
Chapter 14

Funding-Liquidity Risk in ALM

Introduction

- Funding-liquidity risk (cash-crisis risk) is caused from mismatches between the assets and liabilities
- This risk arises because banks generally fund themselves with liabilities that have very short contractual maturity and undertake long-maturity investments
- “run on the bank” (擠兌): rumor causes the demand of withdraw, therefore creating a liquidity problem and increasing the rumors

Introduction

- 遇擠兌時
 - 向別的銀行借錢 (被charge較高之利率)
 - ◆ Reputation issue: if a bank is seen scrambling for funds, other market participants will charge the bank high interest rates on funds it borrows
 - 賤賣資產 (“cash in” asset)
 - 違約倒閉
- Funding-liquidity risk vs. Liquidity risk in trading (擠兌 vs. 要承認損失出場而賣不出去)

Measurement of Liquidity Risk

- The use and sources (outflows and inflows) of funds of banks

Scheduled payment

例：企業借款之利息 (Inflow)，自己之債券 (Outflow)

Unscheduled payments

例：房貸的提早款 (Inflow)，credit line的增加 (Outflow)

Semidiscretionary payments

例：一般證券交易 (Inflow and Outflow)，repo market (Inflow and Outflow)

Discretionary payments

例：interbank money market操作 (Inflow and Outflow)，
selling securities from a liquidity reserve (inflow)

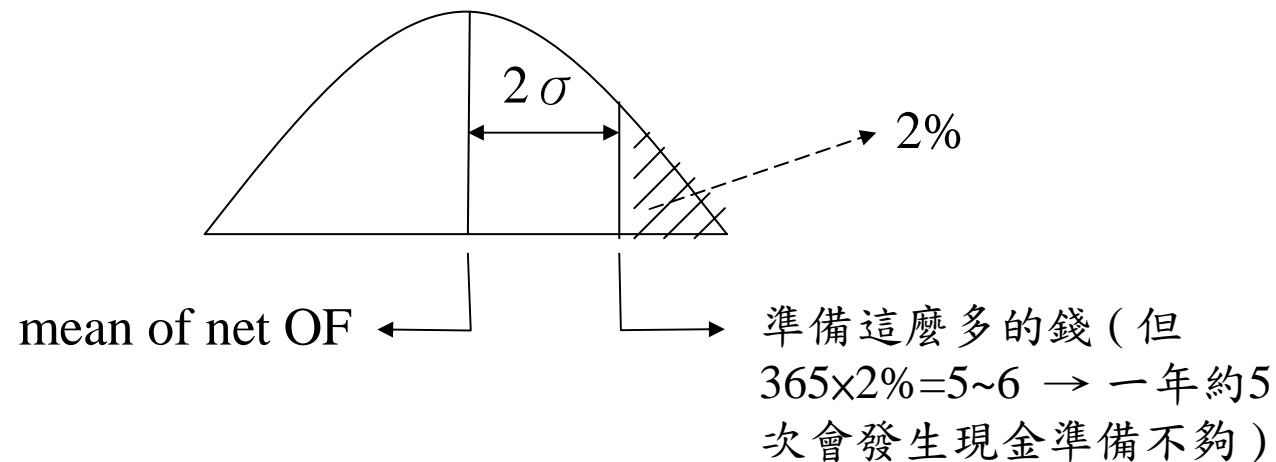
1. Expected Funding Requirement

= scheduled payments + 其它payments的平均

- 例如：活存帳戶的儲蓄餘額，預期可能會穩定的成長。更仔細來看，每個月初企業要發薪水，所以企業帳戶餘額減少，但是個人因為薪水入帳，所以帳戶餘額增加，兩種力量相消後，銀行的net CF受此影響幾乎為0，因此可以預期餘額會穩定成長
- 但scheduled payment是當合約定好後，有scheduled cash flows，但新的合約卻可能隨時發生，例如，企業臨時需要週轉，而向銀行借貸，造成銀行的現金的流出

2. Unusual Funding Requirement

- 銀行的準備金for unusual day，是根據類似VaR的想法來決定



- 當超過所準備的錢時，銀行先以discretionary payments (for example, interbank loan or selling liquid securities) 來支付

- 計算unusual day時，需多少之discretionary inflow才夠達成in flow = out flow

$$I_D + I_{SD} + I_U + I_S = O_D + O_{SD} + O_U + O_S$$

(在unusual day錢不夠，自然， $O_D = 0$)

$$\begin{aligned}\Rightarrow I_D &= (O_S + O_U + O_{SD}) - (I_S + I_U + I_{SD}) \\ &= (O_S - I_S) + R\end{aligned}$$

上式中， $(O_S - I_S)$ 為已知的net out flow,

而 R 代表其他的現金流量視為一個 net outflow random variable

$$\Rightarrow I_{D,2\sigma} = (O_S - I_S) + \bar{R} + 2\sigma_R$$

★ 因只是unusual day，故並不需把標準差的前乘係數提高

★ 若是要估計unusual period，則 $\sigma_{R,T} = \sqrt{T} \times \sigma_R$

3. Crisis Funding Requirement and Economic Capital

- 何謂crisis (顧客與其他金融機構對銀行失去信心)
 1. 別家銀行不借錢融通 (discretionary inflow = 0)
 2. scheduled inflow可能沒法全數收回
 3. no unscheduled inflow from customers (顧客不來存款)
 4. 減少自己的discretionary outflow (例不借錢給別的銀行) 與 semidiscretionary outflow (例不買進新的證券)
 5. scheduled outflow還是要付
 6. unscheduled outflow會大增 (存戶大量提款)

- 第一種估計方法：找之前的crisis，並且得到當時的市場情況與顧客行為，好預測需要準備多少錢來應付危機(但是crisis資料難找，因為當銀行快破產時，它不會將資料公開)
- 第二種估計方法：
 - ◆ Step1: 用類似之前估計unusual day現金需求的方法，估計在crisis所需的現金，例如滿足前一頁的1~5項限制，此外第6項的unscheduled outflow假設為數個標準差
 - ◆ Step2: 此時銀行只能從增加semidiscretionary inflow著手，銀行可先賣出 liquid asset，若還不夠，則需要處理illiquid asset，用“fire-sale” price賣出，這樣會損失產生，此即為所需之EC，因銀行至少要能吸收此損失，才能維持不倒閉

例 p. 208 Table 14.1

Liquidity-Risk Management

- Liquidity risk management (如何改善liquidity risk)
 - 借長債or發長bond (流動性差)，用此錢，買政府公債(流動性好)，這樣當crisis發生時，就不用像別人借錢，只需將政府公債賣掉即可(但會有利差損失)
 - 跟別家銀行約好信用額度，到時可救援
 - 不借出長債，最好只借隔夜債，完全消去liquidity risk，但只能賺很低之yield
 - 減低銀行liability部位之流動性，例：希望客戶將活存改定存，短期改長期，或增加提早解約之penalty
 - 例出整理表，看何種資產可以先賣，且損失較小