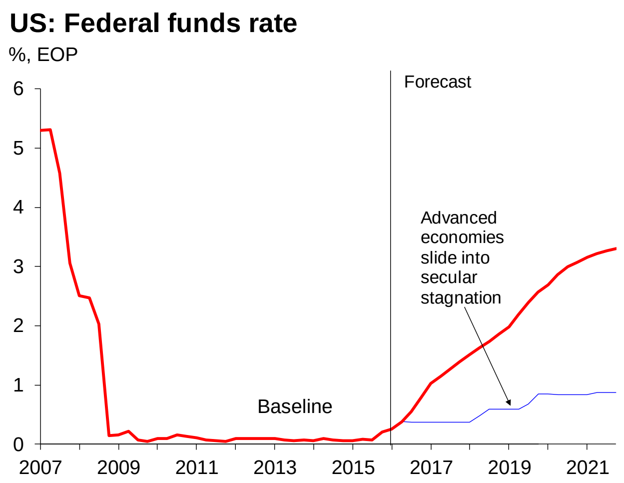
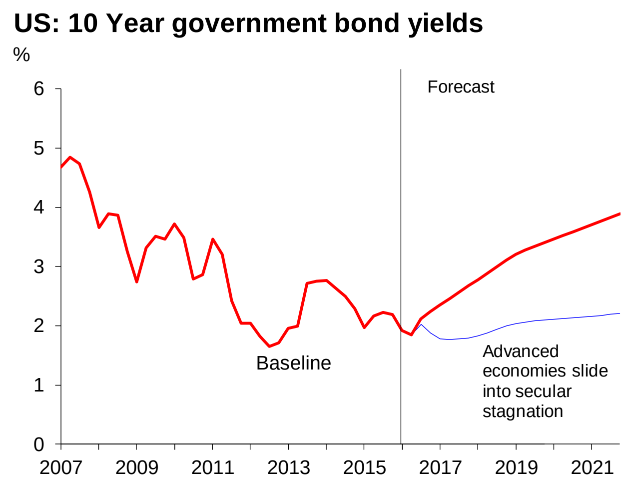


Chart 6.7: US policy rates



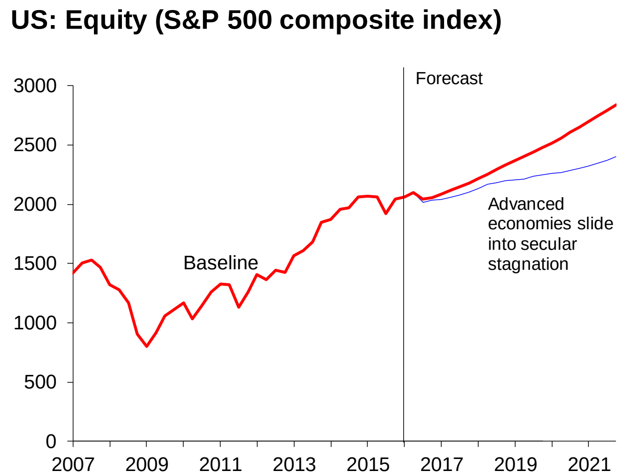
Source : Oxford Economics/Haver Analytics

Chart 6.8: US bond yields



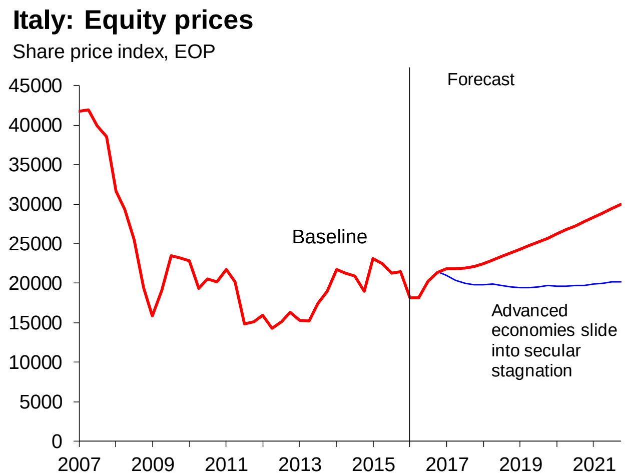
Source : Oxford Economics/Haver Analytics

Chart 6.9: US equity prices



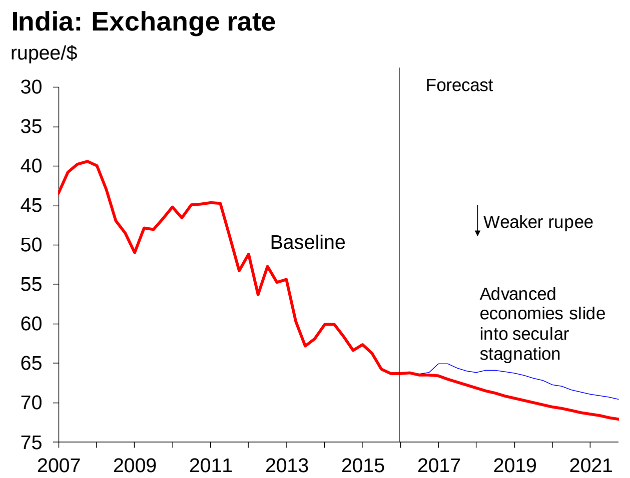
Source : Oxford Economics/Haver Analytics

Chart 6.10: Italian equity prices



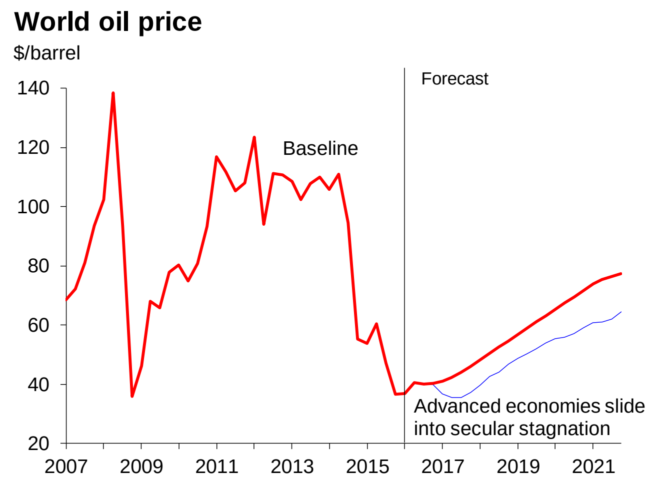
Source : Oxford Economics/Haver Analytics

Chart 6.11: Indian exchange rate



Source : Oxford Economics/Haver Analytics

Chart 6.12: World oil prices



Source : Oxford Economics/Haver Analytics

7 Productivity rebounds globally

One salient feature of the global economic landscape following the financial crisis has been the remarkably subdued performance of productivity growth. In this scenario, we consider the possibility of a productivity rebound, supporting a sustained global economic recovery.

In the scenario, the global demand outlook steadily improves. Governments with fiscal room invest in infrastructure projects. As tight labour markets begin to feed through to wages, earnings growth surprises on the upside and supports increased consumer spending. Business investment also picks up, supported by an easing in credit conditions as the recovery solidifies. As activity picks up to meet increased demand, a cyclical recovery in productivity gains pace.

At the same time, a number of additional factors more structural in nature drive productivity higher. Earlier investment in ICT gradually becomes more fruitful, as firms adjust their processes and workforce skills. Renewed falls in the relative cost of capital spur additional investment in the latest technology. And structural reforms are also implemented in some countries, providing a further boost to growth over the medium term.

The result is a sustained period of improved global growth. World GDP rises by 3.1% in 2017 and 3.5% in 2018, around ½ percentage point above rates envisaged in the baseline. But the impact across countries varies markedly, in part reflecting countries' investment behaviour in the past and their scope for fiscal stimulus in the future.

In financial markets, equities gain globally. The dollar appreciates as the Fed tightens policy more quickly and the US benefits from its relative productivity improvement; meanwhile, emerging market currencies generally appreciate, as the risk-on environment leads to capital inflows. At the same time, commodity prices rise in step with increased demand; by the end of the forecast, oil prices have returned to $100 per barrel.

We attach a 15% probability to this scenario playing out.

Assumptions

The key assumptions for the scenario are as follows:

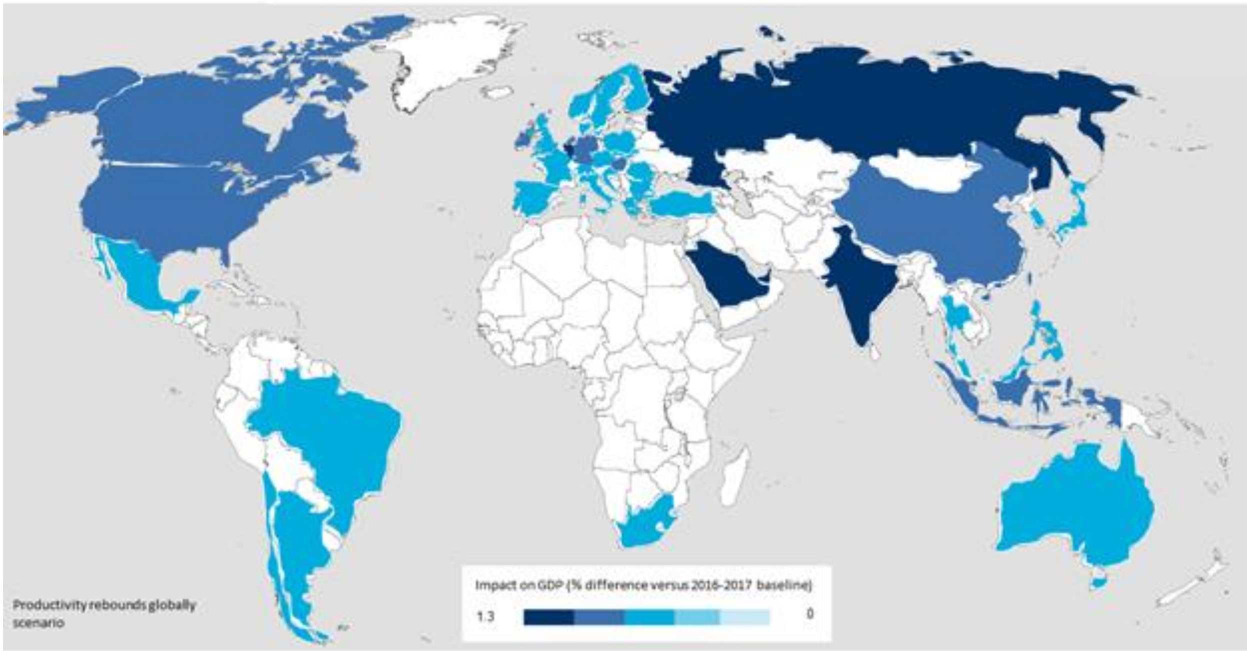
- **A sustained recovery in potential output** takes place in advanced economies, as earlier investments in ICT begins to bear fruit and firms make additional investments in the latest technology against the backdrop of increased returns on capital and declining relative costs.
- **The recovery is specific to individual economies**, calibrated using previous investment levels in ICT. Potential output in 2021 is 3.6% higher than baseline for the US, 2.8% higher in the Eurozone and 2.3% higher in Japan.
- **Governments with fiscal room invest in infrastructure.** Countries which have relatively high or moderate prospects for infrastructure and fiscal expansion – such as China, Germany, India and Canada – increase spending, supporting the cyclical upturn. The contribution to growth from the stimulus is gradually phased out in the latter years of the scenario.
- **Demand responds relatively quickly to the pickup in productivity**, as households and businesses anticipate higher future earnings. A positive confidence effect spreads through the world economy, as downside risks abate.
- **In financial markets, a risk-on environment ensues**. Spreads on emerging market debt decline amid rising investor confidence.

Real economy results

The real economy results of this scenario may be summarised as follows:

- **Global growth rises** to 3.1% in 2017 and 3.5% in 2018, compared with 2.7% and 2.9% in the baseline. Growth remains at 3.5% in 2019 before beginning to slow. World GDP is 2.4% higher than baseline by the end of 2021.
- In general, the largest gains are experienced by:
  - **Countries that invested heavily in ICT in recent years**, particularly where modest productivity growth is envisaged in the baseline - for example in the US. (While the UK also benefits from earlier ICT investment, the boost in the scenario is more modest given its less weak assumed profile for total factor productivity growth in the baseline.)
  - **Countries that benefit from a cyclical boost as government investment increases** – namely China, India, Germany and Canada.
  - **Countries that benefit from the strength of commodity prices**. Commodity exporters – such as Russia and Saudi Arabia – are two of the strongest performers in the initial years of the scenario, as increased demand drives up the world price of oil (and other commodity prices).
  - **Countries that benefit from the risk-on environment**, as concerns over emerging market vulnerabilities ease during the first half of the forecast. Russia and, to a lesser extent, Brazil benefit in particular.
- As a result, **higher growth in advanced economies is sustained**. Growth reaches 2.3% in 2017 and 2.6% in 2018, and remains close to 2½% throughout the latter years of the scenario, supported by increased potential supply.
- Within advanced economies, **the US and Japan benefit from earlier heavy investment in ICT**. In the US, growth picks up to 2.8% in 2017 and averages 3.0% from 2017-2021 (compared with 2.2% in the baseline); in Japan, growth averages 0.9% (compared with 0.5% in the baseline).
- **The Eurozone benefits from both earlier ICT investment and German fiscal stimulus**. Growth reaches 2.1% in 2017 and 2.3% in 2018/19, and remains around 2% during the remainder of the forecast.
- **Emerging markets generally experience a cyclical upturn**, benefitting from trade spillovers, increased demand for commodities and the risk-on environment. Emerging market growth reaches 4.7% in 2017 and 5.1% in 2018, before gradually easing in the latter years of the scenario. Growth averages 4.8% from 2017-2021 (compared with 4.5% in the baseline).
- Within emerging markets, **China and India benefit from increased government investment in infrastructure**. Growth in India peaks at 8.2% in 2018; growth in China reaches 6.9% in 2017 and 6.7% in 2018, before beginning to converge to growth rates closer to the baseline.
- Meanwhile, **Russia and other commodity exporters gain from the increased demand for oil and other commodities**. In Russia, growth recovers to 2.3% in 2017 and 3% in 2018.
- Against the backdrop of strengthening global growth, **global inflation picks up moderately.** Higher cost pressures related to increased oil prices and earnings are mostly offset by productivity gains.

Figure 7.A: Cross-country GDP impact in productivity rebound scenario

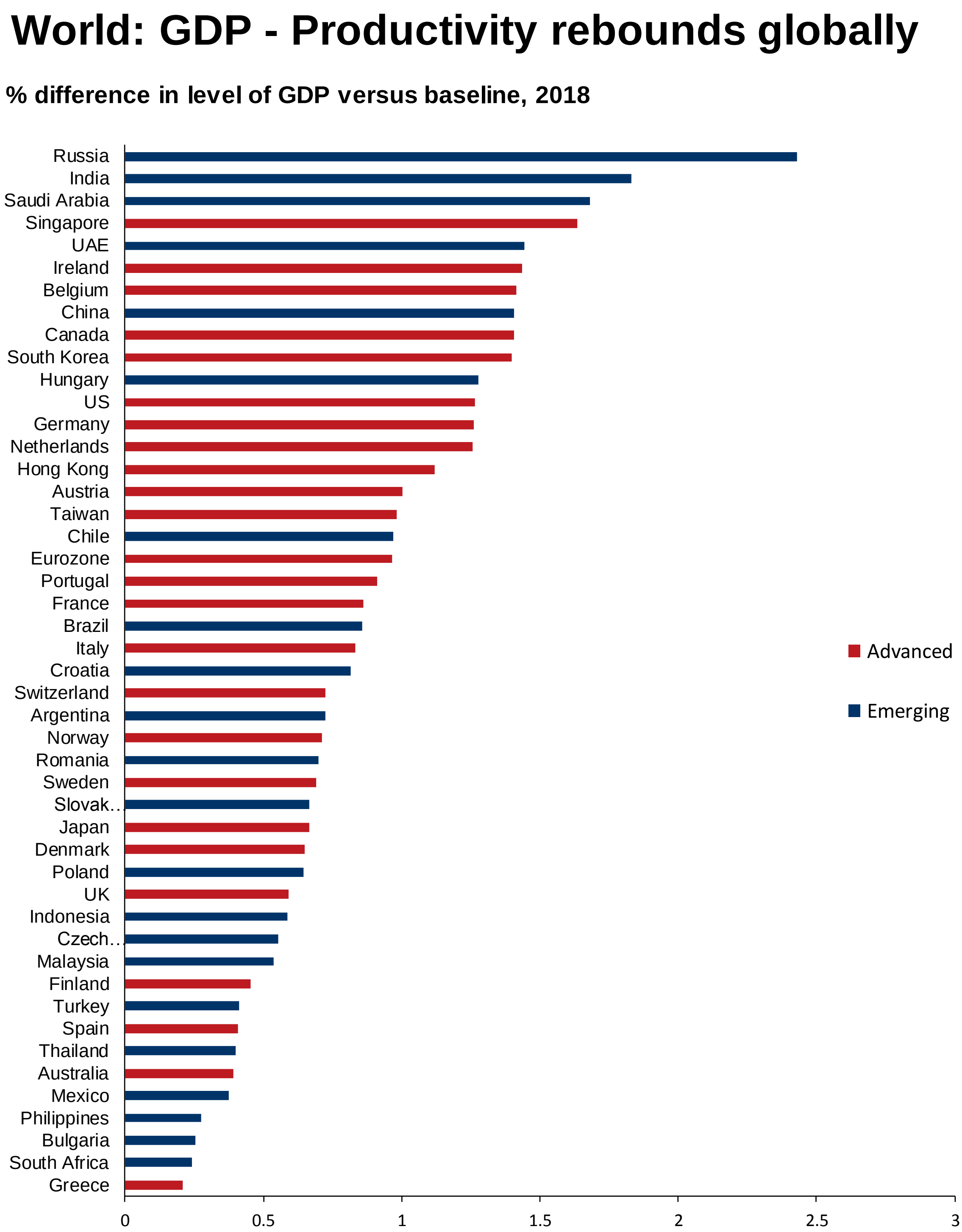


Commodity and asset market results

The commodity and asset market results of this scenario may be summarised as follows:

- **Equities gain globally**, growing by 11.1% in 2017 and averaging 9.0% annual growth over the five year forecast period; by 2021, stock markets lie 13.0% above baseline on average. The US stock market performs particularly well, rising 18.9% above baseline by the end of the five-year forecast; European equities end the period 12.0% higher than baseline.
- **Oil prices rise continuously throughout the scenario**, as global demand picks up and improvements in oil sector productivity fail to match the gains seen elsewhere in the global economy. Oil prices reach $100 per barrel by the end of 2021, compared with $77 in the baseline.
- **Policy rates edge slightly higher than the baseline in advanced economies**. The Fed increases the pace of rate hikes in 2017, with the Federal Funds rate reaching 1.6% at the end of 2017 and 3.9% by the end of 2021. The ECB begins to hike rates in 2019, with its main refinancing rate reaching 1.7% by end 2021. The Bank of England raises rates at a faster pace, and the policy rate is 3.2% by the end of 2021. The Bank of Japan however keeps rates unchanged from the baseline, as it maintains efforts to raise inflation to 2%.
- **Long term yields** are, correspondingly, a little higher. By 2021, yields are at or around 4% in the US, Eurozone and the UK.
- **Emerging market currencies** generally appreciate, with the risk-on environment leading to capital inflows. The Russian rouble appreciates against the dollar, by 4.3% relative to baseline by the end of the scenario. The Brazilian real gains 7.7%, following a more muted initial depreciation than in the baseline.

Figure 7.B: Cross-country GDP impact of productivity rebound scenario (2018)



Source : Oxford Economics

Figure 7.C: Cross-country GDP impact of productivity rebound scenario (2021)

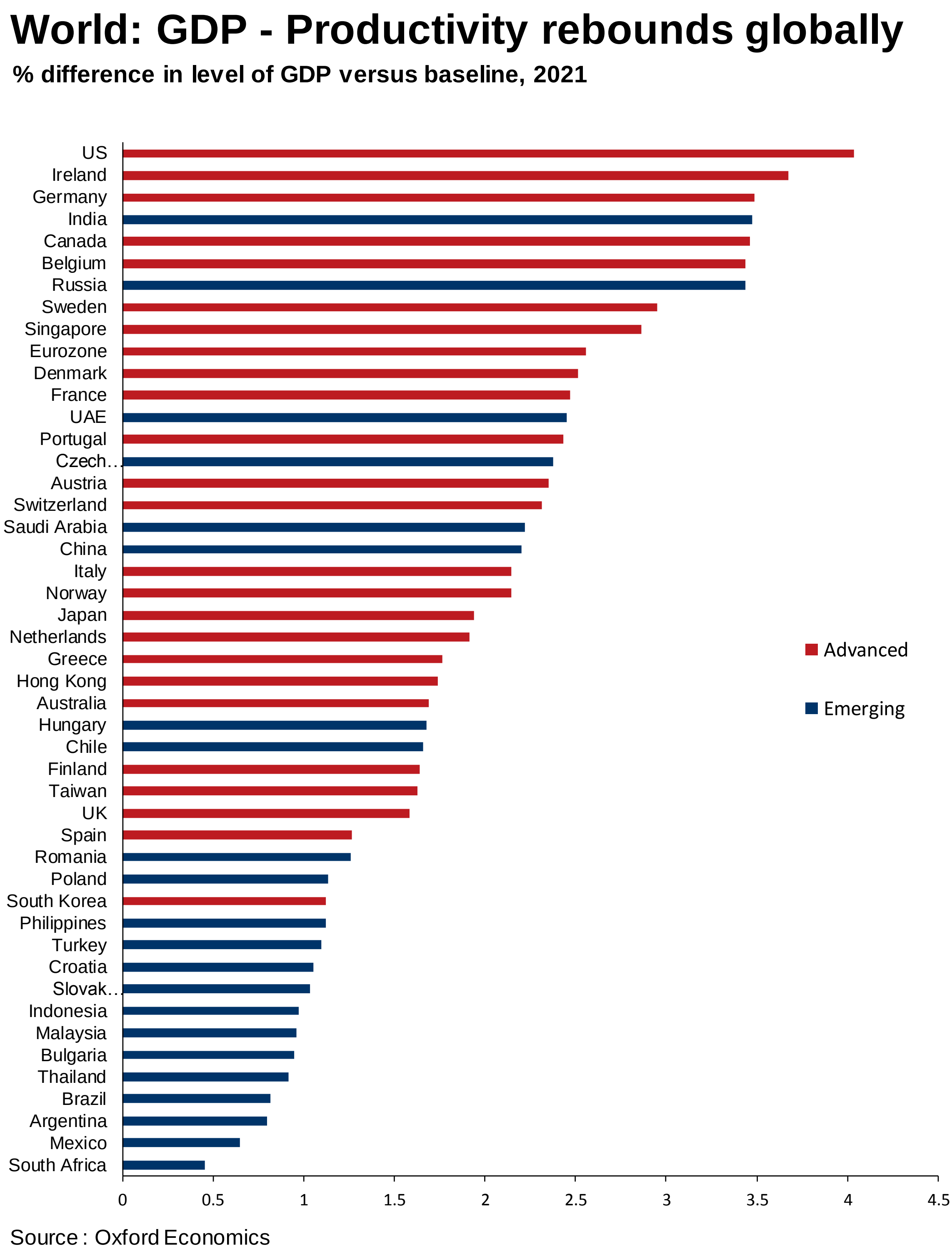
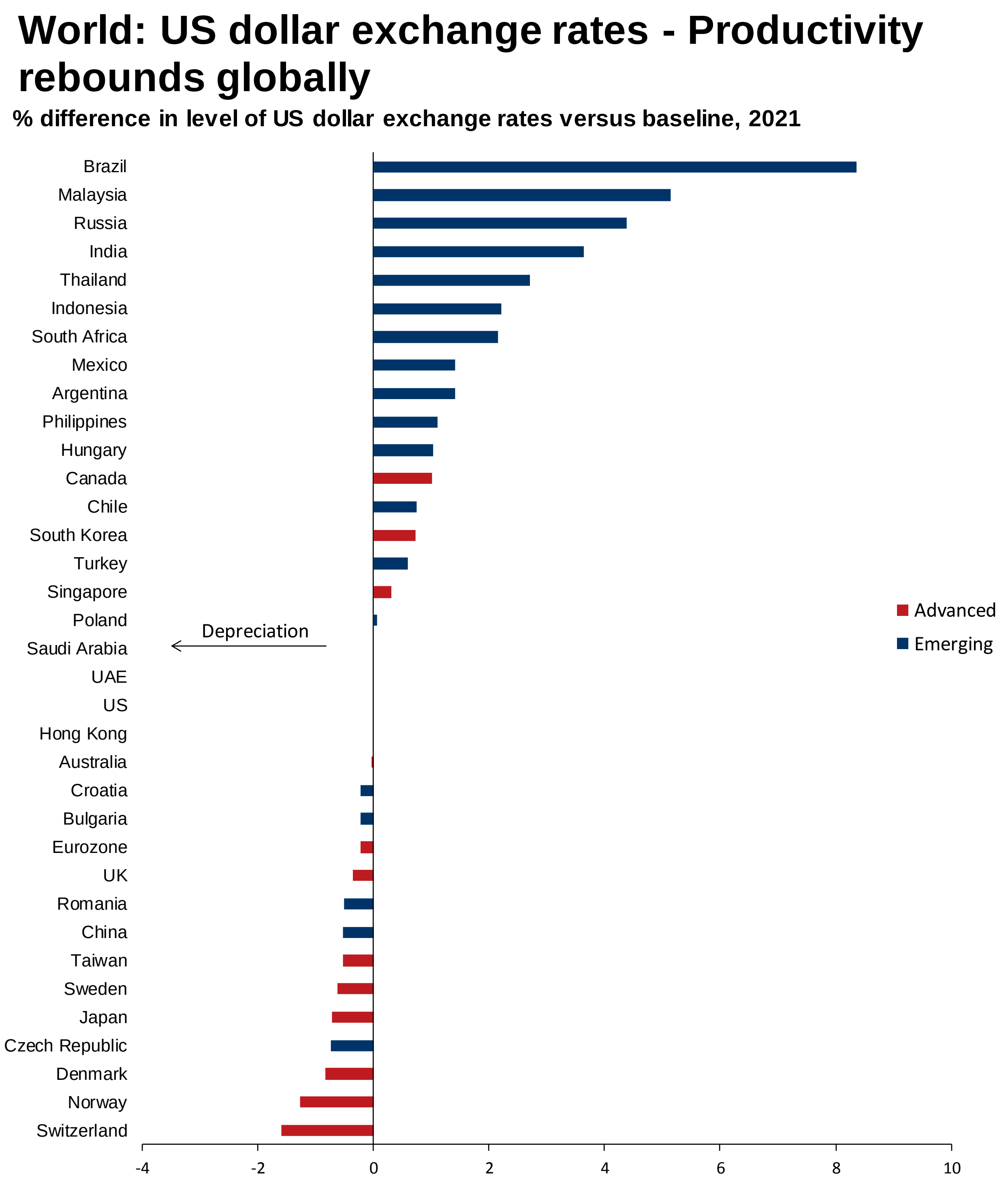


Figure 7.D: Cross-country bond-yield impact of productivity rebound scenario



Source : Oxford Economics

Chart 7.1: World GDP

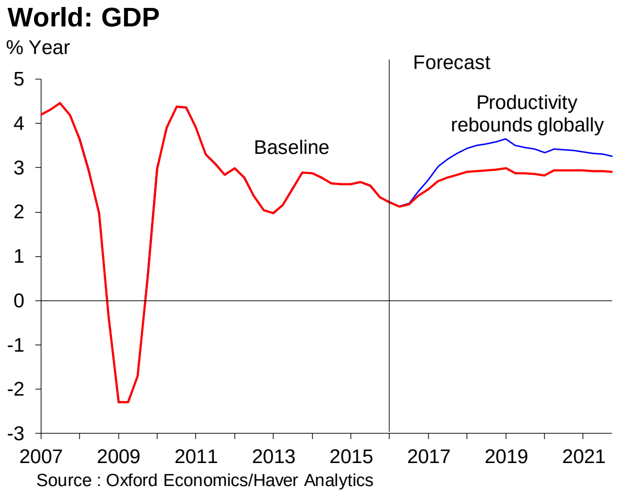


Chart 7.2: US GDP

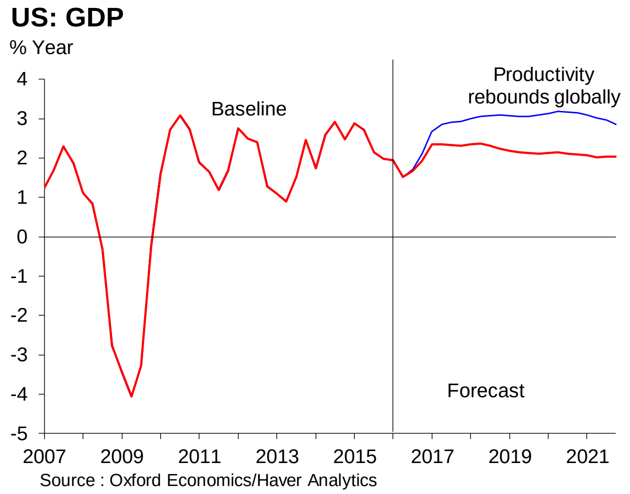


Chart 7.3: US productivity

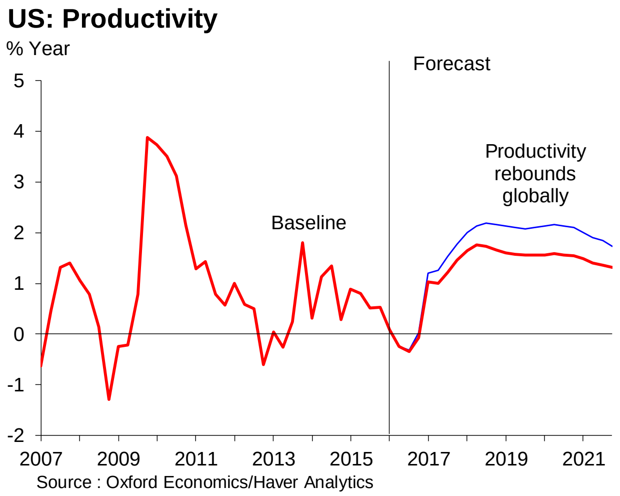


Chart 7.4: Eurozone GDP

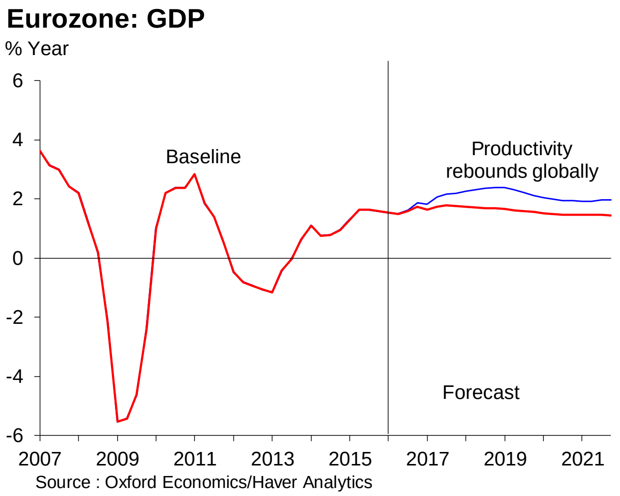


Chart 7.5: Chinese GDP

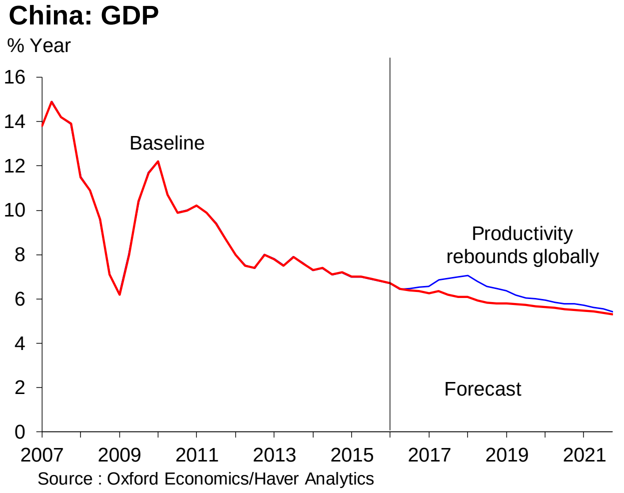


Chart 7.6: World inflation

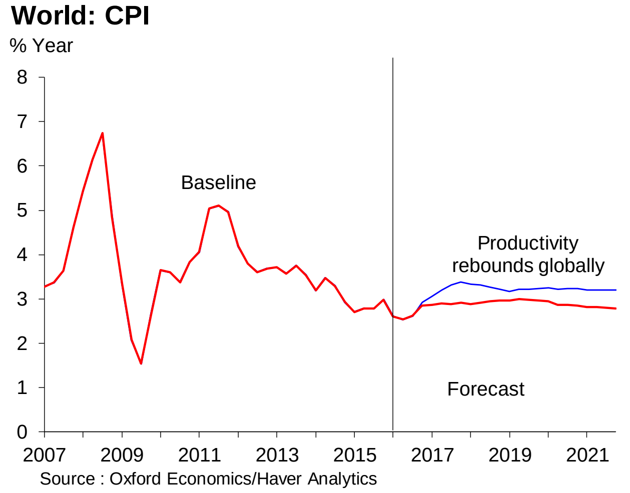


Chart 7.7: US policy rates

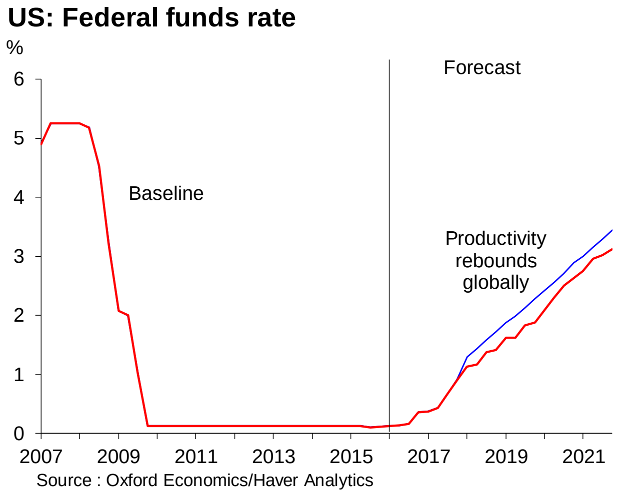


Chart 7.8: US bond yields

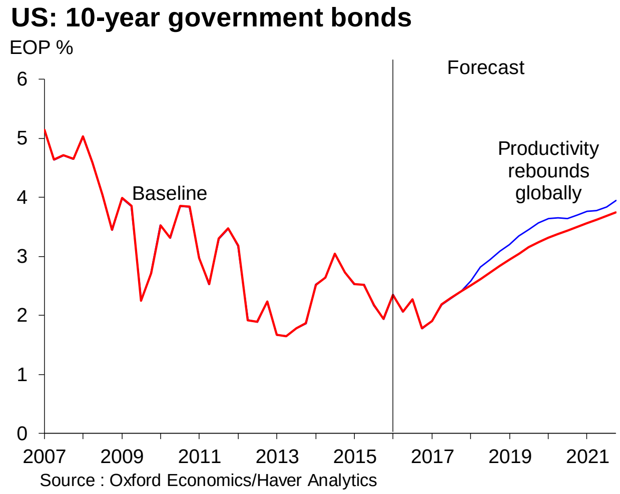


Chart7.9: US equity prices

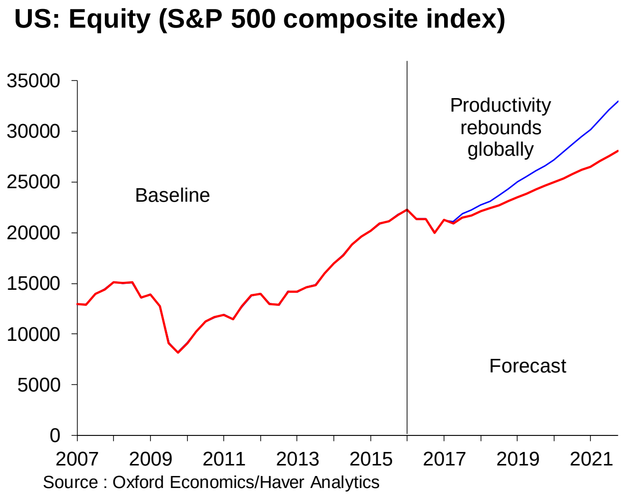


Chart 7.10: Emerging Market interest rates

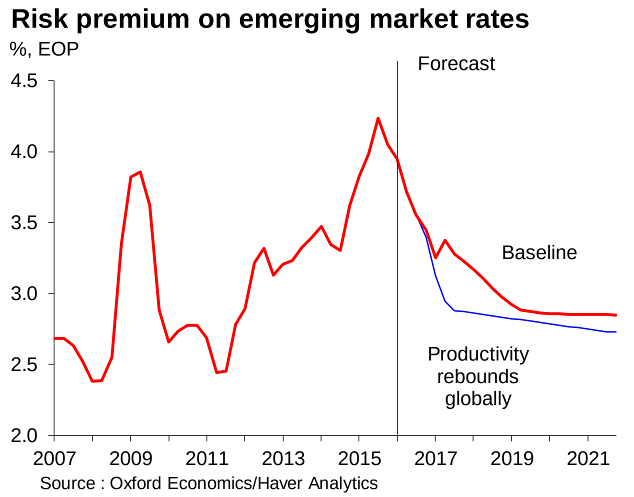


Chart 7.11: Brazilian exchange rate

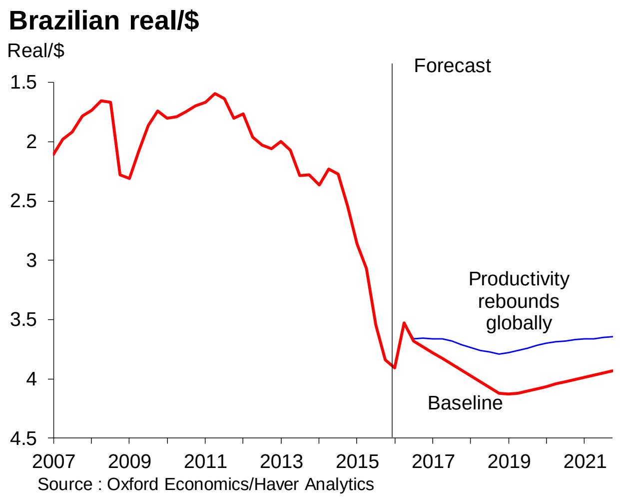
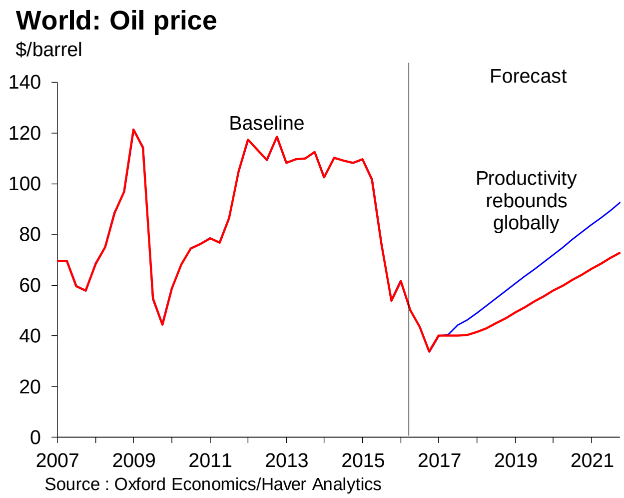


Chart 7.12: World oil prices



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