

**Meeting of the Task Force on Financial Intermediation Services Indirectly Measured (FISIM)
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**FISIM and Risk
(and Liquidity transformation)**

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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

Table 1. Notation

Concept	Flow	Liability	Asset
Output (total, in current prices)	$P1$		
Directly priced output prices (m vector)	p		
Directly priced output quantities (m vector)	y		
Intermediate consumption	$P2$		
Compensation of employees	$D1$		
Other taxes on production	$D29$		
Consumption of fixed capital	$P51c$		
Nonfinancial assets			AN
Financial instruments (k vector)		AFL	AFA
Deposits		$AF2DL$	$AF2DA$
Debt securities		$AF3L$	$AF3A$
Loans		$AF4L$	$AF4A$
Equity capital		$AF5CL$	$AF51A$

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, $r \hat{}$

- Output = input cost

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

or

$$+ (\hat{r}'_{AFL} AFL - \hat{r}'_{AFA} AFA)$$

$$\begin{aligned} P1 &= P2 + D1 + D29 - P51c + (\hat{r}'_{AFL} AFL - \hat{r}'_{AFA} AFA) \\ &= P2 + D1 + D29 - P51c + rr (\iota' AFL - \iota' AFA) \\ &= P2 + D1 + D29 - P51c + rr \cdot AN \end{aligned}$$

where

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

$$AN \equiv \iota' AFL - \iota' AFA$$

Reasonableness test of multiple reference rates \hat{r}

- 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

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

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

$$p'y + r'_{AFA} AFA - r'_{AFL} AFL + rr(i' AFL - i' AFA) = P2 + D1 + D29 - P51c \\ + rr(i' AFL - i' AFA)$$

Equivalence of single and multiple reference rate approaches

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

$$p'y + r'_{AFA}AFA - r_{AFL}AFL + rr(i'AFL - i'AFA) = P2 + D1 + D29 - P51c + rr(i'AFL - i'AFA)$$

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

- 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:

$$rr_{AFA} \equiv \frac{\hat{r}'_{AFA} AFA}{i'_{AFA}} = \frac{\hat{r}'_{AFL} AFL}{i'_{AFL}}$$

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?