Funds Transfer Pricing in Banks - Implications of Basel III

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Introduction

As long as the net interest margin is the dominant income for banks, their approach to funds transfer pricing (FTP) will play a central role for their financial performance in both the short and the long term. The FTP system aims at allocating a bank's net interest margin to the financial products the bank provides to its customers. On an aggregate level, the information generated through the FTP system enables the bank to measure and evaluate the financial performance of its business lines and the profitability of customer relationships, but also to control and improve its overall assets and liability management (ALM). The accuracy of performance and profitability measurements as well as the efficiency of ALM stands in a direct relation to how accurately the net interest margin is divided into its three basic components: the credit spread, the funding spread and the interest rate spread.

In a bank that has developed and adopted a highly sophisticated FTP system, all granted loans to and obtained deposits from customers at branch/ business unit levels are matched centrally by the bank's treasury unit with liabilities and assets of the same maturity and term structure on the market. In this system, business units are accountable for the bank's credit risk exposures (as the originator of loans) and the cost efficiency of its operations (including the interest paid on deposits and savings products). In return, they are allocated the credit spread and the funding spread. Accordingly, the remaining component of the net interest margin, the interest rate spread, is allocated to the treasury unit, which is accountable for the bank's exposures to interest rate risk (including related operating expenses).

Similar to other FTP systems, even the sophisticated systems seem to be less clear-cut when it comes to assigning accountability for the cost of unexpected liquidity risk. This became evident during the financial crisis which led to the introduction of Basel III. In Basel III, the ability of the individual bank to manage liquidity shocks in the short- and medium term is particularly emphasised through the introduction of the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). These ratios are scheduled to be implemented gradually over the next five years, but in many banks the challenging work of revising their current FTP system has already started.[1] In this study we examine the internal pricing of

[1] For more elaborate discussions see for example Fiedler & Mahlknecht (2013), Tumasyan (2012), George (2006)

liquidity in highly sophisticated FTP systems and how banks are adapting their existing systems to comply with the new Basel III regulation.

The rest of the paper is organised as follows. In the next section we briefly recapitulate the theoretical foundations of efficient FTP in banks and its role in allocating risk exposure to different organisational units. Particular attention is paid to the internal pricing of liquidity and the effect of including a liquidity risk premium in a sophisticated FTP system. In the section thereafter we present, discuss and elaborate on the results of an empirical study in which we examine the FTP systems adopted by two large banks operating on the Swedish banking market. Based on our empirical findings and analyses we then contribute to the theoretical literature on FTP in banks by demonstrating FTP's impact on business decisions in banks operating on oligopolistic and oligopsonistic markets, respectively.

Funds transfer pricing theory

As Dermine (2009) clarifies (based on Klein (1971) and Monit (1972)), efficient FTP systems build on the separation theorem demonstrated by the two diagrams in Figure 1. The optimal volume of a bank's deposits (D^{OPT}) is reached when its marginal cost of deposits (MC_D)[2] is equal to the relevant market rate of the corresponding funding on the money or capital market. This market rate is the bank's opportunity cost of deposit funding and is commonly based on an interbank rate, such as LIBOR, or the interest rate on government bonds for short maturities of fixed term products, and swap rates for longer maturity fixed-rate products. At D^{OPT} it will not be profitable for the bank to take on additional deposits as the marginal cost of these deposits would exceed their opportunity cost in terms of market return. Similarly, the optimal volume of loans (L^{OPT}) is reached when the net marginal revenue on loans (NMR_L)[3] is equal to the market rate.

The left diagram in Figure 1 illustrates a market situation in which the bank is a net lender to the market. At this market rate level, the bank maximizes its profit not only by financing its lending to customers (L^{OPT}) with deposits obtained from customers, but also by raising additional deposits up to D^{OPT} and supplying these ($D^{OPT} - L^{OPT}$) to the money and/or the capital market. In the right diagram, the market situation is the opposite implying that the bank is instead a net funds borrower on the market.[4] Without market-access, the bank would

[2] The marginal cost is increasing since raising additional deposits requires the bank to either increase the deposit rate or conduct costly activities such as marketing or opening new branches.

[3] The net marginal revenue is decreasing since the bank must either lower the interest rate or take on loans of lower quality in order to increase its loan portfolio.

[4] In practice the separation theorem does not hold for all decisions. Some decisions affect both loans and deposits. For an extended discussion also incorporating how to handle dependent decisions, see Dermine (2011).

maximize its profit by adjusting both customer lending and customer depositing to the volume where NMR_L equals MC_D. However, if the bank would choose this volume even if there is a market with a relevant market rate, the shaded area in either of the left or right diagrams would then be foregone. With access to efficient money and capital markets, the bank can and should (at least in the short run) make its decisions about loan and deposit volumes separately regardless of the volume where NMR_L equals MC_D. This is in accordance with the separation theorem, which states that these decisions are independent of each other when loans and deposits are priced with reference to relevant market rates. Both the diagrams display how separate lending and funding decisions will maximize the profit of the bank.

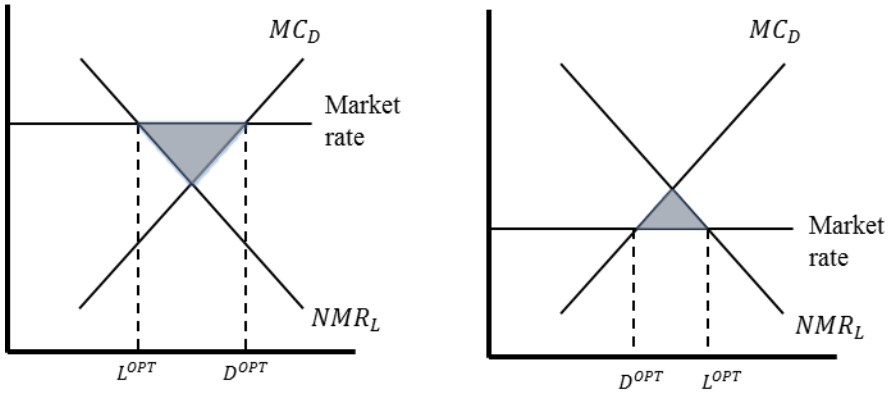

Figure 1 Optimal loan and deposit volumes under the separation theorem

In general, the bank's operations on the money and capital markets are taken care of at a central level by its treasury unit. In principle, the treasury unit operates as an internal clearing center in which the loan and deposit volumes resulting from business decisions at the branch level are netted. Irrespective of whether the business units (branches) are debited and credited the relevant market rates on their net or gross balances, only aggregate net balances need to be physically settled on the market. This reduces the bank's transaction costs. The advantage of central netting under the separation theorem increases substantially when the treasury unit pools and matches loans and deposits with respect to their different maturities. This is done by banks that have adopted a more advanced and sophisticated FTP system, like the matched maturity marginal funds transfer pricing (MMMFTP) system. In the MMMFTP system all loans and deposits with same maturity are allocated an internal price equal to the corresponding market rate or yield to maturity. In the coming analysis we will focus on the MMMFTP system, why we refer to, for example, Weiner (1997) and Kawano (2005) for a discussion of the characteristics and qualities of a number of other FTP systems.

By applying internal prices in accordance with yield curve based market rates, the MMMFTP system allows the bank to efficiently divide its net interest margin into the credit spread, the funding spread and, the interest rate spread (see Figure 2). Then the treasury unit assumes the interest rate risk, whereas the business units focus on managing exposures to credit risks and business risks in general. The liquidity risk is closely linked to the interest rate risk and can, in that respect, be regarded as a responsibility of the treasury unit. However, this requires that the internal prices in the MMMFTP system include a liquidity premium, which is added to the market rates in which the internal prices on loans are based on. Grant (2011) observes that prior to the crisis this premium was, if even applied, often based on an average cost and identical for all lending. Not only does this approach fail to reflect the higher liquidity risk embedded in long term lending, but it actually encourages business units to increase the maturity miss-match and, hence, the bank's liquidity risk.

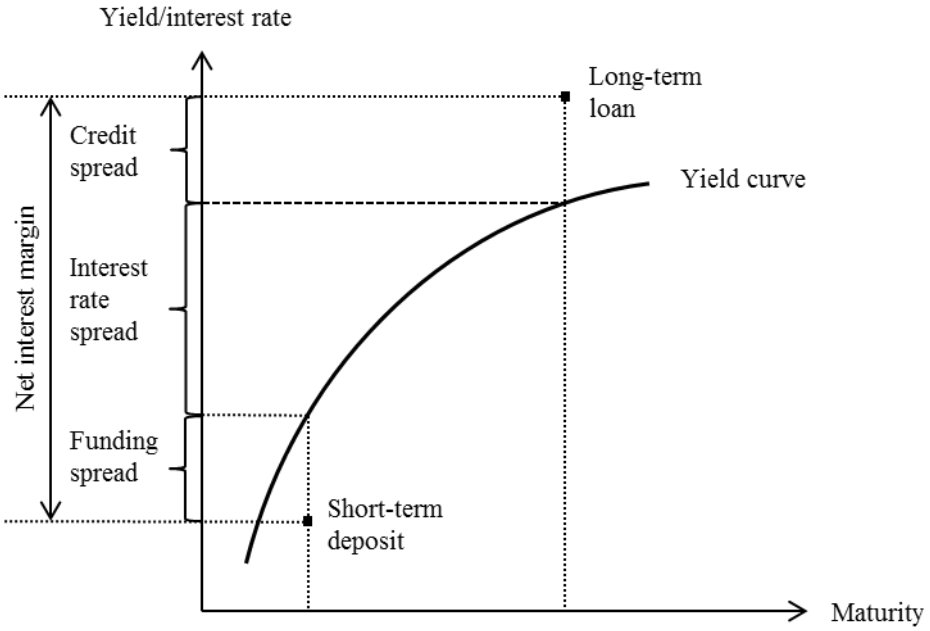

Figure 2 Division of the net interest margin

In his analysis of banks' liquidity transfer pricing (LTP), Grant (2011:30) stresses the importance of basing also liquidity premiums on opportunity costs and demonstrates that these costs can be derived *"by converting fixed-rate borrowing costs through an internal swap transaction and observing the spread over the reference rate, which is depicted from the swap curve"*. He views this spread as a term liquidity premium and argues that this premium, on one hand, should be charged on loans as an additional cost of using funds. On the other hand, it should be credited those business units that provide liquidity through obtaining deposits. The difference between an average and marginal cost based adjustment of the

relevant market rates is illustrated in Figure 3, where the swap curve corresponds to yield curve.

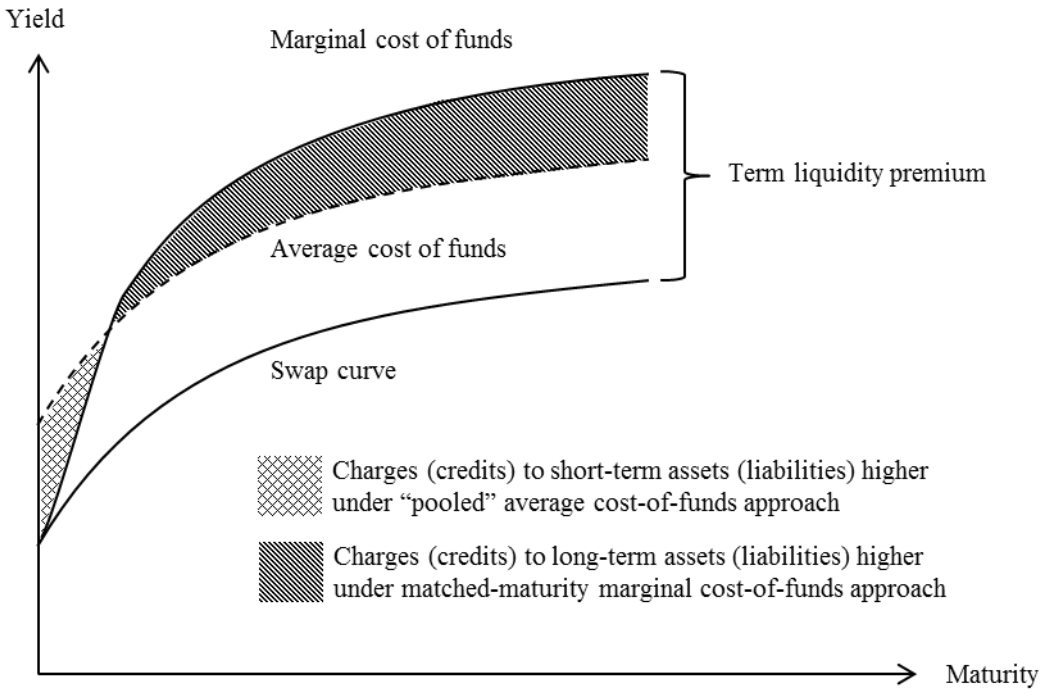

Figure 3 Matched-maturity marginal cost of funds approach to LTP
Source: Grant (2011:30)

A problem with liquidity premium adjustments of the internal prices on deposits may arise in banks that are net lenders to the market as they will only be paid the existing market rate. Figure 4 shows that a bank, which initially was a net borrower on the market, may in fact become a net lender when implementing a liquidity premium charge in its internal price. Prior to the implementation of the liquidity premium, the bank's loan volume (L^{OPT}) exceeded its deposit volume (D^{OPT}). The liquidity premium (LP) increases the previous internal price from FTP to $FTP_{LP,}$ hence incentivising branches on the business level to reduce the loan volume to L_{LP}^{OPT} and increase the deposit volume to D_{LP}^{OPT}. The reduction of the loan volume is unproblematic as long as the LP mirrors the opportunity cost of liquidity for the bank. At the new loan volume, the bank's NMR_L will compensate this cost. In theory, neither the increase of the deposit volume would be problematic when the LP is in accordance with the bank's opportunity cost of liquidity. At the new deposit volume the bank is exposed to less liquidity risk. However, we know from corporate finance theory that the market will not pay for any firm specific risk reduction, implying that the treasury unit will have to cover the LP compensation on deposits exceeding the loan volume (see the rectangle area A, B, C and D in Figure 4).

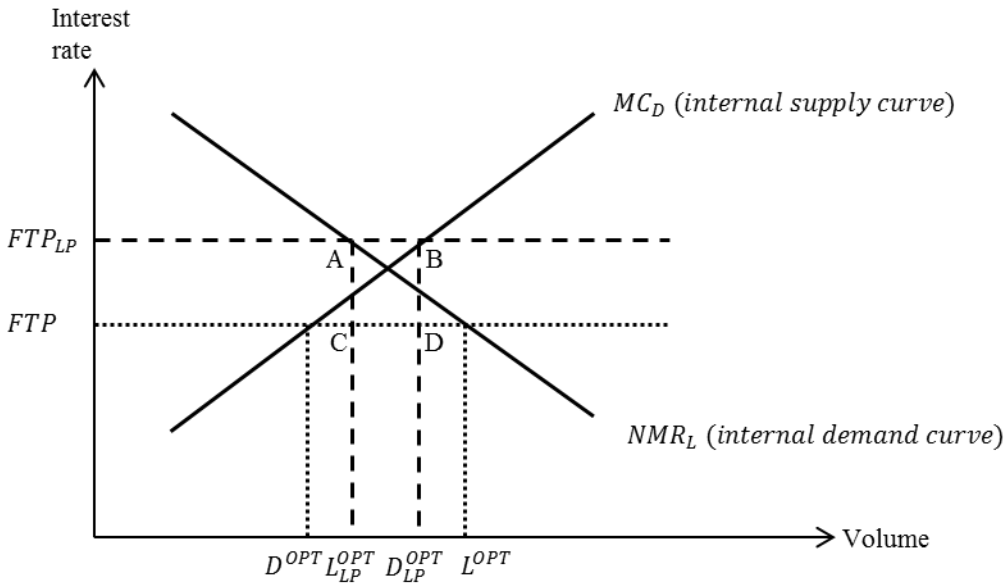

Figure 4 Funds transfer pricing with and without liquidity premiums

Practical implications

The imposition of the liquidity ratios in Basle III accentuates the problem of including liquidity premium charges in banks' funds transfer pricing in practice. As these ratios are very detailed and specific to each individual bank, the opportunity cost cannot easily be derived from the swap curve. Moreover, both the LCR and the NSFR are likely to incur fixed costs. To include these costs in the internal prices is not trivial. If fixed costs are to be covered with an average cost based charge, this will give the business units little incentive to alter the weights of different loans and deposits in their portfolios (see Figure 3). In deposit heavy banks, the bank's lending will under-compensate the liquidity premiums to deposits even more. The bank's lending is also unlikely to cover these premiums even if the charges included in the internal prices are differentiated with respect to maturity. The latter would lead to changes in the loan and deposit portfolios of the business units and, thus, lower the bank's overall exposures to liquidity risk. This would likely be preferable to the bank even though cost coverage may remain a problem for deposit-oriented banks.

Funds transfer pricing theory, and related literature, demonstrate the general role of FTP in a well-organised profit-maximizing bank operating in a risky environment. This provides banks with valuable insights about the foundations of efficient internal pricing of funds, but behavioural aspects must also be taken into consideration when applying FTP in practice. With conflicting purposes underlying the specific FTP application adopted by an individual bank, its actual FTP system is likely to be much messier than in theory. Below we will

explore if and how the introduction of Basel III is influencing the use and development of the FTP system in two case banks.

The choice of case banks

We have conducted interviews with representatives of two of the largest banks in Sweden; Skandinaviska Enskilda Banken (SEB) and Swedbank. The bank market in Sweden is currently of particular interest, since the Swedish authorities have decided to implement several regulatory measures included in the Basel III framework prior to other countries. These measures include the mandatory reporting of, and compliance with, the LCR by January 2013 among the large domestic banks. The Swedish bank market is also interesting because of its oligopoly-like structure. Four commercial banks dominate the market (having a total market share of about 85 per cent). Out of these four banks, SEB is the most pronounced merchant bank, whereas Swedbank primarily focuses on the retail segment. Swedbank has its origin in the savings- and cooperative bank sector, whereas SEB has always been a commercial bank.[5] The different focus of the two banks is likely to influence their FTP systems, hence, motivating our selection of these specific banks.

During the spring of 2014, interviews were made with two respondents in each bank. The respondents were the CFO and Head of Group Financial Management in SEB and the Head of Liquidity and Capital Steering and the Vice President Chief Controller of Group Treasury in Swedbank. Both authors were present during the interviews, which were recorded and transcribed. In the following sub-sections we present our initial analysis in which the respondents as well as the banks are kept anonymous.

The purpose of using FTP

In one of the banks, both the respondents view the FTP system as one of the main control mechanisms within the bank. As it is described to us, the bank's FTP system seems to serve both as a signalling device to the business units and as a means to optimize the profitability of the whole bank. One of the respondents specifically explained how, in the traces of the financial crisis, management decided on a three year plan in which the stability and risk management was put in focus whereas the returns were considered less important. One implication of this strategic focus was the deviation from the marginal cost of funds:

[5] A more detailed introduction of the two banks is presented in the appendix.

'Both Swedbank and SEB experienced problems on the funding market after the Baltic crisis. Therefore, we decided to base our FTPs on an average of Handelsbanken's and Nordea's funding cost. If we had not done that we would have been priced out of the market and we were confident that when the market stabilized our funding costs would go down. It has done so and about a year or two ago we went back to our true funding cost, in the meanwhile treasury took the costs centrally.'

According to the respondent the bank is now entering the next phase, which is described as *'optimizing the profitability of the bank without compromising the strength of the balance sheet'*.

In the other bank a project was launched in 2010 to design a new FTP system. Both respondents declared that the main purpose of the new system is to accurately price the funds generated and used by business units. This purpose has guided the project already from the start and is motivated by an intention and ambition to avoid internal political discussions related to the use of FTP. In contrast to the previous FTP system, the new system is no longer used as a control mechanism but should only reflect the actual funding cost of the bank. In the long run, the treasury unit should not make any money on the basis of the FTP and there are no strategic decisions involved in the setting of the FTPs. This means that that there are no major negotiations between the treasury department and the business-side of the bank related to the FTPs. One of the respondents described the new FTP system in the following way:

'Our main task at the Treasury department is to price money, we also handle regulatory reporting and compliance but ultimately we try to accurately price our funding'

As in the other bank, another important purpose of the new FTP system is to transfer the interest rate risk and currency risk to the treasury department. The pricing of risk is further discussed under the technicalities of the FTP systems.

Organizing the FTP system

In both banks the FTP system is organized under the treasury unit on a CFO mandate. The treasury units 'own' the entire balance sheet and operate strictly as a bank within the bank, charging and crediting all transactions with a related FTP. Moreover, capital is allocated to all

transactions and return on capital is used to evaluate profitability on a customer or transaction basis.

Two key problems related to reorganizing the FTP system, in accordance with the new regulations, are described by the respondents as the technical aspects and gaining acceptance in the organization. The technical aspects refer to the IT-infrastructure, which includes a large number of systems in both banks. Some of these systems are very old and not compatible with the complexities of a more sophisticated FTP system. Several of the respondents noted that the elusiveness of the regulatory process aggravates this problem. Implementing systems' change can be both time-consuming and expensive, but there is no way of knowing if the regulatory requirements are going to change in the near future. One of the respondents specifically noted:

> *'If we take LCR as an example, the people at Group Financial Management spend weeks on going through the balance sheet, item by item, to recalibrate against the LCR-measure. When they are done they inform the guys at the IT-department who set up a system, which the regulatory authorities may later decide to change.'*

The acceptance problem has two dimensions and also differs somewhat between the two banks in relation to their respective purposes with their FTP systems. The first dimension relates to the different perspectives on the FTP experience of employees in the different divisions. In the merchant bank division, the employees generally want the FTP to be updated as often as possible and small price-changes make a big difference to them. In the retail division it is almost the other way around and employees prefer stability over getting the exact price down to the single basis point. In one of the banks the conflict between the separate needs of the divisions gives rise to political discussions and negotiations, while in the other bank the FTP is considered to reflect the 'correct' funding cost and there is less room for politicking.

The second dimension relates more directly to the regulatory process and one of the respondents explained that there seems to be a regulatory fatigue among the employees. He specifically emphasized the balance between getting the price correct and the number of changes that can be made:

> *'In the management we have to think about the balance between theoretical perfection and bank optimization in relation to involvement. If we constantly*

change the parameters people stop paying attention and we lose the ability to manage'.

Although problems like those described above occur in a practical context, both banks have chosen to move towards a more sophisticated FTP system which shares many characteristics with the MMMFTP systems suggested in theory. This is further discussed in the following subsection, which briefly introduces the more technical aspects of the FTP systems and focuses on how the case banks handle the cost of liquidity and the adaptation of their FTP systems to Basel III.

The technicalities of the FTP systems and the adaptation to Basel III

In one of the banks, the respondents described the FTP system in terms of a calculator. The calculator extracts market data from Reuters, which assigns daily base-rates to all transactions. The traders at the treasury unit calculates a cost of liquidity called maturity add-on and the cost of keeping a liquidity buffer called the liquidity buffer add-on on a weekly basis. These add-ons are added to the base-rate together with 'other costs', which include charges for the deposit insurance, the countercyclical buffer, and other funding costs. The calculator then adds these together and feeds the FTPs into the bank's IT-system. Before the crisis and Basel III, the bank did not have any liquidity-related add-ons and most of the FTPs were based on historical average costs. The previous FTP system was also, to a greater extent, used as a signaling device in terms of manual adjustments made by the management when they wanted to incentivize the business units to alter their balance sheets.

The new system is highly sophisticated and closely resembles the MMMFTP approach. In terms of practical considerations the organizational adaptation process is still ongoing and the respondents stressed that it has not been an easy transition so far: neither in terms of explaining the new system to the employees nor making the IT-technical adjustments. However, another interesting practical problem that arises with the introduction of the liquidity premiums in the FTP system is related to the handling of customer pre-payment. Traditionally, a customer has to pay an interest-rate related redemption charge if the customer, for instance, decides to pre-pay a loan. This redemption charge is regulated under the Swedish Consumer Credit Act and the standard contracts of all banks include clauses that determine how this should be handled. The same is not true for the liquidity costs associated with pre-payments and according to one of the respondents there is an ongoing project within the bank that aims to develop a new standard contract, but in the meanwhile the treasury department bears the liquidity costs associated with pre-payments.

According to the respondents from the other bank, their bank also applies a highly sophisticated MMMFTP-like approach in which a base-rate (such as a swap rate) is used to match a combination of the contractual and behavioural maturity of the product. In addition, products are charged with a liquidity add-on matched against the cost of the liquidity buffer. The respondents described many similar problems, but one respondent specifically discussed the increased importance of attracting deposits after the introduction of Basel III:

> *'Deposits have become much more important today, but deposits are like gasoline: you can increase the price and if you are successful others will follow. Accordingly we have raised our FTPs on deposits and our external prices to attract more deposits but in fact the business units do not seem to experience an increased inflow and we will most likely go back to our previous prices – the price-elasticity is just not that high on deposits'*

It is quite clear from the interviews that the introduction of the LCR and NSFR stimulate banks to increase deposits on expense of other types of funding. It is also clear that the price of liquidity is going up, but it is less clear if the benefits of these ratios exceed their costs.

Analysis and theoretical implications

Both the case banks have designed and adopted sophisticated FTP systems, which are well in accordance with the described theoretical framework. The respondents in one of the banks explicitly underlined the aim of accurately pricing internal funds, whereas optimizing the balance sheet and returns on capital were emphasized in the other bank. Also the banks' adaptation to the changing regulatory requirements related to Basel III seems to be theoretically founded. The time dimension is evident, though. Revisions of the FTP system, for example, with respect to the LCR and the NSFR buffers, are not accomplished overnight. The implementation of new components, like add-ons or LPs, was rather seen as a process by the respondents and, as was maintained in one of the banks; 'a project of its own'. New designs or adjustments of the FTP system must be communicated throughout the organization and may require educating of personnel as well as anchoring at the business unit level. However, even after such a project is completed and the bank operates a fully implemented new and/or revised FTP system, business units might still respond different from what is expected in traditional FTP theory. Despite Monit's (1972:435) observation that *"markets for bank assets and liabilities are often oligopolistic in nature"*, to the best of our knowledge, the

FTP theory does not yet cover the case of oligopoly – let alone the case of oligopsony, which was indirectly referred to by the respondents.

The bulk of literature on funds transfer pricing in banks seem to implicitly presume that banks operate either under 'perfect' competition, where the slopes of the internal demand and supply faced by business units are explained by ever-increasing incremental or marginal costs to attract and attach borrowers and savers, or under monopolistic competition where business units more or less can act as a monopolist toward bank customers of both kinds. Neither of these market conditions seems to be the prevalent one in Sweden. The respondents in both banks gave examples of events and situations, which suggest that the banks are operating under oligopolistic competition when providing customer loans and under an oligopsony-like market condition when obtaining deposits. The following empirical observation provides further evidence of the oligopoly-like market condition in Sweden.

In November 2013, the Swedish Financial Supervisory Authority announced a potential adjustment of the risk weights on mortgages in the capital adequacy requirements from 15 to 25 per cent. In a response to this potential increase, one of the case banks (Swedbank) did increase its interest rate with 25 basis points on all mortgages. As commented upon by the respondents in both banks, none of the other three major banks in Sweden did change their mortgage rates. This is not an unexpected reaction of competitors on an oligopoly market and, in the prospect of losing market shares, Swedbank soon decided to change back to its former mortgage rate levels.

It appears as if the decisions to change the mortgage rates were made at a central level of the bank and, thus, not at the business unit level as a response to an add-on of 25 basis points included in the FTP. In the latter case, however, the business units might very well had been reluctant to increase their mortgage rates in the first place. In an oligopoly, the single bank (business unit) will be likely to meet a 'kinked' (external) demand curve on the consumer loan market. Banks on this market are supposed to focus on market share and, in order to defend (gain) market share, they will be more likely to respond actively (passively) on a decrease (increase) of the price of another bank. As displayed in Figure 5, the internal demand curve of a business unit of the bank, i.e. its net marginal revenue (NMR_L), therefore breaks into two parts with different slopes resulting in a 'gap' at the volume where the external demand curve kinks.

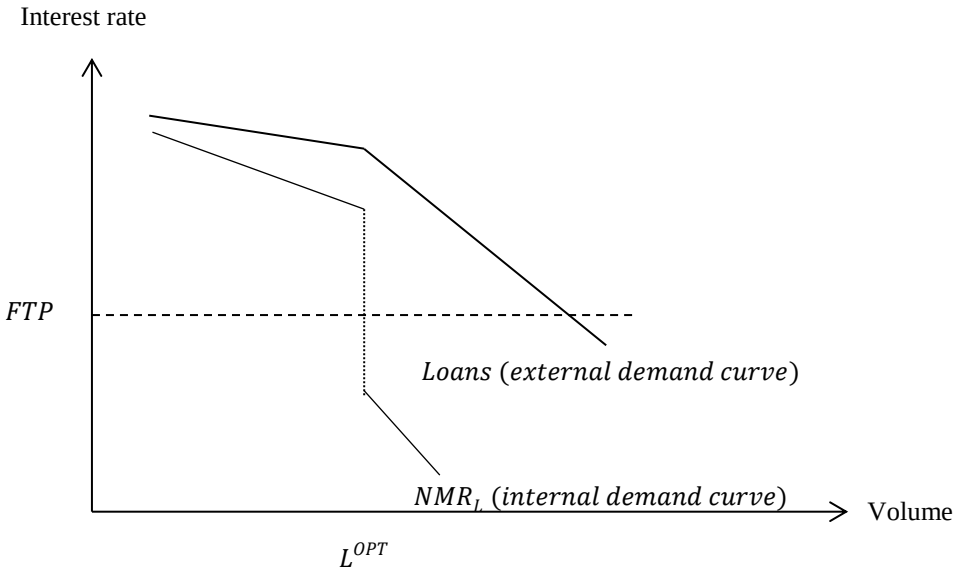

Figure 5 Funds transfer pricing and optimal loan volume in an oligopoly

Due to the 'gap' in NMR_L, the business units of the bank are likely to be less sensitive to changes in internal prices for using the funds needed to provide loans. Depending on the size of the gap and the present level of the FTP, the underlying market rate may be manipulated substantially without affecting the current loan volume. This is why the business units of Swedbank might not had increased their mortgage rate levels if the potential increase of the bank's funding cost would instead have been 'signalled' through the FTP system.

Accordingly, the implementation of an 'add-on', in banks operating on an oligopoly market, in terms of a liquidity charge (LP) may not lead to a desired volume reduction of the loan type targeted even if the LP is based on the bank's 'true' opportunity cost of liquidity (see Figure 6).

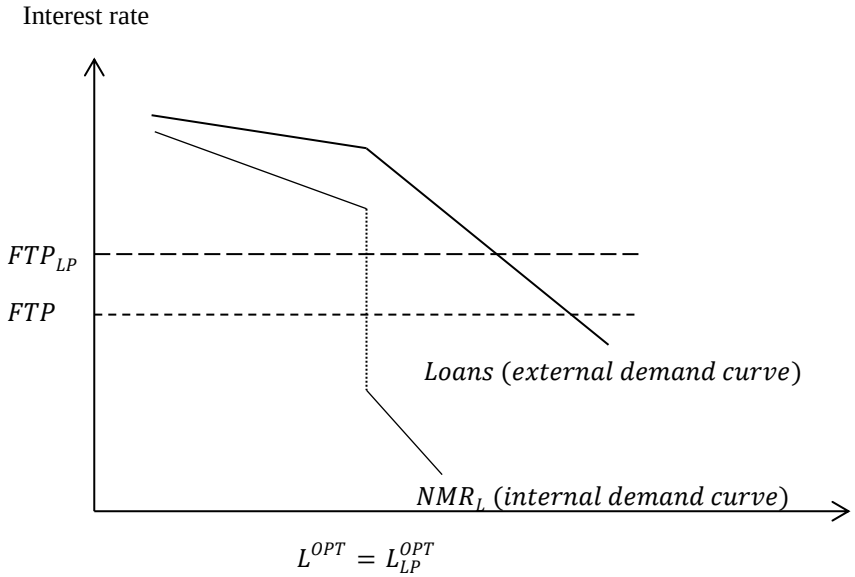

Figure 6 Optimal loan volume under oligopoly, market-based FTP and liquidity premium

On an oligopsony market, a bank's business units are facing the corresponding opposite situation on the deposit side. The bank will experience a kinked supply curve in an oligopsony market. The banks operating on this market are expected to react on any other bank's increase of the interest rate offered to customers on their deposits, but not to respond on a lowering of the deposit rate. As no bank can gain market shares by being aggressive, the banks will be reluctant to take any action unless other banks do. The external supply curve in Figure 7 reflects the bank's average funding cost. This is because all customers are assumed to get the same deposit rate. Accordingly, the slope of the internal supply curve, i.e. the marginal cost of deposits (MC_D), will be twice as steep as the slope of external supply curve. Similar to the internal demand curve on an oligopoly market, the internal supply curve (MC_D) is therefore split into two separated parts at the kink of the external supply curve.

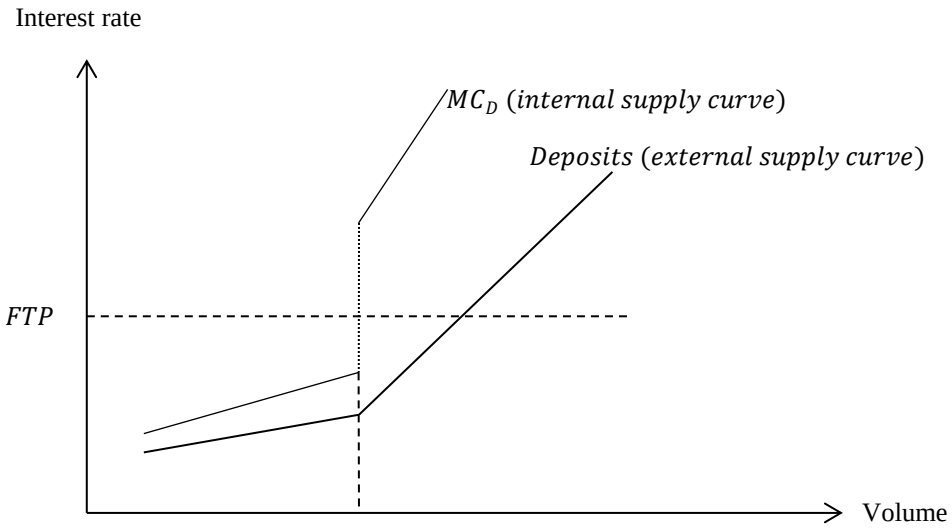

Figure 7 Funds transfer pricing in an oligopsony and optimal deposit volume

Depending on the size of the gap between the marginal cost at the points just to the left and to the right of the volume where the external supply curve kinks, the business units concerned will be more or less insensitive to changes in internal prices regardless of whether these are liquidity risk premium or market rate driven. Provided that the banks have access to efficient and well-functioning money and capital markets, the separation theorem will still hold even though a bank (treasury unit) that makes a deviation from the actual market price (add-ons etc) may not achieve the desired effect. This is illustrated in Figure 8.

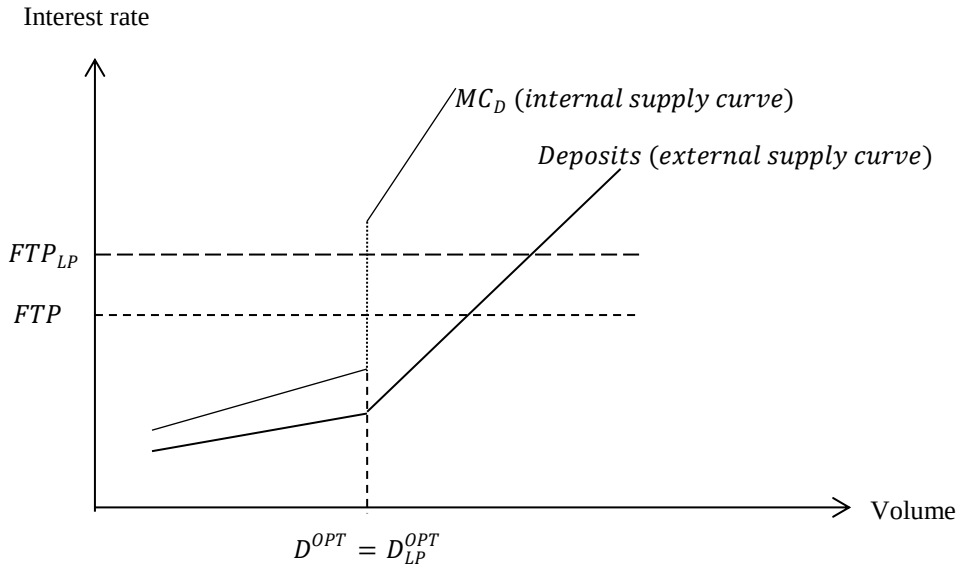

Figure 8 Optimal deposit volume under oligopsony, market-based FTP and liquidity premium

In Figure 9, the conditions of oligopolistic bank competition on the consumer loan market and oligopsony on the consumer deposit market are considered simultaneously. The figure shows clearly the benefit for the bank of having access to a market-based internal price (FTP_M). Such access is also valuable for a bank which operates under other market conditions, but the conditions of oligopoly and oligopsony are distinguished from these in that deposit and loan volumes may remain unchanged even if the bank would face an increase in its current market rate. The degree of this robustness depends on the difference between the slopes of the internal supply curves and the reaction of competitors. As in other oligopolies and oligopsonies, a general market rate change is likely to alter the optimal volumes for all banks.

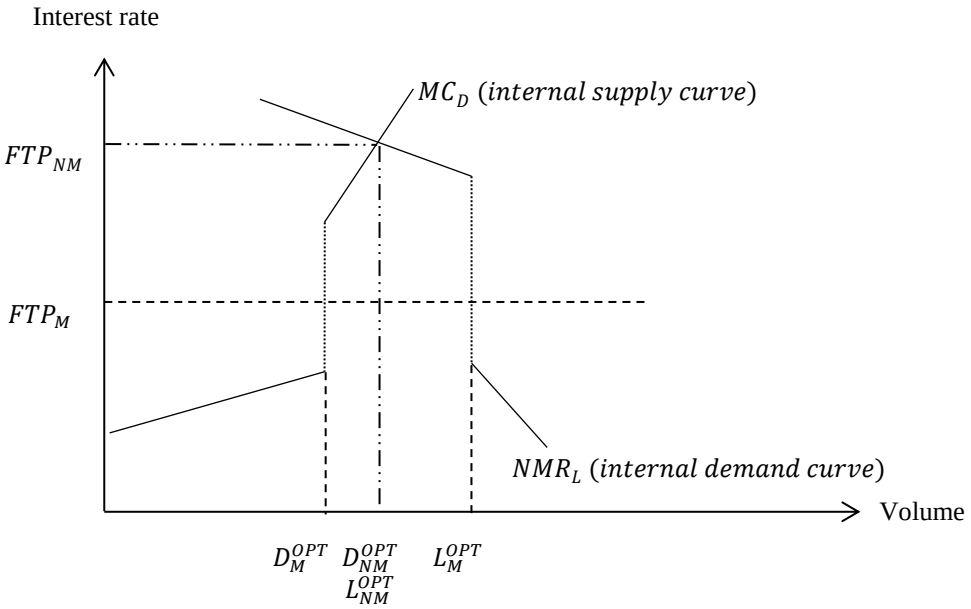

Figure 9 FTP under oligopoly/oligopsony with and without market access

The situation would change radically if the banks on these markets did not have access to efficient money and capital markets. Then divergences between the optimal deposit and loan volumes cannot be settled externally and, consequently, the advantage of the separation theorem would be forgone. As is also displayed in Figure 9, it would in that case be optimal for the single bank to set an internal price (FTP_{NM}) at a level where the internal demand (NMR_L) equals the internal supply (MC_D). This will lead to an identical optimal deposit and loan volume. For the bank in Figure 9, this would reduce overall profit due to a lower loan volume and a larger deposit volume incurring higher costs. Without access to a market-based internal price, the bank (business units) would also be more sensitive to changes in the FTP_{NM}. On one hand, this appears to make it easier for the bank to comply with the liquidity buffers in Basel III by adding a liquidity premium to the FTP_{NM}. On the other hand, the bank would then risk losing market shares that will be costly to regain from the 'new' kinks on the external demand and supply curves.

Conclusion

The financial crisis and the regulatory framework following the crisis have brought new attention to banks' FTP processes. Regulators are now trying to make sure that banks successfully price risk and several regulatory measures have been taken in this direction over the past years. The present paper examines the internal pricing of liquidity in highly sophisticated FTP systems and how banks are adapting their existing systems to comply with the new Basel III regulation. Under the traditional assumptions of the theoretical FTP framework, the cost of liquidity should be added to a marginal cost based FTP.

However, the practical implications are not as straightforward since the market will not pay for any firm specific risk reductions, banks that are net lenders to the market may find that the market is not willing to pay the liquidity premium. Moreover, the implementation costs, although not accounted for in theory, is highly relevant in practice. It is clear from the empirical findings of the paper that the respondents think of the FTP adaptation as a process, or even a project. The cost of updating the IT-systems, educating employees and altering the control processes are not trivial and should be considered as a part of the regulatory costs.

The empirical findings also made us consider an extension of the FTP theory to cover the cases where banks are competing under oligopoly and oligopsony market conditions. This extension may have important policy implications both internally, within the banks, and externally for regulators and academics. In case of the former, bank managers can use the model to better predict the behaviour of the business unit managers, whereas the designers of

regulatory metrics could gain from the model by better understanding how banks, operating under different market conditions, may act and react in response to their policy mechanisms.

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Appendix

SEB

Stockhoms Enskilda Bank (SEB) was founded in 1856. In 1934 SEB was transformed into a public company and in 1971/2 SEB merged with Skandinaviska Banken (SB) and formed S-E-Banken. According to Olsson (1986), one of the prime reasons for the merger was SEBs pronounced merchant bank focus. During the booming years of the 1960s, credit demand was high and SEB had problems to attract funding for the expansion since their deposits from private customers were relatively small. SB had a larger deposit portfolio and the merger allowed the new bank to continue its expansion. According to Glete (1994), the merger also marked the end of a transformation of SEB starting already in the 1920s. Driven by external factors, such as market change and government regulation, the bank went from being the central organization in the Wallenberg sphere[6], to become a financial service organization for the extensive portfolio of industrial firms controlled by the Wallenberg's. During the oil crisis in 1974, only a few years after the merger, a large part of the firms connected to SB ran into major difficulties but the bank managed well, primarily because the state absorbed much of the losses. As the problems abated in the late 1970s several of the larger firms started to find other ways to finance their activities and similar to the other banks in Sweden S-E-Banken started to expand within the growing real estate sector (Glete, 1994). Initially this strategy seemed to pay off and in the late to mid-1980s S-E-Banken was considered one of the most profitable banks in world but as the crisis unfolded in the early 1990s the credit losses quickly increased (Englund, 1999). In the traces of the crisis a new management team entered the bank with a more forward-looking cash-flow driven view of risk and as the conditions stabilized, during the mid-to late 1990s, S-E-Banken started to expand primarily through acquisitions. The bank acquired Trygg-Hansa entered into Germany, the Baltics and Eastern Europe. The quick expansion created a need for unification and in the early 2000s SEB started a project to unite the bank around a set of core values summarized as the three C:s customer satisfaction, cost control and cross-selling. SEBs expansion into the Baltic countries and its reliance on short-term market funding created extensive credit losses and liquidity problems in the 2007/2009 crisis (Elliot, 2014). Today the bank has about 16,000 employees, total assets of more than SEK 2,500b and earns about 45 percent of its income through the net interest income. Figure A1 shows the balance sheet of SEB. The bank's salient merchant bank status has remained intact and according to the 2013

[6] The Wallenberg family is one of the most influential families in the Swedish business society.

annual report the merchant bank division accounted for more than 40 percent of the bank's total income in 2013.

Swedbank

The embryo of Swedbank was formed during the Swedish financial crisis in the early 1990s, when a large share of the Swedish savings bank sector merged in order to save some of the badly affected savings banks. Together these banks formed one public bank named Sparbanken Sverige AB. In 1997 Sparbanken Sverige AB merged with the cooperative counterpart Föreningsbanken AB and formed FöreningsSparbanken AB and in 2006 the bank changed name to Swedbank (cf. Lundberg, 2013). Swedbank has a strong position in the Swedish retail segment and according to the Swedish bankers association they held a 21 percent market share on deposit in 2012. The bank also has a close relationship with the remaining savings banks in Sweden, which accounted for an additional 9 percent market share on deposits in 2012. Swedbank ran into major problems during the 2007/2009 financial crisis, primarily as a result of its vast expansion in the Baltic countries and its reliance on short-term funding. In 2009 the CEO was replaced and the bank started a major reconstruction initiative, which included a "re-focus" on the retail segment, an improved balance sheet structure and less dependence on short-term funding (Elliot, 2014). In relation to the restructuring and, according to our respondents, primarily motivated by the regulatory requirements Swedbank also introduced a program to change and improve the funds transfer pricing system in 2010. Today Swedbank has about 14,000 employees, total assets of SEK 1,800b, and the bank earns about 60 percent of its income through the net interest income. Figure A2 shows Swedbank's balance sheet, which, in comparison to SEB, is weighted to a greater extent towards lending.

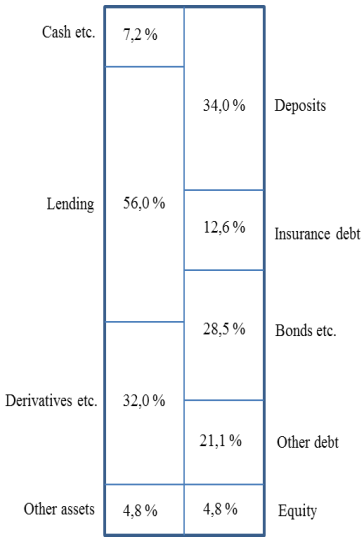

Figure A1 The balance sheet of SEB

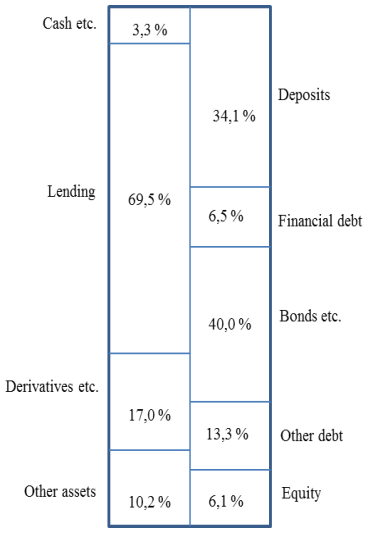

Figure A2 The balance sheet of Swedbank