Appendix: Return Predictability in the Treasury Market: Real Rates, Inflation, and Liquidity

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Table A.I: Forecasted Real Short Rate.

Overlapping quarterly realized real return on nominal three month T-bill onto the nominal three month T-bill, three month lagged realized real return on three month T-bill and inflation over the past year. Newey-West standard errors with four lags in parentheses. * and ** denote significance at the 5% and 1% level.

	(1)	(2)
$y^{\$}_{1,t} - \pi_{t+1}$	U.S.	UK
$y^{\$}_{1,t}$	0.55^{**}	0.79^{**}
	(0.20)	(0.13)
$y^{\$}_{1,t} - \pi_t$	0.10	-0.08
	(0.08)	(0.05)
$(\pi_{t-3} + \pi_{t-2} + \pi_{t-1} + \pi_t)/4$	0.10	-0.07
	(0.08)	(0.04)
$Const.$	-0.52^{**}	-0.26^{*}
	(0.09)	(0.12)
p-value	0.00	0.00
R^2	0.48	0.48
Sample	1982.1 – 2010.12	

Table A.II: Univariate Liquidity Regressions

Variables as in Table **??**. Newey-West standard errors with three lags in parentheses. The p-value of the F-test for no predictability is shown. * and ** denote significance at the 5% and 1% level.

Panel A. U.S. (1999.3 − 2010.12**)**

$y^{\$}_{n,t} - y^{TIPS}_{n,t}$	(1)	(2)	(3)	(4)	(5)	(6)
Off-the-Run Spr.	−2.54**					
	(0.39)					
Asset-Swap Spr.		−1.24**				
		(0.29)				
Transaction Vol.			0.19			
			(0.14)			
Synthetic-Cash				−1.85**		
				(0.37)		
Survey Inflation					−0.00	
					(0.51)	
CFNAI						0.25**
						(0.05)
p-value	0.00	0.00	0.18	0.00	1.00	0.00
R^2	0.53	0.32	0.05	0.36	0.00	0.39
Sample			1999.3 − 2010.12			

Panel B: U.K. (1999.11-2010.12)

$y^{\$}_{n,t} - y^{TIPS}_{n,t}$	(1)	(2)	(3)	(4)
Off-the-Run Spr.	1.59			
	(1.00)			
LIBOR-GC Spr.		0.46**		
		(0.15)		
Transaction Vol.			1.17**	
			(0.13)	
Survey Inflation				0.57**
				(0.06)
p-value	0.11	0.00	0.00	0.00
R^2	0.03	0.13	0.56	0.51
Period		1999.11 − 2006.12		

Table A.III: Estimating Liquidity in Quarterly Changes

We replicate Table **??** using quarterly changes. Newey-West standard errors with three lags in parentheses. The p-value of the F-test for no predictability is shown. * and ** denote significance at the 5% and 1% level.

Panel A: U.S. (1999.6-2010.12)

$\Delta\left(y^{\$}_{n,t}-y^{TIPS}_{n,t}\right)$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δ Off-the-Run Spr.		-2.47^{**}	-1.02^{*}	-1.02^{*}	-1.59^{**}		-0.95
		(0.68)	(0.47)	(0.47)	(0.49)		(0.53)
Δ Asset-Swap Spr.			-1.24^{**}	-1.24^{**}			0.55
			(0.26)	(0.27)			(0.76)
Δ Transaction Vol.				-0.04	-0.09		-0.19
				(0.19)	(0.19)		(0.18)
Δ Synthetic-Cash					-1.16^{**}		
					(0.17)		
Δ Survey Inflation	-0.71	-0.34	-0.55	-0.53	-0.62	-0.00	0.24
	(0.55)	(0.49)	(0.50)	(0.50)	(0.49)	(1.14)	(1.09)
Δ CFNAI	0.16^{**}	0.10^{**}	0.09^{**}	0.09^{**}	0.08^{**}	0.05	0.05
	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
p-value	0.01	0.00	0.00	0.00	0.00	0.46	0.42
R^2	0.11	0.37	0.47	0.47	0.48	0.02	0.07
Sample	$1999.6-2010.12$					$1999.6-2006.12$	

Panel B: U.K. (2000.2-2010.12)

$\Delta\left(y^{\$}_{n,t}-y^{TIPS}_{n,t}\right)$	(1)	(2)	(3)	(4)	(5)	(6)
Δ Off-the-Run Spr.		-0.61	-0.41	-0.20		0.24
		(0.32)	(0.33)	(0.34)		(0.52)
Δ LIBOR-GC Spr.			-0.21^{*}	-0.22^{**}		0.42^{*}
			(0.08)	(0.08)		(0.17)
Δ Transaction Vol.				-0.17		-0.04
				(0.10)		(0.08)
Δ Survey Inflation	0.18^{*}	0.17^{*}	0.18^{**}	0.20^{**}	0.16^{*}	0.21^{**}
	(0.08)	(0.07)	(0.06)	(0.05)	(0.07)	(0.07)
p-value	0.02	0.01	0.00	0.00	0.02	0.06
R^2	0.13	0.16	0.25	0.27	0.08	0.12
Sample	$2000.2-2010.12$				$2000.2-2006.12$	

Table A.IV: Estimating Liquidity with Additional Controls

We replicate Table **??** including interaction terms and the TIPS bid-ask spread. The TIPS bid-ask spread is from Tradeweb and available 2005.3-2010.6. We set to its 2005.3 value before 2005.3 and to its 2010.6 value after 2010.6. Newey-West standard errors with three lags in parentheses. The p-value of the F-test for no predictability is shown. * and ** denote significance at the 5% and 1% level.

Panel A. U.S. (1999.3 – 2010.12**)**

$y^{\$}_{n,t} - y^{TIPS}_{n,t}$	(1)	(2)	(3)	(4)
Off-the-Run Spr.	1.40	1.66	1.50	−0.84
	(0.90)	(1.05)	(1.04)	(0.43)
Asset-Swap Spr.	−0.59*	−0.67*	−0.75	−0.65*
	(0.30)	(0.31)	(0.66)	(0.30)
Transaction Vol.	0.39**	0.32	0.39**	0.32**
	(0.11)	(0.19)	(0.11)	(0.10)
Survey Inflation	0.22	0.19	0.18	0.02
	(0.37)	(0.37)	(0.34)	(0.42)
CFNAI	0.14**	0.14**	0.14**	0.12**
	(0.04)	(0.03)	(0.04)	(0.03)
(Off-the-Run)^2	−4.29**	−4.36**	−4.88	
	(1.53)	(1.51)	(3.09)	
Off-the-Run× Transaction Vol.		0.38		
		(0.79)		
Off-the-Run× Asset-Swap Spr.			0.46	
			(1.81)	
TIPS Bid-Ask Spread				−0.34
				(0.26)
const.	2.15*	2.19*	2.28*	2.87**
	(0.96)	(0.93)	(0.89)	(1.06)
p-value	0.00	0.00	0.00	0.00
R^2	0.69	0.69	0.69	0.67
Sample		1999.3 – 2010.12		

Table A.IV (continued)

Panel B. U.K. (1999.11 − 2010.12**)**

$y^{\$}_{n,t} - y^{TIPS}_{n,t}$	(1)	(2)	(3)
Off-the-Run Spr.	−1.83	−2.02	−0.96
	(1.43)	(2.65)	(1.27)
LIBOR-GC Spr.	0.16	0.16	0.60**
	(0.17)	(0.17)	(0.16)
Transaction Vol.	0.77**	0.78**	0.79**
	(0.17)	(0.19)	(0.18)
Survey Inflation	0.29**	0.30**	0.27**
	(0.08)	(0.09)	(0.08)
(Off-the-Run)^2	3.48	3.78	18.96**
	(3.94)	(5.67)	(5.00)
Off-the-Run× Transaction Vol.		−0.25	
		(2.26)	
Off-the-Run× LIBOR-GC Spr.			−5.16**
			(1.28)
const.	2.65**	2.64**	2.59**
	(0.33)	(0.34)	(0.32)
p-value	0.00	0.00	0.00
R^2	0.66	0.66	0.70
Sample		1999.3 − 2010.12	

Table A.V: Nominal Yields onto Liquidity Proxies U.S.

Variables as in Table **??**. Newey-West standard errors with three lags in parentheses. The p-value of the F-test for no predictability is shown. * and ** denote significance at the 5% and 1% level, respectively.

Panel A: U.S. (1999.3-2010.12)

$y^{\$}_{n,t}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Off-the-Run Spr.		2.33*	3.24**	−0.67	−1.12		−2.45
		(0.99)	(1.00)	(1.46)	(1.11)		(1.48)
Asset-Swap Spr.			−2.37**	−0.27			4.21*
			(0.54)	(0.78)			(2.04)
Transaction Vol.				−1.17**	−1.27**		−1.81**
				(0.30)	(0.22)		(0.26)
Synthetic-Cash					0.52		
					(0.70)		
Survey Inflation	5.61**	4.87**	3.21**	4.38**	4.64**	1.34	1.18
	(1.23)	(1.13)	(1.06)	(1.26)	(1.35)	(3.16)	(1.48)
CFNAI	0.28**	0.44**	0.21*	0.08	0.12	−0.04	0.12
	(0.08)	(0.11)	(0.10)	(0.07)	(0.07)	(0.18)	(0.10)
p-value	0.00	0.00	0.00	0.00	0.00	0.87	0.00
R^2	0.30	0.36	0.47	0.60	0.61	0.00	0.63
Sample	1999.3 − 2010.12					1999.3 − 2006.12	

Panel B: U.K. (1999.11-2010.12)

$y^{\$}_{n,t}$	(1)	(2)	(3)	(4)	(5)	(6)
Off-the-Run Spr.		0.11	−0.16	0.04		2.01*
		(0.57)	(0.64)	(0.62)		(0.91)
LIBOR-GC Spr.			0.10	0.09		−1.03**
			(0.06)	(0.06)		(0.28)
Transaction Vol.				−0.45**		−0.58**
				(0.16)		(0.16)
Survey Inflation	0.02	0.02	0.00	0.16*	−0.07	0.07
	(0.06)	(0.06)	(0.06)	(0.06)	(0.19)	(0.16)
p-value	0.67	0.90	0.35	0.02	0.71	0.00
R^2	0.00	0.00	0.02	0.16	0.00	0.28
Sample	1999.11 − 2010.12				1999.11 − 2006.12	

Table A.VI: TIPS Yields onto Liquidity Proxies U.S.

Variables as in Table **??**. Newey-West standard errors with three lags in parentheses. The p-value of the F-test for no predictability is shown. * and ** denote significance at the 5% and 1% level, respectively.

$y_{n,t}^{TIPS}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Off-the-Run Spr.		4.40**	5.21**	0.20	0.14		−0.99
		(0.92)	(0.95)	(1.29)	(1.07)		(1.34)
Asset-Swap Spr.			−2.09**	0.59			3.43
			(0.60)	(0.68)			(2.16)
Transaction Vol.				−1.49**	−1.51**		−1.90**
				(0.27)	(0.21)		(0.24)
Synthetic-Cash					1.66**		
					(0.61)		
Survey Inflation	5.56**	4.17**	2.70**	4.21**	4.08**	0.55	0.88
	(1.15)	(1.02)	(1.01)	(1.17)	(1.11)	(4.44)	(1.42)
CFNAI	0.03	0.33**	0.12	−0.03	0.02	−0.32	−0.06
	(0.10)	(0.11)	(0.11)	(0.07)	(0.07)	(0.20)	(0.09)
p-value	0.00	0.00	0.00	0.00	0.00	0.28	0.00
R^2	0.19	0.37	0.45	0.66	0.69	0.05	0.74
Sample	1999.3 − 2010.12					1999.3 − 2006.12	

Panel B: U.K. (1999.11-2010.12)

$y_{n,t}^{TIPS}$	(1)	(2)	(3)	(4)	(5)	(6)
Off-the-Run Spr.		0.56	0.73	1.29		5.21**
		(1.15)	(1.41)	(1.09)		(0.99)
LIBOR-GC Spr.			−0.06	−0.09		−1.41**
			(0.22)	(0.19)		(0.26)
Transaction Vol.				−1.24**		−1.05**
				(0.16)		(0.13)
Survey Inflation	−0.55**	−0.56**	−0.55**	−0.12	−0.62*	−0.20
	(0.09)	(0.10)	(0.10)	(0.09)	(0.29)	(0.18)
p-value	0.00	0.00	0.00	0.00	0.03	0.00
R^2	0.36	0.37	0.37	0.62	0.15	0.65
Sample	1999.11 − 2010.12				1999.11 − 2006.12	

Table A.VII: Return Predictability Liquidity with Nonlinear Liquidity.

Return-predictability regressions as in Table A.IX. We adjust for nonlinear liquidity as estimated in Table A.IV, column (1) in Panel A and column (3) in Panel B for U.S. and U.K., respectively. Newey-West standard errors with three lags appear in parentheses. The p-value of the F-test for no predictability is shown. We also show one-sided bootstrap p-values from 2000 replications. We use block bootstrap with block length 24 months. Bootstrap accounts for the fact that the liquidity premium is estimated.

Panel A: U.S. (1999.6-2010.12)

		(1) $xr^{TIPS-L}_{n,t+1}$	(2) $xr^{TIPS-L}_{n,t+1}$	(3) $xr^{b+L}_{n,t+1}$	(4) $xr^{b+L}_{n,t+1}$	(5) $r^{L}_{n,t+1}$	(6) $r^{L}_{n,t+1}$
$(y^{TIPS}_{n,t} - L_{n,t}) - y^{TIPS}_{1,t}$		3.05	2.64		−1.68		−0.29
	Newey-West SE	(1.24)	(1.43)		(1.22)		(0.53)
	Bootstrap p-value	12.6%	17.4%		12.8%		28.2%
$(b_{n,t} + L_{n,t}) - b_{1,t}$			0.05	4.42	5.11		−0.47
	Newey-West SE		(2.83)	(1.62)	(1.53)		(1.87)
	Bootstrap p-value		19.8%	0.1%	0.0%		38.4%
$L_{n,t}$			4.89		−3.88	15.93	16.38
	Newey-West SE		(9.20)		(5.67)	(3.96)	(4.18)
	Bootstrap p-value		26.1%		21.1%	0.0%	0.0%
Const.		−0.00	−0.01	−0.00	0.01	−0.01	−0.01
	Newey-West SE	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)
	Bootstrap p-value	73.3%	11.5%	25.6%	7.8%	20.9%	26.4%
p-value		0.02	0.11	0.01	0.01	0.00	0.00
R^2		0.06	0.07	0.08	0.12	0.22	0.23
Sample				1999.6 − 2010.12			

Panel B: U.K. (2000.2-2010.12)

		(1) $xr^{TIPS-L}_{n,t+1}$	(2) $xr^{TIPS-L}_{n,t+1}$	(3) $xr^{b+L}_{n,t+1}$	(4) $xr^{b+L}_{n,t+1}$	(5) $r^{L}_{n,t+1}$	(6) $r^{L}_{n,t+1}$
$(y^{TIPS}_{n,t} - L_{n,t}) - y^{TIPS}_{1,t}$		3.42	2.68		−1.72		0.39
	Newey-West SE	(2.20)	(2.77)		(3.10)		(2.26)
	Bootstrap p-value	5.2%	4.6%		5.3%		11.6%
$(b_{n,t} + L_{n,t}) - b_{1,t}$			−2.50	3.72	6.03		2.41
	Newey-West SE		(3.74)	(4.16)	(4.60)		(2.91)
	Bootstrap p-value		23.5%	0.5%	0.8%		19.8%
$L_{n,t}$			−24.17		15.99	21.15	23.20
	Newey-West SE		(9.51)		(11.20)	(6.85)	(7.94)
	Bootstrap p-value		7.0%		13.0%	0.0%	0.0%
Const.		0.00	0.03	−0.01	−0.03	−0.02	−0.02
	Newey-West SE	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Bootstrap p-value	31.8%	4.7%	1.7%	3.9%	2.4%	2.1%
p-value		0.12	0.00	0.37	0.19	0.00	0.00
R^2		0.03	0.12	0.02	0.08	0.14	0.16
Sample				2000.2 − 2010.12			

Table A.VIII: Return Predictability Liquidity with Tradeable Excess Returns.

We run liquidity-adjusted return-predictive regressions as in Table A.IX. We consider liquidity-adjusted log nominal bond returns on TIPS over nominal returns on the nominal T-bill rate $r_{n,t}^{TIPS-L} - r_t^{Tbill}$ as a tradeable version of liquidity-adjusted log excess returns of TIPS. We also consider log nominal bond returns on nominal bonds over liquidity-adjusted log nominal bond returns on TIPS $r_{n,t}^{nom} - r_{n,t}^{TIPS-L}$ as a tradeable version of liquidity-adjusted breakeven returns. Newey-West standard errors with three lags appear in parentheses. The p-value of the F-test for no predictability is shown. We also show one-sided bootstrap p-values from 2000 replications. We use block bootstrap with block length 24 months. Bootstrap accounts for the fact that the liquidity premium is estimated.

Panel A: U.S. (1999.6-2010.12)

		$\left(r_{n,t}^{TIPS-L} - r_t^{Tbill}\right)$		$\left(r_{n,t}^{nom} - r_{n,t}^{TIPS-L}\right)$	
$\left(y_{n,t}^{TIPS} - L_{n,t}\right) - y_{1,t}^{TIPS}$		2.27	2.42		−1.42
	Newey-West SE	(1.50)	(1.69)		(1.66)
	Bootstrap p-value	31.2%	24.3%		33.2%
$(b_{n,t} + L_{n,t}) - b_{1,t}$			−0.57	4.93	5.55
	Newey-West SE		(2.50)	(2.09)	(2.20)
	Bootstrap p-value		14.5%	0.6%	0.2%
$L_{n,t}$		5.19	4.91	−7.81	−4.78
	Newey-West SE	(8.75)	(9.36)	(5.74)	(7.58)
	Bootstrap p-value	21.5%	27.5%	9.8%	20.0%
p-value		0.11	0.20	0.05	0.08
R^2		0.06	0.06	0.09	0.10
Sample			1999.6 − 2010.12		

Panel B: U.K. (2000.2-2010.12)

		$\left(r_{n,t}^{TIPS-L} - r_t^{Tbill}\right)$		$\left(r_{n,t}^{nom} - r_{n,t}^{TIPS-L}\right)$	
$\left(y_{n,t}^{TIPS} - L_{n,t}\right) - y_{1,t}^{TIPS}$		3.90	4.92		−4.16
	Newey-West SE	(2.53)	(2.71)		(3.19)
	Bootstrap p-value	7.8%	10.4%		13.8%
$(b_{n,t} + L_{n,t}) - b_{1,t}$			−2.39	3.88	6.49
	Newey-West SE		(2.90)	(3.75)	(4.22)
	Bootstrap p-value		14.5%	37.9%	26.0%
$L_{n,t}$		−17.96	−18.00	15.43	11.74
	Newey-West SE	(12.40)	(12.38)	(14.32)	(15.50)
	Bootstrap p-value	62.0%	38.8%	48.3%	50.0%
p-value		0.00	0.00	0.39	0.06
R^2		0.10	0.11	0.05	0.08
Sample			2000.2 − 2010.12		

Table A.IX: Return Predictability of Unadjusted Excess Returns.

We regress 3-month overlapping excess log bond returns of TIPS and of nominal bonds onto the TIPS term spread, the nominal term spread, the liquidity-adjusted TIPS term spread, the liquidity-adjusted breakeven term spread and the liquidity premium on TIPS $L_{n,t}$. $L_{n,t}$ is estimated as the negative of the variation explained by liquidity variables in Table **??**(4). Newey-West standard errors with three lags in parentheses. The p-value of the F-test for no predictability is shown. We also show one-sided bootstrap p-values from 2000 replications. We use block bootstrap with block length 24 months. Bootstrap accounts for the fact that the liquidity premium is estimated.

Panel A: U.S. (1999.6-2010.12)

		(1) $xr^{TIPS}_{n,t+1}$	(2) $xr^{TIPS}_{n,t+1}$	(3) $xr^{\$}_{n,t+1}$	(4) $xr^{\$}_{n,t+1}$
$y^{TIPS}_{n,t} - y^{TIPS}_{1,t}$		4.36			
	Newey-West SE	(1.29)			
	Bootstrap p-value	1.9%			
$y^{\$}_{n,t} - y^{\$}_{1,t}$				2.40	
	Newey-West SE			(1.42)	
	Bootstrap p-value			21.3%	
$\left(y^{TIPS}_{n,t} - L_{n,t}\right) - y^{TIPS}_{1,t}$			2.54		1.00
	Newey-West SE		(1.71)		(2.38)
	Bootstrap p-value		21.5%		30.8%
$(b_{n,t} + L_{n,t}) - b_{1,t}$			−1.09		4.98
	Newey-West SE		(2.80)		(3.32)
	Bootstrap p-value		10.3%		39.3%
$L_{n,t}$			17.91		0.12
	Newey-West SE		(8.98)		(9.24)
	Bootstrap p-value		9.2%		48.6%
Const.		−0.01	−0.03	−0.00	−0.00
	Newey-West SE	(0.01)	(0.01)	(0.01)	(0.01)
	Bootstrap p-value	94.9%	1.9%	46.5%	31.6%
p-value		0.00	0.01	0.09	0.33
R^2		0.12	0.16	0.04	0.05
Std-Expected Exc. Ret.		2.64	3.07	1.75	2.01
Sample			1999.6 − 2010.12		

Table A.IX (continued)

Panel B: U.K. (2000.2-2010.12)

		(1) $xr^{TIPS}_{n,t+1}$	(2) $xr^{TIPS}_{n,t+1}$	(3) $xr^{\$}_{n,t+1}$	(4) $xr^{\$}_{n,t+1}$
$y^{TIPS}_{n,t} - y^{TIPS}_{1,t}$		3.10			
	Newey-West SE	(1.71)			
	Bootstrap p-value	19.5%			
$y^{\$}_{n,t} - y^{\$}_{1,t}$				2.42	
	Newey-West SE			(1.58)	
	Bootstrap p-value			2.8%	
$\left(y^{TIPS}_{n,t} - L_{n,t}\right) - y^{TIPS}_{1,t}$			3.09		0.76
	Newey-West SE		(1.86)		(2.30)
	Bootstrap p-value		18.0%		41.6%
$(b_{n,t} + L_{n,t}) - b_{1,t}$			−0.14		4.10
	Newey-West SE		(2.46)		(4.37)
	Bootstrap p-value		40.2%		3.1%
$L_{n,t}$			−2.49		−6.26
	Newey-West SE		(10.15)		(10.13)
	Bootstrap p-value		16.3%		26.7%
Const.		0.00	0.01	−0.00	0.00
	Newey-West SE	(0.01)	(0.01)	(0.01)	(0.01)
	Bootstrap p-value	52.6%	37.2%	37.3%	48.1%
p-value		0.07	0.03	0.13	0.47
R^2		0.03	0.04	0.04	0.05
Std-Expected Exc. Ret.		1.56	1.69	2.01	2.23
Sample			2000.2 − 2010.12		

Table A.X: Sub-Period Betas.

We regress liquidity-adjusted and non liquidity-adjusted excess log government bond returns onto excess log stock returns. All variables are described in Table **??**. Newey-West standard errors are computed with three lags. * and ** denote significance at the 5% and 1% level for $\hat{\alpha}$ and $\hat{\beta}$, respectively.

Panel A: U.S.	1999.6-2010.12		1999.6-2006.12		2002.1-2010.12	
	$\widehat{\beta}$	$\widehat{\alpha}$	$\widehat{\beta}$	$\widehat{\alpha}$	$\widehat{\beta}$	$\widehat{\alpha}$
Excess Log Return Nominal	-0.19^{**}	4.21^{*}	-0.23^{*}	3.66	-0.19^{**}	4.87^{*}
Excess Log Return TIPS	0.01	4.66^{*}	-0.16^{*}	4.36^{**}	0.03	4.89^{*}
Excess Log Return BEI	-0.21^{*}	-0.45	-0.07	-0.69	-0.22^{*}	-0.01
Liq.-Adj. Exc. Log Ret. BEI	-0.08	0.52	-0.05	0.72	-0.09	0.65
Liq.-Adj. Exc. Log Ret. TIPS	-0.11	3.68^{*}	-0.18^{**}	2.94^{*}	-0.11	4.23^{*}
Log Return Liquidity	0.12^{**}	0.98	0.02	1.41^{**}	0.13^{**}	0.66

Panel B: UK	1985.7-2010.12		1985.7-2006.12		1985.7-1998.12		1999.1-2010.12	
	$\widehat{\beta}$	$\widehat{\alpha}$	$\widehat{\beta}$	$\widehat{\alpha}$	$\widehat{\beta}$	$\widehat{\alpha}$	$\widehat{\beta}$	$\widehat{\alpha}$
Excess Log Return Nominal	0.15	3.16	0.19	3.45	0.31	4.26	-0.07	0.86
Excess Log Return TIPS	0.14^{**}	1.63	0.13^{*}	1.58	0.16^{*}	0.53	0.13	2.77
Excess Log Return BEI	0.01	1.53	0.06	1.87	0.15	3.73	-0.20^{*}	-1.91

	2000.2-2010.12		2000.2-2006.12		2002.1-2010.12	
	$\widehat{\beta}$	$\widehat{\alpha}$	$\widehat{\beta}$	$\widehat{\alpha}$	$\widehat{\beta}$	$\widehat{\alpha}$
Excess Log Return Nominal	-0.08	0.42	-0.16	0.32	-0.08	1.50
Excess Log Return TIPS	0.11	2.58	0.02	2.75	0.11	3.34
Excess Log Return BEI	-0.19^{*}	-2.16	-0.19^{**}	-2.43	-0.19	-1.84
Liq.-Adj. Exc. Log Ret. BEI	-0.22^{*}	-0.58	-0.22^{*}	-0.32	-0.21	-0.28
Liq.-Adj. Exc. Log Ret. TIPS	0.14	1.00	0.06*	0.64*	0.13	1.79
Log Return Liquidity	-0.03	1.58	-0.03	2.11	-0.02	1.56

Table A.XI: Four Factor Regressions.

US liquidity-adjusted and non liquidity-adjusted excess log government bond returns onto excess log stock returns xr_{t+1}^{equity}, the SMB factor, the HML factor, and innovations in the Pastor-Stambaugh liquidity factor. Annualized (%). Newey-West standard errors with three lags in brackets. * and ** denote significance at the 5% and 1% level.

Panel A: 1999.6-2010.12	$xr_{n,t+1}^{\$}$	$xr_{n,t+1}^{TIPS}$	$xr_{n,t+1}^{b}$	$xr_{n,t+1}^{TIPS-L}$	$xr_{n,t+1}^{b+L}$	$r_{n,t+1}^{L}$
xr_{t+1}^{equity}	-0.13^{*}	0.08	-0.21^{*}	-0.05	-0.09	0.13^{**}
	(0.06)	(0.11)	(0.09)	(0.07)	(0.05)	(0.04)
HML	0.02	-0.03	0.05	-0.04	0.06	0.01
	(0.06)	(0.07)	(0.06)	(0.07)	(0.06)	(0.02)
SMB	-0.16^{*}	-0.11	-0.05	-0.13^{*}	-0.03	0.03
	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.02)
Pastor-Stambaugh	-0.07^{*}	-0.08^{*}	0.01	-0.07^{*}	-0.00	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.01)
const.	5.00^{*}	5.23^{**}	-0.22	4.59^{**}	0.42	0.64
	(1.99)	(1.81)	(1.60)	(1.47)	(1.30)	(0.67)

Table A.XII: Dickey-Fuller Unit Root Tests.

We report Dickey-Fuller test for the null-hypothesis of a unit root with twelve lags. $Supply_t$ denotes the amount of inflation-indexed bonds outstanding relative to all nominal and inflation-indexed bonds outstanding. $\Delta Supply_t$ denotes the relative issuance of inflation-indexed bonds relative to all nominal and inflation-indexed bonds issuance. $\Delta Supply_t - \Delta Supply_{t-12}$ is the change in relative issuance over the past 12 months. * and ** denote significance at the 5% and 1% level respectively.

Panel A: U.S.

	$Supply_t$	$\Delta Supply_t$	$\Delta Supply_t - \Delta Supply_{t-12}$
	-2.02	-2.12	-3.25^{*}
Sample	$1999.1 - 2010.12$	$1999.2 - 2010.12$	$2000.2 - 2010.12$

Panel B: UK

	$Supply_t$	$\Delta Supply_t$	$\Delta Supply_t - \Delta Supply_{t-12}$
	-1.96	-4.75^{**}	-2.65
Sample	$1986.1 - 2010.12$	$1986.1 - 2010.12$	$1987.1 - 2010.12$

Table A.XIII: Supply Autoregression.

We regress relative issuance $\Delta Supply_t$, as described in Table 5 onto its own twelve lags. We also regress the 12-month change in relative issuance onto its own twelve lags. We report the sum of the twelve autoregressive coefficients.

	Panel A: U.S. $\Delta Supply_t - \Delta Supply_{t-12}$	**Panel B: UK** $\Delta Supply_t$
Sum of Coeff.	0.44	0.23
const.	-0.25	0.00
	(0.21)	(0.00)
R^2	0.29	0.04
Sample	$2000.2 - 2010.12$	$1986.1 - 2010.12$

Table A.XIV: Sample Correlations of Excess Returns and Spreads.

Monthly data of quarterly overlapping returns and inflation 1999.6-2010.12. Annualized (%). All data are described in Table A.IX.

Panel A. U.S. (1999.6 – 2010.12)

Correlations Excess Returns

	$xr^{TIPS-L}_{n,t+1}$	$xr^{b+L}_{n,t+1}$	$r^{L}_{n,t+1}$
$xr^{TIPS-L}_{n,t+1}$	1	−0.06	−0.03
$xr^{b+L}_{n,t+1}$	.	1	−0.18
$r^{L}_{n,t+1}$	.	.	1

Correlations Spreads

	$\left(y^{TIPS}_{n,t} - L_{n,t}\right) - y^{TIPS}_{1,t}$	$(b_{n,t} + L_{n,t}) - b_{1,t}$	$L_{n,t}$
$\left(y^{TIPS}_{n,t} - L_{n,t}\right) - y^{TIPS}_{1,t}$	1	0.30	0.49
$(b_{n,t} + L_{n,t}) - b_{1,t}$	.	1	0.02
$L_{n,t}$	.	.	1

Panel B. U.K. (2000.2 – 2010.12)

Correlations Excess Returns

	$xr^{TIPS-L}_{n,t+1}$	$xr^{b+L}_{n,t+1}$	$r^{L}_{n,t+1}$
$xr^{TIPS-L}_{n,t+1}$	1	−0.55	−0.63
$xr^{b+L}_{n,t+1}$	.	1	0.65
$r^{L}_{n,t+1}$	.	.	1

Correlations Spreads

	$\left(y^{TIPS}_{n,t} - L_{n,t}\right) - y^{TIPS}_{1,t}$	$(b_{n,t} + L_{n,t}) - b_{1,t}$	$L_{n,t}$
$\left(y^{TIPS}_{n,t} - L_{n,t}\right) - y^{TIPS}_{1,t}$	1	0.53	−0.28
$(b_{n,t} + L_{n,t}) - b_{1,t}$	.	1	−0.15
$L_{n,t}$	.	.	1

Table A.XV: Estimating Liquidity with Alternative Measures of Nominal Bond Market Liquidity

We calculate the off-the-run curve spread by comparing the on-the-run yield with the implied yield for the same cash flows discounted at the Gurkaynak, Sack, and Wright (2007) yield curves, see also Supplementary Appendix Section B. The F&G Liquidity variables denotes the bond market funding liquidity variable by Fontaine and Garcia (2012). Over our sample period, the Fontaine and Garcia (2012) factor has a correlation of -0.07 with the the off-the-run curve spread and a correlation of -0.13 with the off-the-run spread used in the main paper.

$y^{\$}_{n,t} - y^{TIPS}_{n,t}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Off-the-Run Curve Spr.		-1.72**	-1.64**	-0.46				
		(0.33)	(0.32)	(0.44)				
F&G Liquidity						0.01	0.05	0.03
						(0.04)	(0.04)	(0.03)
Asset-Swap Spr.			-0.51*	-1.05**			-0.78*	-1.25**
			(0.25)	(0.29)			(0.34)	(0.24)
Transaction Vol.				0.39**				0.45**
				(0.10)				(0.07)
Survey Inflation	0.04	1.01	0.67	0.11	0.04	0.07	-0.27	-0.11
	(0.46)	(0.53)	(0.54)	(0.44)	(0.46)	(0.48)	(0.52)	(0.39)
CFNAI	0.25**	0.17**	0.11**	0.14**	0.25**	0.25**	0.16**	0.15**
	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R^2	0.39	0.55	0.58	0.65	0.39	0.39	0.44	0.65
ADF of Residuals	-4.17^{**}	-4.47^{**}	-4.12^{**}	-4.92^{**}	-4.17^{**}	-4.21^{**}	-4.03^{**}	-5.21^{**}

Table A.XVI: Risk Premia Correlations with Nominal Term Spread and Cochrane Piazzesi (2005) Factor

We report correlations between risk premia as reported in Figures 5A and 5B with the nominal term spread and the Cochrane and Piazzesi (2005) bond risk factor.

Panel A: US (19996.6-2010.12)	Nominal Term Spread	Cochrane-Piazzesi Factor
Inflation RP	0.71	0.26
Real Rate RP	0.88	0.63
Liquidity RP	0.37	0.34

Panel B: UK (2000.2-2010.12)	Nominal Term Spread
Inflation RP	0.85
Real Rate RP	0.90
Liquidity RP	-0.23

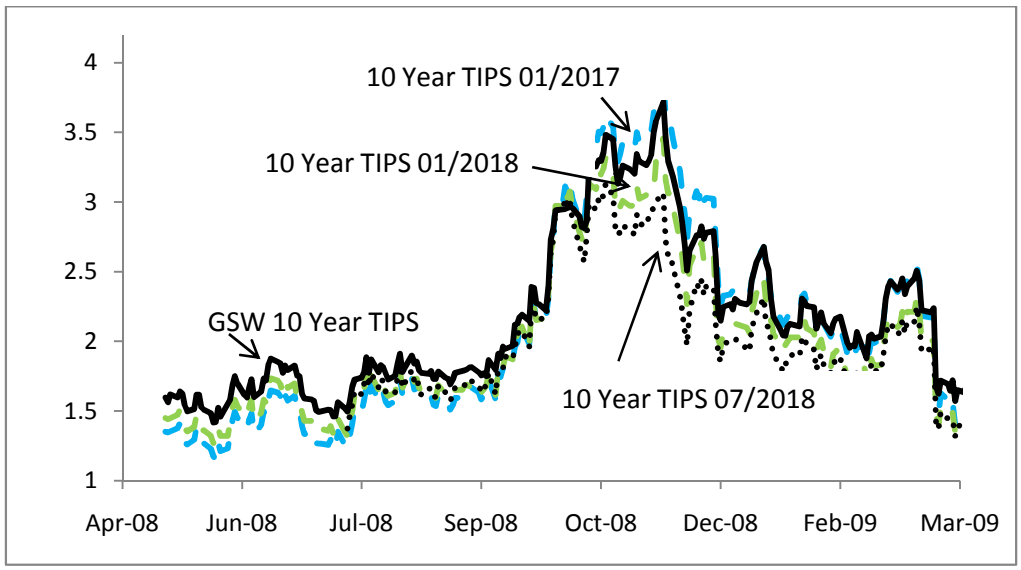
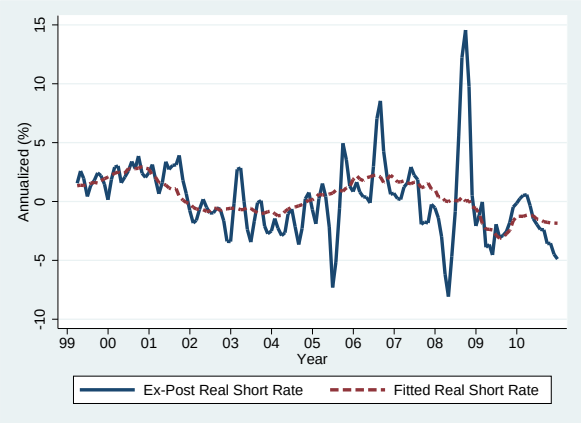


Figure A.1: Recently Issued and Less Recently Issued 10 Year TIPS.

GSW 10 Year TIPS yields from Gurkaynak, Sack and Wright (2010); 10 Year TIPS maturing in 07/2018 (reference CPI 215.7), 01/2018 (reference CPI 209.5) and 01/2017 (reference CPI 201.7) from Bloomberg.

Panel A: U.S.



Panel B: U.K.

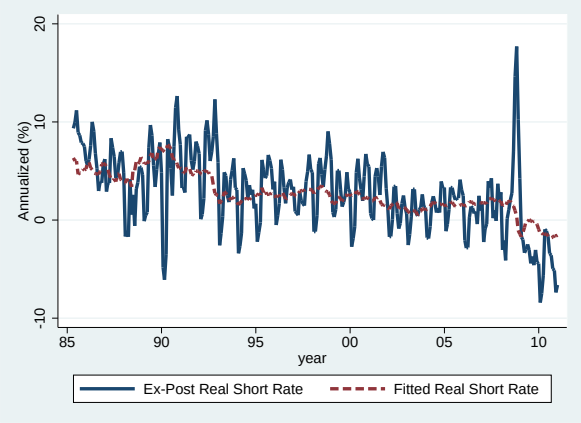


Figure A.2: U.S. and U.K. Ex-Post and Fitted Real Short-Term Rates

Ex-post real return on a nominal three month T-bill. The fitted real short rate obtains by regressing overlapping quarterly realized real return on nominal three month T-bill onto the nominal three month T-bill, three month lagged realized real return on three month T-bill and inflation over the past year, see Table A.I.

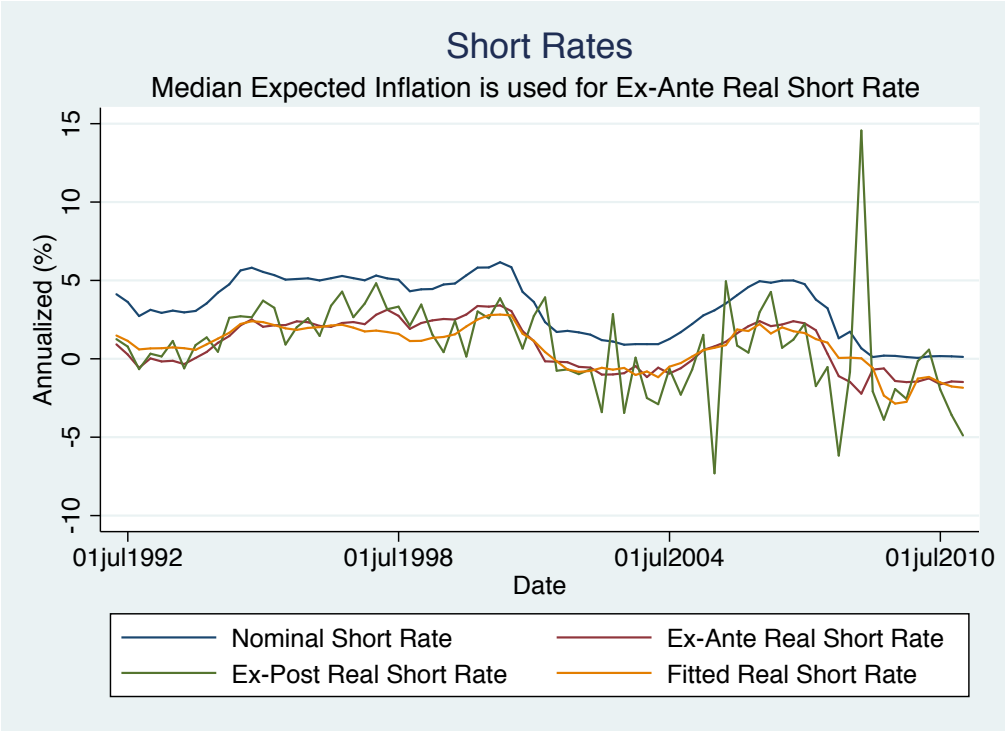


Figure A.3: U.S. Comparison Real Short Rate Proxies

We compare the fitted real rate in Figure A.2 with a real rate proxy based on Survey of Professional Forecasters' (SPF) inflation expectations. We use the difference between the nominal T-bill and the SPF one quarter median CPI-inflation forecast for the ex-ante real short rate.

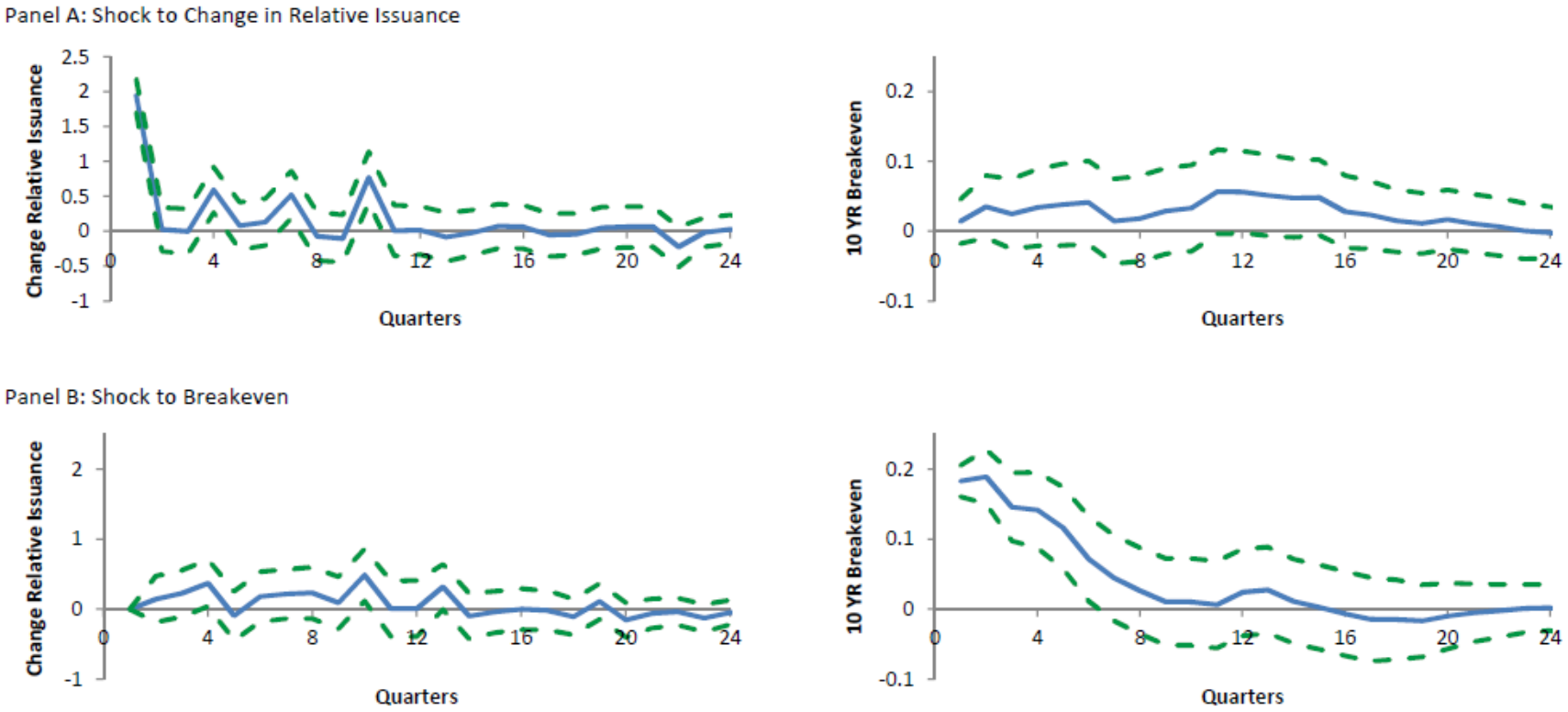


Figure A.4: Orthogonalized Impulse Responses to U.S. Year over Year Change in Relative TIPS Issuance (% of Total Issuance) and Breakeven (Annualized).

Monthly structural Vector Autoregression with 12 lags. Relative TIPS issuance is assumed to not react to a shock to breakeven within the quarter but only with a lag. Impulse Responses to one standard deviation increases in orthogonalized shocks. 95% confidence intervals shown in dashed.

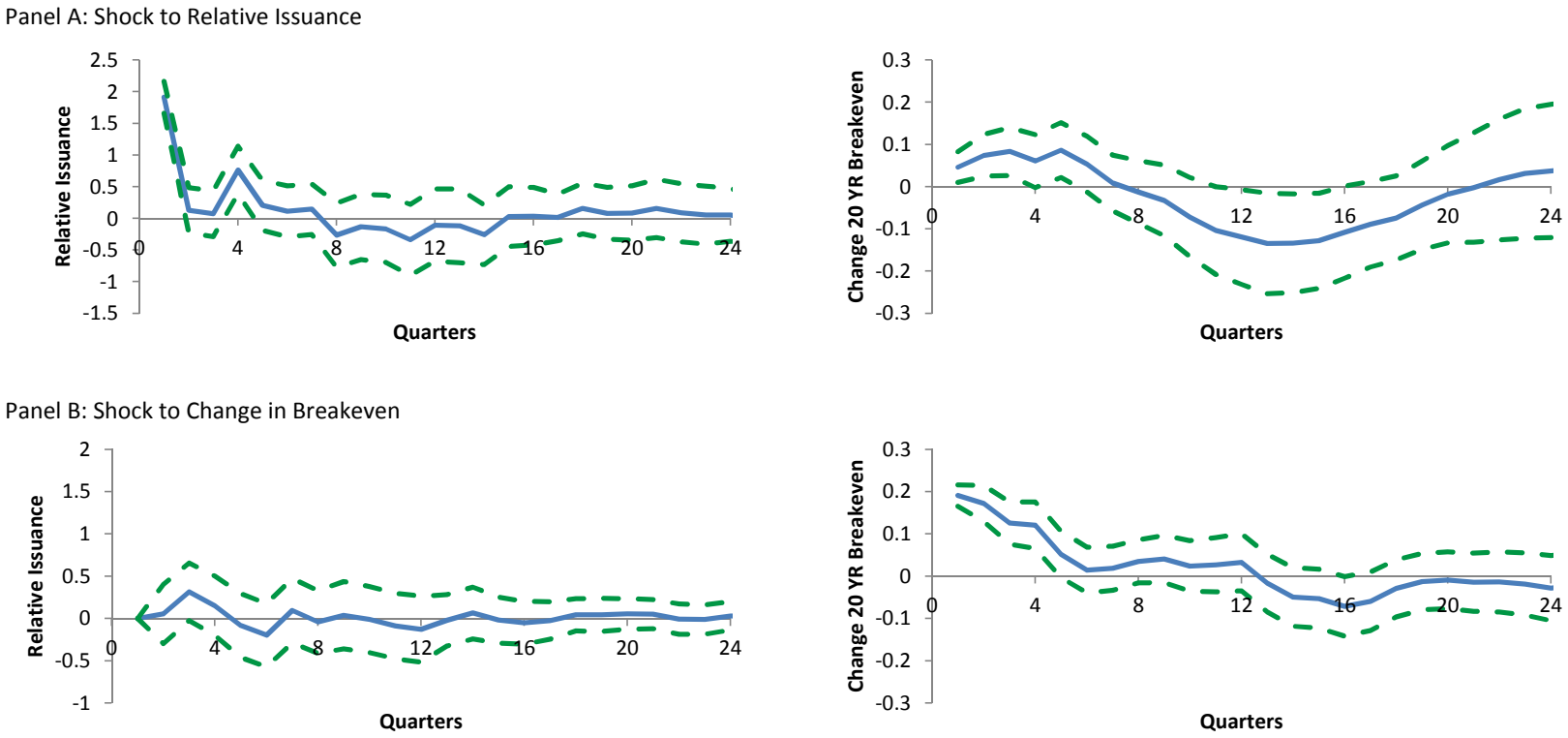


Figure A.5: Orthogonalized Impulse Responses to U.K. Relative Linker Issuance (% of Total Issuance) and Breakeven (Annualized).

Monthly structural Vector Autoregression with 12 lags. Relative linker issuance is assumed to not react to a shock to breakeven within the quarter but only with a lag. Impulse Responses to one standard deviation increases in orthogonalized shocks. 95% confidence intervals shown in dashed.

B Constructing the Off-the-Run Curve Spread

Table A.XV reports liquidity estimates using an off-the-run curve spread. The off-the-run curve spread compares the yield on an on-the-run bond with the yield obtained by discounting the same cash flows at an off-the-run yield curve.

We use the monthly CRSP Treasury master file to obtain end-of-quarter yields and issue characteristics for Treasury notes and bonds. We exclude all flower bonds and all bonds that are not fully taxable. We use the most recently issued bond with an original maturity of 10 years as the on-the-run bond. We obtain the on-the-run bond's yield, issue date, maturity date, and coupon from the CRSP Treasury master file.

Consider an on-the-run bond at time t with face value 100, maturity date mat_t, and yield $y_t^{on-the-run}$. The yield $y_t^{on-the-run}$ is semi-annually compounded in percent per annum. The on-the-run bond has semi-annual coupon payments of $c_t^{on-the-run}/2$, where $c_t^{on-the-run}$ is the bond coupon rate in percent per annum. At maturity mat_t, the on-the-run bond provides a cash flow of 100.

A zero-coupon bond with price P_t^{zero} and maturity mat_t provides a cash flow of 100 at mat_t and zero at all other times. A par-bond with maturity mat_t and semi-annually compounded percent per annum yield y_t^{par} provides semi-annual coupon payments of $y_t^{par}/2$ and a cash flow of 100 at maturity mat_t. Hence, a portfolio with weight $\frac{c_t^{on-the-run}}{y_t^{par}}$ on the par bond and $\left(1 - \frac{c_t^{on-the-run}}{y_t^{par}}\right)$ on the zero coupon bond replicates the cash flows of the on-the-run bond.

Gurkaynak, Sack, and Wright (2007) provide both zero coupon yields and par yields from a fitted smoothed off-the-run yield curve. Since Gurkaynak, Sack, and Wright (2007) provide yields with integer maturities, we interpolate linearly to obtain the off-the-run par yield y_t^{par} and the off-the-run zero coupon bond price P_t^{zero} with the same maturity as the on-the-run bond. The price of the on-the-run cash flows discounted at the off-the-run yield curve is then given by: $P_t^{curve} = \frac{c_t^{on-the-run}}{y_t^{par}} + \left(1 - \frac{c_t^{on-the-run}}{y_t^{par}}\right) P_t^{zero}$.

We then use the YIELD function in Excel to compute the semi-annually compounded percent per annum yield y_t^{curve} for a bond with price P_t^{curve}, coupon rate $c_t^{on-the-run}$ and maturity m_t. We calculate the off-the-run spread as the difference between the curve yield and the on-the-run yield in continuously compounded units: off-the-run$_t = 200 \times log(1 + y_t^{curve}/200) - 200 \times log(1 + y_t^{on-the-run}/200)$.