Chapter 15
Funds-Transfer Pricing and the Management of ALM Risks

Introduction

- 如何紀錄會計帳以真實反應每個business units或是products的risk與profit，如此才能
  1. 知道每個單位所承擔的風險與想對應的報酬
  2. 評估各單位考慮風險調整過後的績效，並了解公司真正有競爭力的部分在哪
  3. 收取顧客適當的利息
- The way we determine where the risk is located inside the bank is by using the Transfer Pricing Framework
- The major units considered include: the lending units, the deposit-taking units, the trading unit, and the ALM desk

- 銀行營運單位間transfer price之收付原因：
  1. 提供services (不歸ALM管理)
  2. 提供funding

  *銀行收入之來源：提供services 與承擔風險

- 本章中只考慮funds-transfer pricing, or called cost of funds (the interest payments charged when one unit lends funds to another), which is the framework to move interest rate and liquidity risks between units by affecting the accounting profitability of each unit

- 一般的funds-transfer pricing都只考慮cost of debt，但是本章最後還多考慮了funds-transfer pricing for economic capital，此觀念有點類似WACC之觀念

Traditional Transfer Pricing and Its Problems

● Traditional transfer pricing

Retail group

較多 ──── 存款 放款 ──── 較少

本金+利息 ◄──────────────── 多的存款

ALM ◄──► Another bank
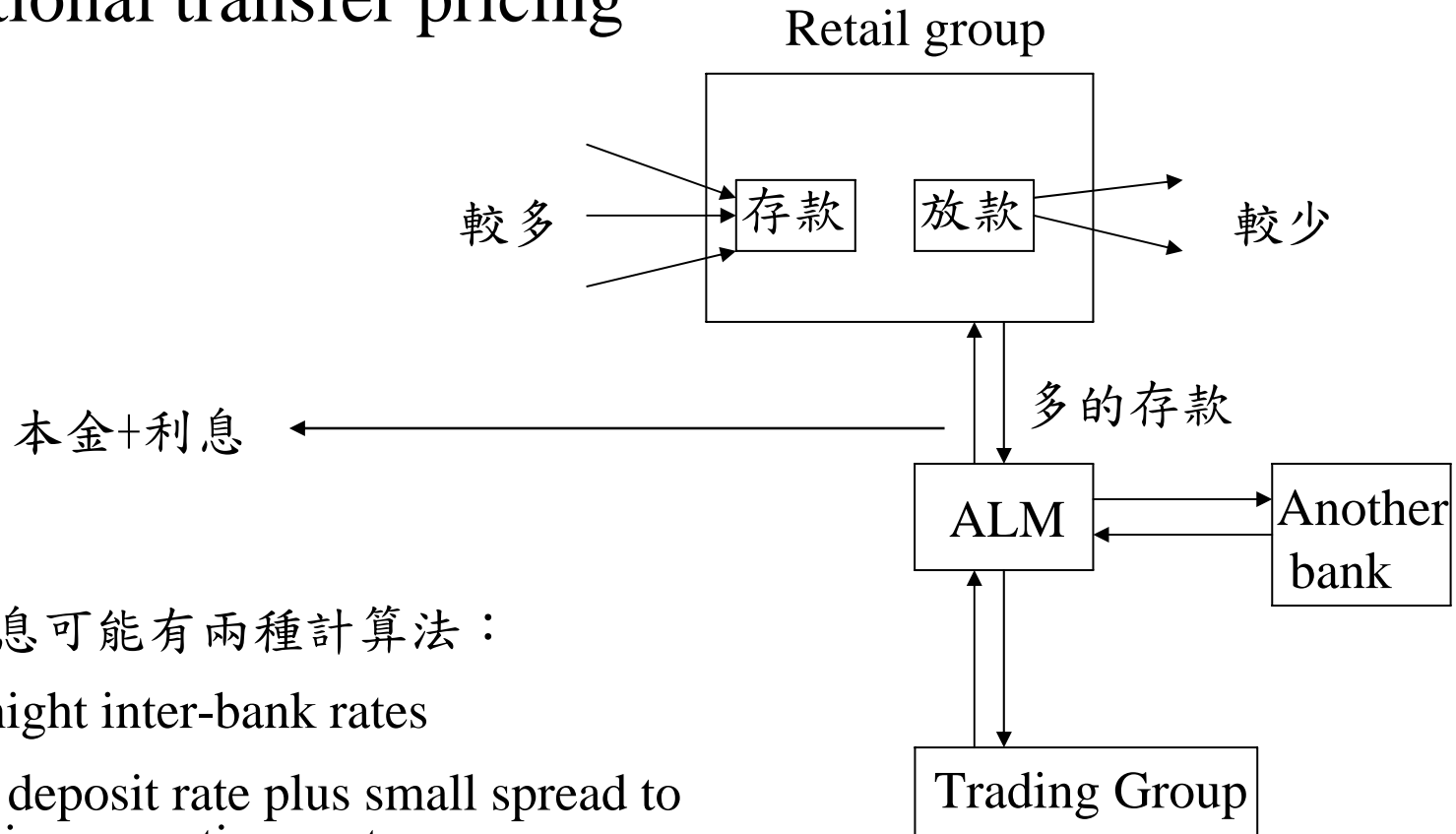
其中利息可能有兩種計算法：

1. overnight inter-bank rates

2. retail deposit rate plus small spread to covering operating cost

Trading Group

- Problems：

  1. 對於retail group而言，其無法分辨是deposits $r\downarrow$ or loans $r\uparrow$ 所帶來之利益 (因整個 retail group中有存款，也有放款)，使retail group的決策者不知要增加deposits，還是增加loans

  2. retail group的excess fund，通常只能賺到較差之r，意即便宜借給別的部門，或是因為透過ALM為中介，被其在中間賺了一手。因次，若能直接借給別的部門，可以得到更高的報酬，此外，便宜的資金成本也會誤使trading or commercial loan unit高估其獲利能力

  3. 當利率變動時，會影響所有business units，如此會使得風險管理單位很難來監督與控制利率風險

  4. 除上所述，銀行亦希望r之變動，不會影響或抹殺各unit之貢獻，如此不但提供各單位較強之incentive，也可更清楚的區別其貢獻

Introduction to Matched-Funds-Transfer Pricing

- Traditional operation for banks (p.212 Figure 15-1), the interest rate spread covers:
  - Administrative costs
  - Credit loss on the loan
  - The interest rate risk from the mismatch of the maturity
- Problems:
  - 不能分辨利益是來自loans的高利率，還是fixed deposit的低利率
  - 存在structural IR risk between loans and fixed deposit

- Remove the structural IR risk from all business units (各自經由interbank market去借錢) (p.213 Figure 15-2, 15-3)
  - 很清楚知道那個產品獲利
  - 銀行會少賺一點，卻可換得沒有structural IR risk, 意即不需持有capital 來 against ALM risks
  - 可是不大可能每次都在interbank市場上找到size又合，maturity又合之asset與liability

- 因此改採以ALM desk為internal media，建立 internal market來aggregate individual transactions，net amount才經由external market解決

- Every business unit interacts with the ALM desk as if it were an external counterparty, that is the fundamental concept of matched-funds-transfer pricing (亦即所有單位的資金，都經過ALM，並賺取或支付interbank interest rate)

★ P.214 figure 15-4

- 所有資金的供給與需求，都透過ALM，ALM與各個business units間，互相記錄fictitious asset and liability
  - 如此對整個銀行而言，資產負債表並沒有變
  - 除了ALM之外，其它單位都顯示出asset與liability 是maturity and size match，亦即沒有structural IR risk
  - ALM可以將net amount交易出去以避險，要不就是自己來承擔風險，賺取報酬，但同時須增加自己部門所需的EC

General Rules For Matched-Funds-Transfer Pricing

1. 存款部門將所有存款交給ALM保管，並根據 maturity獲得相對應的 market rates (p.216 Figure 15-5)

2. 當任何部門有資金需求時，其與ALM簽定合約，其內容類似外部交易之合約

3. 對於每個交易，Business units與ALM各自為此交易合約記錄fictitious asset or liability
   - ◆ 向ALM借錢：business unit記負債，ALM記資產
   - ◆ 存錢進ALM：business unit記資產，ALM記負債

4. For trading unit，因其可直接access capital market，未必都跟ALM交易，若跟ALM調度資金，則根據 effective maturity來決定所需付之利率
   - ◆ Trading unit所記的虛擬資產與負債，將會放進VaR calculator

10

★ Balance Sheet for Transfer Pricing (p.217 Figure 15-6)

- Maturity matching and option to prepay for commercial loans

- Car loans according to prime rate are hedged with a series of loans of different maturities

- For retail unit, the whole deposits are unlikely to be withdrawn for at least, so the retail unit lends the deposit funds as a mixture of loans from overnight to 2 years

- The net value of each business unit is zero

- All available capital to support the business units is concentrated on the ALM desk

Transfer Pricing For Indeterminate-Maturity Products

- 當到期日不確定時 (如checking accounts or prime-based loans)，其best hedge strategy可能包括一些instruments的組合 (例如bond + option)
    - prime-based loan為semi-float且還是有prepay之問題 (如車貸、房貸、小額信貸)，使得到期日不確定
    - 若借出之loan含有option時，lending unit還是可將此option轉嫁給ALM，而ALM可多charge option premium
    - 當到期日不確定時，best hedge strategy很難找，最好能用simulation，找出價值變動最match之商品，使得投資組合未來的一段期間 (一年) 其價值之變異最小

Allocation of Capital

- After applying fund transfer pricing，可看到各單位之各種風險之分配之狀況 (p.219 Figure 15-7)

- 對lending and deposits unit而言，雖然免除了structural IR risk與market risk，仍然有credit risk與operating risk，每個單位仍要維持自己的EC來against risk

- 因此，各個部門的資金需求，應包括了transfer pricing fund (類似debt)，與對抗credit risk與operating risk的EC (類似equity)

● 考慮了mixture of funding，各單位跟ALM借錢時，可真實反應出各單位之資金成本 (類似WACC)

  1. 由ALM用銀行的equity幫各單位持有高流動性之資產，如公債，等發生credit or operating problems時，可賣掉來補償，但須向各單位收取EC與公債間的利差

  2. 或是各單位同時向ALM借所需之EC與D (等同 1)

$$\text{cost} = A \times r_d + E \times (r_e - r_d) \ (1)$$
$$= D \times r_d + E \times r_d - E \times r_d + E \times r_e$$
$$= D \times r_d + E \times r_e \ (2)$$

★ 總之，ALM借給各business unit時，一部分用debt，一部分用equity，其應收之利息不同

★ 對於各business unit都有equity-raise money，可能是各單位內部的equity或是向ALM借來的equity

★ P.221, Figure 15-8

- 對於存款部分，因為它是將錢借給ALM，其單位內部還要準備equity嗎？要，最基本之想法即是其要cover operating risk與cash liquidity risk，不過相對於lending unit須準備equity against credit risk而言，deposit unit所需準備之equity相對較少

- 當要承做deposits的業務，銀行應先raise equity for operating risk與cash liquidity risk。然後將存進來的錢與equity都放進ALM，賺取適當的報酬。當存款要被提領時，才從ALM拿回，除了還錢給投資人之外，還要扣掉因operating risk所造成的costs，剩下的即為deposit-taking business的EC所賺的報酬

- ALM之balance ≠ Bank's balance sheet，還差了

  1. trading group之部位

  2. 對存款部門而言，其EC應記成其負的資產

  P. 221 Figure 15-8 and P. 222 Figure 15-9

15

The Roles of Organization Units Involved In ALM

- ALM之組織架構與功能
    1. Senior Risk Committee and the Asset Liability Committee (ALCO)
        - SRC monitors all risks of the bank, especially is interested in ALM book, fix income position in trading desk, and correlation of interest rate risk with other risks
        - ALCO monthly reviews the structural IR and liquidity positions
        - ALCO reviews transfer-pricing policy and decisions on administered rates, ex. prime rate or retail fixed-deposit rates
        - 改變資本結構以改變risk profile (審核issue bond或資產證券化)
        - 審核產品，以改變利率的方式，看要主推或減少什麼樣之產品
        - 若有太大的gap between assets and liabilities, 應該要避險或是調整部位，除非ALCO決定要take此risk

2. Asset Liability Manager

- AL manager is a trader who has the daily responsibility of maintaining the interest-rate and liquidity profile targeted by ALCO

- It is done based on risk reports from the ALCO support group and is carried out by ordering trades such as swaps and interbank loans for the ALM books, which is an accounting entity holding all the fictitious assets and liabilities

- 一般ALM避險之交易，通常是由trading desk處理

- ALM做的事與bond desk做的投資很像，但觀念是不同的

- 如果AL manger不做事，take risk，可收到利差，但需大量EC

- 如果internal market之借貸率與external market之借貸率相同，ALM理論上可以natural hedge with no cost

3. ALCO support group

- 對ALCO與AL manager提供weekly risk report
- 算indeterminate-maturity products之effective duration，而此資訊會用來來決定fund-transfer pricing
- 建議避險策略，方法包括經由市場交易或是改變銀行的商品

4. The Money-Market Funding Desk

- 短期資金調度 (ensure the daily funding requirements are balanced)
- 實務上，各business unit要錢時，直接跟money-market funding desk講，但記帳時，中間多加了ALM，好似是由ALM去money-market desk弄錢

5. Financial Accounting Group
    - report the profitability of each business unit (要考慮 funds-transfer pricing)

6. Business Units
    - 用transfer-rate來control此unit之獲利的交易量，例多增加此單位所需EC，即用較高的capital cost來限制business unit