

A Compendium of Equations, Visual Images and Thoughts on Funds Transfer Pricing (FTP) in a Banking Context

Fundamental Equations and Relationships

When FTP is not used

$$\text{Profit}_{\text{wo/FTP}} \pi_{\text{Bank}} = \pi_{\text{Loans}} + \pi_{\text{Deposits}}$$

$$\text{Risk (IRR)} \frac{\partial \pi_{\text{Bank}}}{\partial r} = \frac{\partial \pi_{\text{Loans}}}{\partial r} + \frac{\partial \pi_{\text{Deposits}}}{\partial r}$$

$$\text{Risk (LR)} \frac{\partial \pi_{\text{Bank}}}{\partial l} = \frac{\partial \pi_{\text{Loans}}}{\partial l} + \frac{\partial \pi_{\text{Deposits}}}{\partial l}$$

$$\rightarrow \text{If } \frac{\partial \pi_{\text{Bank}}}{\partial r} \neq 0 \text{ then } \frac{\partial \pi_{\text{Loans}}}{\partial r} \neq 0 \text{ or } \frac{\partial \pi_{\text{Deposits}}}{\partial r} \neq 0$$

$$\rightarrow \text{If } \frac{\partial \pi_{\text{Bank}}}{\partial l} \neq 0 \text{ then } \frac{\partial \pi_{\text{Loans}}}{\partial l} \neq 0 \text{ or } \frac{\partial \pi_{\text{Deposits}}}{\partial l} \neq 0$$

When FTP is used (a Mismatch Center is created)

$$\text{Profit}_{\text{w/FTP}} \pi_{\text{Bank}} = \pi_{\text{Loans}} + \pi_{\text{Deposits}} + \pi_{\text{MM}}$$

$$\text{Risk (IRR)} \frac{\partial \pi_{\text{Bank}}}{\partial r} = \frac{\partial \pi_{\text{Loans}}}{\partial r} + \frac{\partial \pi_{\text{Deposits}}}{\partial r} + \frac{\partial \pi_{\text{MM}}}{\partial r}$$

$$\text{Risk (LR)} \frac{\partial \pi_{\text{Bank}}}{\partial l} = \frac{\partial \pi_{\text{Loans}}}{\partial l} + \frac{\partial \pi_{\text{Deposits}}}{\partial l} + \frac{\partial \pi_{\text{MM}}}{\partial l}$$

Effective FTP is characterized by the following

$$\frac{\partial \pi_{\text{Bank}}}{\partial r} = \frac{\partial \pi_{\text{MM}}}{\partial r} \text{ and } \frac{\partial \pi_{\text{Bank}}}{\partial l} = \frac{\partial \pi_{\text{MM}}}{\partial l}$$

$$\rightarrow \frac{\partial \pi_{\text{Loans}}}{\partial r} = 0 \text{ and } \frac{\partial \pi_{\text{Deposits}}}{\partial r} = 0$$

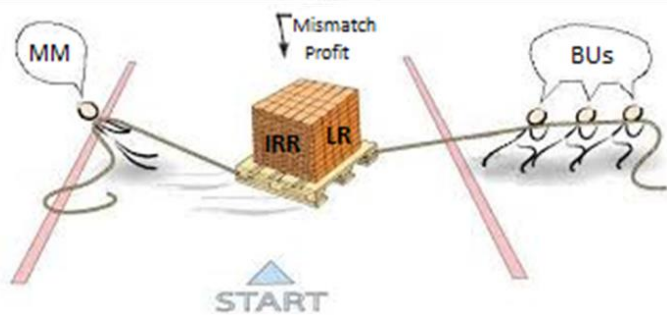
$$\rightarrow \frac{\partial \pi_{\text{Loans}}}{\partial l} = 0 \text{ and } \frac{\partial \pi_{\text{Deposits}}}{\partial l} = 0$$

The price of all risk transfers must honor the following

$$\text{if } \frac{\partial \pi_{\text{Bank}}}{\partial r} = 0 \text{ and } \frac{\partial \pi_{\text{Bank}}}{\partial l} = 0 \text{ then } \pi_{\text{MM}} = 0$$

This assumes that hedging is done contemporaneous with the calculation and application of FTP rates.

The allocation of profits must follow logically from the transfer of risk to the mismatch center...



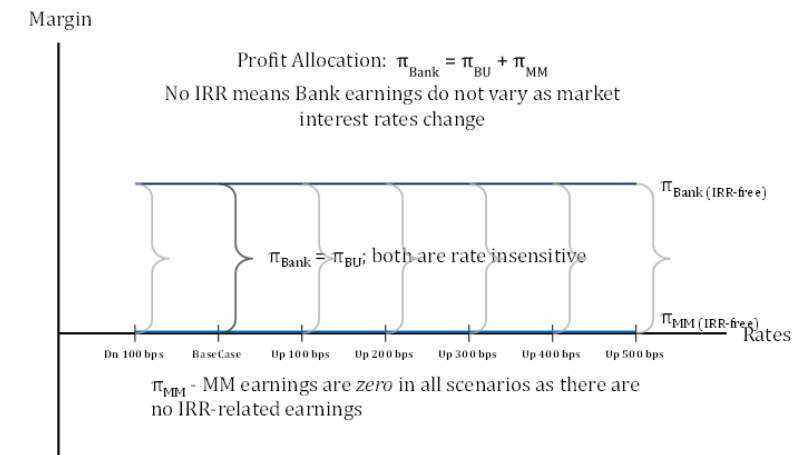
Matched Maturity FTP Rate Calculations for Fixed or Floating Rate Instruments

$$\text{MMFTP Rate}_t = \frac{\sum (\text{Repr Cash Flow}_t * \text{Spot Swap Rate}_t * \tau) + \sum_{t=0} (\text{Cash Flow}_t * \text{Spot LP}_t * \tau)}{\sum \text{Repr Cash Flow}_t * \tau + \sum_{t=0} \text{Cash Flow}_t * \tau}$$

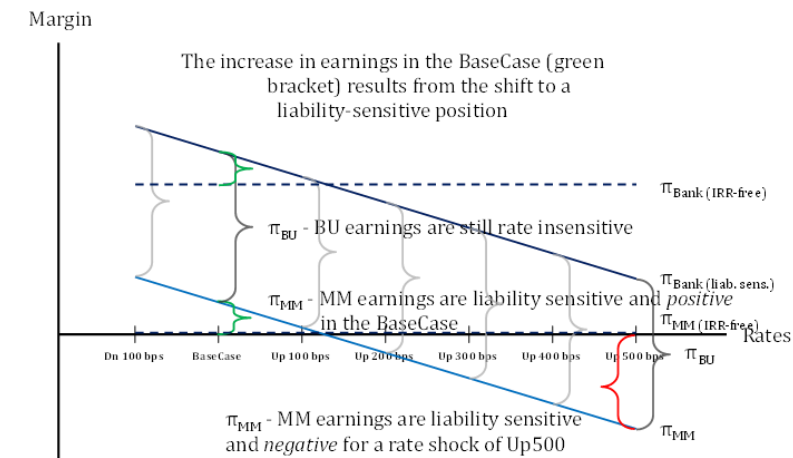
Embedded options and collateral requirements (value) must be acknowledged through additional charges or credits to the MMFTP rate.

Visual Images of Effective FTP Processes

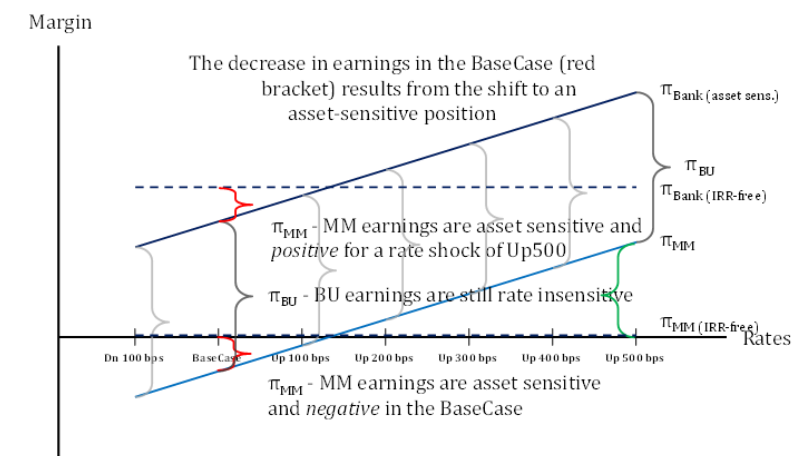
Earnings decomposition of a bank with no IRR



Earnings decomposition of a liability-sensitive bank

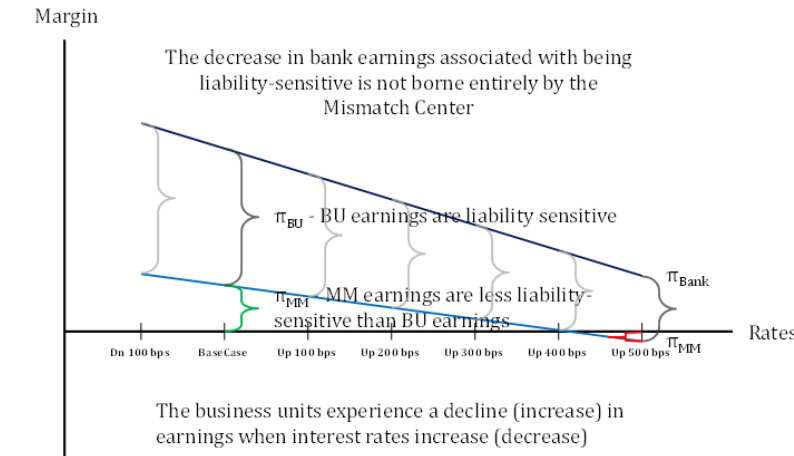


Earnings decomposition of an asset-sensitive bank

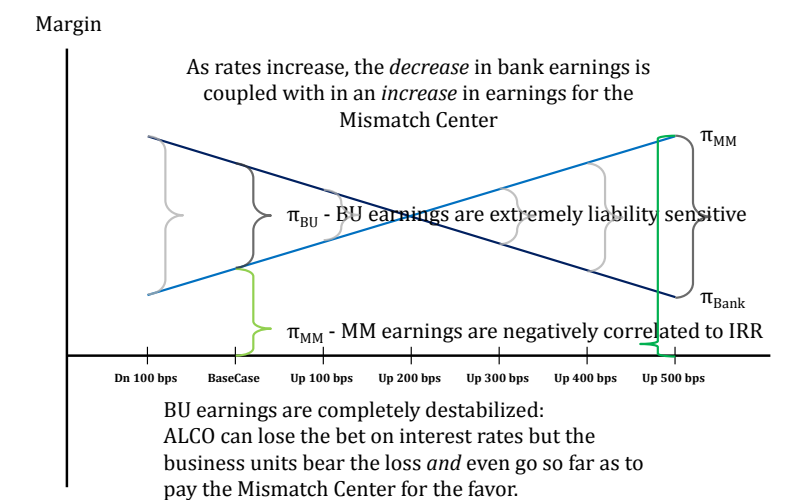


Visual Images of Ineffective FTP Processes

Earnings decomposition of a liability-sensitive bank with an ineffective FTP process



Earnings decomposition of a liability-sensitive bank with an extremely poor-functioning FTP process



When Constructing FTP Methodologies and Governance Frameworks Keep These Thoughts in Mind

What people believe prevails over the truth. – Sophocles

It is difficult to get a man to understand something when his salary depends upon his not understanding it. – Upton Sinclair

I value self-discipline, but creating systems that make it next to impossible to misbehave is more reliable than self-control. – Tim Ferriss

Trust but verify. – Ronald Reagan

Thoughts on Equity

Risk management is the practice of quantifying and managing the risk exposure to equity.

Equity cannot be used to hedge itself.

Equity does not have an innate duration or liquidity, but the duration and liquidity of equity can be imputed from the IRR and LR characteristics of the assets and liabilities on the balance sheet. Consider the meaning of a Duration GAP report and the Duration of Equity; in both cases, the risk to equity is the dependent variable.

This means that 100% of the balance of all margin-related assets needs to be transfer priced regardless of how much equity the business unit may have to hold against the credit and operational risk associated with the instrument else the Mismatch Center will not be fully compensated for the risk being transferred to it from the business unit.

Thoughts on Non-Maturity Deposits (NMD)

Assumptions around the behavior of NMDs are critically important to the development of measures of IRR and LR.

$$\text{DOE} = ((\text{MV}_A * D_A) - (\text{MV}_{\text{NMD}} * D_{\text{NMD}} + \text{MV}_{\text{TL}} * D_{\text{TL}})) / \text{MV}_E$$

The coefficient on D_{NMD} is $\text{MV}_{\text{NMD}} / \text{MV}_E$. This is generally a large number (high single digits).

By extension, the assumptions around the behavior of NMDs are critically important to the calculation of FTP rates and therefore business unit and Mismatch Center income.

Thoughts on Governance and Accountability

The responsibility for managing the mismatch lies with ALCO because it is the governance committee responsible for the management of IRR and LR. As such, it should be held accountable for the earnings and earnings volatility in the mismatch center. Accountability is challenging because as many as half of the members of ALCO represent the business units on the other side of transactions with the Mismatch Center. Business unit heads have an inherent conflict of interest because almost any choice they face which is "good" for the Mismatch Center will be perceived as "bad" for their business units. To address this, consider having the business unit heads abstain from voting on FTP-related matters or establish an independent subcommittee to handle FTP-related matters.