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Distributional Effects of Asset Purchases

Actuary Conference, Staples Inn, Holborn

Dr. Martin Weale

24th January 2013

Outline

- The impact of asset purchase decisions on interest rates and share prices.
- Other influences on gilt yields.
- Impact of interest rate changes on pension funds.
- Impact of interest rate changes on incomes of old people.

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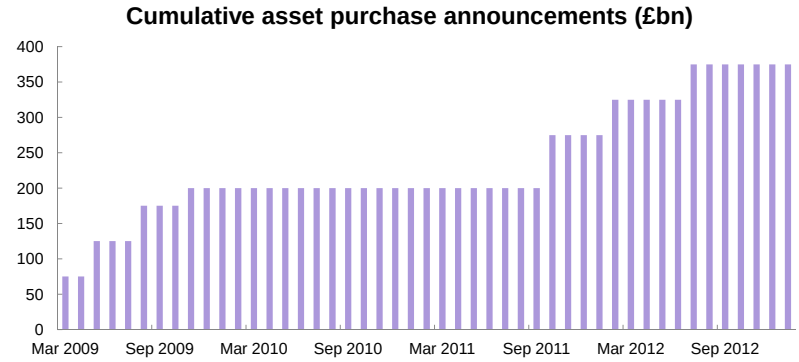
Decisions to Purchase Assets



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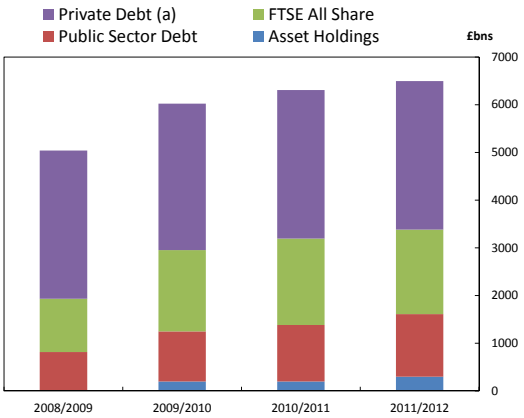
Total asset purchases compared to debt and equity



(a) Private Debt for 2010/2011 is used to represent private debt in 2011/2012

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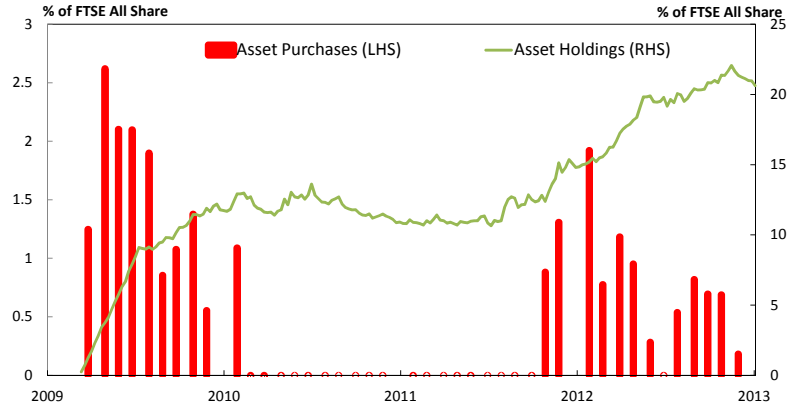
Sources: Treasury, Bank of England, Eurostat, Bloomberg, Bank Calculations

Asset purchases as a percentage of FTSE All Share market cap.



Source: Datastream, Bank calculations

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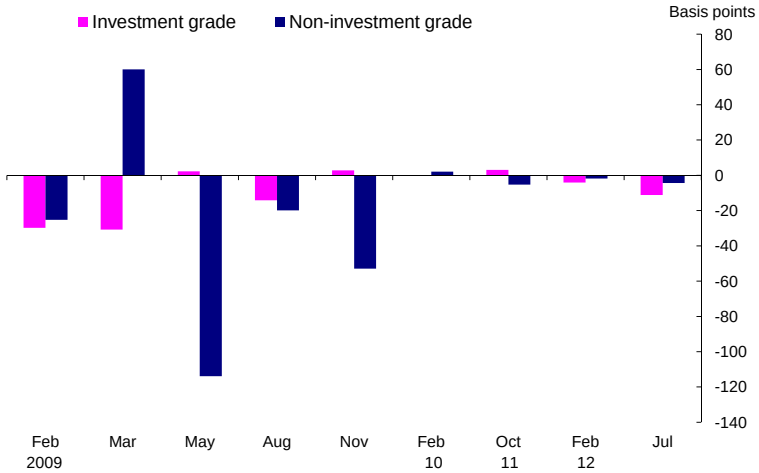
QE impact on corporate bond yields(a)



(a) Based on a two day window event study

Sources: Merrill Lynch and Bank calculations

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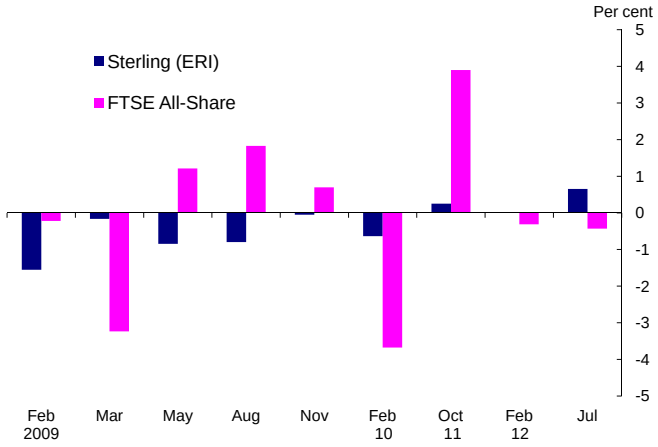
QE impact on sterling and FTSE All-Share



(a) Based on a two day window event study

Sources: Bloomberg and Bank calculations

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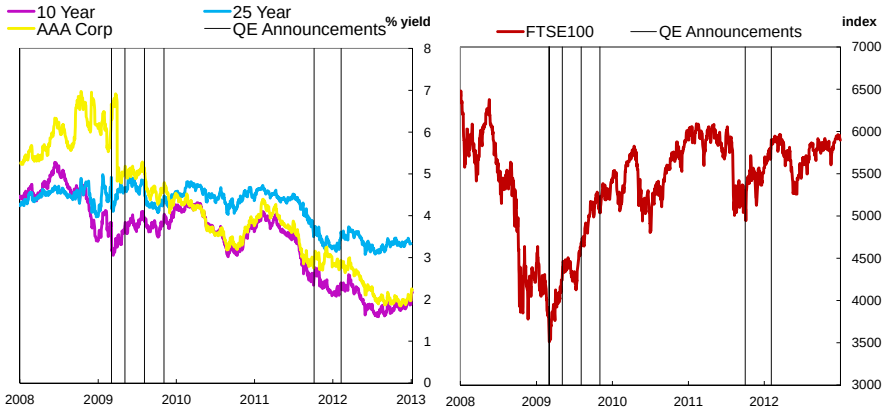
Fixed income yields and UK equity market, indicating times of QE announcements



Source: Bloomberg

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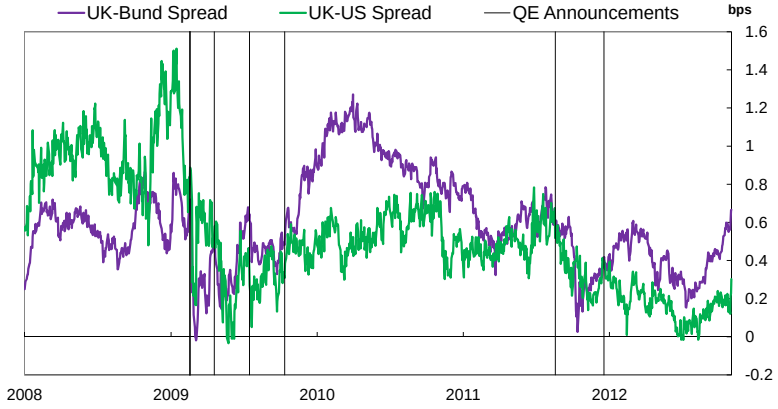
Sovereign Bond Yield Differentials relative to US and Germany, indicating times of QE announcements



Source: Bloomberg

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Changes in expectations of purchases

Table A Changes in auction maturity sectors

Market Notice	Auction Details
11 February 2009	February *IR* and press conference give strong indication that gilt purchases are likely. No details on the quantity or distribution of purchases
05 March 2009	Gilt purchases announced, split between **two** auction maturity sectors for gilts, with maturities of: (i) 5-10 years; (ii) 10-25 years.
06 August 2009	Purchases split between **three** auction maturity sectors for gilts, with maturities of: (i) 3-10 years; (ii) 10-25 years; (iii) 25+ years.
09 February 2009	Purchases split between **three** auction maturity sectors for gilts, with maturities of: (i) 3-7 years; (ii) 7-15 years; (iii) 15+ years.

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Changes in expectations of purchases

Table B Market expectation of amount of gilt purchases expected in the future, mean response to Reuters survey

£ billions

Date of MPC announcement and Market Notice	05 March 2009	06 August 2009	09 February 2012
Expected before	0	27	86
	(n.a.)	(30 Jul 2009)	(1 Feb 2012)
Expected after	142	62	92
	(1 Apr 2009)	(6 Aug 2009)	(9 Feb 2012)
Total QE 'surprise'	142	35	6

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Effects of local supply surprises

- Asset purchases can affect the local supply of a specific gilt maturity if gilts are imperfect substitutes.
- This 'local supply' surprise in the maturity distribution will affect yields, even if the scale of asset purchases is already expected.
- As a result the following specification can be used to provide an alternative measure of the impact of QE:

$$\Delta y_n = \alpha + \beta \Delta q_n + \gamma d_n + \varepsilon_n$$

Δy_n=change in gilt yields in two day window α = constant
Δq_n= local supply surprise d_n=duration of each bond

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Yield change regression results

Independent variables		2009		2012
		5 March	6 August	9 February
Constant	α_t	-17.2	1.8	-3.9
		(0.00)	(0.24)	(0.01)
Local supply surprise	Δq_t	-0.81	-0.74	-0.80
		(0.00)	(0.04)	(0.00)
Bond Duration	d_n	-2.8	-0.6	0.2
		(0.00)	(0.18)	(0.09)
R-squared		0.94	0.8	0.91
Observations		30	34	36

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The Long Term Effect of Asset Purchases

- Joyce and Tong (Economic Journal 2012) looked at yields on gilts with maturity five years + from January 2009 to April 2010.
- Yields were explained by:

1. Expectations of asset purchases.
2. Cumulative purchases of individual and nearby gilts
3. The expected cumulative fiscal deficit over the period 2008-2013
4. The UK credit default swap premium
5. The three-year overnight indexed swap rate

- They suggested £200bn of asset purchases had reduced rates by around 1.2 percentage points at 15-20 year maturity.
- This suggests the overall impact of the programme of £375bn purchases may be around two percentage points.

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Other factors driving down gilts yields

- Expectations of low short-term rates.

The expectations model suggests that long rates are the average of current and expected future short rates.

$$R_T = \left\{ \prod_{t=1}^{T} (1 + r_t) \right\}^{1/T} - 1$$

Why should expected future rates have fallen?

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Slower Economic Growth and greater risk

The relationship between these and the interest rate based on intertemporal choice.

$$E\Delta \ln c_{t+1} = \rho^{-1}(Er_{t+1} - \delta) + \rho\omega^2 / 2$$

E is expectation; c_{t+1} is consumption

δ is the discount rate

ω is the variance of next period consumption

ρ^{-1} indicates how far a change in the price of future consumption relative to current consumption induces people to change their spending plans (intertemporal elasticity of substitution)

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Implications

- The rate of interest and the rate of consumption growth are related. With growth is driven by supply-side considerations, low growth implies low interest rates.
- An increase in risk at a given rate of growth implies a reduction in the safe rate of interest- a safe haven effect.
- But these would not also drive share prices up.

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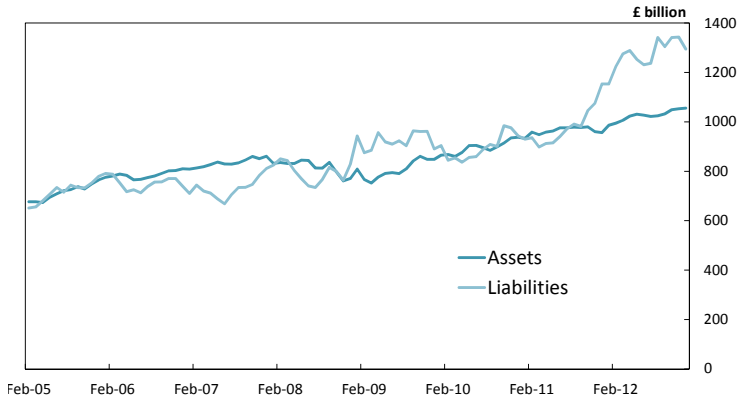
Yields and fund deficits(a)



(a) Estimated movements in assets and liabilities of schemes in the Purple Book 2012 dataset

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Source: PPF/ The Pension Regulator

Illustrative effects of DB Pension scheme deficits

£m deficit for £100m (valued at Mar. 2007) DB pension schemes

	Baseline Scheme	Scheme 1	Scheme 2
	Fully-funded at Mar. 2007		Under-funded at Mar. 2007
	Matched Asset/Liability	Asset/Liability Mismatch	
Deficits at:			
End Mar. 2007	0.0 (100/100)	0.0 (100/100)	-30.0 (70/100)
End Feb. 2009	0.0 (102.9/102.9)	-26.5 (76.4/102.9)	-49.4 (53.5/102.9)
End Feb. 2010	0.0 (99.3/99.3)	-9.6 (89.7/99.3)	-36.5 (62.8/99.3)
End Sep. 2011	0.0 (125.0/125.0)	-26.5 (98.5/125.0)	-56.1 (69.0/125.0)
End May 2012	0.0 (140.1/140.1)	-33.5 (106.6/140.1)	-65.5 (74.6/140.1)

Note: Negative figures indicate deficits/any increase in deficits/liabilities

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Source: Bloomberg, Thomson Reuters Datastream and Bank Calculations

Illustrative effects of DB Pension scheme deficits continued

£m deficit for £100m (valued at Mar. 2007) DB pension schemes

	Baseline Scheme	Scheme 1	Scheme 2
	Fully-funded at Mar. 2007		Under-funded at Mar. 2007
	Matched Asset/Liability	Asset/Liability Mismatch	
Changes Mar. 2007-May 2012	*0*[0%]	*-33.5*[-33.5%]	*-35.5*[-50.7%]
Due to QE	*0*	*-5.1*	*-12.6*
Change in assets	*30.3*	*25.2*	*17.7*
Change in liabilities	*-30.3*	*-30.3*	*-30.3*
Due to other factors	*0*	*-28.4*	*-22.8*

Note: Negative figures indicate deficits or any increase in deficits/liabilities

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Source: Bloomberg, Thomson Reuters Datastream and Bank Calculations

Illustrative examples of annuities

£ per year from a pension fund valued at £100,000 at end March 2007

Negative figures indicate reduction in annuity	Portfolio 1 'Conservative'	Portfolio 2 'Balanced'	Portfolio 3 'High risk'	Annuity Rate (%/pps)
Annuity bought at:				
End Mar. 2007	7140 (100000)	7140 (100000)	7140 (100000)	7.14%
End Feb. 2009	7160 (102940)	5630 (80860)	4090 (58780)	6.96%
End Feb. 2010	6710 (99330)	6170 (91340)	5630 (83360)	6.76%
End Sep. 2011	7700 (125020)	6340 (102930)	4980 (80850)	6.16%
End May 2012	8200 (140130)	6560 (112210)	4930 (84280)	5.85%

Note: Numbers in () are the values of assets/liabilities at point in time

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Source: Bloomberg, Thomson Reuters Datastream, William Burrows Annuities and Bank Calculations

Illustrative examples of annuities continued

£ per year from a pension fund valued at £100,000 at end March 2007

Negative figures indicate reduction in annuity	Portfolio 1 'Conservative'	Portfolio 2 'Balanced'	Portfolio 3 'High risk'	Annuity Rate (%/pps)
Changes Mar. 2007- May 2012	1060	-580	-2210	-1.29 pp
Due to QE	*-10*	*130*	*260*	*-1.63 pp*
o/w impact from higher asset value	*1620*	*1760*	*1890*	
o/w impact from lower annuity rate	*-1630*	*-1630*	*-1630*	
Due to other factors	*1070*	*-710*	*-2470*	*0.34 pp*

Note: Numbers in () are the values of assets/liabilities at point in time

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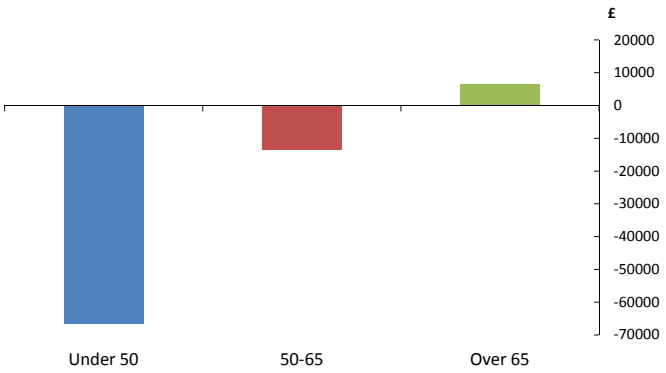
Source: Bloomberg, Thomson Reuters Datastream, William Burrows Annuities and Bank Calculations

Changes since 2012 Q3

		Increase in Assets	Increase in Liabilities	
Change in Gilt Yield	+0.13	0.6%	-2.6%	
Change in Share Prices	+2.9%	1%		
		Assets	Liabilities	Deficit
2012Q3 Average		1052.5	1326.6	274.1
2012Q4 Average		1060.6	1304.8	244.2
2012 December		1065.6	1310.3	244.7
2013 Jan Estimate		1082.6	1276.2	193.6

The estimate for January 2013 s computed using the PPF ready reckoners

Net Financial Assets Per Person



Source: ONS Wealth and Asset Survey, Bank calculations

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Mean Asset Holdings for those aged 50-64

		45-55		70-80	
		2008 mean (£s)	2010 mean (£s)	2008 mean (£s)	2010 mean (£s)
Primary House Wealth		169,913	174,509	255,584	260,773
Financial Wealth	**Long Term**	11,158	6,905	21,108	26,027
	Short Term	20,745	19,819	38,215	47,952
Physical Wealth		7,376	6,469	27,409	23,904
Debt		20,125	17,233	18,852	14,605
Net Wealth		189,067	190,469	323,464	344,052
Impact of 1% rise in rates on annual income		6	26	194	333
Mean Annual Income		22,120	23,910	29,793	29,724
Impact as a percentage of income		0.03	0.11	0.65	1.12

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Source: English Longitudinal Study of Ageing, Bank Calculations

Mean Asset Holdings for those aged 65+

		45-55		70-80	
		2008 mean (£s)	2010 mean (£s)	2008 mean (£s)	2010 mean (£s)
Primary House Wealth		175,220	177,456	264,223	267,507
Financial Wealth	**Long Term**	11,000	7,187	29,549	31,454
	Short Term	26,215	21,901	48,326	51,785
Physical Wealth		7,629	2,814	22,744	10,067
Debt		3,202	2,763	2,020	1,114
Net Wealth		216,863	206,594	362,822	359,699
Impact of 1% rise in rates on annual income		230	191	463	507
Mean Annual Income		15,911	15,671	21,112	20,787
Impact as a percentage of income		1.45	1.22	2.19	2.44

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Source: English Longitudinal Study of Ageing, Bank Calculations

Regression showing effects of gilt yield changes on consumption-to-income ratio

VARIABLES	ALL	LQWEALTH	UQWEALTH	LQINCOME	UQINCOME
Pension Wealth/ Income	**0.009***	**0.075*****	**0.032*****	**-0.003**	**-0.006**
	(0.005)	(0.021)	(0.009)	(0.006)	(0.007)
Other Wealth/ Income	**0.044*****	**0.099*****	**0.026*****	**0.050*****	**0.042****
	(0.008)	(0.008)	(0.009)	(0.015)	(0.019)
Debt/ Wealth	**0.157**	**-0.013**	**-0.691**	**0.073**	**0.320**
	(0.118)	(0.144)	(0.430)	(0.202)	(0.413)
Proportion of Pension in Defined Contribution scheme (DCp)	**10.95**	**0.824**	**-62.43**	**24.14**	**8.425**
	(9.991)	(22.99)	(39.93)	(53.55)	(14.01)
Change in Real Gilt Yield* DCp	**17.40*****	**-0.277**	**20.43****	**27.63**	**18.61****
	(5.403)	(12.97)	(9.095)	(17.70)	(8.118)
Observations	2,470	625	594	562	573
R-squared	0.427	0.632	0.699	0.500	0.267
Number of households	1,235	406	381	411	396

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The mean of 'Change in Real Gilt Yield*DCp' is -0.252
The mean of 'Proportion of Pension in Defined Contribution' is 0.473

Conclusions

- Asset purchases have had the effect of reducing medium and long-term interest rates.
- Gilt yields may have been reduced by around two per cent.
- Other factors have also contributed to the overall fall in yields.
- Fully-funded and hedged pension funds are not affected by the decline in yields but those which are underfunded or have a portfolio mismatch may be.
- Overall deficits have fallen markedly as interest rates and the stock market have risen in the last few months.
- Low gilt yields may depress the consumption of people with DC pension schemes close to retirement.
- Low interest rates transfer income from old people to young people with net incomes of reasonably wealth people aged 65 and over reduced by about two per cent for each percentage point reduction in net interest rates.

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