Appendix A: Summary of key forecast assumptions by Simon Kirby and Iana Liadze

The forecasts for the world and the UK economy reported in this *Review* are produced using the National Institute's global econometric model, NiGEM. NiGEM has been in use at NIESR for forecasting and policy analysis since 1987, and is also used by a group of more than 40 model subscribers, mainly in the policy community. Most countries in the OECD are modelled separately,[1] and there are also separate models of China, India, Russia, Brazil, Hong Kong, Taiwan, Indonesia, Singapore, Vietnam, South Africa, Latvia, Lithuania, Romania and Bulgaria. The rest of the world is modelled through regional blocks so that the model is global in scope. All models contain the determinants of domestic demand, export and import volumes, prices, current accounts and net assets. Output is tied down in the long run by factor inputs and technical progress interacting through production functions, but is driven by demand in the short to medium term. Economies are linked through trade, competitiveness and financial markets and are fully simultaneous. Further details on NiGEM are available on http://nimodel.niesr. ac.uk/.

The key interest rate and exchange rate assumptions underlying our current forecast are shown in tables A1–A2. Our short-term interest rate assumptions are generally based on current financial market expectations, as implied by the rates of return on treasury bills and government bonds of different maturities. Long-term interest rate assumptions are consistent with forward estimates of short-term interest rates, allowing for a country-specific term premium. Where term premia do exist, we assume they gradually diminish over time, such that long-term interest rates in the long run are simply the forward convolution of short-term interest rates. Policy rates in major advanced economies are expected to remain at extremely low levels, at least throughout 2016.

The Reserve Bank of Australia and the central bank of New Zealand lowered their benchmark interest rates by a further 25 basis points in 2016, after cutting them by 50 and 100 basis points correspondingly in 2015. The People's Bank of China and the Indian central bank both reduced their interest rates throughout 2015 by a total of 125 basis points each. While the People's Bank of China has kept them unchanged since, the Indian central bank lowered its benchmark rate further by 25 basis points in April 2016. After reducing its policy rate by 100 basis points in four steps between August 2014 and June 2015, the Bank of Korea cut it again by 25 basis points in June 2016. Indonesia's central bank reduced its benchmark interest rate by 25 basis points in February 2015, for the first time since 2012, and then lowered it again in 2016 in three steps – bringing its interest rate down to 6.5 per cent. The Central Bank of Turkey has left its policy rate unchanged at 7.5 per cent since February last year, following a spell of reductions around the middle of 2014, where the interest rates were reduced by a cumulative 250 basis points. Through 2014 and 2015, the Romanian Central Bank reduced its benchmark interest rate by a total of 275 basis points in six steps and has kept it unchanged since. The National Bank of Hungary has brought its benchmark interest rates down by 120 basis points over eight rounds since the beginning of last year. The central banks of Norway and Poland have lowered their policy rates by 50 basis points each in 2015, to 0.75 and 1.5 per cent respectively. While the central bank of Norway cut its benchmark rate further by 25 basis points in March 2016, the central bank of Poland has left its rate unchanged since. Over the course of last year, the Swedish Riksbank cut its policy rate by 35 basis points in three rounds and has lowered it again by 15 basis points this year. At the time of writing, the Riksbank's policy rate stands at –0.5 per cent. At the turn of 2015 the Swiss National Bank cut its benchmark rate by 25 basis points to –0.75 per cent, while the Central Bank of Denmark reduced its rate by 15 basis points to just 0.05 per cent. Both central banks have left their main policy rate unchanged since. After reducing its interest rate by a cumulative 600 basis points to 11 per cent over five stages in the first seven months of 2015, the Central Bank of Russia lowered it again by 50 basis points in June 2016. The Bank of Canada has kept its benchmark interest rate unchanged, at 0.5 per cent, after lowering it by 50 basis points over two rounds last year. These were the first cuts in nominal interest rates by the Bank of Canada since April 2009.

In contrast, the Central Bank of Brazil and the South African Reserve Bank both increased interest rates in response to inflationary and financial market pressures in 2015. The South African Reserve Bank increased its benchmark rate by 25 basis points in July last year and the Central Bank of Brazil has raised its interest rate by 200 basis points to 14.25 per cent, in a series of steps over the course of 2015. While the Central Bank of Brazil has left its interest rate unchanged since, the South African Reserve Bank increased them further by 75 basis points in two rounds this year. To stem downward pressure on the Peso following a rise in the federal funds rate in the US, the central bank of Mexico has increased its interest rate by 125 basis points in three rounds since December 2015. These were the first increases since August 2008.[2]

In December 2016, the Federal Reserve raised the target range for the federal funds rate by 25 basis points to 0.25–0.50 per cent. This action, agreed unanimously by the Federal Open Market Committee (FOMC), was taken seven years after the target range had been lowered close to zero, and six and a half years after the end of the US recession of December 2007–June 2009. The statement accompanying the Fed's decision emphasised that monetary conditions remained accommodative after the increase; that the timing and size of future adjustments would depend on its assessment of actual and expected economic conditions relative to its objectives, and that it expected that only gradual increases in the rate would be warranted. This message has been reiterated by the FOMC at subsequent meetings. Indeed these assessments have led the FOMC to conclude that further interest rates were not warranted in the first half of this year.

The expectation of the first rate change of the Monetary Policy Committee (MPC) of the Bank of England is based on our view of how the economy will evolve over the next few years. As the UK chapter in this *Review* discusses, we expect the UK economy to enter a downturn as a consequence of the vote to leave the EU.[3] In the near term we expect a policy response by the Monetary Policy Committee (MPC) of the Bank of England. At the August 2016 meeting we have assumed the MPC will lower interest rates by 25 basis points and by a further 15 basis points at their November 2016 meeting. In line with market expectations, Bank Rate is then assumed to remain at 0.1 per cent until the end of 2017. At the time of writing, financial markets expect

Table A1. Interest rates

Per cent per annum

		Central bank intervention rates					10–year government bond yields				
		US	Canada	Japan	Euro Area	UK	US	Canada	Japan	Euro Area	UK
2012		0.25	1.00	0.10	0.88	0.50	1.8	1.9	0.8	3.2	1.8
2013		0.25	1.00	0.10	0.56	0.50	2.3	2.3	0.7	2.7	2.4
2014		0.25	1.00	0.10	0.16	0.50	2.5	2.2	0.6	1.9	2.5
2015		0.26	0.65	0.10	0.05	0.50	2.1	1.5	0.4	1.0	1.8
2016		0.50	0.50	–0.10	0.01	0.38	1.7	1.2	0.0	0.6	1.2
2017		0.75	0.61	–0.41	0.00	0.10	2.2	1.8	0.0	1.1	1.6
2018–2022		2.39	2.26	–0.55	0.89	1.44	3.5	3.4	0.3	2.7	3.1
2014	Q1	0.25	1.00	0.10	0.25	0.50	2.8	2.5	0.6	2.5	2.8
2014	Q2	0.25	1.00	0.10	0.23	0.50	2.6	2.4	0.6	2.1	2.7
2014	Q3	0.25	1.00	0.10	0.13	0.50	2.5	2.2	0.5	1.7	2.6
2014	Q4	0.25	1.00	0.10	0.05	0.50	2.3	2.0	0.4	1.3	2.1
2015	Q1	0.25	0.81	0.10	0.05	0.50	2.0	1.4	0.3	0.8	1.6
2015	Q2	0.25	0.75	0.10	0.05	0.50	2.2	1.6	0.4	1.0	1.9
2015	Q3	0.25	0.54	0.10	0.05	0.50	2.2	1.5	0.4	1.2	1.9
2015	Q4	0.30	0.50	0.10	0.05	0.50	2.2	1.5	0.3	1.0	1.9
2016	Q1	0.50	0.50	0.00	0.04	0.50	1.9	1.2	0.1	0.8	1.5
2016	Q2	0.50	0.50	–0.10	0.00	0.50	1.8	1.3	–0.1	0.7	1.4
2016	Q3	0.50	0.50	–0.10	0.00	0.38	1.4	1.0	0.0	0.4	0.9
2016	Q4	0.50	0.50	–0.19	0.00	0.15	1.7	1.3	0.0	0.6	1.1
2017	Q1	0.50	0.50	–0.25	0.00	0.10	1.9	1.5	0.0	0.8	1.3
2017	Q2	0.75	0.50	–0.38	0.00	0.10	2.1	1.7	0.0	1.0	1.5
2017	Q3	0.75	0.64	–0.46	0.00	0.10	2.3	2.0	0.0	1.2	1.7
2017	Q4	1.00	0.78	–0.55	0.00	0.10	2.4	2.2	0.0	1.3	1.9

Table A2. Nominal exchange rates

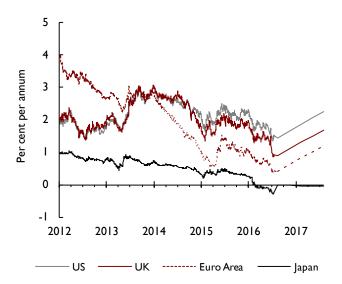|	Percentage change in effective rate								Bilateral rate per US $			
	US	Canada	Japan	Euro Area	Germany	France	Italy	UK	Canadian $	Yen	Euro	Sterling
2012	3.4	0.9	2.2	−3.6	−2.0	−2.0	−1.6	4.2	0.997	79.8	0.778	0.631
2013	2.9	−3.1	−16.7	5.6	2.8	3.0	3.7	−1.2	1.039	97.6	0.753	0.640
2014	4.1	−5.4	−5.1	3.8	1.8	1.8	3.2	7.8	1.112	105.8	0.754	0.607
2015	13.7	−10.7	−5.8	−5.1	−3.2	−3.3	−2.2	6.5	1.299	121.1	0.902	0.654
2016	4.4	1.9	16.6	5.0	2.4	2.5	3.2	−8.6	1.297	107.7	0.897	0.725
2017	−0.2	1.0	5.1	0.5	0.2	0.4	0.2	−4.0	1.284	102.2	0.894	0.751
2014 Q1	1.6	−3.8	−1.5	1.6	0.9	0.7	1.1	2.6	1.111	102.7	0.730	0.604
2014 Q2	−0.9	2.4	0.1	−0.2	−0.2	−0.1	0.2	1.4	1.083	102.1	0.729	0.594
2014 Q3	1.5	−1.0	−1.1	−1.5	−0.8	−0.9	−0.8	1.6	1.100	104.0	0.755	0.599
2014 Q4	4.8	−3.1	−6.6	−0.7	−0.5	−0.7	−0.3	−0.5	1.153	114.6	0.801	0.632
2015 Q1	6.2	−6.9	−0.6	−4.1	−2.5	−2.5	−2.0	2.8	1.262	119.1	0.888	0.660
2015 Q2	0.7	2.4	−1.5	−2.1	−1.2	−0.8	−1.2	2.3	1.237	121.4	0.905	0.652
2015 Q3	3.6	−6.0	2.0	3.3	1.8	1.5	2.1	2.3	1.327	122.2	0.899	0.646
2015 Q4	2.2	−2.5	2.3	0.7	0.3	0.2	0.6	−0.4	1.370	121.5	0.914	0.659
2016 Q1	1.7	4.6	6.9	3.0	1.5	1.4	1.9	−5.4	1.323	115.2	0.908	0.699
2016 Q2	−1.6	2.2	5.6	0.6	0.2	0.5	0.4	−1.9	1.288	108.0	0.886	0.697
2016 Q3	0.7	0.2	3.2	−0.4	−0.2	−0.1	−0.4	−6.5	1.290	104.9	0.900	0.752
2016 Q4	−0.2	0.4	2.3	0.3	0.2	0.1	0.2	−0.4	1.285	102.6	0.896	0.752
2017 Q1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.285	102.6	0.896	0.752
2017 Q2	0.0	0.0	0.2	0.2	0.1	0.1	0.2	0.1	1.285	102.4	0.895	0.752
2017 Q3	0.0	0.1	0.3	0.2	0.1	0.1	0.2	0.1	1.284	102.1	0.894	0.750
2017 Q4	0.0	0.0	0.3	0.2	0.1	0.1	0.2	0.1	1.283	101.8	0.892	0.749

the MPC first to raise rates towards 25 basis points in the summer of 2019, and to 50 basis points in the first quarter of 2021. We think a much earlier move is more likely, with the return to 25 basis points in February 2018 and a rise to 50 basis points in May of that year. Published market expectations are based on the mean of the distribution. As such, a skew to the downside, possibly reflecting where the perceived risks are weighted towards, weighs on the arithmetic mean as opposed to other measures of central tendency. Indeed, it is 'our modal view' that we discuss here. Bank Rate is expected to reach 2 per cent by the second quarter of 2021, this being the point at which the MPC is assumed to stop reinvesting the proceeds from maturing gilts it currently holds, allowing the Bank of England's balance sheet to shrink 'naturally'.

The central banks of the Euro Area (ECB) and Japan (BoJ) have continued to expand their balance sheets. The 'expanded asset purchase programme' which began in March 2015 was expanded further in March this year. The original package envisaged combined purchases of assets amounting to €60 billion a month until at least September 2016. In the latest package, beginning in April 2016, monthly purchases increased to €80 billion and

"run until end-March 2017, or beyond, if necessary, and in any case until the Governing Council sees a sustained adjustment in the path of inflation consistent with its inflation aim". On 8 June this year, the eurosystem began purchases under the corporate sector purchase programme (CSPP), a new component of the APP announced by the ECB in March; in June as a whole, APP purchases amounted to €85.1 billion, including €6.4 billion of corporate bonds. Also, on 22 June, the ECB conducted its first operation under its new series of targeted longer-term refinancing operations (TLTRO II), intended to give banks additional incentives to lend to the private sector.

In October 2014, the BoJ surprised financial markets by announcing that it would expand its asset purchase programme by about 30 per cent. The programme envisaged an increment of about ¥80 trillion added to the monetary base annually, up from an existing ¥60–70 trillion. In December 2015, the BoJ announced a further modification of its programme of quantitative and qualitative easing (QQE). This involves lengthening the average maturity of bonds purchased from the beginning of 2016 to 7–12 from 7–10 years; increasing purchases of Japan's real estate investment trusts and
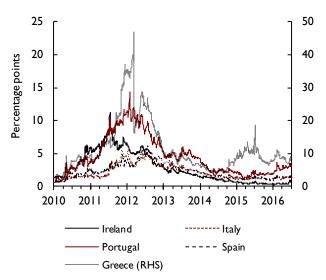
Figure A1. 10-year government bond yields

Source: Datastream and NIESR projections.

Figure A2. Spreads over 10-year German government bond yields

Source: Derived from Datastream series.

also of exchange-traded funds and loosening collateral constraints by allowing foreign currency bonds and housing loans to be eligible. Additionally, at the end of January 2016, the Bank of Japan lowered the interest rate on one tier of bank reserves marginally below zero. Figure A1 illustrates the recent movement in, and our projections for, 10-year government bond yields in the US, Euro Area, the UK and Japan. Convergence in Euro Area bond yields towards those in the US, observed since the start of 2013, reversed at the beginning of 2014. Since February 2014, the margin between Euro Area and US bond yields started to widen, reaching a maximum of about 150 basis points (in absolute terms) at the beginning of March 2015. Since then the margin has narrowed, remaining at around 100 basis points. In the second half of 2014 a wedge has opened between the US and UK government bond yields, which fluctuated between 20–30 basis points throughout last year. Since the beginning of 2016, the margin has started to widen, reaching 60 basis points by mid-July. Looking at the levels of 10-year sovereign bond yields, these have declined since April in the US, Euro Area, the UK and Japan – by about 20–30 basis points in the US, the Euro Area and Japan and 70 basis points in the UK. Looking ahead, expectations for bond yields for the end of 2016 are lower, compared with expectations formed just three months ago. Expectations are lower by about 40–50 basis points in the US and the Euro Area and 70 basis points in the UK. The exception is Japan, where expectations are virtually unchanged.
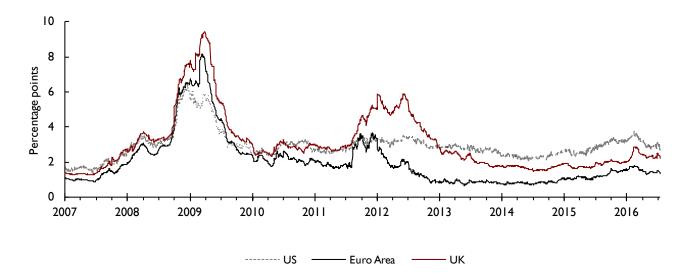
Sovereign risks in the Euro Area have been a major macroeconomic issue for the global economy and financial markets over the past five years. Figure A2 depicts the spread between 10-year government bond yields of Spain, Italy, Portugal, Ireland and Greece over Germany's. The final agreement on Private Sector Involvement in the Greek government debt restructuring in February 2012 and the potential for Outright Money Transactions (OMT) announced by the ECB in August 2012 brought some relief to bond yields in these vulnerable economies. Sovereign spreads have remained stable, in most cases, from late July 2014, the most notable exception being a marked widening of Greek spreads. For Greece this reflected initial uncertainty over the fiscal stance and probability of debt repayment following the formation of a government dominated by a political party elected on an 'anti-austerity' manifesto in January 2015. The risk of Greece leaving the Euro Area returned to the fore, as a deal on a third bailout for Greece appeared unlikely. In the summer of 2015 a lack of liquidity led to a three-week closure of the domestic banking system, with withdrawal limits imposed upon on Greeks' bank accounts and the imposition of controls on external payments. The dangers relating to the financial difficulties of Greece and the policy programme being negotiated with its European partners subsequently receded. In mid-August last year, it was confirmed that negotiators had reached agreement in principle on a 3-year fiscal and structural reform programme to be supported by €86 billion of financing from the European

Figure A3. Corporate bond spreads. Spread between BAA corporate and 10-year government bond yields
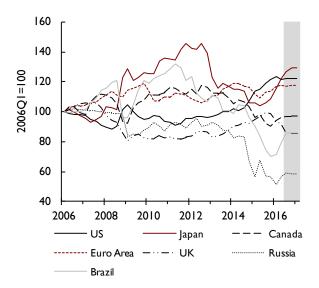

Source: Derived from Datastream series.

Stability Mechanism (ESM). Disbursements (including cash and cashless) totalling €28.9 billion were made by the ESM between August last year and July 2016. However, sovereign spreads remain elevated as long-term debt sustainability remains an issue.

In Portugal sovereign spreads started to widen at the end of 2015, and throughout 2016 have been around the levels last seen at the beginning of 2014. A combination of factors, including the 'anti-austerity' stance of the new Socialist government, the surprise decision by the Portuguese central bank to impose losses on bank bonds held by international investors, a risk of a credit-rating downgrade that could result in the exclusion of government bonds from the ECB's asset-buying programme and weakness in the banking system combined with a high level of government debt (around 128 per cent of GDP) led to Portuguese bonds being the worst performers in the Euro Area (after Greece). In our current forecast, we have assumed spreads over German bond yields continue to narrow in all Euro Area countries, and that this process resumes both in Greece and Portugal from the end of this year.

Figure A3 reports the spread of corporate bond yields over government bond yields in the US, UK and Euro Area. This acts as a proxy for the margin between private sector and 'risk-free' borrowing costs. Private sector borrowing costs have risen more or less in line with the observed rise in government bond yields from the second

Figure A4. Effective exchange rates

Source: NiGEM database and NIESR forecasts. Weights based on 2010 goods and services trade shares.
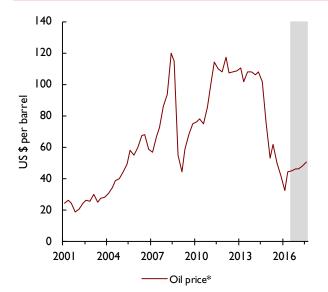
half of 2013 till the second half of 2015, illustrated by the stability of these spreads in the US, Euro Area and the UK. However, since late last year corporate bond spreads have widened, reflecting a tightening of financial conditions. Our forecast assumption for corporate spreads is that they gradually converge towards their long-term equilibrium level.

Nominal exchange rates against the US dollar are generally assumed to remain constant at the rate prevailing on 14 July 2016 until the end of March 2017. After that, they follow a backward-looking uncovered-interest parity condition, based on interest rate differentials relative to the US. Figure A4 plots the recent history as well as our forecast of the effective exchange rate indices for Brazil, Canada, the Euro Area, Japan, UK, Russia and the US. In foreign exchange markets, the main developments since our April forecast have been a further appreciation of the yen against the currencies of all other major advanced economies and a general depreciation of sterling. The yen has appreciated by about 9 per cent both against the US dollar and in trade-weighted terms since the first quarter of this year. Over the same period, the pound depreciated by about 9 per cent against the US dollar and 8 per cent in effective terms. The euro's trade-weighted value has been broadly stable since late April, although it has depreciated against the US dollar by about 3 per cent. Among the major emerging market currencies, the Brazilian real and Russian rouble have partially recovered following earlier declines, mainly reflecting political developments in the former case and oil price developments in the latter.

Our oil price assumptions for the short term are based on those of the US Energy Information Administration (EIA), published in July 2016, and updated with daily spot price data available up to 14 July 2016. The EIA use information from forward markets as well as an evaluation of supply conditions, and these are illustrated in figure A5. Oil prices, in US dollar terms, have stabilised in recent months after picking up to about $45 a barrel in late April from their trough of about $26 in early February. Prices rose above $50 in early June, reflecting supply disruptions in Canada and Nigeria as well as declines in US inventories, but have fallen back more recently, following reports of a recovery of investment in productive capacity in the US. Projections from the EIA suggest more than 20 per cent increase in prices towards the end of 2017. Current expectations for the position of oil prices at the end of this year have increased by about 30 per cent, compared to the expectations formed just three months ago. However, this still leaves oil prices more than $60 lower than their nominal level in mid-2014. Oil prices are expected to be about $46 and $58 a barrel by the end of 2016 and 2017 respectively.
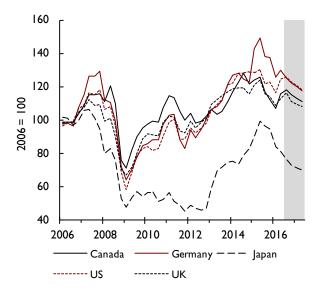
Our equity price assumptions for the US reflect the expected return on capital. Other equity markets are assumed to move in line with the US market, but are adjusted for different exchange rate movements and shifts in country-specific equity risk premia. Figure A6 illustrates the key equity price assumptions underlying our current forecast. Overall, between 2013 and the second half of 2014, global share prices had performed well, irrespective of a short-lived drop – a reaction to the QE tapering signals emanating from the Federal

Figure A5. Oil prices

Source: NiGEM database and NIESR forecast.
Note: *Average of Dubai and Brent spot prices.

Figure A6. Share prices

Source: NiGEM database and NIESR forecast.

Table A3. Government revenue assumptions

	Average income tax rate (per cent)[a]			Effective corporate tax rate (per cent)			Gov't revenue (% of GDP)[b]		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Australia	14.8	14.9	14.9	25.7	25.7	25.7	33.1	33.6	33.6
Austria	32.4	32.7	33.0	21.8	21.8	21.8	43.6	43.0	42.8
Belgium	35.2	35.2	35.0	21.7	21.7	21.7	44.2	44.2	43.4
Canada	20.6	20.7	20.9	20.8	20.8	20.8	36.3	35.8	35.7
Denmark	35.4	31.5	32.1	17.9	17.9	17.9	47.2	47.9	47.5
Finland	33.0	32.7	32.5	23.1	23.1	23.1	47.1	47.1	46.7
France	30.9	30.8	30.8	32.7	32.7	32.7	46.0	45.7	45.8
Germany	29.2	29.5	29.5	19.4	19.4	19.4	41.2	40.5	40.6
Greece	24.2	23.8	23.8	13.5	13.5	13.5	38.7	37.7	37.2
Ireland	26.3	25.3	24.4	9.8	9.8	9.8	21.1	21.6	21.1
Italy	29.2	29.2	29.1	26.5	26.9	26.9	42.9	42.8	42.1
Japan	24.5	24.7	24.7	29.6	29.6	29.6	35.1	35.2	35.0
Netherlands	33.0	33.2	33.2	8.4	8.4	8.4	39.8	39.3	38.9
Portugal	23.2	23.7	23.6	20.1	20.1	20.1	37.7	37.9	37.8
Spain	25.1	24.8	24.7	16.0	16.4	16.4	37.9	37.9	38.0
Sweden	26.1	25.9	25.9	23.1	23.1	23.1	44.8	43.9	44.2
UK	22.2	22.2	22.1	13.3	13.1	12.3	35.5	35.8	35.5
US	19.6	19.5	19.6	29.0	29.0	29.0	30.8	30.8	31.1

Notes: (a) The average income tax rate is calculated as total income tax plus both employee and employer social security contributions as a share of personal income. (b) Revenue shares reflect NiGEM aggregates, which may differ from official government figures.

Table A4. Government spending assumptions[a]

	Gov't spending excluding interest payments (% of GDP)			Gov't interest payments (% of GDP)			Deficit projected to fall below 3% of GDP[b]
	2015	2016	2017	2015	2016	2017	
Australia	33.0	33.2	32.8	1.8	1.7	1.6	–
Austria	42.4	42.7	42.6	2.4	2.1	1.8	–
Belgium	43.9	43.7	43.1	2.9	2.5	2.1	2015
Canada	34.6	34.8	34.9	3.1	3.0	2.8	–
Denmark	47.7	48.6	47.7	1.6	1.4	1.3	–
Finland	48.6	48.2	47.6	1.2	1.1	0.9	2015
France	47.4	47.1	47.1	2.0	1.8	1.5	2017
Germany	38.7	39.2	39.1	1.7	1.1	0.8	–
Greece	42.1	40.8	39.9	3.9	4.0	3.9	–
Ireland	20.7	20.2	20.2	2.6	2.5	2.4	2015
Italy	41.3	41.2	40.7	4.2	4.0	3.4	2015
Japan	38.5	38.9	39.4	2.0	1.7	1.4	–
Netherlands	40.4	40.1	39.7	1.2	1.0	0.8	–
Portugal	37.6	37.3	36.9	4.6	4.2	4.1	2018
Spain	39.9	39.5	38.7	3.1	2.7	2.2	2017
Sweden	44.2	44.3	44.7	0.6	0.5	0.4	–
UK	36.1	35.6	35.2	1.7	1.8	1.7	2018
US	31.6	31.4	31.1	3.5	3.2	3.2	2019

Notes: (a) Expenditure shares reflect NiGEM aggregates, which may differ from official government figures. (b) The deficit in Australia, Austria, Canada, Denmark, Germany, Netherlands and Sweden is not expected to exceed 3 per cent of GDP within our forecast horizon. In Greece and Japan the deficit is not expected to fall below 3 per cent of GDP within our forecast horizon.

Reserve in summer 2013. However, concerns about weak growth and low inflation seem to have induced a fall in share prices in many countries in the second half of 2014, with the scale of the drop varying significantly between economies. Share prices in many countries rose again in the first half of 2015, especially in the Euro Area economies, partly supported by the wide-scale asset purchase programme introduced by the ECB in March 2015. However, between mid-2015 and the first quarter of 2016, the performance of share prices globally has been disappointing. The triggers for equity price declines seem to have been related to turmoil in the Chinese equity market, with in some cases country-specific issues exacerbating the impact. Since the first quarter of 2016 the performance of equity markets has been mixed, rising in North America, the UK (in terms of the FTSE-100), and the major emerging markets, while falling in Japan and the major economies of the Euro Area. Most of the declines in these latter cases occurred before the UK's referendum on EU membership. The movements in equity prices, especially in Japan and the UK, may be attributed partly to exchange rate movements. In the Euro Area in particular, the declines have been especially severe in the financial sector, for a variety of reasons, but perhaps including concerns about the implications for bank profits from even lower interest rates across advanced economies.

Fiscal policy assumptions for 2016 follow announced policies as of 8 July 2016. Average personal sector tax rates and effective corporate tax rate assumptions underlying the projections are reported in table A3, while table A4 lists assumptions for government spending, which is expected to decline as a share of GDP between 2015 and 2016 in the majority of Euro Area countries reported in the table. Pressure continues to mount for a loosening of fiscal policy to support demand. Infrastructure investment, which supports both demand in the near term and potential growth in the longer term is where these calls are particularly focused (IMF, 2016 and OECD, 2016). A policy loosening relative to our current assumptions poses an upside risk to the short-term outlook in Europe. For a discussion of fiscal multipliers and the impact of fiscal policy on the macroeconomy based on NiGEM simulations, see Barrell *et al.* (2012).

NOTES
1   With the exception of Chile, Iceland and Israel.
2   Interest rate assumptions are based on information available for the period to 14 July 2016.
3   For discussions of the short and long-run economic implications of the UK leaving the EU see Baker *et al.* (2016) and Ebell and Warren (2016), respectively.

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