Kristóf Lehmann: International experiences with unconventional central bank instruments*, [1]

This article provides an overview of international experiences with the use of unconventional central bank instruments. The application of unconventional instruments may be justified by the existence of financial market friction, turmoil, failure or constraint, when instruments that change the size and/or composition of central bank balance sheets may be more efficient in achieving monetary policy objectives than traditional interest rate policy.

INTRODUCTION

Similarly to the original objective of central banks, the ultimate goal of the unconventional monetary policy instruments applied during the financial crisis is to achieve or maintain price stability (in several cases the avoidance of deflation) as well as to prevent the collapse of the financial intermediary system and in doing so to reduce the extent of economic contraction. Accordingly, unconventional instruments can be interpreted as ones that support the main objectives of monetary policy. Their application may be justified by the existence of financial market friction, turmoil, failure or constraint, when instruments that change the size and/or composition of central bank balance sheets may be more effective than traditional monetary or fiscal instruments.

Two situations can be distinguished when the application of these instruments may be justified. Firstly, during the crisis some of the developed countries reduced their respective policy rates close to zero ('zero lower bound'); therefore, further monetary easing was only possible with alternative means. In this case, unconventional instruments practically **replace, substitute** conventional instruments that lose their efficiency.

Secondly, unconventional instruments attempt to ease the strains of a financial market that plays an important role in monetary transmission; these strains are reflected in low liquidity and unjustified spreads. In this case, unconventional instruments **complement** monetary policy by restoring the transmission; accordingly, their application may be justified even when the interest rate is higher than zero.

TYPES OF UNCONVENTIONAL INSTRUMENTS

According to their purposes and effects on yields, unconventional instruments can be classified into two groups (Chart 1).

The objective of one of the groups of instruments is the **reduction** or flattening **of the risk free yield curve.** This group includes central bank liquidity providing measures in which the central bank extends fixed-rate collateralised loans to the participants of the financial sector. Through interest rate expectations the purpose of flattening the yield curve is also served by the commitment of the central bank to maintain a lower policy rate for a longer period of time, i.e. the reduction of interest rate increase expectations.[2] In addition to the expected interest, the long-term risk free yield may contain a term premium, which can be reduced by the purchase of long-term government bonds. The longer end of the yield curve was intended to be influenced expressly by the central banks of those countries for which only the reduction of the long-term yields could mean any significant monetary impulse due to the close-to-zero short-term interest rate level (e.g. the Bank of England, the Bank of Japan and the Fed[3]).

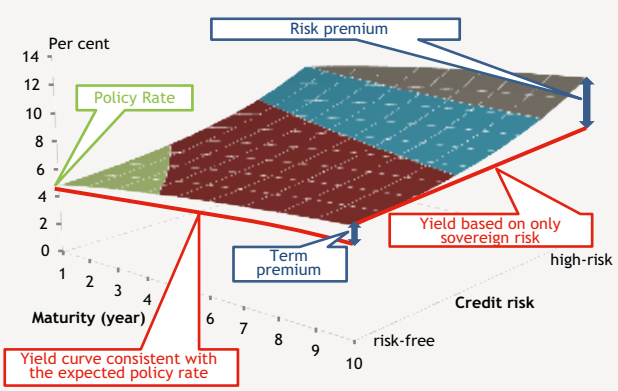
* The views expressed in this article are those of the author(s) and do not necessarily reflect the offical view ot the Magyar Nemzeti Bank.

[1] Krekó J., Balogh Cs., Lehmann K., Mátrai R., Pulai Gy. and Vonnák B. (2012), 'Nemkonvencionális jegybanki eszközök alkalmazásának nemzetközi tapasztalatai és hazai lehetőségei', [International experiences and domestic opportunities of applying unconventional central bank instruments], *MNB-tanulmányok,* 100.

[2] For example the Fed, the English, the Japanese, the Canadian and the Swedish central banks promised to maintain an extremely low interest rate level for a protracted period of time.

[3] Instead of their full names, the most often mentioned developed market central banks are referred to by their accepted abbreviations: Fed (Federal Reserve System or Federal Reserve Bank of New York, the central bank of the USA), ECB (Eurosystem or European Central Bank).

Chart 1
Stylised chart of the maturity and risk structure of interest rate transmission



The objective of the other group of measures is **the reduction of a credit risk premium** (risk premium) appearing in the credit market. This group comprises corporate bond purchases that reduce corporate credit risk, liquidity providing measures with an intention to reduce interbank market yields which increased sharply due to lack of confidence and also the purchasing of government bonds, if its objective is the reduction of a higher-than-justified sovereign risk premium (e.g. in the case of the ECB).

According to the method of intervention, the instruments applied can be classified into three groups.

Facilities providing liquidity to banks and **refinancing** transactions may primarily be effective in the easing of liquidity tensions, the improving of lending capacity and the reduction of the cost of funds, in cases when banks are struggling with difficulties in obtaining funds, when the funding costs of banks are too high compared to the policy rate of the central bank or too many assets have become illiquid in banks' balance sheets. However, this set of instruments is ineffective when bank lending is mainly limited by poor capital positions, or when credit supply becomes narrower for other reasons, such as a longer-term intention of deleveraging or a significant increase in banks' risk aversion. At the time of the market panic following the bankruptcy of the Lehman Brothers, when the interbank markets dried up, many developed and emerging market central banks applied instruments that ease liquidity tensions. The most frequently applied instruments of this group are the easing of regulations concerning eligible collateral, modification of reserve rules, credit facilities granted in domestic currency or foreign exchange and longer-term collateralised credit facilities. Bank liquidity providing measures are less risky[4] for the central bank, and at the same time they are effective measures in the case of the most limited problem, i.e. shortage of liquidity. The general risks are: moral hazard,[5] squeezing out of the market and uncertain closing of the intervention (exit strategy).

In the case of **direct credit market interventions** (corporate bond and mortgage-backed securities purchases, direct lending), the central bank establishes direct contact with the private sector, takes over the latter's credit risk, and thus is able to have a direct effect on the risk premium. Direct interventions may be more effective than indirect ones if non-bank instruments (e.g. corporate bonds) play an important role in the funding of the private sector or if the structural problems of the financial intermediary system that cannot be eased by monetary policy instruments justify the bypassing of the banking system. Direct credit market interventions expose the central bank to major risks. Firstly, the credit risk that becomes included in the balance sheet of the central bank may result in a loss for the central bank, and thus, ultimately, in a fiscal cost. This additional risk may justify a preliminary agreement on sharing the loss between the government and the central bank – in order to preserve central bank credibility.

Table 1
Proportion of loans to the private sector and market capitalisation as a percentage of GDP

	Domestic credit provided by the banking sector (per cent of GDP)	Market capitalization (per cent of GDP)
	2008	2008
Austria	130.7	17.4
Germany	126.3	30.5
Hungary	80.3	12.0
Australia	143.7	65.0
United Kingdom	211.7	69.7
Canada	178.1	66.9
USA	220.8	82.1
Japan	299.6	66.0
Korea	109.4	53.1
Israel	90.1	66.5

Source: World Bank.

[4] Usually, the instruments that belong here mean collateralised loans; therefore, they result in losses for the central bank if the partner also goes bankrupt, and the collateral also loses its value.

[5] The essence of moral hazard is that market participants expect a sharing of losses and external help; therefore, their decisions are less cautious or risk avoiding.

Secondly, the interventions may result in unintended sectoral distortion or distortion according to company size, and thus in an inefficient allocation of funds. This group of instruments was practically applied only by the central banks of some developed countries. Firstly, this is explained by the fact that only few countries have a developed securities market (Table 1), through which the lending conditions of the private sector can be influenced efficiently and effectively. Secondly, due to the credit risk taken and possible fiscal costs borne by the central bank, these instruments are typically used by highly credible central banks.

Finally, the third group of instruments contains large-scale government bond purchases. Typically, highly creditworthy central banks that have reached the zero lower bound used **government bond purchase** programmes to stimulate aggregate demand and moderate the risk of deflation by reducing longer-term risk-free yields and increasing the amount of money in the economy. By contrast, the government bond purchases of the ECB were motivated by the drastic increase in and overshooting of the yield spreads of some riskier euro-area countries. In this case the objective was to ease liquidity tensions on the government bond market, to restore monetary transmission and to avoid the self-fulfilling sovereign crisis.

Purchasing large volumes of government bonds is a risky instrument. Within unconventional instruments, it is particularly government bond purchases that raise the problem of compatibility with inflation targeting or, in general, with the independent central bank role that considers price stability as the primary objective. The dividing line between serving liquidity or transmission purposes and monetary financing is not clear either. In order to avoid its being considered by the market as debt financing, central banks basically intervene in the secondary market. However, if a central bank continuously purchases large volumes of government bonds, the dividing line between transmission purposes and monetary financing may become blurred in the case of secondary market interventions as well.

Government bond purchases may – through the reduction of the financing costs of the general government – delay fiscal adjustment that might be necessary. In an unfavourable case, this may also undermine the confidence in fiscal authorities and in the independence of monetary policy. When purchases are applied with a macroeconomic stabilisation objective or in times of government bond market turbulences, credible monetary and fiscal policies as well as low country risk are fundamental conditions for successful application. When there is lack of credibility, if fear of monetary financing becomes dominant in investors' expectations, government bond purchases may eventually result in an excessive increase in inflation expectations and thus also in an upturn in government bond yields, which is contrary to the intentions.

THEORETICAL MODELS

The theoretical models of unconventional instruments focus on financial frictions. In the model of Gertler and Karádi (2011), central bank intervention results in welfare gain because, unlike financial intermediaries, the state is able to obtain unlimited amounts of cheaper funds by issuing risk-free government bonds. Central bank lending means an efficiency loss compared to the financial intermediary system. However, during a crisis the latter faces especially strong fund-raising constraints, which increases the net profit on central bank intervention considerably. Therefore, it is worth deploying unconventional instruments only in the case of a crisis, because net gains disappear following the recovery of the financial intermediary system and economic activity. In this model, intervention – as it is justified by financial turmoil – makes sense not only when the base rate is zero, but the expected gain on the intervention is higher with a zero base rate. An important element of the model is that welfare gain can only be realised if the country risk is low.

In the new-Keynesian model of Curdia and Woodford (2010a, 2010b) complemented with the financial intermediary system, the source of financial frictions is the asymmetrical information between banks and borrowers, which makes lending costly, and the spreads between deposit and lending rates increase. Similar to the model of Gertler and Karádi (2011), unconventional intervention results in welfare gain only in the case of turmoil of the financial intermediary system, i.e. in times of financial crises, when the costs of financial intermediation grow drastically.

INTERNATIONAL EXPERIENCES

Large central banks in the world put several unconventional instruments into action at the time of the crisis in 2008 in order to ease financial turmoil and maintain price stability. In the evaluation of instruments it is a methodological problem that the market effects of asset purchases cannot clearly be separated from the effects of other liquidity increasing or other monetary instruments or of market developments and that there is no well-definable alternative scenario to which the success of unconventional instruments

could be compared. Nevertheless, numerous studies and research analyses have attempted to quantify the effects of programmes or groups of programmes.[6]

Developed countries

The majority of the empirical analyses examined the effects on financial markets, and within that especially the impact on the yields of the instruments concerned (on the maturity premium and risk premium) or on quantitative elements (market turnover, credit supply). Most of the studies emphasise the success of the programmes in easing monetary and financial conditions and in improving the liquidity situation in the case of all the three types of unconventional instruments.

According to Klyuev et al. (2009), market panic typically declined in the market segment where the intervention took place. In line with that, financial stress indicators fell close to the level that was typical prior to the Lehman bankruptcy, and risk premium also declined. Much fewer estimates regarding the effect on lending and aggregate demand were prepared. However, they revealed a significant, positive macroeconomic effect: without the instruments the fall in lending and GDP would have been greater, although the instruments were unable to put lending and the economy on a growth path (Klyuev et al., 2009). Central banks have a limited role in contributing to the capital needs of commercial banks. In spite of the fact that several banks increased their capital during the crisis, thus managing to stabilise the banking system, a sufficient amount of capital was not available even after the increases to launch satisfactory lending and economic recovery. Accordingly, the real economy outcome can rather be shown in the sense of how much greater the downturn would have been without applying the programmes. The Japanese example, which is the only programme that can be considered entirely completed so far, shows that in the case of structural problems of the financial intermediary system,[7] unconventional instruments may be able to achieve only limited results.

Lenza et al. (2010) and Fahr et al. (2010) evaluated the liquidity providing instruments of the ECB in a way that using various assumptions they set up an alternative scenario without unconventional instruments. Lenza et al. (2010) found that the instruments of the ECB played a significant role in the stabilisation of the economy in the period after the Lehman bankruptcy. According to the estimate of Fahr et al. (2010), without the instruments the euro area would have had a more than one percentage point lower GDP growth and deflation until the first half of 2010. Based on the research conducted by Beirne et al. (2011), the covered bond purchase programme of the ECB can be considered successful. The yield spread of covered bonds declined, money market yields fell, and there was an upturn in bond markets at all maturity horizons. An important experience is that in euro-area countries struggling with the sustainability of government debt the programme was not able to improve yields in the covered bond market either; it was completely ineffective.

Joyce et al. (2011) examined the effects of the programmes of the Bank of England on the basis of several market indicators. They tried to point out a correlation between the news value of announcements and the market effect using a regression model, with the help of the programme size expected according to the Reuters analyst survey. Their analysis found that the total 200 billion programme caused a yield decline of 125 basis points. In this period, a lesser decline in similar yields was observed in other countries, which confirms that it is a country-specific phenomenon. With their multiple time series model, Kapetanios et al. (2011) came to the conclusion that government bond yields would have been 100 basis points higher without the quantitative easing programme, whereas GDP and the consumer price index would have been 1.5 and 1.25 per cent lower, respectively.

The evaluation of the quantitative easing in Japan between 2001 and 2006 divides experts. In spite of the fact that Bernanke et al. (2004) and Shirakawa (2009, 2012) emphasised certain successes of the programme (the yield curve was pushed downwards successfully), it must be noted that the most important objective, i.e. the stimulation of the economy and breaking out of deflation, was not achieved.[8] The failure of the programme was mentioned by Bini Smaghi (2009). In his opinion, although the reserve objectives were achieved, the multiplier effect weakened, because banks had not increased their lending to corporations due to their bad capital structures. The Japanese banking sector did not reduce its bad loans until the 1990s; therefore, bank lending slowed down, resulting in permanent stagnation. The Japanese example shows that deleveraging cannot be significantly decelerated by monetary easing. According to Berkmen's (2012) analysis, in

[6] The applied instruments included regressions, econometric models (VAR, GARCH-M, error correction model, distributed lag model), DSGE models and case studies.

[7] If the loan portfolio of banks is bad, their response is the reduction of balance sheets, which may result in a decline in corporate lending over the long term.

[8] Klyuev et al. (2009).

terms of the growth effect the Japanese programme applied since 2008 is somewhat more successful than the quantitative easing of 2001–2006, which is mainly attributable to the fact that, as a result of the sounder balance sheets of the past decade, neither the banking sector nor the corporate sector are forced to undertake protracted balance sheet adjustments.

In connection with the comprehensive evaluation of the programmes of the Fed, Gagnon et al. (2010) emphasised their successes in the reduction of the maturity premium and long-term interest rates. The study considered mortgage market crisis management as most effective, as here the targeted instruments were able to prevent the complete collapse of the market. In addition, the analysis points out that the harmonised programmes triggered a perceptible positive effect in the market of government bonds and corporate bonds as well. It can be concluded in general that the asset purchase programmes of the Fed added to market liquidity, reduced spreads and increased bond issues. Numerous studies attempted to give quantitative estimates of the effects of large-scale asset purchase programmes. Overall, based on the findings of the studies, the programmes had a significant positive effect on financial markets. Based on the evaluation of the programmes, strong consensus evolved in the literature about the first phase of the large-scale asset purchase programme of the Fed, which reduced the yields of the 10-year treasury bills and corporate bonds with a good credit rating by some 50 basis points.[9]

In terms of the macroeconomic effects, the conclusions of the studies are very diverse. At the same time, they point out that without the programmes the fall in GDP would have been much more significant. Baumeister and Benati (2010) estimate a 4 percentage point lower real GDP growth both in the USA and in the United Kingdom in the first quarter of 2009 as a result of the asset purchase programmes. Analysing the programmes of the Fed, Chung et al. (2011) came to the conclusion that term premiums declined by an average 50 basis points and by a further 20 basis points as a result of the first and second quantitative easing programmes, respectively. Economic growth until 2012 would have been 2 percentage points lower without the first programme, and GDP would have declined by a further 1 percentage point without the second programme.

Emerging countries

Following the Lehman bankruptcy, central banks of emerging countries widely – although to a lesser extent than the central banks of developed countries – used liquidity tension reducing instruments, mainly foreign exchange liquidity instruments. However, large-scale, systematic liquidity increasing instruments, direct credit market interventions and government bond purchases were used only sporadically and only in emerging countries that can rather be considered – in several respects – as developed countries (Ishi et al., 2009; Stone et al., 2011; Moreno, 2011). In 2009, corporate bonds and government bonds were purchased by the Korean and the Israeli central banks, respectively. Both countries have low base rates, much more favourable credit ratings and risk indicators than what is typical of emerging countries, better inflation performance and developed capital markets.

There may be two basic reasons why emerging countries applied unconventional central bank instruments less frequently. Firstly, macroeconomic pressure was typically lower, as the central banks concerned were much more rarely close to the zero lower bound. Following the eruption of the crisis, first the interest rate was increased in many emerging countries. As a result, the average base rate was above 5 per cent in 2009 as well. In many cases the extent of the real economy shock to the economy and the financial market turbulence was smaller, and generally there was no danger of deflation that would have made further monetary easing necessary in the developed countries. However, due to their vulnerability, in many emerging countries, for example in the Central East European region, there is much less room for manoeuvre to apply unconventional instruments than in developed countries. Due to the average lower credit rating, higher country risk premiums, high external debt and foreign exchange exposure, extensive and systematic liquidity expansion carries risks, as it may result in capital withdrawal and unintended exchange rate depreciation instead of an upturn in real economy demand (Ishi et al., 2009). This is particularly true if the credibility of monetary policy is low, and the market tends to consider the actions as delegating fiscal tasks to the central bank, hiding of fiscal burdens or monetary financing. Exchange rate depreciation is a key risk in countries where the exchange rate exposure of the banking sector or domestic players is high, for example in Hungary.

Evaluated within the framework of the model of Gertler and Karádi (2011), limited fiscal policy leeway means that the state – contrary to the assumptions of the model – is unable to obtain unlimited amounts of funds without additional costs from the market. It can do so only with a further increase in the risk premium, which impairs the sustainability of government debt. Accordingly, with an increase in the extremely high sovereign risk premium, which is sensitive to

[9] Gagnon et al. (2010), Joyce et al. (2011).

further growth in expenditures, the liability side advantage of the state is much smaller than in the Gertler–Karádi model, which emphasises the balance sheet constraints of the private sector, thus questioning the effectiveness of the intervention.

These risks are confirmed by the analysis of Jacome et al. (2011), in which the authors reviewed the financial crises of 16 Latin-American countries between 1995 and 2007 and examined the effect of the central bank liquidity provided during the crises on financial and macroeconomic developments. They found that central bank schemes that intended to improve the liquidity position of the banking sector typically tended to add to instability. Against the background of limited economic policy credibility, monetary policy was unable to restore confidence in the financial markets. The funds provided to the financial system were withdrawn from weaker banks and landed at stronger banks or abroad as a withdrawal of capital, thus weakening the foreign-exchange rate and the position of problematic banks. Yields continued to rise as depreciation and inflation expectations strengthened, resulting in a further increase in stability tensions. Overall, active monetary policy in many cases was not only unable to prevent the unfolding of exchange rate and bank crises, but also contributed to it with the excessive amount of liquidity provided for the financial system. Due to high foreign exchange debt, the 'monetisation' of bank crises usually had a negative impact on economic growth as well. According to the study, the significant liquidity provision by the central bank also damaged the independence of the central bank in many cases. With bankruptcies of banks and loss in value of collateral, the programmes sometimes resulted in significant costs. In many cases, the government was unwilling to make up for the loss and increase the capital of the central bank, thus jeopardising the efficient functioning of the central bank and the achievement of its objectives.

CONCLUSIONS

This article provided an overview of international experiences with the application of unconventional central bank instruments. According to the conclusions of theoretical models, the application of unconventional central bank instruments may result in a welfare gain if the financial intermediary system faces strong fund-raising constraints, and the state – with low country risk – is able to obtain unlimited amounts of cheaper funds by issuing risk-free government bonds. Empirical analyses found the unconventional instruments applied in developed countries successful in easing market tensions, increasing market liquidity and reducing yields. Although they proved to be unsuccessful in giving a start to economic growth, they were able to mitigate the fall in lending and output. In vulnerable emerging countries with a lower credit rating and high external debt, there is much less room for manoeuvre to apply non-conventional instruments. During a crisis, liquidity providing instruments, which are otherwise considered the least risky, may result in exchange rate depreciation and withdrawal of capital, and the interventions that involve assumption of risks by the state may add to market concerns regarding fiscal sustainability.

REFERENCES

Baumeister, C. and L. Benati (2010), 'Unconventional Monetary Policy and the Great Recession', *European Central Bank Working Paper,* No. 1258.

Beirne, J., L. Dalitz, J. Ejsing, M. Gothe, S. Manganelli, F. Monar, B. Sahel, M. Susec, J. Tapking and T. Vong (2011), 'The Impact of the Eurosystem's Covered Bond Purchase Programme on the Primary and Secondary Markets', *ECB Occasional Paper Series,* No. 122 January.

Berkmen, S. Pelin (2012), 'Bank of Japan's Quantitative and Credit Easing: are they now more effective?', *IMF Working Paper,* Vol. 12 No. 2.

Bernanke, B. S., V. R. Reinhart and B. P. Sack (2004), 'Monetary policy alternatives at the zero bound: an empirical assessment', *Finance and Economics Discussion Series,* No. 48, Board of Governors of the Federal Reserve System (U. S.).

Bini Smaghi, L. (2009), 'Conventional and unconventional monetary policy', *Keynote lecture at the International Center for Monetary and Banking Studies (ICMB),* Geneva, 28 April 2009.

Chung, H., J. P. Laforte, D. Reifschneider and J. Williams (2011), 'Have We Underestimated the Likelihood and Severity of Zero Lower Bound Events?', *Federal Reserve Bank of San Francisco Working Paper,* No. 1.

Curdia, V. and M. Woodford (2010a), 'Conventional and Unconventional Monetary Policy', *Federal Reserve Bank of St. Louis Review,* July–August, 92 (4), pp. 229–64.

Curdia, V. and M. Woodford (2010b), 'The Central-Bank Balance Sheet as an Instrument of Monetary Policy', *NBER Working Papers,* No. 16208.

Fahr, S., R. Motto, M. Rostagno, F. Smets and O. Tristani (2010), *Lessons for monetary policy strategy from the recent past.*

Gagnon, J., M. Raskin, J. Remache and B. Sack (2010), 'Large-Scale Asset Purchases by the Federal Reserve: Did They Work?', *Fed Staff Report,* No. 441.

Gertler, M. and P. Karádi (2011), 'A model of unconventional monetary policy', *Journal of Monetary Economics,* No. 58, pp. 17–34.

Ishi, K., M. Stone and E. B. Yehoue (2009), 'Unconventional Central Bank Measures for Emerging Economies', *IMF Working Paper,* No. 09/226.

Jacome, H., T. Saadi-Sedik and S. Townsend (2011), 'Can Emerging Market Central Banks Bail Out Banks? A Cautionary Tale from Latin America', *IMF Working Paper,* No. 11/258.

Joyce, M., A. Lasaosa, I. Stevens and M. Tong (2011), 'The financial market impact of quantitative easing in the United Kingdom', *International Journal of Central Banking,* Vol. 7 No. 3, pp. 113–61.

Kapetanios, G., H. Mumtaz, I. Stevens and K. Theodoridis (2011), 'Assessing the economy-wide effects of quantitative easing', *BoE Working Paper,* manuscript.

Klyuev, V., P. de Imus and K. Srinivasan (2009), 'Unconventional Choices for Unconventional Times: Credit and Quantitative Easing in Advanced Economies', *IMF Staff Position Note,* No. SPN/09/27, November.

Lenza, M., H. Pill and L. Reichlin (2010), 'Monetary Policy in Exceptional Times', *ECB Working Paper Series,* No. 1253.

Moreno, R. (2010), 'Central bank instruments to deal with the effects of the crisis on emerging market economies. The global crisis and financial intermediation in emerging market economies', *BIS Paper,* No. 54.

Shirakawa, M. (2009), 'Unconventional Monetary Policy – Central Banks: Facing the Challenges and Learning the Lessons', *Speech at the Conference co-hosted by the People's Bank of China and the Bank for International Settlements in Shanghai,* 8 August.

Shirakawa, M. (2012), 'Deleveraging and growth – is the developed world following Japan's long and winding road?', *Lecture at the London School of Economics,* 10 January.

Stone, M., K. Fujita and K. Ishi (2011), 'Should Unconventional Balance Sheet Policies be Added to the Central Bank Toolkit? A Review of the Experience So Far', *IMF Working Paper,* No. 11/145.