THE WORLD ECONOMY

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World Overview

Recent developments and the baseline forecast

The US election result, recent financial market developments, and our revised forecast

The unexpected election on 8 November of Donald Trump as President of the United States has dominated recent financial market developments. The consequences of the election for US economic policies remain unclear, and our revised projections are based, as usual, on the assumption that currently established policies will be maintained, rather than on any speculative assumption about policy changes. Our projections are therefore subject to the risks implied by the prospect of significant shifts in US policy, as discussed below.

Table 1. Forecast summary *Percentage change*

	Real GDP[a]												World trade[b]
	World	OECD	China	EU–28	Euro Area	USA	Japan	Germany	France	Italy	UK	Canada	
2013	3.3	1.5	7.8	0.3	–0.2	1.7	2.0	0.6	0.6	–1.7	1.9	2.5	3.4
2014	3.4	2.0	7.3	1.6	1.2	2.4	0.2	1.6	0.7	0.2	3.1	2.6	3.9
2015	3.2	2.4	6.9	2.1	1.9	2.6	1.2	1.5	1.2	0.6	2.2	0.9	2.6
2016	3.0	1.7	6.7	1.8	1.7	1.7	1.0	1.8	1.1	0.9	2.0	1.4	2.8
2017	3.1	1.8	6.4	1.6	1.5	2.1	0.7	1.7	1.0	1.0	1.7	1.7	2.4
2018	3.5	2.0	5.9	1.7	1.5	2.2	0.8	1.3	1.2	1.3	1.9	2.2	4.3
2007–2012	3.6	1.0	10.2	0.4	0.3	0.8	0.1	1.2	0.6	–1.0	0.4	1.3	3.9
2019–2023	3.4	1.8	5.5	1.4	1.2	2.2	0.3	0.8	1.2	1.4	1.9	1.5	3.7

	Private consumption deflator									Interest rates[c]			Oil ($ per barrel) [d]
	OECD	Euro Area	USA	Japan	Germany	France	Italy	UK	Canada	USA	Japan	Euro Area	
2013	1.5	1.1	1.3	–0.2	1.1	0.7	1.2	2.3	1.4	0.3	0.1	0.6	107.1
2014	1.6	0.5	1.5	2.1	0.9	0.1	0.2	1.7	1.9	0.3	0.1	0.2	97.8
2015	0.7	0.1	0.4	0.4	0.6	–0.2	0.0	0.3	1.1	0.3	0.1	0.1	51.8
2016	1.1	0.3	1.1	–0.4	0.7	0.0	0.1	1.0	1.0	0.5	–0.1	0.0	42.6
2017	2.0	1.4	1.7	0.5	1.4	1.0	1.9	3.2	1.8	0.9	0.0	0.0	53.5
2018	2.0	1.3	1.8	0.8	1.2	1.0	1.8	3.0	1.4	1.7	0.1	0.0	56.2
2007–2012	1.9	1.7	1.9	–0.8	1.4	1.3	2.0	2.4	1.3	1.4	0.2	2.0	87.6
2019–2023	2.1	1.5	2.1	0.9	1.5	1.4	1.8	2.1	1.7	3.0	0.3	1.1	61.6

Notes: Forecast produced using the NiGEM model. (a) GDP growth at market prices. Regional aggregates are based on PPP shares, 2011 reference year. (b) Trade in goods and services. (c) Central bank intervention rate, period average. (d) Average of Dubai and Brent spot prices.

*All questions and comments related to the forecast and its underlying assumptions should be addressed to Simon Kirby (s.kirby@niesr.ac.uk). We would like to thank Jagjit Chadha for helpful comments and Matteo Ramina for compiling the database underlying the forecast. The forecast was completed on 26 January, 2017. Exchange rate, interest rates and equity price assumptions are based on information available to 12 January 2017. Unless otherwise specified, the source of all data reported in tables and figures is the NiGEM database and NIESR forecast baseline.

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Our revised forecast of global economic growth is only slightly different from that described in last November's *Review*. Our estimate of world GDP growth in 2016 is unchanged, at 3.0 per cent, the slowest annual expansion since the 2009 recession. Global growth in 2017 and 2018 has been revised down marginally, to 3.1 and 3.5 per cent, respectively, owing to downward revisions for some emerging market economies, including Brazil, India (in 2017) and Russia. Among the advanced economies upward revisions for the UK, in 2017, and Japan, in 2017–18, are offset by small downward revisions for Canada, in 2017, and the Euro Area and the UK, in 2018.

In financial markets, the US election result had immediate and sustained effects. Global bond yields have risen significantly since late October, led by US instruments; the US dollar has appreciated against most other major currencies that have not benefited from the recent upturn in oil prices; and equity markets have risen in the US and most other countries.

With regard to the interpretation of these movements, they may in part reflect recent positive economic data for some countries, but they seem more to signify expectations of a near-term shift in the policy mix in the US, with more expansionary fiscal policy, including tax cuts that will raise after-tax returns on capital, together with deregulation, being viewed as likely to lead to faster economic growth, increased inflationary pressure, and steeper increases in official interest rates by the Federal Reserve (Fed). Markets appear to have focused less on the possible negative implications for growth of other policies proposed by the President, including in the areas of trade and immigration. The specific policies to be implemented by the new US administration are likely to become clearer in the next few months.

Recent economic developments

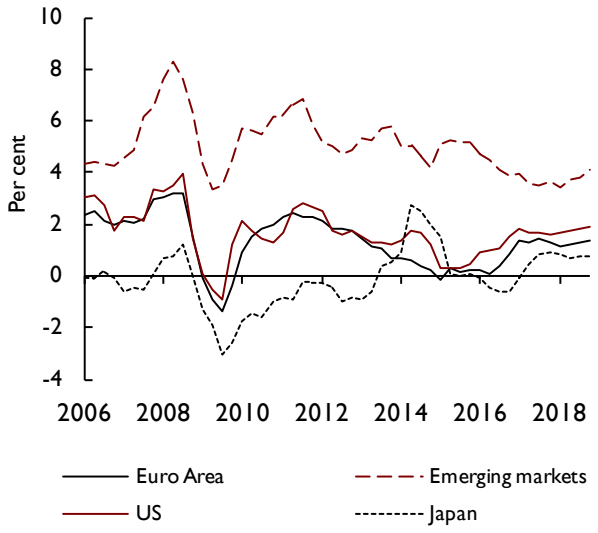
With regard to recent economic data, a number of developments point towards a slight strengthening of growth in some economies in late 2016 and early 2017. These include a pick-up in US GDP growth in the third quarter; three successive quarters of positive growth in Japan last year – the first such run of positive growth in Japan since 2013; continuing moderate growth in the Euro Area; indications of stronger expansion in China in recent months; and further signs of a bottoming out of Russia's recession. There has also been a notable upturn in global commodity prices, particularly prices of oil and metals, in recent months. On the other hand, Brazil's economic downturn has worsened and growth in India has been hit by a poorly implemented demonetisation of currency notes.

Among the advanced economies, unemployment remains high in much of the Euro Area, including France (9.5 per cent in November), Italy (11.9 per cent), Spain (19.2 per cent), and Greece (23.1 per cent). By contrast, unemployment is low in Germany (4.1 per cent) and Japan (3.1 per cent). In the US, unemployment in December was 4.7 per cent, which is the lower end of the Federal Reserve's current range estimate (4.7–5.0 per cent) of the longer-run unemployment rate.

In the US, wage increases have remained moderate but have picked up to 2.5–3.0 per cent, on a 12-month basis, since mid-2016, from about 2.0 per cent in the period between late 2009 and mid-2015. In the year to December 2016, average hourly earnings rose by 2.9 per cent, the largest 12-month rise since mid-2009. In the other countries with low unemployment, upward pressures on wages have remained limited, leaving questions about the true degree of labour market slack.

Consumer price inflation has remained below central banks' targets in all the advanced economies, markedly so in the Euro Area and Japan. All-items inflation rates have recently risen closer to core rates (in some cases above them) mainly reflecting the stabilisation and partial recovery of energy prices following the declines of 2014–15. However, there has generally been little sign of any significant rise in core inflation, which has recently

Figure 1. Selected economies – inflation



Source: NiGEM database and NIESR forecast.
Note: Emerging markets – weighted average of Brazil, China, India, Indonesia, Mexico, Russia and Turkey. Euro Area, US, Japan – consumer expenditure deflator; emerging markets – consumer price index.

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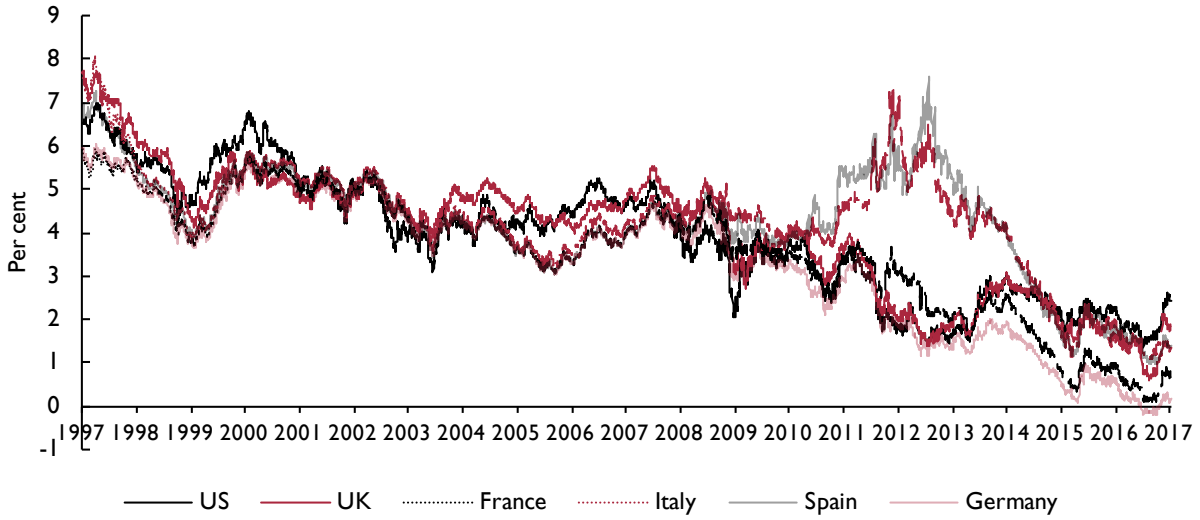
Box A. Rising government bond yields

While not inconsistent with an overall downward trend in the past 2–3 decades, government bond yields in advanced economies started to rise in the latter half of 2016, as figure A1 illustrates. Why has this occurred? Will the increases be sustained? Historically, government bond yields in advanced economies appear to have co-moved extremely strongly. However, recent changes in monetary policy have been less synchronised across advanced economies such as the US, UK and the Euro Area. In light of this, how might government bond yields in advanced countries co-move in the coming years? What can historical evidence suggest?

Figure A1. Nominal yields on 10-year government bonds



Source: Thomson Reuters Datastream.

Why are bond yields rising?

Recent NIESR estimates indicate that rising bond yields can be attributed to a combination of increased expectations of future short-term interest rates, and a rise in the term premium (see figure A2) – the compensation investors' demand for risk over-and-above interest rate expectations.[1] Lloyd (2016) also provides a US-specific case study, using the recent Presidential Election to illustrate the same conclusion.

Theoretically, increases in interest rate expectations should be associated with, *inter alia*, the level of inflation expectations, which influence expectations about the future stance of monetary policy. In contrast, uncertainty about, *inter alia*, future inflation should be reflected in term premia. Both appear particularly pertinent in the current climate, and the evidence supports this.

Figure A3 plots 10-year break-even inflation rates – i.e. the difference between 10-year nominal government bond yields and inflation-linked bond yields of the same maturity – which provide a measure of average expected inflation over the 10-year horizon. It indicates that inflation expectations increased in the latter half of 2016, warranting recent increases in interest rate expectations and thus bond yields. Moreover, the lengthy horizon over which these inflation expectations has risen indicates that increases in bond yields are likely to be sustained.

What do recent trends imply for monetary policy?

Although inflation expectations and uncertainty about future inflation are heightened in the UK, US and Euro Area, recent movements in monetary policy stances have been less synchronised. Although the Federal Reserve has begun to raise interest rates from their effective lower bound, the Bank of England's most recent interest rate change, in August 2016, went in the opposite direction, while ECB policy rates have been unchanged since March 2016. Monetary policymakers face a competing challenge: inflation expectations are universally on the rise, while, in each jurisdiction, policymakers face idiosyncratic challenges. The fact that inflation expectations are climbing in all three jurisdictions indicates that either monetary policy in advanced economies is likely to become more synchronised – meaning policymakers become less concerned for idiosyncratic challenges in their jurisdiction – or asynchronous monetary policy will be met with asynchronous inflation, raising questions about the scope for international monetary policy coordination and whether changes in relative long-term interest rates provide an outlet to alleviate these competing challenges.

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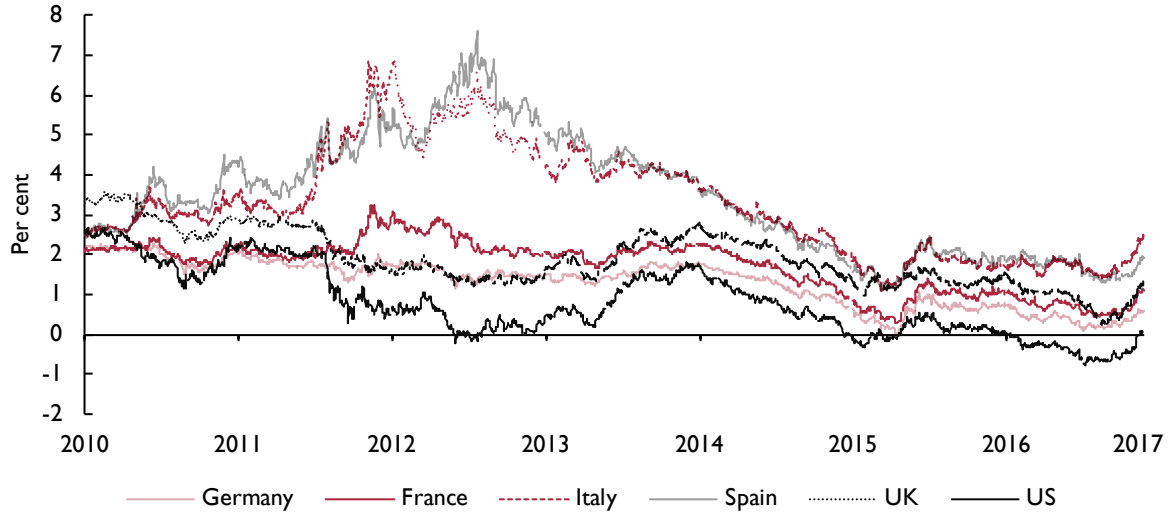
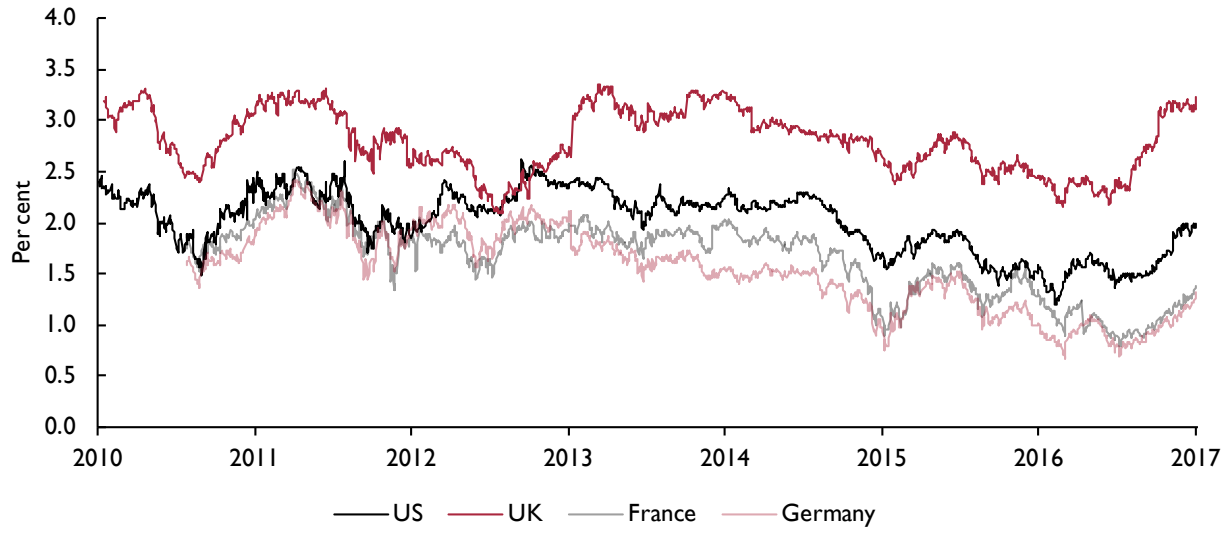
Box A. (continued)

Figure A2. Term premia on 10-year government bond yields



Source: Thomson Reuters Datastream and author's calculations.

Figure A3. Break-even inflation, 10-year horizon



Source: Thomson Reuters Datastream and author's calculations.

NOTE

1 See: http://www.niesr.ac.uk/niesr%E2%80%99s-sovereign-bond-premia-estimates.

REFERENCE

Lloyd, S.P. (2016), 'The US election and its global impact', *NIESR Yield Curve Update*, No. 4.

This box was prepared by Rebecca Piggott.

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been stable at about 0.9 per cent annually in the Euro Area, 0.1 per cent in Japan and 1.6 per cent in the US. In the major emerging market economies, inflation has declined further towards central bank targets in Brazil and Russia, reflecting the recessions in these economies, while in China it has risen towards the official target in the wake of the strengthening of commodity prices.

Monetary policy

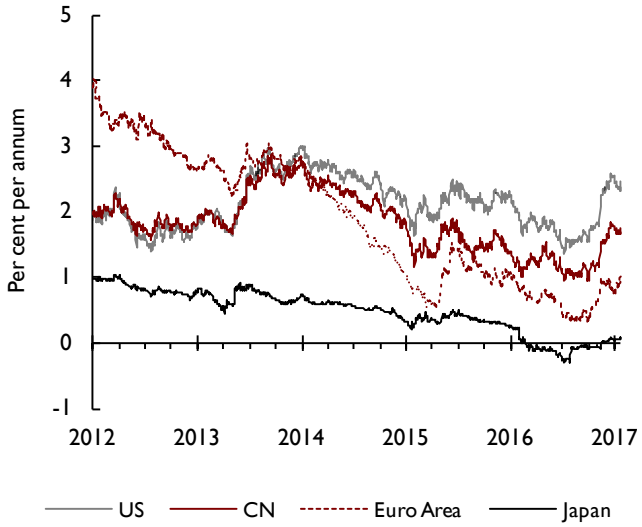
With regard to monetary policy, the Fed, as expected, raised its target range for the federal funds rate by 25 basis points to 0.5–0.75 per cent on 14 December – the second increase from the low of 0.0–0.25 per cent that applied for the seven years up to December 2015. The Fed also increased its median projection of the end-2017 federal funds rate by 25 basis points from its projection last September. By contrast, the ECB, at its December meeting, extended the duration of its asset purchase programme from March to December 2017, with monthly purchases after March reverting to €60 billion from the €80 billion level to which it was raised last April. In Brazil, with inflation falling back into its target range, the Central Bank lowered its benchmark interest rate in two further steps, in late November and mid-January, by 100 basis points in total, to 13.0 per cent. Also since late October, central banks have reduced benchmark interest rates further in Argentina, Iceland and New Zealand, but have raised them in Mexico and Turkey in response to currency pressures.

Financial and foreign exchange markets

Financial market developments since late October have been dominated by reactions to the unexpected result of the US presidential election on 8 November. Longer-term interest rates, which had already risen significantly from lows reached last July that were unprecedented in some cases, have increased markedly further in most countries since late October. Ten-year sovereign yields have risen in this period by about 60 basis points in the US (almost half of this having occurred in the two days following the election): 55 basis points in Canada, 25 basis points in Germany, 30–50 basis points in the other major countries of the Euro Area, 10 basis points in Japan (where the central bank, since last September, has been maintaining a flexible cap on the 10-year yield, under its policy of "yield curve control"), and 50 basis points in China. In other major emerging markets, government bond yields have declined since late October, by about 20 basis points in Russia and 40 basis points in Brazil and India, partly reflecting declining inflation and downward trends in official rates.

The shift in relative yields in favour of US dollar-denominated assets has contributed to a further

Figure 2. Selected economies: 10-year government bond yields



Source: Datastream.

appreciation of the US currency since late October, by about 3½ per cent in trade-weighted terms. The dollar's recent appreciation has been particularly marked against the yen (about 11 per cent), partly reflecting the Bank of Japan's cap on longer-term interest rates, but smaller against most other major currencies – about 2 per cent against the euro, the renminbi, the Brazilian real and the Indian rupee. The US dollar's value has been flat in the past three months in terms of sterling and the Canadian dollar. Partly reflecting the recent upturn in global oil prices, the US dollar's value in terms of the Russian rouble has meanwhile declined by about 6 per cent. In late January 2017, the US dollar's trade-weighted value was close to the peaks of a year earlier and to its highest levels in fourteen years.

Downward pressure on the renminbi has continued to be absorbed partly by drawdowns of China's international reserves, which fell to $3.01 trillion at the end of December, 2016, 25 per cent below their mid-2014 peak and their lowest level since March 2011. In October, China ceded back to Japan its position as the largest holder of US Treasury securities, a position it had held since 2008.

Commodity markets

Global oil prices have risen by about 7 per cent in US dollar terms since late October, to about $55 a barrel, which is more than twice the low of $26 reached last February but still about half the level of prices that prevailed in 2011–13. The recent rise in prices seems due mainly to agreements

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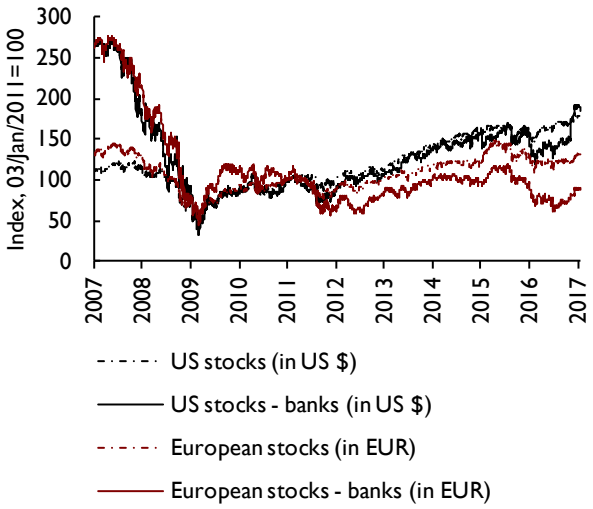
Figure 3. Stock prices in the US and Europe



Source: Datastream.
Note: US stocks refer to S&P 500, US stocks-banks refer to S&P 500 banks; European stocks refer to STOXX Europe 600, European stocks-banks refer to STOXX Europe 600 OPTIMISED Banks.

reached first, in late November, by OPEC producers to reduce output by 1.2 million barrels a day (about 3.5 per cent) for six months from January 2017, and second, in early December, by a group of ten non-OPEC countries, including Russia and Mexico, to reduce output in parallel with OPEC producers by about 0.6 mbd.

There has also been a significant upturn in other global commodity prices, particularly metal prices, in recent months. Thus in late January, the *Economist* all-items index in US dollar terms was 11 per cent higher than a low reached in mid-September, and the corresponding index for metals was 18 per cent higher. These increases have occurred despite the appreciation of the US dollar.

Equity markets

Equity markets have risen in all the major advanced economies since late October, although prices leveled off in January (figure 3). Increases in stock prices have been particularly marked for banks, apparently reflecting a widening of interest margins associated with the recent steepening of yield curves and, particularly in the US, expectations of an easing of banking regulations.

Risks to the forecast and implications for policy

Our baseline forecast again shows a gradual strengthening of global economic growth, after the slowdown of 2016, towards rates in the medium term that would still be below the rates of expansion experienced before the financial crisis. Thus average annual global GDP growth in 2019–23 is projected at 3.4 per cent, compared with 4.2 per cent in the decade that ended in 2007.

As usual, there are risks on either side of this forecast.

Diminished risks: deflation and squeezed bank profits

Recent developments indicate that some risks discussed in recent issues of this *Review* have diminished. The risk of deflation, which was still a significant concern early last year, has generally receded: the collapse of global energy prices that occurred in 2014–15 has had only limited effects on underlying domestic inflation rates, thanks partly to supportive monetary policies, and negative inflation rates, in terms of producer or consumer prices, have become rare. Nevertheless, inflation remains below central banks' targets in all advanced economies, and the need for continuing accommodative monetary policies remains.

Another set of risks, arising from the consequences for bank profitability of extraordinarily low interest rates, was discussed in the November 2016 *Review* (F14). These risks have also declined with the recent increases in market interest rates and steepening of yield curves, as indicated in the recent marked upturn in the stock market prices of banks, although this may also reflect expectations of tax cuts and an easing of regulations by the new US administration.

Euro Area imbalances

However, a number of other familiar risks remain. These include the continuing economic and financial imbalances in the Euro Area and the fragility of banking systems in a number of its member countries, most prominently Italy. The financial imbalances in the Area continue to be represented importantly by Germany's extraordinary external current account surplus, which reached 9.1 per cent of GDP in 2016 and which we expect to remain above 7 per cent in 2018. They have also contributed to the fact that the ECB's Target2 balances have recently risen to levels close to the peaks of mid-2012, before the Euro Area crisis subsided and the balances narrowed over the following two years. The Area's imbalances – which also include persistently high unemployment in many cases – continue to pose political as well as economic risks. While the high-unemployment countries have limited room for manoeuvre because of constrained fiscal space, there is little sign of policy action in surplus countries like Germany that could help both to address the imbalances and promote faster growth in the Area.

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One favourable development has been that price and wage inflation in Germany have recently been above Euro Area averages. This should help reduce imbalances by improving the competitiveness of other member countries. Consumer price inflation in Germany, 1.7 per cent in the year to December (compared with 1.1 per cent in the Area as a whole) is still below the ECB's medium-term inflation objective for the Area. If inflation in Germany rises above 2 per cent this will not, in itself, of course, give cause for the ECB to tighten. In fact, inflation "below, but close to, 2 per cent" in the Area as a whole, with inflation above 2 per cent in Germany and other surplus countries, and below 2 per cent in deficit countries, is the only configuration of inflation rates that would both be consistent with the ECB's objective and conducive to rebalancing in the Area.

Early progress in addressing the Area's institutional shortcomings also seems highly unlikely in the current political environment, with key elections due this year in the Netherlands (in March), France (in April and May), and Germany (probably in September), and also possibly in Italy. It seems clear, in particular, that Stage 1 of the plan to complete the economic and monetary union that was put forward in June 2015 by the Five Presidents (see August 2015 *Review*, Box A) will not be completed as proposed by June this year.

China's corporate debt

The high level of corporate debt in China also continues to pose significant risks, which have been discussed in recent issues of this *Review*. It is discussed again in the section below on China.

US economic policies

The most striking risks currently, however, are the new risks – upside and downside – arising from the promise of significant policy changes to be introduced by the new US administration. These remain to be specified, and in many cases implementation will require passage of legislation by the US Congress, which may take some time. The new President has, however, made his general intentions clear in key areas.[1] First, with regard to fiscal policy, he has set out a "pro-growth tax plan", together with plans for increased infrastructure spending and a steady reduction of non-defence, non-safety-net spending. The tax plan includes significant reductions in corporate and personal income tax rates, various reforms of these tax systems, and the elimination of estate tax. Second, he plans a significant scaling back of regulations, including Dodd-Frank banking regulations and environmental regulations. Third, he will implement an "America-First Trade Policy", including by abandoning the Trans-Pacific Partnership, re-negotiating or cancelling the North America Free Trade Agreement (NAFTA), labelling China a currency manipulator, and taking action, including tariffs, to counter and remedy what the US government views as currency manipulation, unfair subsidies and other unfair trading behaviour by other countries.

The effects of these policies will depend on their specifics. The fiscal plans seem to imply a widening of the budget deficit, with an associated boost to aggregate demand that will be smaller the more regressive are the changes in taxes and spending. There are indications that the increase in infrastructure spending may rely on large-scale tax incentives for investment by the private sector more than on spending from the public purse.[2] This again may limit the boost to aggregate demand as well as the social benefits of the kind of projects undertaken, if they have to be projects to which user charges (such as tolls) can be applied. (The implications of the changes in fiscal policy, based on very simple assumptions and the National Institute Global Economic Model (NIGEM), are discussed in Box B.)

The fiscal plans thus suggest risks on both the upside and the downside of our growth forecast. On the upside, there may be a significant and beneficial boost to US demand growth in the short term, and also longer-term supply-side benefits if potential output is raised by productive infrastructure investment or improved tax incentives. The fiscal boost could also advance the normalisation of monetary policy and allow official interest rates to be raised to levels where their use as a counter-cyclical tool in the event of a recession again became feasible, thus addressing a major recent worry.[3] Even this upside scenario, however, carries concerns. It would be likely to involve a significant further appreciation of the US dollar and widening of the external current account deficit, which would conflict with the new administration's objectives of improving the US trade position and boosting manufacturing production and employment. It could therefore intensify protectionist pressures (see below). Furthermore, while there is still uncertainty about the degree of slack remaining in the economy, recent indicators, especially the upturn in wage increases, suggest that some capacity constraints are beginning to bite. In these circumstances, a fiscal boost might not only crowd out private domestic demand and net exports through increases in interest rates and currency appreciation, but also give rise to inflationary pressure and increased inflation, especially if the new administration acts to limit the Fed's independence. Indeed, in December, Fed Chair Yellen observed that

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"at this point…fiscal policy is not obviously needed to provide stimulus to help us get back to full employment".

To the downside of our growth forecast, the envisaged changes in fiscal policy could risk a widening of the budget deficit with relatively little benefit to aggregate demand if, for example, the changes are dominated by tax reductions for the wealthy and tax credits for private investors. In any event, because of legislative and other delays, any fiscal boost could take time and not materialise fully until 2018. In the meantime, demand may be constrained by the increases in interest rates and dollar appreciation that occur in anticipation of the fiscal boost, including the market movements that have already occurred. The pace of the Fed's tightening may then need to be moderated to take account of the fact that financial markets have done some of any needed tightening for it.

Turning to President Trump's "America-First Trade Policy", the risks to global growth are clearly on the downside. Protectionist or defensive trade policies damage economic efficiency and productivity growth by weakening competitive forces, raise domestic costs and prices, reduce real incomes, and risk a downward international spiral of economic activity through successive retaliatory measures.

President Trump has threatened to impose taxes on imports, particularly from China and Mexico and certain US companies producing abroad for export to the US. An alternative, but related, approach that has emerged from Congress would be the introduction of a border tax adjustment to corporate income tax.[4] This would exempt export sales revenue from taxable corporate income and disallow the deduction of the costs of imported inputs. Such policies of taxing imports and subsidising exports seem to be intended essentially to reduce the current account deficit and thus boost US economic growth. But achievement of this objective would be likely to be frustrated by the real appreciation of the US dollar that the trade policies would tend to cause. Since a country's current account deficit is, by definition, the difference between its domestic saving and investment, a tariff or border tax adjustment will reduce the deficit only to the extent that it increases domestic saving (by reducing the fiscal deficit or increasing private sector saving) or reduces domestic investment. If, then, the achievement of the objective is frustrated – perhaps as the current account deficit widens partly on account of tax cuts and a growing fiscal deficit – additional, misconceived protectionist measures by the US could follow, exacerbating the situation.

There would also be a significant risk of international retaliation amounting even to a "trade war". For example, President Trump has made much of allegedly unfair currency and trading practices by China, and promised to label the country a currency manipulator. This charge was not difficult to make in the first decade of this century, when the country had a large current account surplus and was engaging in sustained, one-way intervention in the foreign exchange market, accumulating an unprecedented volume of international reserves. But since mid-2014, China has been engaged in one-way intervention in the other direction, depleting its reserves by one-quarter and thus slowing the pace of the renminbi's depreciation, while its current account surplus has narrowed significantly from a decade ago. The charge of manipulation – which was never formally made by the US or the international community when it would have had a substantive basis – thus now seems much more difficult to make. (Presumably it would have to be based somehow on the fact that China's stock of reserves remains unusually large or on an argument that China's capital outflows have a significant official component.) Such a charge therefore seems unlikely to gain international support or to be accepted by the Chinese without counter-action. Other protectionist or defensive US policies are similarly liable to lead to retaliation.

Finally, it is notable that both President Trump's fiscal policies and his trade policies seem likely to lead to further appreciation of the US dollar, which is already close to its highest level in fourteen years in trade-weighted terms. This carries the danger of increasing the fragility of dollar-denominated debtors, including in many emerging market economies.

Appreciation of the US dollar also tends to weaken the net foreign-asset position of the United States, because most (about 70 per cent) of its foreign assets are denominated in foreign currencies while most (about 85 per cent) of its foreign liabilities are denominated in dollars.[5]

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Box B. The macroeconomic implications of possible changes in US fiscal policy

There is uncertainty about the policies to be pursued by the United States' new President, Donald Trump. However, reactions in financial markets to his largely unexpected election victory reflect expectations that economic policies will evolve broadly in the directions he has indicated. Specifically, prospects of more expansionary fiscal policy and business deregulation appear to have contributed to significant increases in longer-term interest rates, appreciation of the US dollar against most other major currencies and rises in equity prices in the United States and other advanced economies.

In this box we focus only on the implications of an expansionary shift in US fiscal policy, based on simple assumptions about the policy shift, and do not take into account any other potential policy changes. We use the National Institute's Global Econometric Model (NiGEM) to run stylised scenarios that illustrate the possible effects of tax-reducing measures, coupled with an increase in government investment, on macroeconomic variables in the US and the world in general. The magnitudes of the shocks are as follows:

- The reductions in personal income taxes and the corporate tax rate are calibrated to match broadly the fall in receipts estimated in the analysis of Trump's tax plans by Nunns *et al.* (2016). Shocks to both corporate tax rates and personal income taxes are applied from the beginning of 2017 and are assumed to be exogenous and permanent. The corporate tax rate is reduced by 13.5 percentage points (relative to baseline) (i.e. from 29 to 15.5 per cent) which leads to reductions in corporate tax intake of about 0.8 and 1.3 per cent of 2016 nominal GDP in 2017 and 2018 respectively. Personal income tax revenue is reduced by about 6 per cent (equivalent to around 1 per cent of 2016 nominal GDP) in the short term.

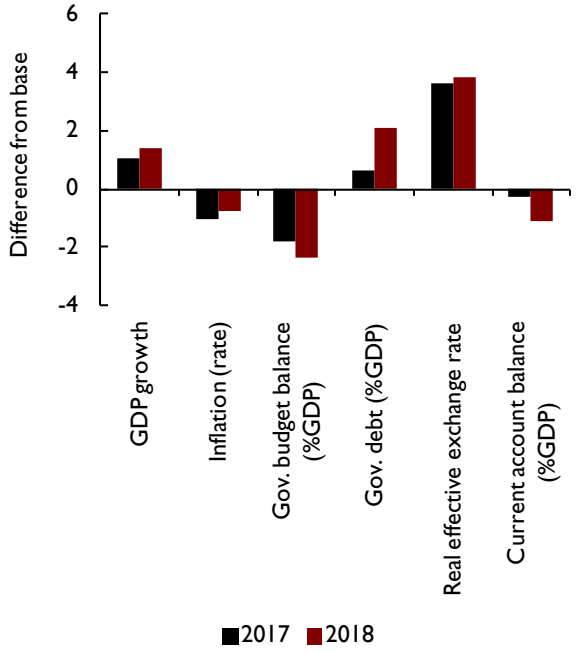
- Starting from the second half of 2017, government investment is assumed to increase by 0.1 per cent of GDP (compared to baseline projections) each year for the next five years. The increase is assumed to be small as the indications are that the administration will aim to achieve an increase in infrastructure investment mainly through tax incentives for private investment, rather than through public spending.

In the simulations, financial markets are assumed to be forward looking and the Federal Reserve is assumed to react to deviations from inflation and nominal GDP growth targets. An income tax rule, which ensures that in the long run the budget deficit (as a per cent of GDP) returns to a target level is overwritten by exogenous changes imposed on household income tax rates. This leads to the possibility of a persistent increase in the budget deficit.

Figure B1 illustrates the impact on US variables: GDP growth, the inflation rate, the government budget balance (as % of GDP), the real effective exchange rate, the government debt-to-GDP ratio (%) and the current account balance (as % of GDP) from the combined shock.

The reduction in taxes and increase in government investment stimulate aggregate demand. GDP growth rises in the short run and then returns to baseline, i.e. a permanent fiscal expansion has a temporary impact on GDP growth. The US dollar appreciates, which puts downward pressure on import prices and initially lowers inflation. With time, however, inflation rises, as the exchange rate impact on imported prices diminishes (see Kirby and Meaning, 2014, for a discussion on exchange rate pass-through in NiGEM) and stronger domestic demand conditions dominate. Even though the initial drop in inflation allows the Federal Reserve to conduct more accommodative monetary policy in the first two years, increasing price pressures later on leads to interest rate rises counteracting some of the positive impact of the fiscal stimulus.

Figure B1. Short-run impact on macroeconomic variables in the US



Source: NiGEM simulations.

Note: GDP growth, inflation rate, budget balance (%GDP), current account balance (%GDP) and debt (%GDP) are reported as percentage point differences from base and the real effective exchange rate as per cent difference from base.

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Box B. (continued)

The external current account balance (as % of GDP) deteriorates (by about 1 percentage point by the second year) owing to the appreciation of the currency and the rise in domestic demand. The reduction in tax revenues leads to an increase in the budget deficit as a ratio to GDP (by about 2–2¼ percentage points in the first two years) and hence the national debt to GDP ratio compared to the baseline (by around ½–2 percentage points). This suggests either that the US Congress will need to raise the federal debt limit to avoid defaults on the government's obligations, or that offsetting measures, such as spending cuts, will be needed to keep debt below the ceiling.

Reflecting the share of the US economy in world output, world GDP increases in the short-term (by about 0.1 percentage points in the first two years and then returns to baseline) following the expansionary US policy. Meanwhile, price levels respond more slowly (increasing by 0.3 and 0.7 per cent in the first and the second year respectively), due to varying price and labour rigidities across the countries.

Our results are, of course, based on particular assumptions, including those embedded in NiGEM. For example, keeping monetary policy fixed for the first five years would add about 0.2 percentage point to output growth in the first two years. This additional positive impact on GDP growth is due mainly to lower long-term interest rates, which stimulate investment.

Imposing restrictions on the budget deficit increase in the future may dampen the positive impact of fiscal stimulus, as the anticipation of future tax increases or a reduction in government spending will be expected to alter households' consumption decisions in the short term. There is also no provision for any deadweight loss from the change to capital taxes, in their effect on investment plan and given that NiGEM is a representative agent model, there are no distributional effects of the fiscal policies.

The assumption about forward-looking financial markets in NiGEM also affects the result of the simulation output. The forward-looking behaviour assumed in the analysis causes exchange rates to jump immediately when changes (for example, in interest rates) occur. If the analysis instead assumed backward-looking behaviour, there could be only a modest initial real appreciation of the dollar. In this case, output growth would be boosted by more as there is less of a drag from net trade. Also stronger demand coupled with less downward pressure on import prices would cause domestic inflation to increase (relative to baseline) in the first two years by 0.2 and 1.5 percentage points, respectively.

Our analysis does not take account of changes in the labour force, as labour supply in NiGEM is exogenous. A separate set of assumptions would be required to model changes either in the population or labour force participation. We do not model any productivity-enhancing effects of increases in infrastructure either, beyond the effect of an increase in the capital–labour ratio.

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