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Unconventional Monetary Policy and International Risk Premia

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Introduction

- Study the relationship between monetary policy, FX risk premia and term premia at the zero lower bound.

- Static, reduced-form approach analysis
 - ▶ Construct currency carry trade portfolios using U.S. and foreign daily interest rate.
 - ▶ Estimate the contemporaneous effects of U.S. monetary policy announcements on excess returns.

● Static, reduced-form approach analysis

- ▶ Construct currency carry trade portfolios using U.S. and foreign daily interest rate.
- ▶ Estimate the contemporaneous effects of U.S. monetary policy announcements on excess returns.

● Dynamic, structural VAR

- ▶ Identification by a variant of “external instruments”, avoids dubious assumptions.

Data

- VAR analysis: mix of daily, intra-daily and monthly data
 - ▶ 3-month, 5-year and 10-year zero coupon US yields
 - ▶ 3-month and 10-year foreign zero coupon yields (UK, Germany, Japan)
 - ▶ Log exchange rate
 - ▶ Log employment and core CPI
 - ▶ BAA-Treasury spread
 - ▶ January 1990 to March 2015 (January 1999 to March 2015 when the euro area as foreign country)

Carry Trade Analysis

Carry Trade and Excess Returns Analysis

- Construct 5 carry trade portfolios sorted in increasing order of the 3-month interest rate differential (with quarterly rebalancing).
 - ▶ Calculate daily returns to the carry trade strategy of going long the foreign bond and short the U.S. bond.
 - ▶ Investigate the relationship between excess returns and U.S. monetary policy using an event-study approach.

Excess Returns Definition

Hold-One-Day Excess Return (H1D)

$$H1D_t = (m - (1/260))i_{t+1} - mi_t - [(m - (1/260))i_{t+1}^* - mi_t^*] + s_{t+1} - s_t$$

Excess Returns Definition

Hold-One-Day Excess Return (H1D)

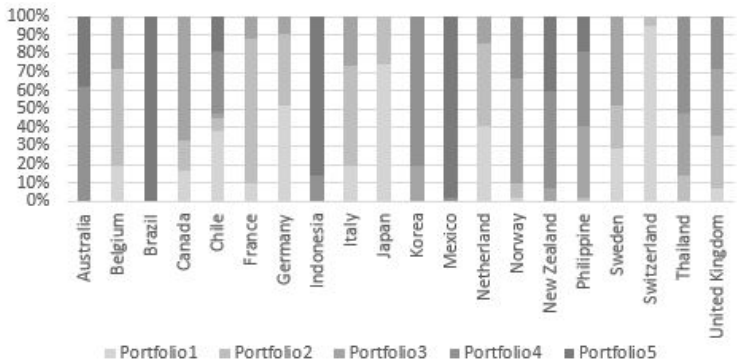
$$H1D_t = (m - (1/260))i_{t+1} - mi_t - [(m - (1/260))i_{t+1}^* - mi_t^*] + s_{t+1} - s_t$$

which is approximately

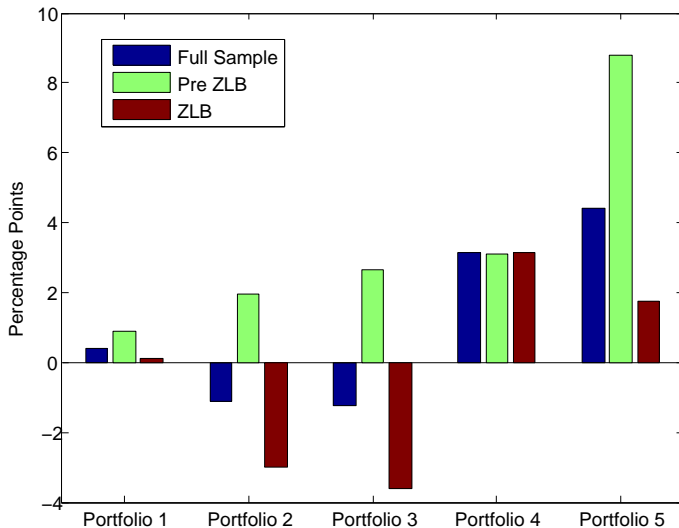
-[daily foreign bond ret - daily U.S. bond ret]+the FX ret

$$-[m(i_{t+1}^* - i_t^*) - m(i_{t+1} - i_t)] + s_{t+1} - s_t.$$

Portfolio Allocation by Country



Excess Returns



Excess Returns and MPS

We study the relationship between monetary policy actions and carry-trade portfolio returns:

$$H1Dt = \beta MPS_t + \varepsilon_t \quad (1)$$

OLS Regression: Excess Returns on MPS

Portfolio	1	2	3	4	5	All Ctrs
Panel A: One-Day Excess Returns (H1D)						
ZLB	0.067*** (8.79) [0.51]	0.071*** (6.41) [0.50]	0.037*** (5.56) [0.24]	0.040*** (3.83) [0.21]	0.038*** (3.50) [0.21]	0.051*** (8.41) [0.43]
Pre-ZLB	0.026*** (3.24) [0.24]	0.025*** (4.40) [0.24]	0.023*** (2.73) [0.20]	0.028** (2.44) [0.19]	0.025 (1.51) [0.08]	0.025*** (3.61) [0.26]
Panel B: Two-Day Excess Returns (H2D)						
ZLB	0.087*** (5.89) [0.46]	0.095*** (3.69) [0.38]	0.063*** (4.91) [0.27]	0.077*** (3.80) [0.21]	0.038 (2.27) [0.08]	0.072*** (5.09) [0.34]
Pre-ZLB	0.026 (1.62) [0.08]	0.023 (1.63) [0.07]	0.022* (1.72) [0.09]	0.038*** (3.75) [0.26]	0.057*** (2.87) [0.23]	0.033*** (3.26) [0.20]

VAR Analysis

VAR Identification

- VAR in monthly data: $A(L)Y_t = \varepsilon_t$.
- Errors: $\varepsilon_t = R\eta_t$; $\eta_t = (\eta_{1t}, \eta'_{2t})'$.
- Define Z_t as intraday change in five-year futures bracketing monetary policy announcements.
- Define X_t as daily (or intradaily) change in Y_t bracketing monetary policy announcements.
 - ▶ Set $X_t = \varepsilon_t$ for variables with only monthly data.

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 - ▶ Set $X_t = \varepsilon_t$ for variables with only monthly data.
- Assumption A1: $E(\eta_{1t}Z_t) = \alpha$ and $E(\eta_{2t}Z_t) = 0$.
- Assumption A2: $E(Z_t(\varepsilon_t - X_t)) = 0$.

VAR Identification

- Identification methodology combines event-study methodology (RSW (2014)) with external instruments (Olea, Stock and Watson (2013), Mertens and Ravn (2013)).
- Identifying assumptions are quite mild.
- Compute impulse responses to shock that lowers five-year ZC yield by 25 basis points.

Risk Premia

- Main objective is to measure effects of monetary policy shocks on risk premia, defined as follows:

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- Domestic Term Premium

$$TP_t(m) = r_t(m) - E_t\left(\frac{1}{m/3} \sum_{i=0}^{m/3-1} r_{t+3i}(3)\right). \quad (2)$$

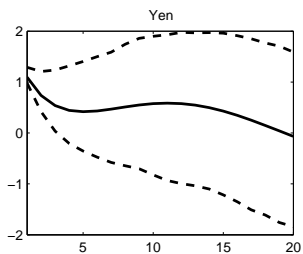
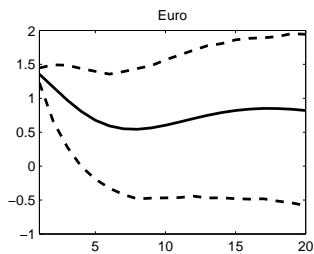
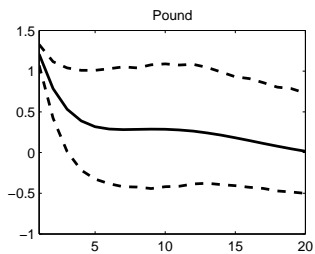
- Foreign Term Premium

$$TP_t^*(m) = r_t^*(m) - E_t\left(\frac{1}{m/3} \sum_{i=0}^{m/3-1} r_{t+3i}^*(3)\right). \quad (3)$$

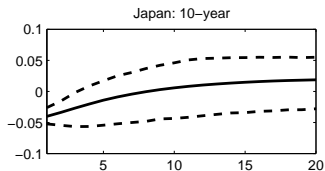
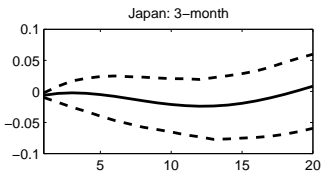
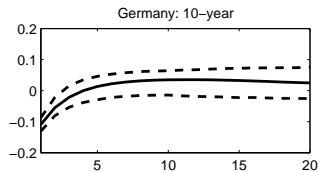
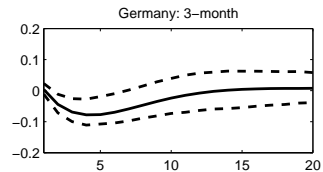
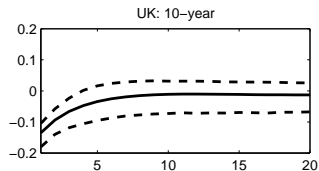
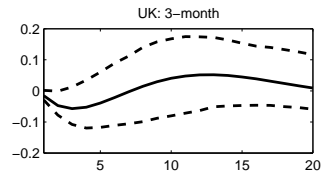
- Foreign Exchange Risk Premium

$$FP(m) = \frac{1}{m/3} \sum_{i=0}^{m/3-1} [E_t r_{t+3i}^*(3) - E_t r_{t+3i}(3) + 400(E_t s_{t+3i+3} - E_t s_{t+3i})]. \quad (4)$$

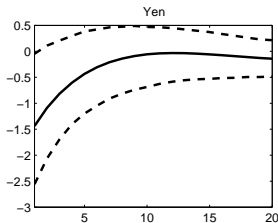
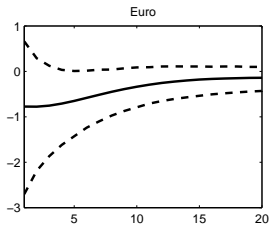
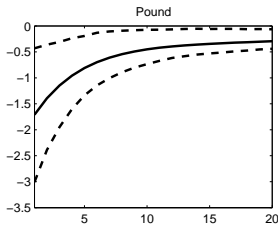
Effects of US MPS at ZLB on FX



Effects of US MPS at ZLB on Yields



Effects of US MPS at ZLB on FX Risk Premia



Foreign Exchange Risk Premia

- We find that US monetary policy easing surprises may **lower** foreign exchange risk premium.
- Opposite direction to the failure of conditional UIP found by EE (1995) and others.

Foreign Exchange Risk Premia

- We find that US monetary policy easing surprises may **lower** foreign exchange risk premium.
- Opposite direction to the failure of conditional UIP found by EE (1995) and others.
- IMF (2013) argues that unconventional monetary policy easings shift risk-reversals in the direction of skewness towards dollar depreciation.
- If policy easings give the dollar more “crash risk”, then risk premium on foreign asset should fall.

Regression of 2-day change in risk reversals on US monetary policy surprises

Risk Reversal Maturity	Euro	Pound	Yen
1 month	1.18*** (0.32)	0.80** (0.34)	1.60** (0.69)
3 months	1.07*** (0.30)	0.64** (0.28)	1.52** (0.72)
6 months	0.85*** (0.23)	0.54** (0.24)	1.07** (0.51)
1 year	0.70*** (0.20)	0.47** (0.24)	0.83* (0.44)

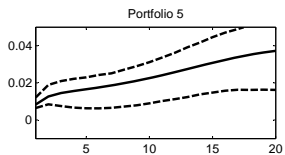
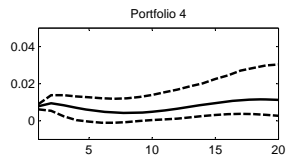
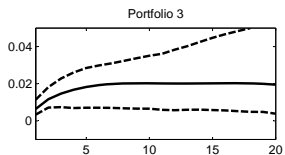
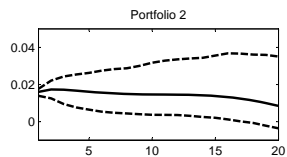
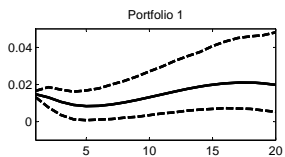
Effects of US MPS at ZLB on Domestic Term Premia

	Point Estimate	Confidence Interval
Five-year	-21.5	(-27.0,-12.6)
Ten-year	-20.5	(-25.8,-10.8)

Effects of US MPS at ZLB on Foreign Term Premia

	Point Estimate	Confidence Interval
UK	-13.6	(-22.6,-7.1)
Germany	-10.3	(-13.8,-7.1)
Japan	-5.4	(-10.0,-1.0)

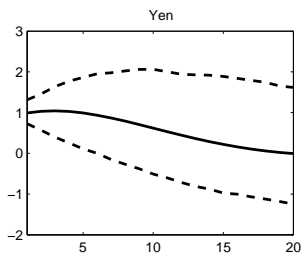
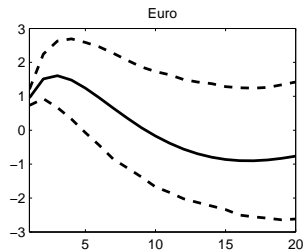
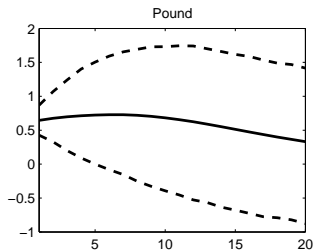
Effects of US MPS on carry-trade returns



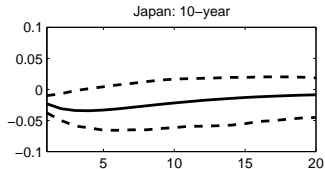
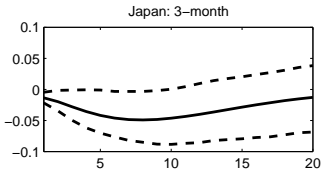
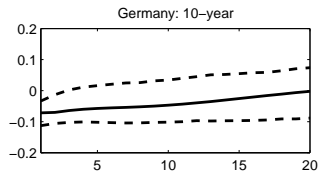
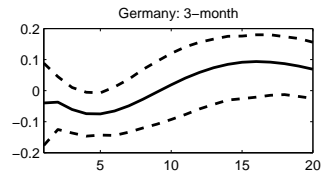
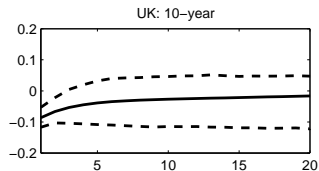
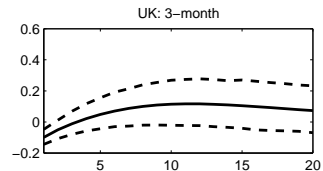
Monetary Policy Shocks before the ZLB

- Can apply methodology to monetary policy shocks before the ZLB.
- Monetary policy surprise Z_t is change in fourth eurodollar contract.
- R_1 estimated over Feb 1994-Oct 2008.

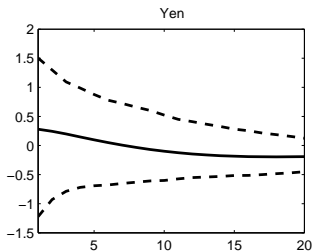
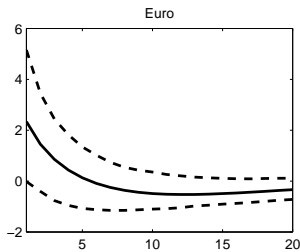
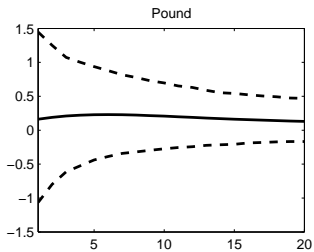
Effects of US MPS pre-ZLB on FX



Effects of US MPS pre-ZLB on Yields



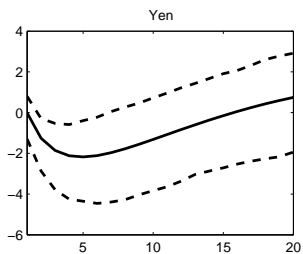
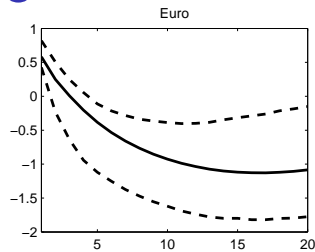
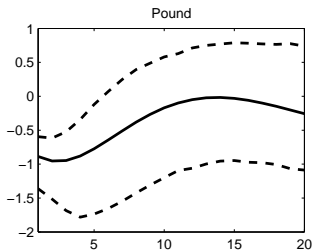
Effects of US MPS pre-ZLB on FX Risk Premia



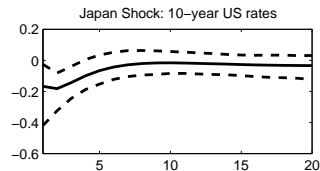
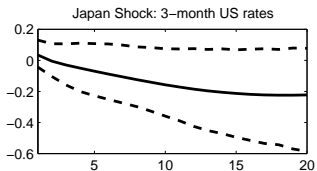
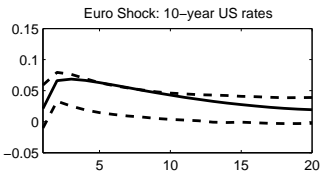
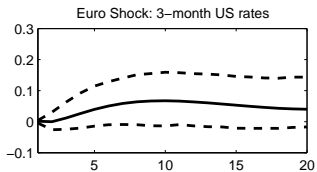
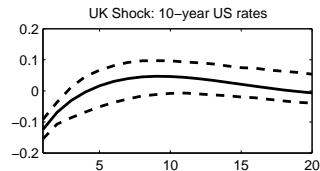
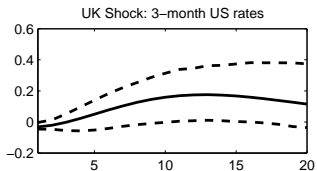
Non-US MPS

- Can redo the same analysis for BOE, ECB and BOJ monetary policy shocks.
- External instrument is change in ten-year yields for UK and Japan and change in ten-year Italian/German spread for ECB.

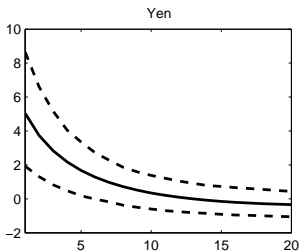
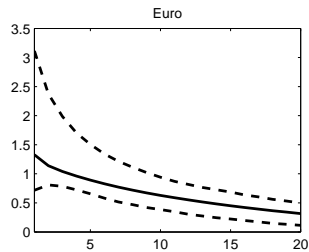
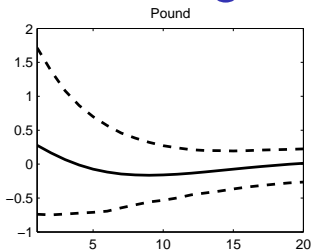
Effects of foreign MPS on FX



Effects of foreign MPS on Yields



Effects of foreign MPS on FX Risk Premia



Conclusions

- We estimate effects of MPS on excess returns to currency carry trade portfolio at HF.
- We employ a dynamic, structural VAR analysis, using MPS as the external instrument.

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- We employ a dynamic, structural VAR analysis, using MPS as the external instrument.
 - ▶ We have not found irreproachable evidence on how these shocks affect foreign exchange risk premia, although MPS easings tend to lower foreign exchange risk premia during the ZLB.
 - ▶ On the other hand, there is consistent evidence that unconventional U.S. monetary policy easing shocks significantly lower domestic and foreign bond term premia and lead to dollar depreciation.