FISIM and Risk
(and Liquidity transformation)

Kim Zieschang

International Monetary Fund
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ISWGNA FISIM Task Force
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What is the 2008 SNA’s ‘FISIM’?

• FISIM = Financial Intermediation Services Indirectly Measured
  – A large part of the output at current prices of important types of financial corporations
• Depends on a reference rate of interest, $rr$
• For deposits $s_D = (rr - r_D) D$
• For loans $s_L = (r_L - rr) L$
• Problem: how to determine $rr$?
Three main camps on the reference rate

• 1993 SNA: riskless and short, i.e., the interbank rate

• Basu, Colangelo, Fernald, Inklaar, and Wang: safe and short for deposits and risk-loaded and long for loans
  – A reference rate for every financial asset, every loan account
  – Essentially eliminates FISIM on loans and maintains a low FISIM on deposits: significant reductions in US and EU FISIM

• Split the difference, the reference rate is the average of the deposit and loan interest rates
Considerations on the reference rate

• Receipts = expenditures
• Output = input cost
• There are individual reference rates for all asset and liability instruments
• The reference rate calculation covers all assets and all liabilities including owners’ capital
• The return on owners’ capital is residually determined
## Notation

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<td>$AF5CL$</td>
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Derivation

- Receipts = expenditures (including financial income and expenditure, whole balance sheet)

\[ p' y + r'_{AFA} AFA \equiv P2 + D1 + D29 - P51c + r'_{AFL} AFL \]

- To transform to output = input cost
  - subtract product of financial asset instrument reference rates times asset instruments from both sides
  - add product of liability instrument reference rates times liability instruments to both sides
  - Collect margin terms and direct service charges on the LHS
Derivation of $rr$ from multiple reference rates, $r \hat{h}at$

- Output = input cost

\[ p' y + (\hat{r}_{AFL} - r_{AFL})' AFL + (\hat{r}_{AFA} - \hat{r}_{AFA})' AFA = P2 + D1 + D29 - P51c \]

or

\[ P1 = P2 + D1 + D29 - P51c + (\hat{r}'_{AFL} AFL - \hat{r}'_{AFA} AFA) \]

\[ = P2 + D1 + D29 - P51c + rr (i' AFL - i' AFA) \]

\[ = P2 + D1 + D29 - P51c + rr \cdot AN \]

where

\[ rr \equiv \frac{\hat{r}'_{AFL} AFL - \hat{r}'_{AFA} AFA}{i' AFL - i' AFA} = \frac{\hat{r}'_{AFL} AFL - \hat{r}'_{AFA} AFA}{AN} \]

\[ AN \equiv i' AFL - i' AFA \]
Reasonableness test of multiple reference rates $r\hat{\text{a}}t$

- Liability reference rates cannot be so low, nor asset reference rates so high, that the numerator of

$$rr \equiv \frac{\hat{r}'_{AFL} AFL - \hat{r}'_{AFA} AFA}{i'_{AFL} - i'_{AFA}} = \frac{\hat{r}'_{AFL} AFL - \hat{r}'_{AFA} AFA}{AN}$$

becomes too small (or even negative), and vice versa

- $rr$ is a weighted average of specific reference rates, reminiscent of 2008 SNA para 6.166, but not quite the same thing
  - However, it is very close, as explained below, when many of the observed rates equal the reference rates
Equivalence of single and multiple reference rate approaches

- Three equivalent ways of writing output = input cost

\[ p'y + (\hat{r}_{AFL} - r_{AFL})'AFL + (r_{AFA} - \hat{r}_{AFA})'AFA = P2 + D1 + D29 - P51c \]
\[ + (\hat{r}'_{AFL}AFL - \hat{r}'_{AFA}AFA) \]

\[ p'y + (r'_{AFA}AFA - r'_{AFL}AFL) + (\hat{r}'_{AFL}AFL - \hat{r}'_{AFA}AFA) = P2 + D1 + D29 - P51c \]
\[ + (\hat{r}'_{AFL}AFL - \hat{r}'_{AFA}AFA) \]

\[ p'y + r'_{AFA}AFA - r_{AFL}AFL + rr(\hat{r}'_{AFL} - \hat{r}'_{AFA}) = P2 + D1 + D29 - P51c \]
\[ + rr(\hat{r}'_{AFL} - \hat{r}'_{AFA}) \]
Equivalence of single and multiple reference rate approaches

• The last way of writing output = input cost reduces to

\[ p'y + r'_{AFA}AFA - r_{AFL}AFL + rr\left(i'_{AFL} - i'_{AFA}\right) = P2 + D1 + D29 - P51c \]

\[ +rr\left(i'_{AFL} - i'_{AFA}\right) \]

\[ p'y + r'_{AFA}AFA - r_{AFL}AFL + rr \cdot AN = P2 + D1 + D29 - P51c \]

\[ +rr \cdot AN \]

• Subtracting the financing cost of nonfinancial capital from both sides, the return on equity is implicitly (residually) determined by

\[ p'y + r'_{AFA}AFA - r_{AFL}AFL = P2 + D1 + D29 - P51c \]
Determining the $r$ hats [1]

- Return on equity is independent of the reference rate, so is predetermined (2008 SNA compliant)
- Reference rate on securities equals observed rate on securities (no FISIM, asset or liability), so is predetermined (2008 SNA compliant)
- Reference rate on deposits is greater than observed rate (2008 SNA deposit FISIM)
  - May be safely determined using liability side on-balance-sheet security rates
Determining the $r \ hats$ [2]

- Reference rate on loans is less than observed rate (2008 SNA loan FISIM, asset and liability)
  - May be understated using asset side *market* security rates
  - Cost of funds (average of liability reference rates, *including return on equity*) a reasonable approach instead:
    \[
    rr_{AFA} \equiv \frac{\hat{r}_{AFA}^{\prime} AFA}{\hat{r}_{AFA}^{\prime} AFA} = \frac{\hat{r}_{AFL}^{\prime} AFL}{\hat{r}_{AFL}^{\prime} AFL}
    \]

However, the cost of funds will be overstated by the impact of loan FISIM on the liability side unless this is removed from loan liability costs.
Determining $rr$ directly

- Operating lease rates less depreciation should equal finance charge on nonfinancial capital and thus could determine $rr$
  - Produced nonfinancial assets
    - Structures by type
    - Equipment by type
  - Nonproduced nonfinancial assets
    - Land (depreciation = 0)
  - No need for determining financial instrument by financial instrument margins, but would be about as bad—lease rates by nonfinancial asset type
Concluding remarks

• To compute aggregate FISIM, you need only one reference rate per sector
  – Equals financing cost of nonfinancial capital
• To compute and allocate deposit FISIM, you need the deposit reference rate
  – On-balance sheet security equivalent
  – Other approaches?
• To compute and allocate loan FISIM, you need the loan reference rate
  – Cost of funds: average of liability reference rates
  – Other approaches?