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

\[ LCR = \frac{HQLA}{NCOF} \geq 1 \]  \hspace{1cm} (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 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

\[
\text{Regulatory value} = \begin{cases} 
\text{Level 1} & \text{unchanged} \\
\text{Level 2} & \text{regulatory downgrade} \\
\text{non-HQLA} & \text{regulatory exclusion}
\end{cases}
\]
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)
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)

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

$t$ 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