(Thema)

Toolbased Liquidity Coverage Ratio Control

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Masterarbeit

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Abstract

The topic of this thesis arose from an internship with Deloitte Germany. The internship took place in a bank preparing for new regulatory claims, especially liquidity. After consulting for a better understatement in the new regulatory needs and improving reporting frequency and quality the issue of the costs to meet the Liquidity Coverage Ratio (LCR) came up.

Thus in this thesis we will develop a framework on how to evaluate regulatory caused liquidity costs for the LCR. This framework is then implemented into a Visual Basic for Application (VBA) tool, which displays a “fair” internal transfer price. Hence the concept of Funds Transfer Pricing (FTP) is used. The thesis will also have a look on the current situation in banks, I will mention ideas on further extensions in the tool as well. In general the thesis stays in touch with practitioner’s needs and market developments.

Keywords: Liquidity Coverage Ratio, Funds Transfer Pricing, Basel III, Capital Requirements Directive (CRD) IV, Liquidity Costs, Transfer Pricing.

Part I.: High Practitioner’s Relevance

1. Introduction

The thesis is based on an issue of the author’s internship with Deloitte Germany. The internship took place in a bank preparing for new regulatory claims, especially liquidity. After consulting for a better understatement in the new regulatory needs and improving reporting frequency and quality the issue of the costs to meet the LCR came up.

The first part of the introduction explains the structure of the thesis and sketches the approach. In the second part we will see the most basic concept of the LCR. Furthermore an overview of the contemporary discussion is drawn, which concludes the high relevance in practice.

1.1. Structure

In late 2010 the Basel Committee on Bank Supervision (BCBS) published - It is framework for two new monitoring standards on liquidity the LCR and the Net Stable Funding Ratio (NSFR). After an observation period beginning in 2011, they will become legally binding in 2015 and in 2018. The combination of LCR and NSFR shall be an appropriate mixture of a short rolling 30-day window of liquidity monitoring and a “longterm” window of one year. In the end the reporting frequency for the LCR will be between monthly and daily in case of a stressed financial environment.

During my internship with Deloitte Financial Services our team developed and implemented ideas to fulfill the new regulatory figure LCR. These ideas started from generally distributing an understatement in the bank to automatize data processing. Obviously the regulatory claims were not fulfilled self-acting, but effort was needed. Thus it arose the idea to develop a framework on how to transfer-price this effort.

The LCR describes basically a stress scenario of assumed run-off rates and inflow default probabilities. The resulting cash flows have to be covered by cash stocks or stocks of highly liquid assets i.e. assets which can be transformed to cash almost immediately even in times of stress. As the LCR asks for more liquidity, we gain the comfortable situation where we do not need to define and discuss liquidity in an abstract way. It is straight forward to take a look at what is the BCBS demanding. In

\[1\] The construction of the NSFR is not exactly the same as the one of the LCR in another (longer) window but as it is not tangible for this work a closer description is left for others.
the end this is the definition of liquidity and what we will be talking about when we say “liquidity”.2

The aim of this thesis is to quantitatively measure the price to meet the regulatory needs. This evaluation is done on the level of products, to do so the thesis is structured as:

**Section 1.2** Basic knowledge about the LCR

**Section 2** Situation in banks according to the Quantitative Impact Study (QIS)

**Section 3** Baseline of the idea and functionality of FTP

**Section 4.1** How to derive the liquidity term-structure of an institute

**Section 4.2** How to charge a product

2Although Hicks’ remark in [12]: “The social function of liquidity is that it gives time to think.” is really striking especially in the case of a bank-run.
Section 5 Connecting the “How to”s to charge a bargain and set regulatory intended incentives

Section 6 How the tool supports management to meet regulatory claims

Chapter III Final extensions and thoughts

The final goal is: to find a system being less restrictive and stiff but dynamic to support a bank on its way to meet regulatory claims. During my internship the team\(^3\) came up with the idea that FTP is the way to choose. FTP allows a high degree of decentralized organization. Obviously this appears as the only practically applicable way as the bank structure becomes diverse.

In nature swarms act decentralized. Insects use really simple algorithms, which are the same for every single one of their class. From a desired behavior in individual responsibility arises a preferable state for the community. These patterns of behavior are not deterministic but concluded from simple if-then-statements\(^4\).

In terms of FTP\(^3\) the diverse internal and external claims become aggregated into a single number: the transfer price. Based on that figure decisions are evaluated on own responsibility to gain a community optimum. Does the transfer price cross a certain threshold bargains are denied or negotiated, making the choice between two or more bargains a “simple” if-then-situation. Thus a feedback is created (“wisdom of the anthill”). Supervisors, i.e. bank management and the European Banking Authority (EBA) become an insight of current market situations. For instance a concentration or dry out in certain asset classes or markets could either describe a deficit

\(^3\) Team: Tilmann Bolze, Andreas Breitbeil and Michelle Chen.
\(^4\) See [17].
in the regulatory design or the bank’s pricing. In turn a change in bank’s strategy or regulatory design tweak the algorithms. I.e. transfer prices are tweaked with no need to explain a completely new task.

Today FTP is organized by a bank’s treasury. The treasury ensures that the maturity mismatch between (mostly) long-term assets and (mostly) short-term liabilities does not exceed a certain extend. Maturity mismatch is caused by term-transformation. Doing so the treasury acts like an objective third person. They sell liquidity to loan granting divisions and pay fund raising departments for their funds.

But why do not business units trade their liquidity on their own? The group treasury adjusts yields for any type of risk. In that case they appear as external costs which occur if you think of a bank as a going concern. In case of liquidity risk especially maturity mismatch is comprehended.

**Figure 1:** Which aspects can be transformed to take advantage?

Before we start let me have a last statement. As I consider its style as really appropriate I will try to stick to [16]. Additionally I will have footnotes and an appendix.\(^5\)

\(^5\)But I will not milk it.
1.2. Constructing the LCR

Banking business is highly dependent on reputation and trust. In times of crisis or environmental change it is almost impossible to switch the business division’s focus. In terms of liquidity this means even if a bank wants to fund in the private sector, it will have to do so regularly in unbend-market times to be able do so during crisis as well (We might think of savings). The same counts for wholesale (interbank) funding. Although this is part of corporate governance and an enduring strategy, a profound LTP enhances most other management target.

Before 1997 most solid institutions could issue senior long-term debt below the swap curve. Then the Asian followed by the Russian crises took place. Uncertainty in the loan portfolio caused investors to demand an individual credit spread above London Inter Bank Offered Rate (LIBOR). The Enron-scandal and the new economy crises in 2002 just continued that image. Thus central banks lowered interest rates, consequently the asset swap spreads of the financial sector decreased. Obviously that new liquidity was missing before.

Four years later, in 2006 it became likely that banks looked at spreads above the swap rate as pure (bank individual) credit risks. In June 2007 a tremendous increase appeared (gray surface in figure 3). Recalling 2002, and the risk of not having the “ability to settle obligations with immediacy” - definition of liquidity risk by the European Central Bank (ECB).

Therefore the BCBS concluded that the available cash (or cash equivalent) today should have the ability to settle your outflows within the next 30 days. You could assume as the acceptance of level two assets came subsequently that the weights and run-off rates are a result of negotiation as well. Hence the two caps implemented appear at least partly as a rule of thumb. The result is the following formula:

\[
LCR_0 : 1 \leq \frac{Assets\ of\ level\ one\ \left[A_1\right] + \min\left(85\%\ Assets\ of\ level\ two\ \left[A_2\right], \frac{2}{3}A_1\right)}{Outflows\ \left[\text{OF}\right] - \min\left(\text{Inflows\ \left[\text{IF}\right]}, \frac{3}{4}\text{OF}\right)}
\]  

(1)

Talking about the quotient of the LCR it is numerator consists of the weighted “Value of the stock of high-quality liquid assets in stressed conditions”[2]. According to the BCBS the denominator is the “Total net cash outflows, calculated according to the scenario parameters[...]”[2].

In that way the denominator is “locked” by the Inflow cap (\(\frac{3}{4}\text{OF}\)) so inflows can never exceed three fourth of the outflows. The aim is to get an LCR greater or equal

\[6\] For a comparable timeline see [15] starting from page 146.
As the denominator is “locked” the fastest way to gain a higher LCR is to increase level one assets. Thus liquidity for the BCBS means getting more level one assets (mainly zero up to 20% risk weight assets, cash or central bank reserves) or reducing contractual outflows. Although according to practitioner’s experience reducing outflows is improbable (see section 6).

Beside the NSFR the 30-day LCR is the new regulatory requirement being binding from 2015. Especially scientists such as Douglas Elliott (working for J.P. Morgan and former principal researcher for the Center on Federal Financial Institutions) demanded a recognition of liquidity earlier within the Basel Framework. For instance France applied own liquidity requirements.

The banking sector and its representative like the Institute of International Finance (IIF) are persistently resistant but heterogeneous at the same time having different backgrounds. You can find many critics like: “It’s all about diversification - that is a key principle of risk management, if you have all your cash-raising collateral in one asset class, such as government bonds, it will be a pretty crowded trade when there is a crisis. We need to be able to diversify and use other assets as cash providers.” - which was stated by David Escoffier, co-head of global equity flow at Société Générale Corporate and Investment Banking (SG CIB) in London [25]. This might be one of the key
arguments why only regarding amounts (not their inherent relation) and especially these harsh acceptance thresholds (assets weights) could even increase interdependencies in times of stress.

In between there are governments or their corresponding central banks. Of course they wish to have a rock solid financial sector. But too high requirements in a still fragile environment might be overshooting. As there is no local differentiation some domestic markets perhaps appear inferior to others, which could draw causal effects to reputation or market risks. Additionally lobbies usual push the “panic button” of unemployment and a declining grant of industrial and private loans. Thus it is no surprise that there is in addition to any BCBS announcement not only another IIF point of view but an - often unpublished - local Central Bank correspondence. According to [26]: “Earlier this year the French, the British and the Canadians [added by author: Central Bank] all wrote to the Basel Committee demanding some form of further recalibration of the liquid asset buffer.”

![Figure 4: Trade-off between the three parties.](image)

Recent literature states that a discussion where the level two asset class is extended from $AA^-$ covered bonds to $BBB$ or even $BBB^-$ [26]. So this might not appear like a standard outlasting times of stress. But it shows the high degree of encouragement and practical relevance related to the LCR.
9. Conclusion and Outlook

The thesis developed a methodology on how to transfer price the efforts to meet regulatory claims. After introducing the LCR and transfer pricing a consistent pricing framework was explained. According to this it is applied in the appending VBA-tool. The result is a single figure which can be implemented in an internal transfer pricing to manage bank divisions precisely. Additionally a consistent target encouragement margin was developed. Nevertheless there are many customizations and extensions to be applied beyond this paper.

In February 2012 the spread between unsecured and secured lending with values around 150 BP was almost as high as in September 2008. If you recall figure 3 you see that this spread appeared at a third of the former interest level. Thus an increasing spread in an overall lower interest level could indicate an enduring lack of trust and liquidity. Apparently the importance of backed up interbank bargains as compensation for trust will remain on a high level.

Figure 19: Development of the Spread between unsecured and secured lending (EURIBOR - EUREPO) from one week to one year, Timeline: 01/01/2007 - 10/01/2012 (Data: Reuters DS-5.1)

With Moody’s released a white paper which emphasizes the strong link between LCR and FTP - as we found out as well. Of course they stay sketchy on the concrete implementation.

To overcome the currently ailing situation banks should first build a solid internal situation which helps them to fulfil regulatory figures, which in turn appears as a
signal and is reflected by the market. To gain a robust fundament the decentralized support of transfer pricing is keen. As the VBA-tool is residential in the FTP framework it is a first step to strengthen the internal situation.

The increasing number of releases on the LCR:FTP issue shows a higher importance. But what makes this topic important and complex is its interdependencies: After the phase-in of the LCR in mid 2013 an automatized report has to be generated. Feedback effects to other external figures and internal figures have to be accounted. But management has to build a solid ground where those effects are persistently hedged. Therefore this thesis gave some indications, whether a consistent implementation within banks will take considerably longer.

“Every ant knows the formula of its ant-hill, every bee knows the formula of its beehive. They know it in their own way, not in our way. Only humankind does not know its own formula.” — Fyodor Dostoyevsky