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Implementing High Value Funds Transfer Pricing Systems

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Abstract

Funds transfer pricing (FTP) is the process through which banks allocate earnings to the various lines of business in which they are engaged. The realization that FTP is an important part of enterprise risk mitigation has sparked new interest in this technique, both in regulatory publications and industry findings. Like any other complex control system, a large body of FTP practices has evolved over time. In this paper, we explore traditional FTP approaches and highlight best practices in FTP methodologies and implementation. We advocate an economic approach when calculating transfer prices, which accounts for the financial risks inherent in an exposure. We emphasize the importance of designing an FTP framework that addresses funding liquidity risk, in light of recent economic events, with increased focus on liquidity management. We demonstrate how an economic approach can be used as a means of disaggregating a transfer price into different components and associating appropriate premia to each component. This decomposition facilitates risk transfer between the funding unit and the various business lines in a manner that aligns the financial incentives of the different units. We point to the linkages between FTP and risk-adjusted performance measurement, and suggest that an economic FTP framework can be viewed as a bridge between risk-based pricing and commercial pricing.

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1 Introduction

FTP is an internal measurement and allocation system that assigns a profit contribution to funds gathered, lent, or invested by a bank. Transfer pricing is a critical component of risk transfer, profitability measurement, capital allocation, and specifying business unit incentives, as it allocates net interest income to the various products or business units of a bank. Following the market turbulence that began in 2007, FTP has been identified as a component that enabled some banks to weather market turbulence better than others. However, like any complex internal control system, numerous challenges must be overcome. While both the theoretical and technical underpinnings of a successful FTP implementation are significant, the major hurdle remains gaining buy-in from the lines of business. Therefore, the FTP framework chosen must fairly reflect the unique characteristics of the funds as well as the institution's goals.

FTP is rooted in a mark-to-market-based risk management framework. However, financial institutions are managed based on accrual income. Therefore, FTP may be thought of as the link through which a market-based financial risk management system is translated into financial incentives for large and diverse organizations. As such, the FTP concept is fraught with controversy, since it is used to benchmark performance. At times it may seem more art, perhaps even "black art," than science.

This paper examines how transfer pricing techniques and systems can add significant value to financial institutions. This document seeks to highlight best practices for high value FTP systems and includes FTP methodologies, the assignment of transfer rates, and FTP curve construction and adjustment. It should become clear to the reader that risk transfer is a mechanism through which a high-value treasury function can operate more as an integrated ERM strategic balance sheet management function than a back office silo.

The remainder of this paper is organized as follows:

- Section 2 discusses common industry practices.
- Section 3 covers FTP basics.
- Section 4 focuses on leading practices in designing funds transfer pricing systems.
- Section 5 provides concluding remarks.

2 Funds Transfer Pricing – Common Industry Practices

Most banking institutions utilize funds transfer pricing in different forms and to varying degrees of complexity. Accordingly, a wide range of practical application and sophistication exists across the banking industry. In the aftermath of the most recent market turbulence, asset/liability management's role within the banking industry continues to evolve, and FTP is an important part of that evolution.

2.1 FTP Applications

As a critical component of a bank's profitability measurement process, FTP allocates net interest income to various products or business units. FTP allows banks to:

- Measure business unit profitability separately from interest rate risk
- Centralize the measurement and management of interest rate risk
- Provide consistent product pricing guidance to business lines
- Set profitability targets for business units

Without the ability to measure risk-adjusted profitability, proper strategic decision-making is impaired. Undoubtedly, planned businesses function better than unplanned businesses. However, not all banking

institutions are the same and management reporting needs vary. Therefore, the FTP system selected should be consistent with the complexity of the organization and its strategic goals.

While the intuitive concept behind FTP may appear simple, actually designing, implementing, managing, and interpreting results can be very difficult. Therefore, the difference between a successful FTP implementation and an unsuccessful one may be the underlying attributes of the chosen method(s).

3 Funds Transfer Pricing: Goals and Objectives

In a well-designed FTP system, a central funding center buys funds from liability gatherers at an economic funds transfer credit and then sells those funds to asset gatherers at an economic funds transfer price. Transfer rates allow the institution to allocate the contribution margin so that the line of business (LOB) profit and loss (P&L) can be aggregated to equal the bank's net interest margin (NIM). An FTP system's NIM components consist of the asset spread, the liability spread, the actual cost of funding variance, the central funding unit interest rate risk P&L, and the equity credit. The following paragraphs describe the various dimensions and choices consistent with a high-value FTP system.

3.1 Measure Business Unit Profitability Independent of Interest Rate Risk

Line managers may maintain discretion over product pricing, but they typically have neither the expertise nor the capital markets' access to manage exposure to interest rate risk. In fact, decentralized IRR management runs contrary to the ERM view of governance and is potentially harmful to a financial institution. Therefore, all hedgable interest rate risk exposure typically transfers from the LOBs by locking in a funds transfer spread. Such practice enables the LOBs to focus on the P&L that they can affect.

3.2 Centralize the Measurement and Management of Interest Rate Risk (IRR):

Since transfer rates lock in a spread over the maturity of a financial instrument, all hedgable IRR is effectively transferred to the central funding center. Thus, business units should remain indifferent to changes in market rates. Risk transfer empowers the lines to focus on managing their businesses and centralizes interest rate risk within the funding center where it can best be managed.

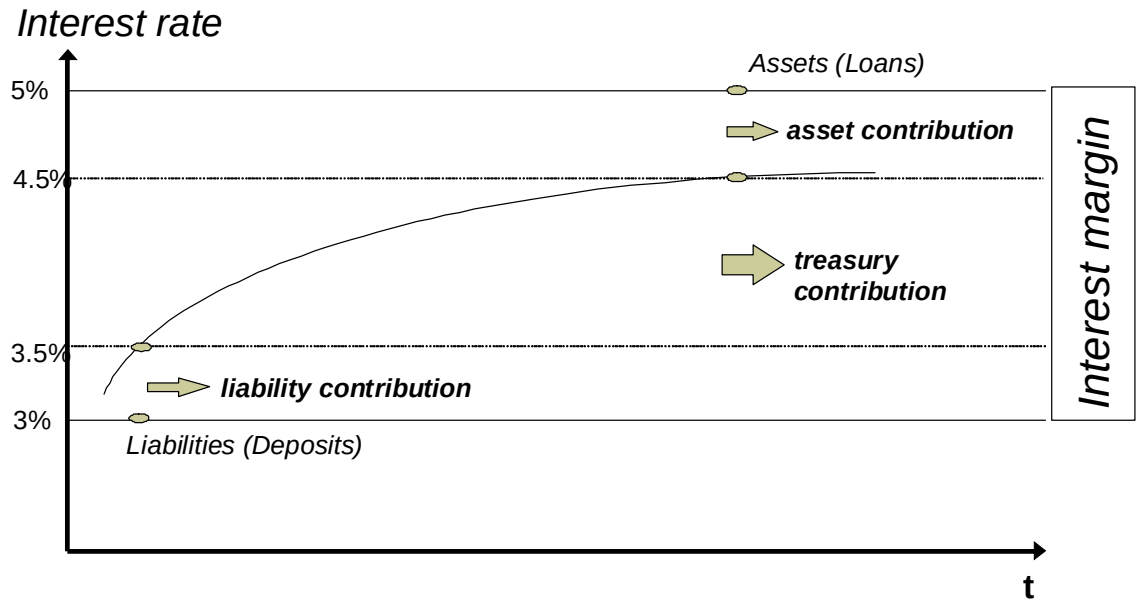

Figure 1 The three primary FTP components

3.3 Provide Consistent Product Pricing Guidance to Business Lines

In general, FTP assumptions and results are highly political because they determine profitability and, therefore, performance. However, the assumptions may seem to be more art than science at times – a "black art." Numerous circumstances exist under which an FTP system uses economic transfer rates to define commercial product incentives:

First, embedded options may expose institutions to economic risks that make certain products undesirable. As an example, assume that a commercial bank wants to make loans at a reasonable cost above its funds transfer price. However, as a deal sweetener, the commercial loan product manager decides to add a cap to close the deal. Even though the cap may be irrelevant to the bank under current economic circumstances, there is an economic cost in giving away embedded options for no compensation. A robust FTP system prices the expected cap cost and adds the option cost to the transfer rate. If the asset yield is insufficient to compensate for the option cost net of the marginal cost of funds, then the FTP system assigns a negative or low spread and disincentivizes the LOB from making the loan.

Second, a high value FTP system explicitly reveals product pricing decisions unaligned with the organization's goals. For example, a situation might arise where management may link incentive compensation to the organization's volume. In the case of deposits, this type of incentive tends to motivate retail organizations to buy "hot money" by raising the offered rate for deposits in excess of that required by existing depositors. Hot money tends to harm a bank's deposit franchise value by compensating depositors in excess of what they historically require to keep their money at the bank. Hot money wastes margin and attracts depositors whom will withdraw funds as soon as a more attractive alternative appears. This pricing tends to reduce the stickiness of deposits and exerts downward pressure on gross margin. A high value FTP system makes this analysis explicit and disincentivizes the retail deposit LOB from buying hot money.

Third, high value FTP systems are effective at identifying unprofitable business units and facilitating efficient capital allocation decisions. Suppose a retail line unit specializes in a particular type of consumer loan. New product originations are transfer-priced through an inter-company gain or loss and then sold to the balance sheet management function. Balance sheet management claims new production should be transfer-priced at a loss, while the retail LOB argues it should be at a gain. The dispute becomes so acrimonious that ALM (Asset/Liability Management) must arbitrate. All arguments are evaluated and the transfer pricing system reveals the business unit is indeed unprofitable. The LOB is promptly placed on the block, sold, and the capital allocated more effectively.

In fact, one of the major findings of the March 2008 Senior Supervisors Group study was that firms whom avoid significant problems are those that align treasury functions more closely with risk management processes, incorporating information from all businesses in global liquidity planning, including actual and contingent liquidity risk. These firms create internal pricing mechanisms that provide business unit incentives to control activities that might otherwise lead to significant balance sheet growth or unexpected reductions in capital. In particular, these firms charge business lines appropriately for creating contingent liquidity exposures to reflect the cost of obtaining liquidity in more difficult market environments.[1]

3.4 Set Profitability Targets for Business Units

Proforma transfer pricing is usually performed as part of the annual budgeting process. ALM software systems with FTP functionality produce forecasted financial statements at the business unit level that serve as performance targets. Therefore, actual performance relative to business line's FTP budget can be used to measure year-end performance.

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[1] Senior Supervisors Group, Observations on Risk Management Practices during the Recent Market Turbulence, March 6, 2008, page 3.

4 Funds Transfer Pricing Basics

4.1 Funds Transfer Pricing Approaches

In practice, only a small number of transfer-pricing methodologies are routinely used, depending upon a firm's resources and strategic goals. Methods include pooled approaches and matched-maturity funds transfer pricing. Under each method, a transfer rate is assigned to the funds provided or leant.

Pooled Funds Transfer Pricing Approaches

Under pooled approaches, the LOB assigns funds to one or more pools based upon pre-defined criteria and a specific set of dimensions. For instance, criteria for pool classification may be based upon instrument type, term, repricing term, origination, or other fund attributes.

- The single-pool approach is the simplest method. It uses one rate to credit and charge liability and asset gatherers. The obvious advantage of the single-pool approach: it is easy to implement and easy to understand. However, it assumes all funds have equal importance without consideration of maturity or embedded optionality. The single-pool approach does not differentiate based upon the funds' attributes, provided or used, nor upon market conditions at the time of transaction origination. Therefore, some business units, products, or customers will have an unfair advantage, while others will have an unfair disadvantage. The assigned transfer rate is derived either internally, based upon actual rates earned or paid, or alternatively, by market-derived interest rates.
- The multiple-pool approach classifies assets and liabilities into pools based upon criteria such as maturity, embedded optionality, seasoning, or credit. Each pool's assigned transfer rate is based upon the unique pool criteria. For example, long maturity pools receive a long-term rate while short-term pools receive a shorter term transfer rate.

With regard to transfer rate assignments, either prevailing market rates or historical market rates can be used. When using prevailing rates, all pools are transfer-priced each reporting period using the latest market data time series. Under the historical variation, each pool is transfer-priced using the yield curve prevailing at the time of origination. Once assigned, these transfer rates do not change over the life of the pool unless an event changes the funds' characteristics. Multiple-pool approaches employing prevailing market rates lack the ability to measure the performance of management decisions made in the past. In contrast, using historical market rates allows for the evaluation of pricing decisions for transactions originated in prior periods. Benchmarking LOB decisions to the historical context in which those decisions were made is the preferred method.

Matched-Maturity or Co-terminus Method

Matched-maturity FTP is a more detailed extension of the multiple-pool, historical variation. It is generally the preferred FTP method. This approach addresses the unique characteristics of funds at the cash flow level and uses matched-maturity funds transfer pricing. Under this method, each source is assigned a unique and maturity-specific transfer rate, and the use of funds is based upon the expected cash flow stream and the prevailing level of interest rates at the time of origination. Expected cash flows are calculated from transaction level contractual features stored in the bank's systems of record. Behavioral assumptions are applied based upon common practice and current experience for amortization, prepayment options, and other embedded features. Large banks generally can construct a unique marginal cost of funds curve, whereas, smaller institutions usually apply the London Interbank Offered Rate (LIBOR) curve, adjusted for term liquidity. The base transfer rate is frequently adjusted for other unique attributes such as embedded optionality, contingent liquidity costs, or basis risk. (Please see the "Calculating a Funds Transfer Rate and Its Components" section for a complete discussion of these concepts).

Bank of America developed this FTP approach during the dramatic interest rate volatility that began in the early 1970's, when increased market volatility made it clear that the current accounting system was no longer capable of reliably allocating profitability among business units.

Despite the added complexity and relatively high implementation and maintenance costs, the advantages a matched-maturity FTP framework include:

- The contribution margin of each transaction can be captured. The profitability of originating a new loan or purchasing an investment is the difference between the asset yield and the marginal cost of funds. Since matched-maturity transfer pricing assigns a corresponding transfer rate to every transaction at its marginal cost of funds, the contribution margin of individual transactions is straight-forward.
- The profitability of the funding center can be measured. In FTP, the funding center buys funds from liability gatherers at an economic funds transfer credit and sells those funds to asset gatherers at an economic funds transfer price. By locking in a net spread using historical market data, the FTP system effectively transfers the interest rate risk from the business unit to the funding center. In addition, by using historical market time series, the system is able to benchmark the performance of past pricing decisions.
- Under a co-terminus FTP system, both pricing decisions and performance measurement for individual business units and transactions should be independent of one another. That is, by assuming that certain funding sources are allocated to specific LOBs or products, product pricing decisions will be unrealistic because such decisions do not take into account the full contribution to the net margin of liability gatherers. In addition, if loan pricing is reduced and origination volumes rise, the liability gatherer may not be able to fund all loans at the same price.

Assume that a commercial banking group proclaimed that money market deposits were the correct funding source for commercial loans (CRE) and based its product pricing accordingly, without considering that other units also contribute to the bank's margin. At prevailing rates, the commercial banking group reasoned it could realize huge margins and could even reduce loan rates to gain additional market share. In reality though, some of the commercial group's margin belongs to the retail deposit organization. Therefore, in effect, retail subsidized the drop in commercial pricing. Furthermore, if loan volumes rise, retail may not be able to increase money market volumes at the same price. In contrast, a matched-maturity FTP system ensures that the unique attributes of funds gathered are fairly priced based upon economic transfer prices that can be purchased or sold at any volume.

4.2 Break Funding Charges

The funding center makes investment decisions based upon the funds it buys from the liability gatherers; it makes wholesale funding decisions based upon the remainder of the assets it needs to fund. If financial instruments terminate before their contractual or agreed-upon maturity date, then the funding center must be compensated for the foregone opportunity as well as the cost of unwinding those positions. Break funding charges are simply the difference between the current face value and the present value of the cash flows forgone, discounted at the current funding curve.

4.3 A Simple Funds Transfer Pricing Example

Consider a bank with only one asset, a five-year loan, and one liability, a two-year deposit, illustrated in Figure 2 below. In this example, Treasury buys two-year money at an economic transfer credit of 3.0% from the Liability profit center and sells five-year money to the Asset profit center at a 4.0% economic transfer price.

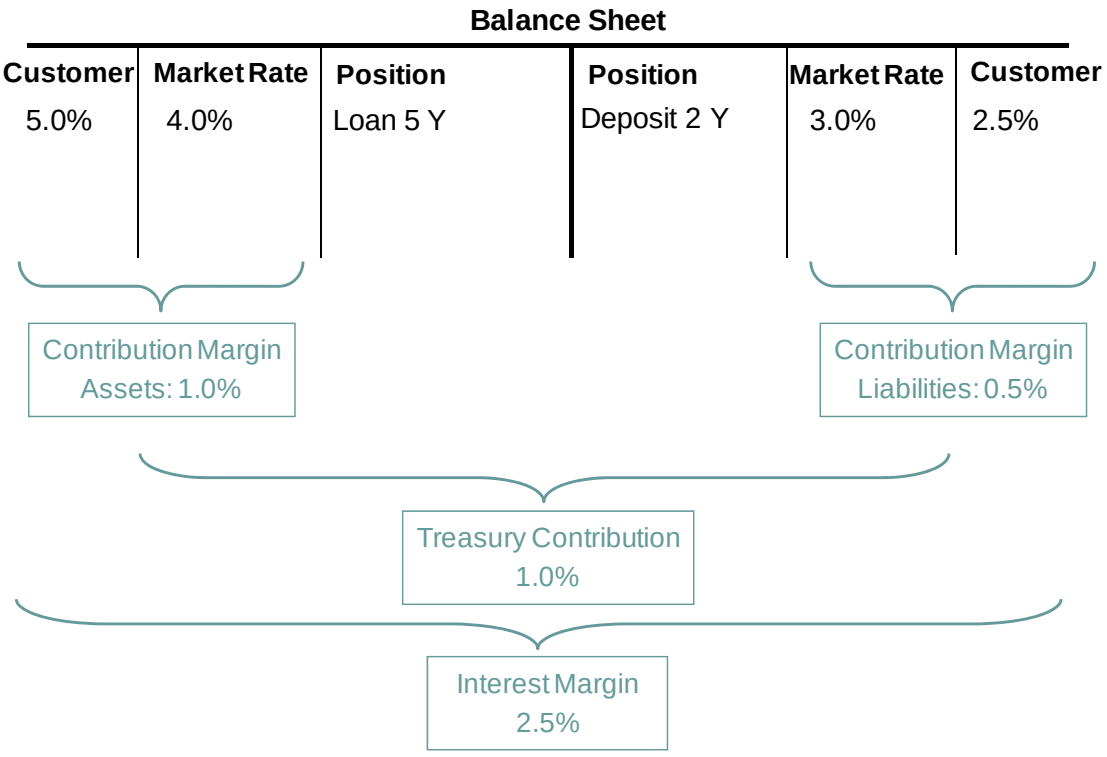

Figure 2 A simple funds transfer pricing example

The inter-company transfers illustrated in the "T" accounts, Figure 3, below, shows how the funds transfer pricing system allocates revenue among the three profit centers. Since these inter-company transfers cancel out upon consolidation, the individual profit center contributions net out to the total bank interest margin. Interest rate risk is effectively transferred to Treasury since the asset and liability contribution margins are locked in.

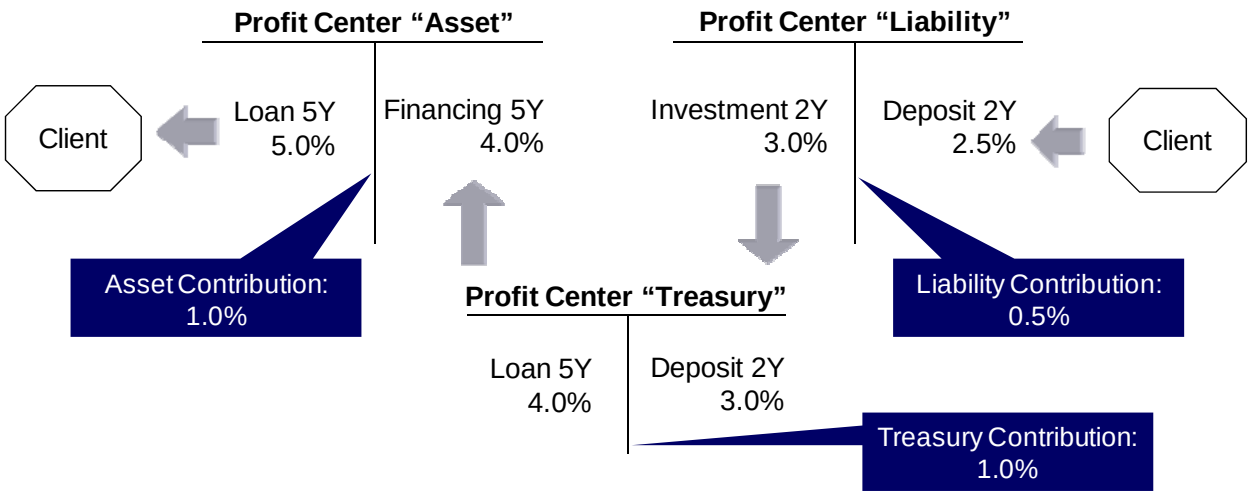

Figure 3 A simple funds transfer pricing example

5 Leading Practices in Designing Funds Transfer Pricing Systems

This section provides an overview of the components and practices that comprise a robust FTP system. One-size fits all solutions do not exist. The solution selected must be consistent with the complexity of the balance sheet and the institution's goals. However, many key considerations are universal, and current research can contribute to risk mitigation and yield enhancement.

5.1 What Must Be Transfer Priced?

Transfer pricing all assets and liabilities, including the investment portfolio, all trading activities, non-earning assets, non-costing liabilities, and equity, provides the most accurate picture of business unit performance.

Many institutions do not transfer-price the investment portfolio due to near-zero spreads on low-risk assets, i.e. agency MBS; they are available for sale (AFS), or there is no expectation of holding them to maturity. However, investments can provide benefits to an institution as a source of pledgable collateral for stand-by liquidity. As we discuss in the FTP Adjustments Section, it may be prudent to credit the funding center for the benefits these assets provide. Using this adjustment depends upon the mix of assets and liabilities. Therefore, depending upon the tradeoff between the added complexities of implementing multiple funding curves versus the added accuracy, we find it may be desirable to assign the matched-maturity transfer prices and then adjustment for standby liquidity and collateral costs for secured transactions.

Trading operations transfer pricing is similar to the investment portfolio. However, rather than using a matched-maturity transfer rate, a short term index is often used to capture the trading P&L. This difference follows, as these assets are held primarily for short-term trading gains rather than interest income alone. Some institutions use an overnight index, while others use monthly rates or moving averages.

Funds transfer pricing of other assets, such as premises and equipment, and other liabilities, such as accrued expense, must be evaluated on a case-by-case basis, as no two institutions are the same. There is some portion for sources of funds – usually immaterial – that supports non-earning assets. However, as margins narrow, these items gain prominence. Therefore, each institution must decide how non-margin sources and uses of funds should be allocated for performance measurement purposes. Some good rules of thumb for attributing balance sheet items:[2]

- The method should send correct signals and encourage managerial behavior that is aligned with the bank's strategy.
- The method should be consistent with allocation and attribution methodologies used for other purposes (i.e. revenue, expense or capital assignment).

Equity allocated to a business unit according to a bank's capital allocation formulae should receive a funds transfer charge.[3] Some institutions use duration of equity as a benchmark for a matched maturity transfer rate, others use an assumed hurdle rate for the required return on capital, while others adjust the capital charge for the specific attributes of the funds.

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[2] Ernst & Young LLP, "Performance Measurement for Financial Institutions: Methods for Managing Business Results," McGraw-Hill, 1995, Page 190.

[3] Ernst & Young LLP, "Performance Measurement for Financial Institutions: Methods for Managing Business Results," McGraw-Hill, 1995, Page 179.

5.2 Determining the Base Transfer Pricing Curve

In order to be effective, an FTP system must lock in a spread so that the lines are indifferent to changes in external cash market rates. In addition, the FTP system must serve as a benchmark for past pricing decisions. Industry-leading practice uses wholesale cash market rates that can be raised in large quantities and that reflect the institution's marginal cost of funds as the base FTP curve.

Larger banks construct an institution-specific cost of funds curve if they have a sufficient number of rate observations. However, most banks use the swap/LIBOR curve adjusted for term liquidity as their base FTP curve. Term liquidity is used to explain the difference between two types of financial securities that have the same qualities except liquidity.
Numerous theories have been advanced in the financial literature to explain the behavior of the term structure of interest rates. Generally, long-term money costs more than short-term money. However, for purposes of funds transfer pricing, the swap/LIBOR curve is not a cash market. Rather, it is a derivatives market without principal exchange. Therefore, the curve must be adjusted to reflect an institution's marginal cost of funds for each point across the interest rate term structure. Common practice uses the spread between a published credit rating agency curve for financial institutions corresponding to the target credit rating of the bank.

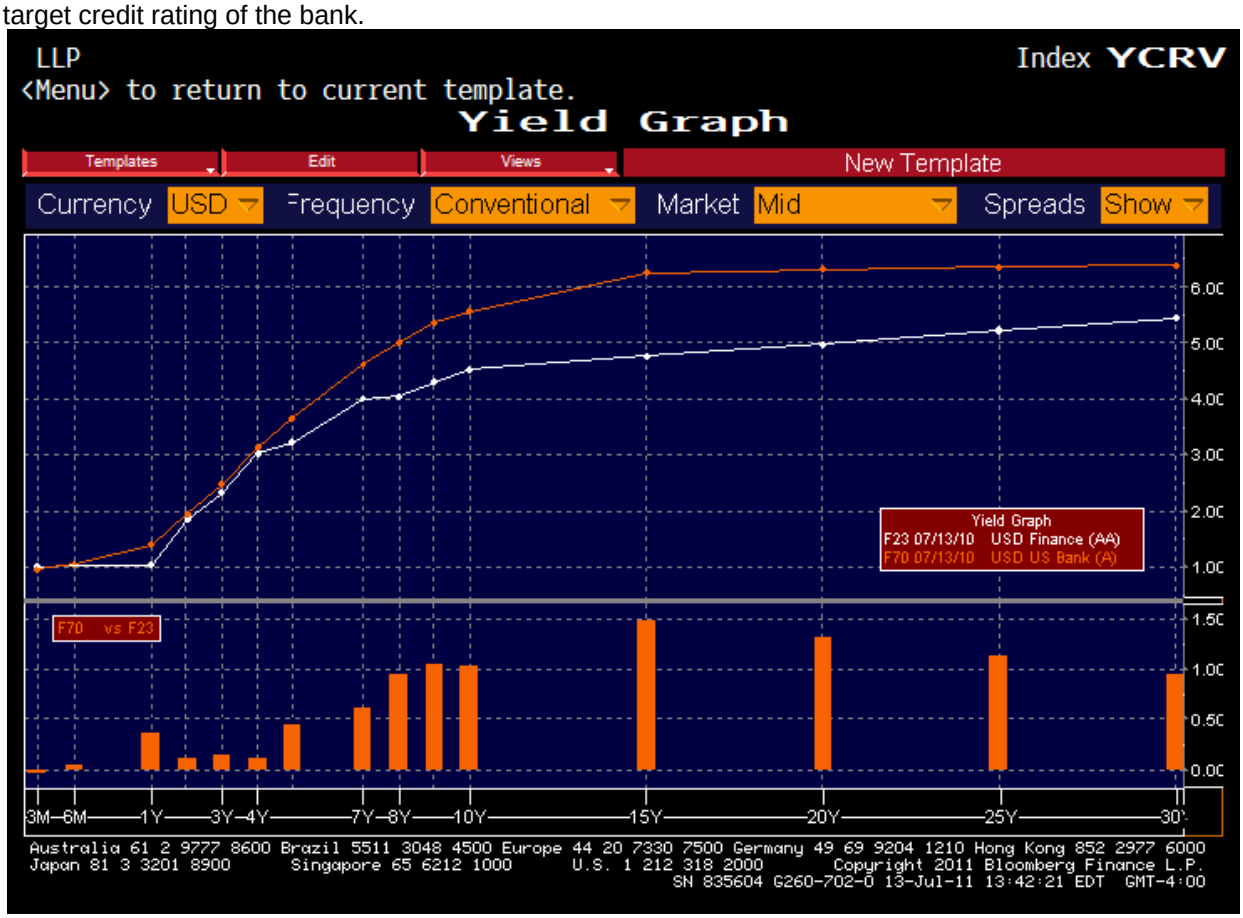

Figure 4 Term liquidity: LIBOR curve relative to AA rating agency curve

Some institutions construct multiple funds transfer pricing curves in order to properly evaluate different types of financial instruments. For example, floating rate notes and pledgable securities may be transfer-priced using different FTP curves.

Many institutions assign the short-term cost of funds to floating rate notes. From a purely practical point of view, this technique can cause difficulties because five-year, three-month repricing money should be

more expensive than three-month money. One solution is to create FTP curves from the fixed rate swap curve and swap it into floating rate.

Some institutions have assets and liabilities, such as collateral for secured transactions, which imply the use of multiple FTP curves. (See Other Adjustments).

5.3 Calculating a Funds Transfer Rate and Its Components

Practitioners use several different methodologies to assign a transfer rate to a stream of cash flows. Methods vary in complexity and sophistication. We advocate the application of an economic approach to the calculation of transfer prices, which sheds light upon the financial risks inherent in an instrument, and associates appropriate premia to each component. Such an economic framework for FTP serves as a bridge between market value-based risk management systems, accrual accounting principles, and commercial product pricing.

Figure 5 shows a typical example of the different components comprising a FTP for a balance sheet asset. In practice, different variations on the composition of a transfer price may be used, mixing economic criteria and commercial criteria.

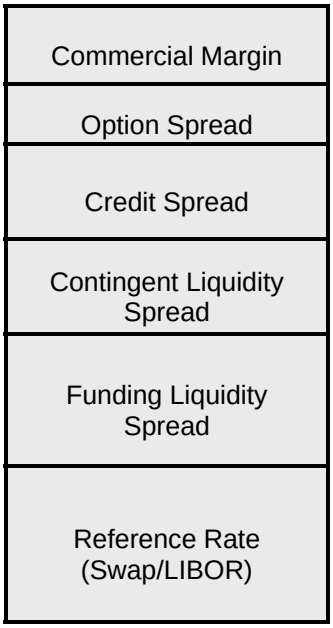

Figure 5 Basic components of a funds transfer price

A transfer price's core component is the base funding curve, or cost of funds, composed of a market reference rate adjusted by a funding liquidity spread, which reflects an institution-specific funding premium. Liquidity adjustments further include a contingent liquidity spread, which relates to the cost of maintaining a sufficient cushion of high quality liquid assets to meet sudden or unexpected obligations. Adjustments for other financial risks include a credit spread as compensation for credit risk and an option spread, which reflects premia for any embedded options in the contract. Additional components, such as a basis spread, may be included as well. Finally, business-driven commercial mark-ups are affixed to the economic transfer price to drive business policies through incentives and penalties differentiated by product and market.

5.4 Economic Approach to Calculating Funds Transfer Prices

An overarching principle for defining economic transfer prices employs a market-based pricing approach that equates the market value of an instrument with the present value of the cash flows. In particular, an economic FTP reflects the cost of funds the financial institution faces in the market, including adjustments for financial risks inherent in the contract as well as instrument-specific characteristics, such as the

amortization schedule of the principal payments. We can think of Economic FTP as the cost of debt perfectly matched to the loan profile; it does not necessarily correspond to the actual structure of debt raised by the treasury unit to fund the obligation.

We now describe an economic framework that facilitates calculating an FTP and its components.

We begin by considering the task of transfer-pricing a vanilla (non-prepayable), bullet payment, and floating-rate loan. The loan has maturity t_M, with LIBOR used as a floating reference rate. The borrower has a default probability *PD,* and the expected loss in the event of default equals *LGD*. In this simple setup, we obtain the transfer rate by equating the expected cash flows of the loan to par, with the discount rate reflecting the cost of funds of the institution. Formally,

$$r^{FTP} = \frac{r_{t_M}^{ref}}{1-PD^Q} + \frac{s_{t_M}^{Funding}}{1-PD^Q} + \frac{LGD \cdot PD^Q}{1-PD^Q} \qquad (1)$$

where $r_{t_M}^{ref}$ is the reference rate (LIBOR) at the maturity of the loan and $s_{t_M}^{Funding}$ is the term liquidity adjustment to the base funding curve at the maturity of the loan. Note, we take the expected value of the loan cash flows with respect to risk-neutral probabilities (We use the superscript *Q* to denote the risk-neutral measure), to obtain a market-based value for the loan.

This analysis facilitates an economic interpretation of the transfer rate, by decomposing the transfer rate into different components associated with the different risks embedded in the exposure. In particular, the above expression suggests that the transfer rate of this vanilla bullet loan contains three components:

- The floating reference rate on the loan
- The second term stands for the funding cost of the bank, represented as a spread above the reference rate, and scaled by the expected life of the loan.
- The third term is the risk-neutral expected loss on the loan due to credit risk.

While outlined in a simple setting, we can generalize the above analysis to produce transfer rates for instruments with more complex cash flow characteristics. In detail, for a defaultable vanilla loan of notional amount *N*, with an uncertain principal cash flow stream CF_{t_i}, $i = 1, 2, ..., M$, we obtain the transfer rate by equating to par the risk-neutral expected value of future cash flows, discounted by the appropriate cost of funds. Formally,

$$N = \sum_{i=1}^{M} \frac{E^Q\left(P_{t_i}^{CF_{t_i}} + r^{FTP}\right)}{1 + r_{t_i}^{ref} + s_{t_i}^{Funding}} \qquad (2)$$

where, as before, $r_{t_i}^{ref} + s_{t_i}^{Funding}$ represents the base funding curve at time t_i, composed of the market reference rate and a term liquidity premium. The transfer spread, equal to the difference between the transfer rate and the instrument rate, is the economic benefit (above the cost of funds) created by the line of business. Thus, we can interpret the transfer spread as a link between a market value-based risk management framework and incentives relative to an accrual-based accounting system.

5.5 Accounting for Embedded Options

When business lines create products with embedded options, the funding center should charge the originating line the appropriate cost associated with bearing the option. The option premium is included as a spread above the transfer rate, Figure 5 illustrates. In order to calculate the value of an embedded option, a stochastic approach is typically adopted, where we model the option exercise as a function of

the uncertain future state of the borrower and the economic environment. We can use different stochastic methodologies to calculate the option value; two popular approaches are tree- or lattice-based methods and Monte Carlo-based methods.

In a lattice-based approach, we model relevant state variables, including the borrower's credit quality and the market rate, over time, with appropriate transition probabilities attributed to the transitions between different state combinations at each time step. Figure 6 illustrates this approach.

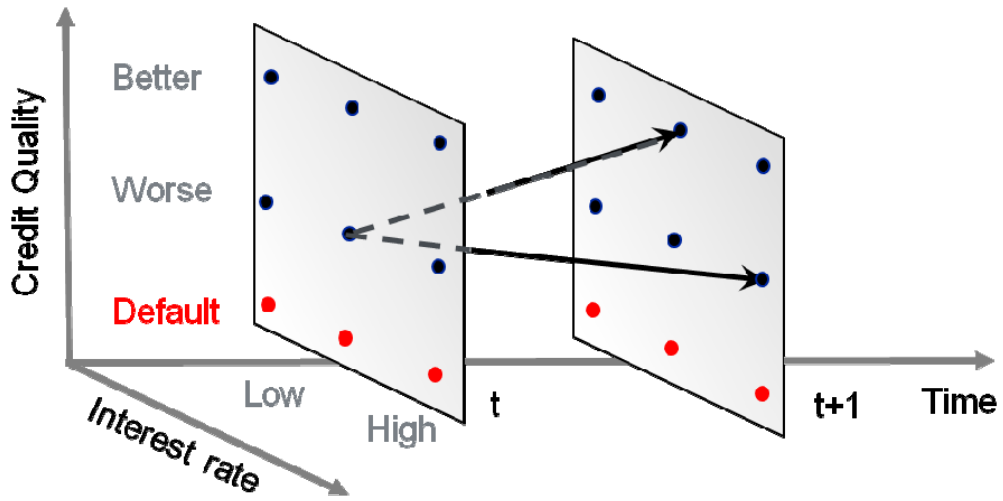

Figure 6 Credit and interest rate state migration in a multi-dimensional lattice

We determine the option exercise at each lattice node by comparing the value of the instrument as an ongoing concern, with the value to the borrower associated with exercising the option. In more detail, valuation within the lattice structure is conducted recursively backward in time, so that, in each period, we discount back expected cash flows from the last period (with expectation taken in the risk-neutral measure) to arrive at a continuation value at each node. This value is compared against the strike price for the option. Thus, a lattice approach produces a map denoting in which time/state combinations we exercise the option.

An alternative approach, typically used in valuing mortgage prepayment options, relies upon an econometric prepayment model, where we model prepayment propensity as a function of a set of explanatory factors, capturing borrower-specific information, seasonal variation, market rates, and macro-economic factors. We use statistical estimation techniques applied to historical prepayment data to estimate the parameters of such models. This statistical description is then used in a Monte Carlo framework, where we simulate the different prepayment factors many times, and, at each simulation scenario, the prepayment rate and associated cash flows are calculated from the state realization and discounted back to the analysis date.

5.6 Adjusting for Basis Risk

Basis risk arises when yields on assets and costs on liabilities are based on different indices, such as the LIBOR versus the U.S. prime rate. In some circumstances, different bases move at different rates or in different directions, which can cause erratic changes in revenues and expenses.

Most banks have basis risk exposure. Like any other form of interest rate risk, basis risk should be transferred to the central funding center in order to provide a locked-in spread for each new piece of business. However, the lines should be charged for bearing the risk of the choice of pricing index. The reasoning is simple: the lines have authority over what benchmark is chosen as a pricing index.

In order to lock in a spread, a fair price for basis risk must be determined. Prime/LIBOR risk is the most common form of basis risk, and a common approach for pricing basis risk uses Prime/LIBOR swap quotes. For example, average mid-market price quotes for Prime/LIBOR swaps were approximately 270–275 bps below prime on 7/13/2011 (see Figure 7 below).

Figure 7 Example of Prime/LIBOR swap quotes

Note that the quotes above are tenor and vintage specific. Therefore, the line of business would need to compensate Treasury by Prime - 271 bps for five year money for bearing basis risk.

5.7 Accounting for Contingent Liquidity Risk

In the aftermath of the 2007–2008 financial crisis, financial institutions recognized the need to revisit practices regarding liquidity risk measurement and management. This initiative was motivated by a series of guidelines published by domestic and international regulatory authorities. A central theme in the proposed regulation posits that financial institutions should maintain a liquidity buffer consisting of cash and highly liquid assets that can be tapped in the event of an institution-specific or market-wide liquidity crisis. The size and composition of the buffer remain institution-specific, depending upon balance sheet characteristics. These tighter liquidity risk management principles will necessarily incur increased costs.

Financial institutions and regulators have identified FTP as a key component that facilitates pricing of these additional costs and their allocation across business activities.[4]

In Figure 5, we highlight two components associated with liquidity risk: The funding liquidity spread and the contingent liquidity spread. In earlier sections, we propose an economic approach that relates the funding liquidity spread to the expected cost of funds required to support the exposure to its remaining life. In this section, we focus on the contingent liquidity spread, which relates to the cost of maintaining a sufficient cushion of high quality liquid assets to meet sudden or unexpected obligations.

To gain more insight into the problem of measuring the contingent liquidity associated with an exposure, consider the following stylized setting. A bank originates a credit line to a borrower, with the funds available for the duration of two periods. The borrower can draw and repay funds at will, and, in return, pays a rate on the proportion of utilized funds. The bank funds the line through short-term financing, which matures at the end of each period and rolls over at expiration. In order to guard against unexpected liquidity shocks, the bank maintains a buffer of liquid assets, which can be converted to cash at any time in order to absorb liquidity-related losses. Thus, the FTP associated with the instrument should include a contingent liquidity spread compensating the funding unit for the cost of holding the liquidity buffer.

To characterize the liquidity risk the institution faces, consider possible scenarios one period after origination, at which time the bank must refinance its short-term borrowing. In the event of a systemic shock, the bank's cost of funds increases, as previous examples demonstrate. At the same time, due to adverse market conditions, the borrower draws down the credit line. This drawdown forces the bank to raise more funds at unfavorable rates, potentially exacerbating losses. Thus, the size of the liquidity buffer should be determined by realizations of the bank's funding cost and the borrower's line usage during extreme systemic shocks, accounting for the dependence between these two quantities. We can characterize this dependence structure and related dynamics quantitatively in an economic framework, gauging the probability of adverse outcomes and consequently estimating an economic cost of contingent liquidity.

Other considerations supporting a liquidity adjustment in the FTP stem from a desire to prevent FTP manipulation. For example, pledgable assets that collateralize secured funding or public funds are relatively low-yielding assets and may have near zero or even negative transfer spreads. However, these assets generate an economic benefit, in that they facilitate cheap funding. Thus, highly liquid, low-yielding assets held for standby liquidity purposes should be credited for their benefit. Specifically, standby liquidity costs should be allocated and charged against the assets or volatile liabilities that necessitate holding standby liquidity.

[4] In "Principles for Sound Liquidity Risk Management and Supervision," the Basel Committee on Banking Supervision states that, "A bank should incorporate liquidity costs, benefits and risks in the internal pricing, performance measurement and new product approval process for all significant business activities (both on- and off-balance sheet), thereby aligning the risk-taking incentives of individual business lines with the liquidity risk exposures their activities create for the bank as a whole."

6 Conclusion

Despite the simplicity of the concept, FTP is often a highly complex and very political framework. Nevertheless, FTP remains indispensable for managing the NIM. In fact, the aftermath of the market turbulence that began in 2007 continues to redefine the importance of internal funds transfer pricing.

Our experience, understanding of industry best practices, and proprietary research indicate that high-value FTP systems tend to reflect the following principles:

- All assets and liabilities must be transfer-priced. Reporting units cannot simply transfer-price net positions.
- A consistent approach should be applied to interest rate risk measurement, risk-adjusted performance measurement, and customer product pricing.
- Transfer rates should be based on cash market interest rates.
- Funds transfer rates should be applied to individual transactions based on each maturity, repricing, and "vintage" assumption; FTP assignments should last until final maturity
- All instruments should receive a "locked-in" spread for each new transaction; the rate assigned should remove basis risk.
- When instruments have embedded options, an option cost/credit should be included in the assigned rate.
- A central mismatch unit should be used to monitor and manage interest rate risk.
- Firms that have a broad mix of assets and liabilities sometimes use multiple FTP curves:
- An unsecured borrowing curve for assets that cannot be pledged as collateral and deposits. The unsecured FTP curve should be adjusted for standby liquidity and term liquidity.
- A secured borrowing curve for pledgable assets, i.e. agency MBS and secured borrowings, i.e. FHLB advances. The secured borrowing curve should be adjusted for term liquidity and standby liquidity costs.
- Best practices allow for the decomposition of the contribution margin into its constituent components, i.e. option risk, liquidity risk, (both contingent liquidity risk and funding liquidity spread), and credit risk.

Institutions are only beginning to realize the importance of FTP in the new regulatory order. It is only a matter of time until ALM evolves from its traditional interest rate risk-only focus toward one where Treasury groups act more as a hub for a much broader set of ERM-type analyses. Funds transfer pricing is one mechanism through which a truly high-value Treasury function can operate more as a strategic balance sheet management function contributing to the overall risk/return performance of the institution.

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