

Impact of the Liquidity Coverage Ratio on Security Prices

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Agenda

- 1 Introduction
- 2 Background
- 3 Theoretical considerations
- 4 Empirical analysis
 - Descriptive statistics
 - Measuring the HQLA-premium
 - Discussion
- 5 Conclusion

Motivation

- Introduction of the Basel III Liquidity Coverage Ratio (LCR)
- LCR requires banks to hold sufficient High Quality Liquid Assets (HQLA) relative to the expected Net Cash Outflows (NCOF)
- **Research Question:** What is the added value for a security which qualifies as HQLA (HQLA-premium)?

What we do...

- Quantify the HQLA-premium for securities denominated in Swiss francs (CHF) making use of a unique quasi-natural experiment
- Theoretical analysis to identify the determinants of the HQLA-premium

...and what we find

- Theoretical analysis: HQLA-premium depends on...
 - ▶ ...how strict the LCR is and on the elasticity of the HQLA supply
 - ▶ ...monetary policy environment (level of central bank reserves and interest rates)
- Empirical analysis: we find weak evidence for the existence of a HQLA-premium of 4 bps for securities denominated in CHF
- Assessment: estimation of the lower bound HQLA-premium primarily due to the current monetary policy environment

Liquidity regulation under Basel III

- Basel III introduces internationally harmonized regulatory frameworks for banks' liquidity risks
- Two concepts:
 - ▶ **Liquidity Coverage Ratio (LCR)**
 - ▶ Net Stable Funding Ratio (NSFR)

Liquidity regulation under Basel III (cont'd)

- LCR requires banks to hold sufficient unencumbered HQLA relative to the expected NCOF for a 30 days stress scenario

$$LCR = \frac{HQLA}{NCOF} \geq 1 \quad (1)$$

- Implementation: 4-year phase-in starting January 2015
- Publication of detailed requirements for securities to qualify as HQLA by FINMA on 7 July 2014

HQLA

- HQLA consist of Level 1 and Level 2 assets:
 - ▶ Level 1: central bank (CB) reserves and securities; government and supranational debt with highest credit quality (regulatory haircut: 0%)
 - ▶ Level 2: Level 1 category securities with lower credit quality; covered bonds and corporate debt (regulatory haircut: 15%; 40% threshold)
- Non-HQLA: all other assets (regulatory haircut: 100%)

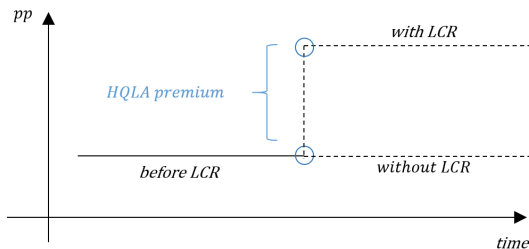
Former liquidity regulation in Switzerland

- Coverage of short-term liabilities with “liquid assets”
- Definition of liquid assets less strict than definition of HQLA
 - ▶ SNB-eligible securities were deemed to be liquid assets
 - ▶ No regulatory haircut
- With the announcement of the LCR, formerly liquid assets were classified as either Level 1, Level 2 and non-HQLA (on SNB-website)
- Regulatory value of formerly liquid assets changed as follows

Regulatory value =	{	Level 1	unchanged
		Level 2	regulatory downgrade
		non-HQLA	regulatory exclusion

HQLA-premium

- Definition: change in the pricing of a security triggered by the different regulatory treatment under the LCR
- Measurement: change in the yield spread between Level 1 and Level 2 (non-HQLA) securities



Hypotheses for empirical analysis

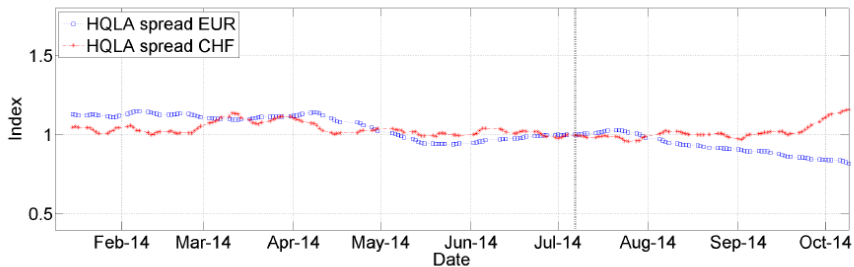
- **Hypothesis 1:** Without LCR, the pricing of HQLA securities and non-HQLA securities differs due to credit and liquidity risk considerations.
- **Hypothesis 2:** If the LCR is a binding constraint and the supply of HQLA securities is not fully elastic, a HQLA-premium is added to the existing yield differentiation between HQLA and non-HQLA. The size of the HQLA-premium depends on how strict the LCR is, whether there is a shortage of HQLA and the degree to which banks can reduce their NCOF.
- **Hypothesis 3:** If the yield on HQLA securities and the interest rate the CB pays on reserves are identical and there are sufficient reserves, the HQLA-premium is zero as banks are indifferent between holding reserves or HQLA securities in order to fulfill the LCR.

Dataset

- CHF- and EUR-denominated SNB-eligible securities (i.e. liquid assets under the former liquidity regulation)
- Observation period 6 January 2014 until 17 December 2014
- Only securities with maturity date \geq 1 February 2015 and no new issuances (fixed dataset)
- In total 1,628 securities

Development of securities denominated in CHF and EUR (const. maturity yield)

Non-HQLA spread in CHF and EUR (indexed; duration 4 years)



Difference-in-Difference (DiD) methodology

- Compare yield changes of CHF-denominated securities (treated group) with EUR-denominated securities (non-treated group)
- Use the fact that LCR was announced three months later in EU
- Dependent variable: difference between pre- and post-period average for each ISIN
 - ▶ SE do not suffer from serial correlation Bertrand et al. (QJE, 2004)
 - ▶ Number of observations = Number of ISINs
- Independent variables:
 - ▶ Dummy variables for the treated and non-treated groups, ...
 - ▶ HQLA attributes as well as interaction terms (HQLA attributes of the treated group)...
 - ▶ while controlling for the yield curves.

DiD methodology (cont'd)

- Treatment and control group...
 - ▶ include fairly homogeneous securities (fulfill SNB-eligibility criteria)
 - ▶ behave similar without treatment (parallel trend assumption; see e.g. placebo regression results)
- HQLA classification was publicly available
- Announcement of LCR details “exogenous” (FINMA/SNB)

⇒ Quasi-natural experiment (very nice and clean set-up)

DiD regression results

Table 2: Difference-in-difference regression results (coefficient are in percentage points)

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline	Liquidity	CH-issuer	LiqV	Placebo	Level 2
CHF x non-HQLA	0.0387** (2.53)	0.0436*** (2.83)	0.0446** (2.53)	0.0342** (2.22)	0.00527 (0.66)	0.0130 (0.90)
non-HQLA	-0.0576*** (-4.52)	-0.0576*** (-4.51)	-0.0576*** (-4.51)	-0.0559*** (-4.38)	0.00372 (0.95)	-0.0338*** (-2.92)
CHF	0.150*** (9.31)	0.155*** (9.86)	0.183*** (7.51)	0.159*** (9.71)	0.0167* (1.84)	0.0902*** (8.18)
CHF x Level 2						0.0167** (2.07)
Level 2						-0.0307*** (-7.19)
Constant	-0.0678*** (-5.89)	-0.0678*** (-5.88)	-0.0678*** (-5.87)	-0.0739*** (-6.29)	-0.0444*** (-11.14)	-0.0220*** (-3.27)
Observations	822	735	589	822	822	1660
Adjusted R^2	0.857	0.884	0.858	0.852	0.471	0.863
Duration (CHF/EUR)	Yes	Yes	Yes	Yes	Yes	Yes
Duration ² (CHF/EUR)	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Robustness checks

- Placebo regressions
- Modelling of the yield curve (slope, curvature)
- Different sample periods
- DiD with constant maturities
- DiD with daily observations but time and ISIN fixed effects
- CHF securities only, as well as VIX as control group
- Controlling for illiquid securities
- ...

⇒ No discrepancies from our baseline results

Discussion of results

- Evidence for a HQLA-premium of up to 4 bp
- Empirical findings are consistent with Hypotheses 1, 2 and 3
 - ▶ Low interest rate environment
 - ▶ Large excess reserves due to FX interventions (creation of HQLA; CHF 500 bn in 2016 versus about CHF 5 bn in 2007)
- Methodological issues
 - ▶ Exogeneity of policy announcement (underestimation)
 - ▶ Short post-period sample (underestimation)

Conclusion

- We quantify the impact of the LCR on security prices
- Empirical analysis: evidence for a HQLA-premium of up to 4 bps for securities denominated in CHF
- Theoretical analysis: HQLA-premium depends on whether the LCR is binding, on how strict the LCR is and on the monetary policy environment
- Various implications:
 - ▶ Monetary policy implementation
 - ▶ Bond markets (issuance conditions)
 - ▶ Central bank collateral policies
 - ▶ Financial stability