

The effectiveness of the Federal Reserve's Maturity Extension Program – Operation Twist 2: the portfolio rebalancing channel and public debt management

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Abstract

This paper provides a first assessment of the Federal Reserve's recent Maturity Extension Program, dubbed Operation Twist 2. Despite the mere exchange of short-term for long-term Treasury securities, the announcement effect is comparable to the second Large Scale Asset Purchase programme (LSAP2). The portfolio rebalancing channel, however, is countervailed by the issuance of even more Treasury coupon securities, which may explain the temporary nature of the observed interest rate effects. In the extreme, Operation Twist 2 and LSAP2 can be viewed as just offsetting the adverse impact of the pronounced increase in outstanding government securities.

Keywords: Operation Twist, large scale asset purchase programme, portfolio rebalancing effect, fiscal and monetary policy interaction

JEL classification: E43, E52, E58, E63

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I. Introduction

On 21 September 2011, the US Federal Open Market Committee decided to engage in a program to extend the maturity of its Treasury security holdings with the purpose of lowering long-term interest rates to provide additional stimulus to the economy, in an environment with a near-zero policy rate. From 3 October 2011 until June 2012, the Federal Reserve will buy Treasuries with maturities of between six and 30 years. To fund the purchases, an equal amount of securities with remaining maturities of three years or less will be sold, which constitutes almost the entire holdings of the Federal Reserve in short-term Treasuries.

The intended effect on interest rates, and ultimately on the real economy, effectively hinges on manipulating the maturity composition and the relative supply of marketable public debt; a domain traditionally controlled by the US Treasury.² While the original Operation Twist³ in 1961 envisaged a cooperation between the Federal Reserve and the US Treasury, no such plans exist for the current Maturity Extension Program. The essential indivisibility of central bank balance sheet policies and public debt management, however, is not a recent topic and has prominent advocates, such as Tobin (1963) and many others. In fact, the effectiveness of Operation Twist in 1961 seems to have been dampened by a surprise lengthening of newly issued Treasury securities (see Swanson (2011)).

The purpose of this short paper is to examine the effects of Operation Twist 2 on interest rates, but also to analyse the concurrent US Treasury issuance behaviour with the aim of deriving implications for the overall effectiveness of the current operation. In particular, the intended effect of improving refinancing conditions through the so-called portfolio rebalancing channel is likely to be countervailed by the increasing issuances of longer-term debt securities by the US Treasury. While the current Maturity Extension Program differs from LSAP2 in key aspects, the two programmes are still comparable in many ways. Hence, LSAP2 can serve as a reference point in assessing the potential impact of Operation Twist 2.

II. Operation Twist 2 versus LSAP2

In contrast to the two earlier large-scale asset purchase operations (LSAP1 and 2), which involved a significant expansion of the Federal Reserve's asset holdings (Graph 1), Operation Twist 2 is designed to be balance sheet neutral. Despite its solely compositional effect on the Federal Reserve's asset portfolio, Operation Twist 2 is comparable to LSAP2 in terms of its intended economic effect. Various estimates⁴ suggest an identical amount of duration risk would be removed from the market under the two programmes (\$400 billion in 10-year equivalents), notwithstanding the larger net size of LSAP2. However, purchases under Operation Twist 2 will be concentrated on significantly higher durations, while sales will be restricted to very short maturities, with an average duration of one year (Table 1).

At the time of their respective announcements, both programmes were targeting a substantial share of outstanding marketable securities within certain maturity baskets. As this implies considerable reductions in the expected supply of long-term Treasury securities to the public, the impact on prices is bound to be significant.

² The results in this paper do not depend on an argument that the US Treasury changed its issuance policy in response to Federal Reserve policy.

³ The current Operation Twist 2 has a predecessor in the Fed's purchases of \$8.8 billion in longer-term Treasury securities and \$7.4 billion sales of Treasury bills in 1961. The purchases amounted to 4.5% of total marketable securities outstanding, which is very similar to the current operation (Table 1); see Meulendyke (1998).

⁴ Federal Reserve Bank of New York (2011).

Graph 1

US outstanding debt holdings

In trillions of US dollars

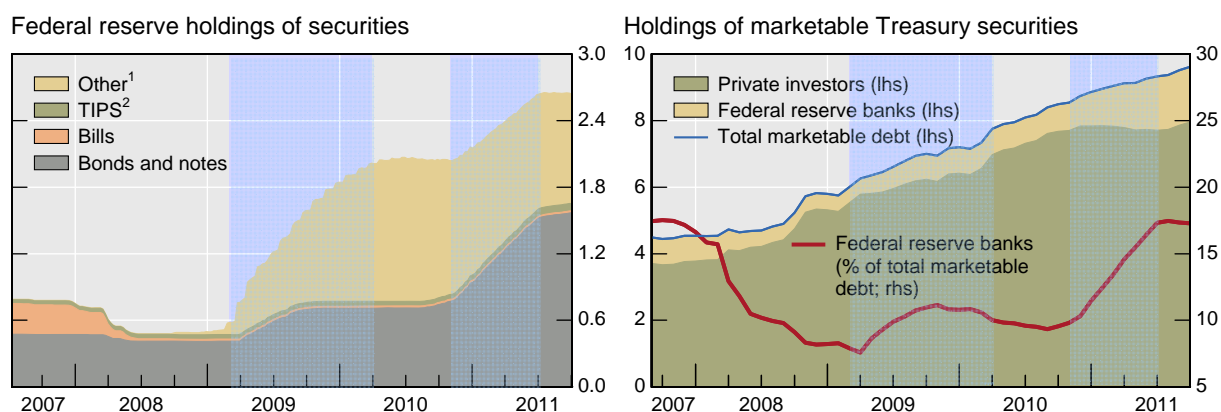


Table 1

Relative sizes of LSAP2 and Operation Twist 2

Remaining maturity at time of purchase	LSAP2		Operation Twist 2	
	Purchases ^{1,2} (in per cent of total)	Relative to the outstanding amount (31 Oct 2010)	Announced purchases ² (in per cent of total)	Relative to the outstanding amount (30 Sep 2011)
>3m – 3y	171.62 (22.1%)	5.40%	–400 (tot sales)	–10.98%
>3y – 6y	205.41 (26.4%)	13.73%	0 (0%)	0%
>6y – 8y	226.3 (29.1%)	33.79%	128 (32%)	15.55%
>8y – 10y	105.48 (13.6%)	17.60%	128 (32%)	21.72%
>10y – 20y	22.37 (2.9%)	7.93%	16 (4%)	5.95%
>20y – 30y	23.35 (3%)	5.68%	116 (29%)	21.01%
TIPS >6y – 10y	19.15 (2.5%)	6.17%	12 (3%)	3.18%
Other	4.76 (0.6%)	0.31%	0 (0%)	0%
Total	778.44	9.16%	0 (400 purchases)	4.16% (purchases)

¹ Federal Reserve Bank of New York Permanent Open Market Operations from 3 November 2010 to 30 June 2011 including reinvestments from maturing MBS securities into Treasuries. ² In billions of US dollars.

Sources: Federal Reserve Bank of New York; Treasury Direct; BIS calculations.

While the main difference between the two programmes lies in the effect on the supply of short-term securities, the impact at the short end of the yield curve should be limited. In the current environment of very low short-term interest rates, and with the Federal Reserve's

commitment to keep the policy rate close to zero until mid-2013, the short-term Treasuries to be sold are fairly close substitutes for central bank reserves. This effectively ties the short-term interest rates to the low levels currently observed, and curbs the price impact of an increased supply of short-term Treasuries. Still, as LSAP2 had an expansionary effect on the total amount of cash in the economy, Operation Twist 2's desired stimulative impact on the real economy may *ceteris paribus* be smaller than LSAP2's.

III. Transmission mechanisms and announcement effects

While there are various channels through which large-scale asset purchases could ease refinancing conditions on financial markets and ultimately increase economic activity,⁵ the prevailing view is that such measures work primarily through the so-called portfolio rebalancing channel.⁶

A reduction in the net supply of longer-dated Treasury securities takes away duration risks from private investors and pushes yields downwards, reducing expected returns. This leads investors to purchase other debt securities of similar maturities, such as long-term corporate bonds. In turn, refinancing conditions are eased, which should ultimately feed into higher credit flows and stronger economic activity. The strength of the portfolio rebalancing channel is hence determined by how much of the outstanding stock of debt is absorbed by the Federal Reserve ("stock effect").

Most of the effect on yields will materialise at the time the purchases, and their size, are announced, as this immediately shifts the expected supply of debt securities in the market. In contrast to a reduction in the policy rate, which may be temporary, both the large-scale asset purchases and the Maturity Extension Program are laid out over a full year. The inherent signal about the persistent stance of future monetary policy strongly contributes to the announcement effect.

Indeed, the announcement effects of Operation Twist 2 on Treasury yields appear to have been sizeable. On 21 September, the 30-year constant maturity Treasury yield dropped around 25 basis points at the time of the publication of the FOMC statement (Graph 2, centre panel). The one- and two-day changes signal drops of 17 bp and 42 bp respectively. A drop in long-term rates of this magnitude is very significant, as it compares to the initial effect of a reduction in the federal funds rate of around 150 basis points.⁷ Also, the interest rate effects are statistically significant and quite comparable to LSAP2, even for the shorter five- and 10-year maturities (Table 2). Subsequently, nevertheless, much of the initial effect at the long end of the yield curve appears to have vanished (Graph 2, right-hand panel).

⁵ For a detailed discussion see Krishnamurthy and Vissing-Jorgensen (2011).

⁶ See Gagnon, Raskin, Remache and Sack (2010), and Bernanke (2010).

⁷ See Gurkaynak, Sack and Swanson (2005).

Table 2
Yield changes of US Treasuries at selected event dates¹

LSAP2			Constant maturities				
FOMC statement	Date	Changes ²	3m	1y	5y	10y	30y
Reinvestment of MBS principal into Treasuries; low rates for an extended period likely	10/08/2010	1-day	0	-1	-8	-7	-1
		2-day	0	-1	-10	-14	-8
Maintain reinvestment policy; low rates for an extended period likely	21/09/2010	1-day	0	0	-9	-11*	-8
		2-day	-1	-1	-10	-16*	-13
Purchase of a further \$600bn of longer-term Treasuries	03/11/2010	1-day	0	0	-4	4	16**
		2-day	0	-1	-11	-10	11
	Total ²	1-day	0	-1	-21**	-14	7
		2-day	-1	-3	-31**	-40***	-10
Operation Twist 2							
Prepared to adjust securities holdings as appropriate; low federal funds rate at least until mid-2013	09/08/2011	1-day	-2*	-1	-20***	-20***	-12*
		2-day	-3**	-3	-18**	-23**	-14
Announcement Maturity Extension Program; reinvestment of agency MBS and agency debt principals into agency MBS	21/09/2011	1-day	0	2	3	-7	-17**
		2-day	-1	1	-6	-23**	-42***
	Total ³	1-day	-2	1	-17**	-27***	-29***
		2-day	-4**	-2	-24**	-46***	-56***
	Std ⁴	1-day	1	1.5	6.1	6.6	6.7
		2-day	1.4	1.9	8.4	9.1	9.3

¹ In basis points. Significance levels denoted by: ***=1%, **=5%, *=10%. ² Two-day changes are from the beginning of the previous day until the end of the event day. ³ Significance level based on the standard deviation of changes calculated over the appropriate number of days. ⁴ Standard deviation of one-day and two-day changes in basis points based on daily data from 2010 to 2011.

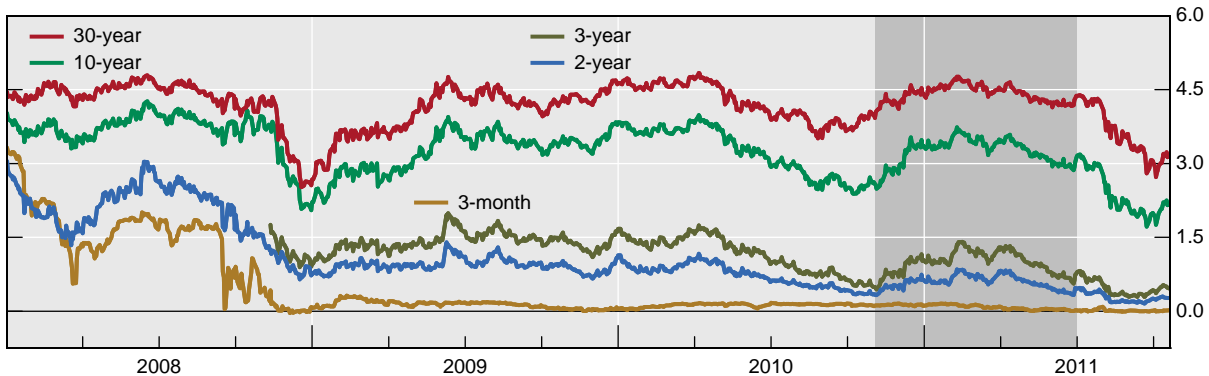
Sources: Federal Reserve Board; BIS calculations.

Clearly, the overall long-term impact of the programme is hard to disentangle from the influence of other factors, such as fluctuations in foreign demand, expectations of US economic growth or changes in inflation expectations. For instance, longer-term rates dropped significantly after the conclusion of LSAP2, clearly due to other factors such as an increased demand for safe haven assets (Graph 2, left-hand panel). Nevertheless, interest rates would certainly have been higher without the Federal Reserve's purchases. Recent research suggests that longer-term yields were 27 to 130 basis points lower as a result of LSAP1 and LSAP2 (see Annex A for a literature overview), with the "stock effect" being responsible for most of the reduction.⁸

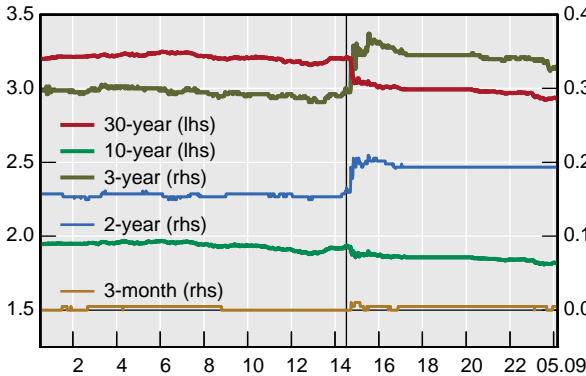
⁸ See chapter IV in Swanson (2011), Meaning and Zhu (2011), and D'Amico and King (2010).

Graph 2
Impact on government bond yields
 In per cent

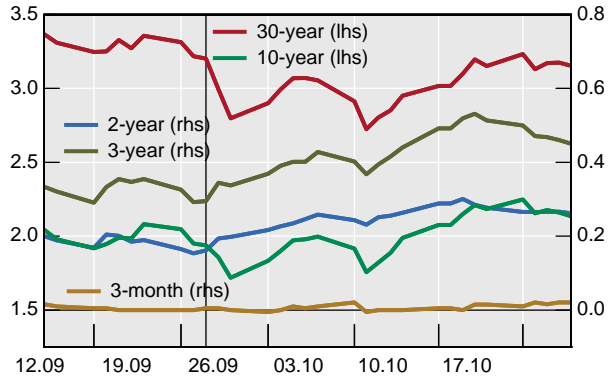
2008–2011¹



21 September 2011 (Eastern Time)²



September–October 2011²



¹ The shaded area indicates the Federal Reserve's LSAP2 programme (3 November 2010 to 30 June 2011). ² The vertical lines mark the Federal Reserve's announcement of "Operation Twist 2" on 21 September 2011.

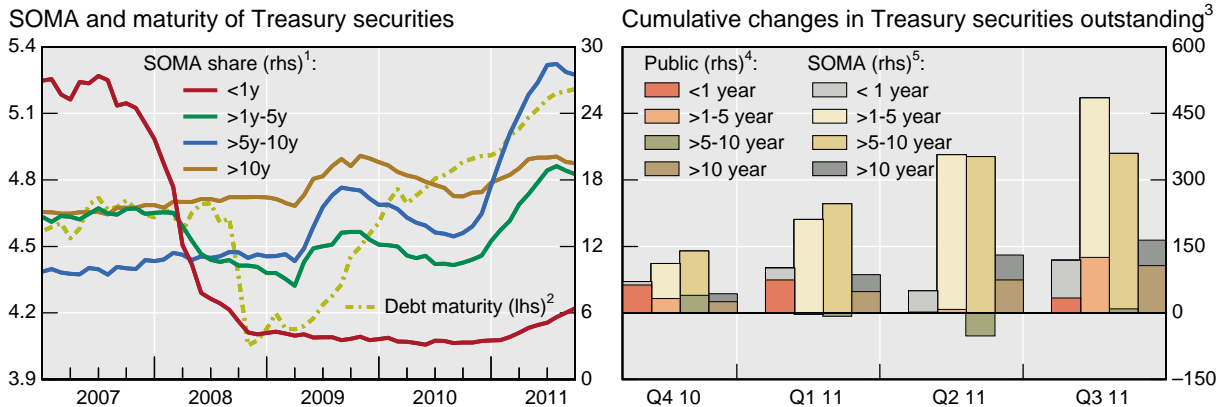
Sources: Bloomberg; BIS calculations.

IV. Public debt management

To judge the effectiveness of both LSAP2 and the recent Maturity Extension Program, in particular in terms of their portfolio rebalancing effects, a comparison with the concurrent issuance behaviour of the US Treasury is indispensable. In fact, the portfolio rebalancing effects of LSAP2 and the recent Maturity Extension Program could be completely offset by an increasing issuance volume of marketable debt securities. Indeed, even though the Federal Reserve purchased a substantial share of outstanding Treasuries at longer maturities under LSAP2 (Graph 3, left-hand panel), the cumulative changes in the supply of US Treasuries exceeded the Fed's absorption after the initiation of LSAP2 at the beginning of November 2010 across all maturities (Graph 3, right-hand panel). At the same time, the average maturity of outstanding debt was persistently lengthening (Graph 3, left-hand panel, green dashed line).

Graph 3

Treasury debt issuance and Federal Reserve purchases



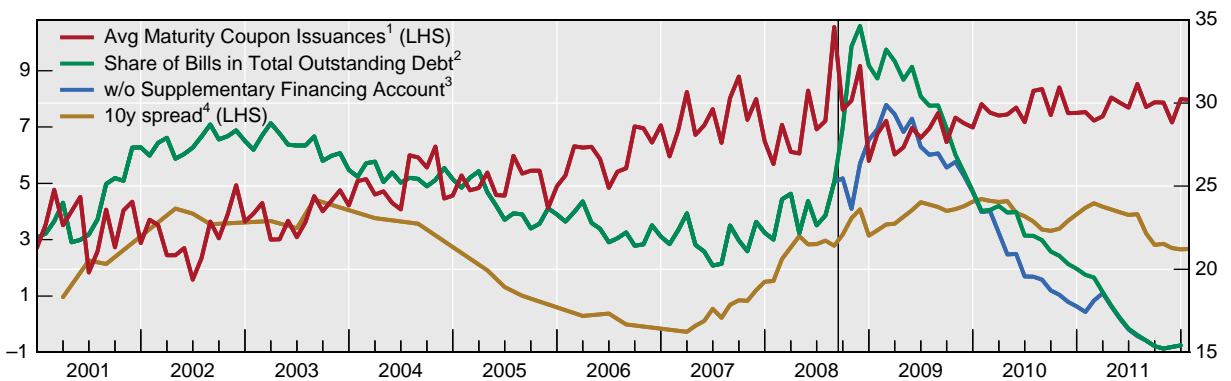
¹ Share of Federal Reserve System Open Market Account (SOMA) in Treasury securities outstanding, in per cent. ² Average maturity of outstanding marketable Treasury securities in years. ³ Cumulative quarterly changes (end of quarter) since the end of Q3 2010, in billions of US dollars. ⁴ Marketable Treasury securities not held by the Federal Reserve. ⁵ SOMA outright holdings of US Treasuries.

Sources: Federal Reserve; Treasury Direct; BIS calculations.

After the collapse of Lehman Brothers, the Federal Reserve requested an additional issuance of bills from the US Treasury with the proceeds to be transferred into the so-called supplementary financing account at the Federal Reserve. This recent example of coordination of central bank policies and debt management was requested by the Federal Reserve in order to better manage the enormous liquidity needs of the financial markets without having to increase the amount of central bank reserves too rapidly. Hence, the share of Treasury bills in total outstanding marketable debt spiked in October 2008 (Graph 4). Reinstated at the beginning of 2010, it effectively reabsorbed some of the central bank reserves created under LSAP1. Subsequently, however, the US Treasury reduced the share of bills to comparatively low levels, while keeping the average maturity of coupon issuances at a level of approximately seven years. As a result, and despite the relatively high yield spreads, the maturity of outstanding debt was lengthened by about one year.

Graph 4

Maturity composition of Treasury issuances



Note: The vertical line marks the collapse of Lehman Brothers on 15 September 2008.

¹ In years. Comprises coupons (maturity > two years) only. Three-month moving average of total monthly issuances. ² In per cent. Calculated on the basis of marketable debt only. ³ In per cent. Excludes bills in the supplementary financing account of the US Treasury held at the Federal Reserve. ⁴ In per cent. Difference between the 10-year and three-month Treasury yields at constant maturities.

Sources: Treasury Direct; Federal Reserve Board; BIS calculations.

V. Implications for Operation Twist 2

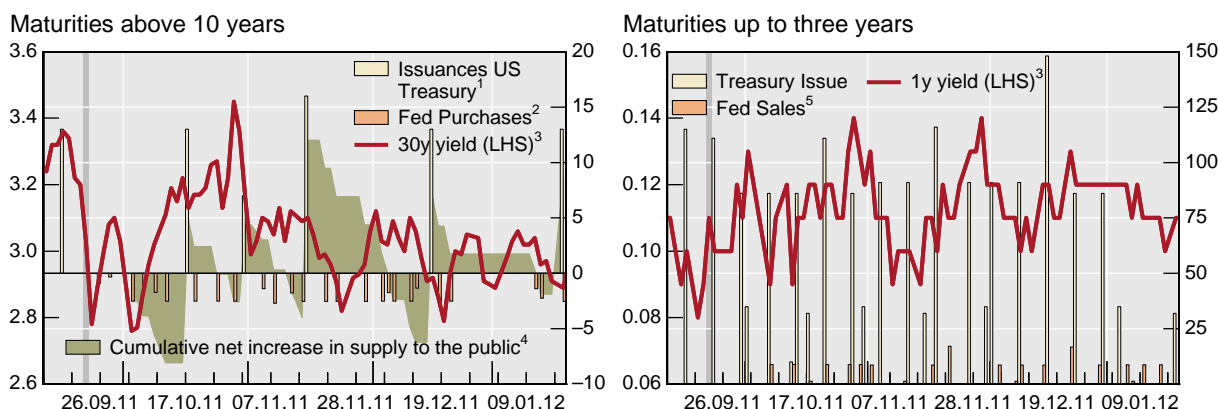
The dampening effects on long-term yields at the announcement of Operation Twist 2 seem to have vanished within a month. Actual purchases by the Federal Reserve, apart from the initial one on 3 October 2011, do not seem to have had additional effects on interest rates (Graph 5, left-hand panel). Even though there seems to be some contemporaneous correlation of security sales and interest rates, the impact on the short end of the yield curve is contained, with the one-year yield remaining within a narrow band at around 10 basis points (Graph 5, right-hand panel).

Given the elevated future refinancing needs of the Treasury, the trend of increasing issuances is likely to continue. The Federal Reserve's purchases at the long end of the yield curve have so far just kept up with the issuances of the US Treasury (Graph 5, left-hand panel). And by the end of Q4 2011, debt issuances had notably exceeded the Federal Reserve's purchases at almost all maturities (Table 3). In light of the roll-over risks of a return to a greater share of bill issuances, and the long-term nature of heightened debt financing of the US government, a shortening of the average maturity of debt issuances seems unlikely. The net supply of longer-term Treasuries will therefore increase further in the coming years.

Hence, any permanent and absolute effect on the yield curve is likely to be small. In the extreme, LSAP2 and Operation Twist 2 can be seen as just offsetting the otherwise adverse impact on government bond prices of the pronounced increase in sovereign debt levels. The effects of LSAP1, LSAP2 and Operation Twist 2 on reducing the maturity of outstanding debt are enormous, which, in itself, may create a stimulative effect on the real economy. For example, in the absence of the Maturity Extension Program, investors would have had to absorb Treasuries with an average maturity of about 7.7 years in Q4 2011, whereas with the purchases, this reduces to only 5.5 years. Nevertheless, a sizeable rebalancing of investor portfolios from government debt to other longer-term private debt securities is inhibited by an even greater increase in the supply of Treasuries.

Graph 5

Operation Twist 2 – sales and purchases of US Treasuries



Note: The shaded areas indicate the announcement of the Maturity Extension Program on 21 September 2011.

¹ In billions of dollars. Total amount of issuances by the US Treasury on a given day not allotted to the Federal Reserve (reinvestment programme). ² In billions of dollars. Total amount of open market purchases on a given day. ³ In per cent, at constant maturities.

⁴ Starting from 3 October 2011, when open market operations under Operation Twist 2 commenced. Cumulative sum of issuances by the US Treasury minus Federal Reserve open market purchases. ⁵ In billions of dollars. Total sales of short-term securities (remaining maturity < three years) conducted on a given day.

Sources: Federal Reserve Bank of New York; Federal Reserve Board; US Treasury; BIS calculations.

Table 3

**Issuances and Federal Reserve purchases of
Treasury securities for Q4 2011**

Remaining maturity at time of purchase	<=3y	>3y– 6y	>6y–8y	>8y– 10y	>10y– 20y	>20y– 30y	TIPS <=6y	TIPS >6y
Net issuances of Treasury securities ^{1,2}	-46.95	72.92	60.42	68.60	0	43.70	11.10	18.76
Fed purchases ¹	-130.03	0	43.948	41.66	5.224	37.93	-4.03	4.14
Net increase of debt to be held by the public ¹	83.08	72.92	16.47	26.94	-5.22	5.77	16.03	14.63

¹ Marketable securities, in billions of US dollars. ² Net of securities maturing in Q4 2011, which fall into the category of <=three years of remaining maturity.

Sources: Treasury Direct; Federal Reserve Bank of New York; BIS calculations.

Annex A: The effects of central bank bond purchase programmes on financial variables

Paper	Country	Focus	Methodology	Variable of interest	Results	Sample period
<i>Gagnon et al (2010)</i>	US	LSAP Treasuries	Event study; changes in yields on the days of announcement	2-yr and 10-yr Treasury yields, 10-yr agency debt yield, 10-yr swap rate, Baa corporate bond index yield	Change in 10-yr Treasury yields in response to LSAP1: -91 bp	Nov 2008–Nov 2009
<i>Yellen (2011)</i>	US	LSAP Treasuries	Event study; changes in yields on the days of announcement	10-yr and 30-yr yields on Treasuries, TIPS, MBS and corporate bond yields	Change in 10-yr Treasury yields in response to LSAP1 and 2: -106 bp	Nov 2008–Mar 2009
<i>Krishnamurthy and Vissing-Jorgensen (2011)</i>	US	LSAP Treasuries	Event study; changes in yields on the days of announcement	Treasury yields at various maturities, agency debt, MBS corporate yields and TIPS	Change in 10-yr Treasury yields: -100 bp (LSAP1); -30 bp (LSAP2)	Nov 2008–Mar 2009; Aug 2010–Nov 2010
<i>Hamilton and Wu (2011)</i>	US	LSAP Treasuries	Times series study	10-yr Treasury yields	Following Fed purchase of \$400 billion of long-term Treasury securities and equivalent sale of short-term notes, 10-yr Treasury yields drop by 14 bp	1990–2007
<i>Gagnon et al (2011)</i>	US	LSAP Treasuries	Times series study	Term premium on 10-yr Treasury yields	Impact on 10-yr Treasury yields following a 1% drop in the net supply of long-term government bonds over GDP: between -7 and -10 bp	Jan 1985–Jun 2008
<i>D'Amico and King (2010)</i>	US	LSAP Treasuries	Panel data study	10-yr Treasury yields	Fed purchases \$400 billion in long-term Treasuries: -67 bp	Mar 2009–Oct 2009
<i>Greenwood and Vayanos (2010)</i>	US	LSAP Treasuries	Times series study	Treasury spreads: 5-yr over 1-yr and 20-yr over 1-yr	Following Fed purchase of \$400 billion of long-term Treasury securities and equivalent sale of short-term notes, 5-yr over 1-yr spread (20-yr over 1-yr spread) drops by 39 (74) bp	1952–2006
<i>Swanson (2011)</i>	US	Operation Twist 1	Event study	10-yr Treasury yields	Change in 10-yr Treasury yields: -16 bp	1961–62
<i>Meaning and Zhu (2011)</i>	US, UK	CB asset purchase programmes (LSAP and APF)	Panel data study	10-yr Treasury yields	Effects similar to D'Amico and King (2010). The effect is largely similar for the LSAP and the APF. MEP should have an effect on longer-term Treasury bond yields similar to LSAP	Nov 2010–Jun 2011 (US); Mar 2009–Jan 2010 (UK)

APF = Asset Purchase Facility; LSAP Treasuries = large-scale asset purchases of Treasuries; MBS = mortgage-backed securities; MEP = Maturity Extension Program.

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