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Sector Paper on:

Banking and Credit, Reference Rates and Negative Prices

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Sector Paper on Banking and Credit, Reference Rates and Negative Prices

1.0 Introduction

This paper summarizes the challenges associated with the definition and classification of the banking and credit industry as well as the collection of turnover data and the measurement of price change. The main sources of information used in this paper are presentations and summary notes from previous Voorburg Group (VG) meetings. Early contributions on the price and volume measurement of the banking and credit industry output stem from the beginning of the 1990's. First contributions found in the archives were background papers for the VG meetings in Ottawa 1989 and Williamsburg 1992 (by J.E. Triplett, US bureau of Economic Analysis) followed by discussion papers to the first Oslo VG meeting in 1993 (Ann Chadeau/OECD, INSEE, R. Collins/G. Sciadas/StatCan). Major input to price measurement for banking services also came from N. Palmer (VG meetings 2001 and 2002). All studies on the volume measurement of banking and credit services were driven by the discussions of the National Accountants on the deflation of GDP where the service sector in general but the growing banking service sector in particular was assumed not to reflect the real picture because the widely used input method did not allow a comprehensive measurement. The Stability and Growth Pact and the EU-Commission Decision 1998 brought a substantive progress into the improvement and harmonization of deflating methods with the categorization into A, B- und C-methods. Furthermore, the new version of the System of National Accounts, the SNA 2008, brought a substantial improvement on the understanding of financial intermediation.

The VG meetings in Oslo 2009 and in Vienna 2010 were intensively working on the measurement of Banking Services. Norway, Mexico, United States and Canada delivered mini-presentations on turnover measurement, while Australia, Canada, Japan, the United Kingdom and United States delivered mini-presentations on service producer price index measurement.

The main objective of this paper is to explain the subject of measurement and to summarize the recommended best practices when collecting turnover data and measuring volumes and price changes in the banking and credit industry.

The production of banking and credit granting services is characterized by the fact that only a part can be directly observed and reported while the other part has to be indirectly measured. This fact leads to the question how to organize the paper. The authors decided to start with a section of classification and definition of banking and credit granting industry (Section 2) and to continue with the description of turnover measurement issues for both directly and indirectly measured banking services (Section 3). Section 4 relates to price measurement for directly observable services and indirectly observable services both sections addressing methodological options chosen by several countries. Section 5 concludes with summarizing and further suggestions.

2.0 Classification and definition

2.1 Industry Classification

Classification of banking and credit activities and products in both industry and product classifications generally focuses on financial intermediation services. These financial intermediation services comprise Central banking and other monetary intermediation. The industry classification systems NACE and ISIC correspond exactly with each other in the recent versions. The NAICS largely corresponds to NACE and ISIC in their revised versions dividing banking into different categories (personal, commercial, corporate and institutional banking. To some extent these services (at least in some countries) can overlap with activities of establishments engaged in the pooling of risk (insurances). As a general important characteristic it can be stated that financial enterprises including banks are subject to strict surveillance and reporting obligations to authorities.

NACE rev. 2	ISIC Rev.4	NAICS
64 Financial service activities, except insurance and pension funding	64 - Financial service activities, except insurance and pension funding	Sector 52, Finance and Insurance
64.1 Monetary intermediation	641 - Monetary intermediation	
64.11 Central banking	6411 - Central banking	521 "Monetary Authorities – Central Bank";
64.19 Other monetary intermediation	6419 - Other monetary intermediation	522, "Credit Intermediation and Related Activities";
*6420 - Activities of holding companies *)*	*6420 - Activities of holding companies *)*	52211 Banking
6430 - Trusts, funds and similar financial entities)*	*6430 - Trusts, funds and similar financial entities*)*	522111 Personal and Commercial Banking Industry
6491 - Financial leasing	*6491 - Financial leasing*	522112 Corporate and Institutional Banking Industry
6492 Other credit granting	6492 - Other credit granting	*523 Securities and Commodity Contracts Intermediation and Brokerage *)*
6499 - Other financial service activities, except insurance and pension funding activities, n.e.c.	6499 - Other financial service activities, except insurance and pension funding activities, n.e.c.	*52311 Investment Banking and Securities Dealing*

*) These activities are obviously not part of Banking and Credit at least according to SNA.
**) NAICS 523 - securities and commodity contracts intermediation and NAICS 52311 – investment banking and securities dealing included in Banking and Credit in the US and Canada.

2.2 Product Classification

The structure of the new CPA has three dimensions:
- type of financial institution,
- type of underlying financial instrument
- type of customer

CPA 2008	CPC Ver.2
641110 Central banking services	7111 Central banking services
641911 Deposit services to corporate and institutional depositors	71121 - Deposit services to corporate and institutional depositors
641912 Deposit services to other depositors	71122 - Deposit services to other depositors
641921 Inter-industry credit granting services by monetary institutions	71135 Non-mortgage loan services for business purposes
641922 Consumer credit granting services by monetary institutions	71133 Personal non-mortgage loan services for non-business Purposes
641923 Residential mortgage credit granting services by monetary institutions	71131 Residential mortgage loan services
641924 Non-residential mortgage credit granting services by monetary institutions	71132 Non-residential mortgage loan services
641925 Commercial non-mortgage credit granting services by monetary institutions	
641926 Credit card services by monetary institutions	
641929 Other credit granting services by monetary institutions	71139 Other credit-granting services
641930 Other monetary intermediation services n.e.c.	71190 Other financial services, except investment banking, insurance services and pension services

2.3 Issues in Classification

The current System of National Accounts (1993 and 2008 SNA) assumes certain additional services contained in deposits and loans, which are not directly measured in a traditional SNA methodology. They are called as FISIM (Financial Intermediation Services Indirectly Measured). FISIM are actually counted as a part of national production (GDP) in many countries. Since CPA2008 and CPC ver.2 classifications do not deal with this idea of FISIM, certain revisions might be necessary in the future to incorporate FISIM more explicitly in order to make product classifications more consistent with SNA.

The definitions of financial intermediaries and FISIM are as follows:

The 2008 System of National Accounts (2008 SNA) defines financial intermediaries as "…institutional units that incur liabilities on their own account for the purpose of acquiring financial assets by engaging in financial transactions on the market (2008 SNA 4.101)." Of particular interest within this group are those institutional units that take deposits, namely:

4.105 Deposit-taking corporations except the central bank have financial intermediation as their principal activity. To this end, they have liabilities in the form of deposits or financial instruments (such as short-term certificates of deposit) that are close substitutes for deposits. The liabilities of deposit-taking corporations are typically included in measures of money broadly defined.

4.106 In general, the following financial intermediaries are classified in this sub-sector:
a. Commercial banks, "universal" banks, "all-purpose" banks;
b. Savings banks (including trustee savings banks and savings and loan associations);
c. Post office giro institutions, post banks, giro banks;
d. Rural credit banks, agricultural credit banks;
e. Cooperative credit banks, credit unions; and
f. Specialized banks or other financial corporations if they take deposits or issue close substitutes for deposits. (2008 SNA 4.105-106)

The banking sector is embedded in the broader finance and insurance sector. Banks and institutions performing credit intermediation move funds from depositors to borrowers. In performing these intermediation activities, banks also provide services, such as the processing of checks or electronic funds transfers, bookkeeping, protection of deposited funds, and investment services. Payment for these services may include explicit (directly measured) charges.

On the other hand banks and other intermediary institutions provide services for which they don't charge explicit fees or commissions to customers but these services are implicitly charged through interest margins, i.e. banks and other credit intermediation institutions pay (charge) depositors (borrowers) lower (higher) rates of interest than they would otherwise pay (earn) on these funds. Since there is no explicit price these implicit charges can only be indirectly measured. This part of the banking output is called FISIM = Financial intermediary Services Indirectly Measured.

The understanding of FISIM is fundamental for the measurement of the banking output and price index compilation as well as for the determination of real output volume of the banking sector in National Accounts. Therefore it is not trivial to look into the definition according to the 2008 System of National Accounts (SNA 2008):

Paragraph 6.163 SNA 2008 states:"One traditional way in which financial services are provided is by means of financial intermediation. This is understood to refer to the process whereby a financial institution such as a bank accepts deposits from units wishing to receive interest on funds for which the unit has no immediate use and lends them to the other units whose funds are insufficient to meet their needs. The bank thus provides a mechanism to allow the first unit to lend to the second. Each of the two parties pays a fee to the bank for the service provided. The unit lending funds by accepting a rate of interest lower than that paid by the borrower the difference being the combined fees implicitly charged by the bank to the depositor and to the borrower. From this basic idea the concept emerges of a reference rate of interest.

The difference between the rate paid to banks by borrowers and the reference rate plus the difference between the reference rate and the rate actually paid to depositors represent charges for financial intermediation services indirectly measured (FISIM)."

And paragraph 6.164 further explains: However, it is seldom the case that the amount of funds lent by a financial institution exactly matches the amount deposited with them. Some money may have been deposited but not yet loaned; some loans may be financed by the bank's own funds and not from borrowed funds. However, the depositor of funds

receives the same amount of interest and service whether or not his funds are then lent by the bank to another customer, and the borrower pays the same rate of interest and receives the same service whether his funds are provided by intermediated funds or the bank's own funds. For this reason an indirect service charge is to be imputed in respect of all loans and deposits offered by a financial institution irrespective of the source of the funds. The reference rate applies to both interest paid on loans and interest paid on deposits so that the amounts of interest recorded as such in the SNA are calculated as the reference rate times the level of loan or deposit in question. The difference between these amounts and the amounts actually paid to the financial institution are recorded as service charges paid by the borrower or depositor to the financial institution. For clarity the amounts based on the reference rate recorded in the SNA as interest are described as "SNA interest" and the total amounts actually paid to or by the financial institution are described as "bank interest". The implicit service charge is thus the sum of the bank interest on loans less the SNA interest on the same loans plus the SNA interest on deposits less the bank interest on the same deposits. The service charge is payable by or to the unit in receipt of the loan or owning the deposit as appropriate.

6.165 By convention within the SNA, these indirect charges in respect of interest apply only to loans and deposits and only when those loans and deposits are provided by, or deposited with, financial institutions. The financial institutions in question need not be resident; nor need the clients of the financial institution be resident. Thus imports and exports of this type of financial service are possible. Nor need the financial institution necessarily offer deposit taking facilities as well as making loans. The financial subsidiaries of retailers are examples of financial institutions that make loans without accepting deposits. A money lender who has sufficiently detailed accounts to be treated as an actual or quasi-corporation may receive this sort of charge; indeed since money lenders usually charge especially high rates of interest, their service charges may exceed the SNA interest payments by significant amounts.

6.166 The reference rate to be used in the calculation of SNA interest is a rate between bank interest rates on deposits and loans. However, because there is no necessary equality between the level of loans and deposits, it cannot be calculated as a simple average of the rates on loans or deposits. The reference rate should contain no service element and reflect the risk and maturity structure of deposits and loans. The rate prevailing for inter-bank borrowing and lending may be a suitable choice as a reference rate. However, different reference rates may be needed for each currency in which loans and deposits are denominated, especially when a non-resident financial institution is involved. For banks within the same economy, there is often little if any service provided in association with banks lending to and borrowing from other banks.

6.167 Banks may offer loans that they describe as being fixed interest loans. This is to be interpreted as a situation where the level of bank interest is fixed but as the reference rate changes, the level of SNA interest and the service charge will vary.

6.168 When an enterprise acquires a fixed asset under the terms of a financial lease, a loan is imputed between the lessor and the lessee. Regular payments under the lease are treated as being payments of interest and repayment of capital. When the lessor is a financial institution, the interest payable under the terms of a financial lease corresponds to bank interest and should be separated into SNA interest and financial service charge as for any other loan.

3.0 Turnover Statistics for explicitly and implicitly charged services

3.1 Unit of measure to be collected – what is turnover in banking and credit?

Notionally the output of banks and credit granting institutions is the summation of explicitly charged and implicitly charged services. As shown above, under the current SNA the later is defined as FISIM on deposits and loans.

Turnover for explicitly charged services can, in principle, be observed through the actual fees and commissions paid by customers. The main sources for the data would be P/L statement of banks and credit granting institutions. In many countries, they are collected periodically by statistical agencies and/or supervisory authorities.

Turnover for FISIM cannot be directly observed and should be imputed using the SNA definition formula and relevant data. The main data sources would be B/S and P/L statements and some market interest rates. Collection of these data itself is not likely to impose any significant issue on the measurement of FISIM.

However, applying SNA definition of FISIM to each country often requires certain adjustments or modifications, so that the structure of financial markets and banking industries be properly reflected in measured FISIM. The issue of the choice of the reference rate is a typical example (see 4.3).

3.2 Turnover for explicitly charged services

The value of output is defined as the sum of explicit service charges (fees and commissions).

Explicit charges include
- fee income from loans and
- commissions from brokering and dealing of equities products,
- gains from brokering and dealing of equities, and financial planning and investment management services that can be collected directly from establishments engaged in Securities, Commodity Contracts and Other Financial Investments and Related Activities.
- fee and commission income for domestic and international money transmission and receipt, account services, securities brokerage services, underwriting services, securities selling services, securities issuance, transfer and related services, financial agency services, safe deposit box services, credit guarantee
- credit card interchange fees
- ATM interchange fees

The information on this part of output can be collected directly from establishments engaged in credit intermediation and related activities. Countries conduct detailed surveys or receive quarterly and annual reports on accounting data (financial statements, balance sheets) from banks and other credit institutions. This information is collected either by national Statistical Institutes, Central banks or other Financial Authorities (e.g. Canada: Revenue Agency which is the central taxation authority). Surveys are either sample surveys (e.g. in Canada for larger businesses) or census-type surveys (like for banks in Canada).

At constant prices the value of output as the sum of explicit service charges (fees and commissions) can be estimated

- by applying extrapolation from the base year using a chosen volume indicator. The volume indicator based on (un-weighted) number of transactions within various operations
- by using employment data and an estimated rate for change in productivity (e.g. Norway for other credit granting services)
- by deflating nominal output using price indexes

3.3 Turnover for implicitly charged services

Output of services not directly charged (FISIM) cannot be extracted directly from the accounts of the banks. The value of this output is estimated using data on payments and receipts of interests and balance sheet information from the banks' accounts in combination with data on certain market interest rates such as inter-bank interest rates. These estimations are carried out in Norway, as in other countries, as part of the National Accounts compilation.

Turnover for implicitly charged services measured as nominal FISIM in line with SNA definition consists of the following components:

Deposit FISIM at period $t = (rr_t - rd_t)^* D_t$

> rr_t: the reference rate at period t
> rd_t: average interest rate paid on deposits at period t
> D_t: balance of deposits at period t

Loan FISIM at period $t = (rl_t - rr_t)^* L_t$

> rl_t: average interest rate earned from loans at period t
> L_t: balance of loans at period t

The choice of the reference rate is the most important issue, and in fact significantly affects measured turnover figures. This topic will be discussed in details later in 4.3.

Other data needed for calculating FISIM using these formulas can usually be collected from B/S and P/L statements of banks and credit granting institutions. They are periodically collected by statistical agencies and/or supervisory authorities in many countries, at least for chartered/supervised banks. However, the frequency of the data collection could be an issue. Quarterly data are available in some countries, which is basically sufficient for producing quarterly measures of FISIM, and hence GDP. In some cases only annual or semi-annual data are available, where quarterly turnover measures as well as GDP must be compiled based on certain estimations. Data for certain credit granting institutions which are not subject to licensing or supervision tend to be more difficult to collect.

Use of B/S data involves another issue. Theoretically, D_t and L_t figures should be the average balance during period t, and rd_t and rl_t are calculated as follows:

> rd_t = (interest on deposits paid during period t taken from P/L)/D_t

> rl_t = (interest on loans earned during period t taken from P/L)/L_t

However, B/S data normally gives only the end of the period balance figures. Some countries (e.g. Canada) report that this inconsistency or accounting/tax anomalies at the end of the period data could become the source of volatility or negative values in FISIM.

If turnover figures are needed on monthly basis for certain purposes (e.g. for monthly index of service production/activities used for assessment of the economic situation), it becomes difficult to rely on B/S and P/L data. Some possible solutions will be given in 4.5.

Recommended Development Options

Category	Data Source	Level of Detail Collected	Frequency	Cost
Best	B/S and P/L statements of all banks and credit granting institutions	Interst payments / receipts and average balance of deposits and loans	Quarterly	High
Good	B/S and P/L statements of all chartered banks	Interest payments / receipts and the end of period balance of deposits and loans	Quarterly	Modest
Minimum	B/S and P/L statemets of major chartered banks	Interest payments / receipts and the end of period balance of deposits and loans	Annual	Low

4.0 SPPI for explicitly and implicitly charged services (FISIM)

4.1 General aspects for developing SPPI for Banking Services

The scope of SPPI for Banking Services is usually restricted to activities associated with loans and deposits, whether they are services for which a direct fee is charged, or services for which a charge is incurred via FISIM. For the purposes of the SPPI, output can further be restricted to services offered to other domestic businesses, e.g. private non-financial corporations. In that case (like in the UK) all other banking activity is then considered out of scope of the current implementation of the Banking SPPI.

In the banking industry the major service lines are mainly the following:
- Loans (assets of a bank defined as funds advanced to a borrower to be repaid at a later date, usually with interest)
- Deposits (liabilities of a bank defined as funds placed with a bank in an account subject to withdrawal)
- Trust services (involve the bank's acting in a fiduciary capacity for an individual or a legal entity, such as a corporation or an individual's estate. This typically involves holding and managing trust assets for the benefit of a third party).
- Other banking services (standby letters of credit, correspondent banking, sale of securities, cash management and other miscellaneous services, such as the sale of money orders).

As concerns sampling in countries where the banking industry is concentrated with large dominant banks and a large number of small banks (like in the US) usually all banks, both large and small, are included in the sampling frame. The selection of banks can be done in 2 stages, in a first stage by probability proportionate-to-size sampling (like in the US) and by sub-sampling in a second stage using different service categories (e.g. mortgage loans, agricultural loans, commercial loans, consumer and other loan services, etc.).

In following this approach for loans and deposits, the unique item to be priced is represented by a homogeneous portfolio of accounts (e.g. all 15-year fixed rate residential mortgages or all 1-year certificates of deposit). Trusts and other banking services are priced by selecting an individual transaction. Once the actual portfolio is selected, its price determining characteristics are identified to permit monthly re-pricing of the same unique item. The following characteristics are common for most banking services:

· Type of service - e.g. mortgage loans, money market savings account, corporate trusts, etc.
· Term of service - e.g. 15-year loan, 5-year certificate of deposit
· Type of fees - e.g. late payment, automatic teller machine, early withdrawal penalty, etc.

Concerning pricing it is necessary to develop a methodology that not only captures directly priced services, but also reflects services priced indirectly. This methodology must allow interest to be allocated between loans and deposits.

Possible pricing methods are:

- user cost approach: the user cost for a financial service is the difference between its revenue and the sum of its implicit and explicit costs. To measure these implicit costs, interest is allocated between loans and deposits by means of a "reference rate." The reference rate is the opportunity cost rate of money from which the risk premium is eliminated to the greatest extent possible and which does not include any intermediation services (see sub-chapter 4.2)
- earning assets approach: here banks are considered intermediaries between holders of liabilities and those receiving funds. Loans and other bank assets are considered output while deposits are inputs. However, banks provide substantial services to depositors that are excluded under this approach. Output is measured by earned interest for loan services and fees for all other banking outputs.
- value added approach: all assets and liabilities have some characteristics of output. In addition, there is no mutually exclusive distinction between inputs and outputs. Unlike the user cost approach, this approach explicitly uses operating costs to measure output. It is measured as the difference between the interest earned on loans and the interest paid on deposits.

Data sources

The SPPI Banking methodology usually uses two sources of data to derive the index: quarterly income statements and balance sheets of chartered banks (Canada). In the case of the UK Banking SPPI administrative by-product data arising from regulatory activity undertaken by the Bank of England are used. The Bank of England collects a significant amount of data for financial policy monitoring and for the UK National Accounts.
Two sources of these data are used in the Financial Intermediation (Banks) SPPI:

- the Effective Rates (ER) form is a survey of average interest rates. These data are collected on a monthly basis and achieves coverage of around 70% of all private UK banks. The ER form collects balances, interest flow and rates, by broad type of bank customer, by type of financial product. Different degrees of detail are available for new and outstanding loans, with new loans provided in a size banding.
- The second source, the Profit and Loss (PL) form is a quarterly census which collects interest payable, interest receivable and fees data. Interest receivable is classified by broad type of product, with information on type of bank customer. Interest payable is classified by broad type of product, also with information on type of bank customer.

For the purposes of an SPPI, the ONS UK would ideally like to construct portfolios of loans and deposits and sample them from period to period.

4.2 SPPI for indirectly charged services (deposits and loans)

SPPI for indirectly charged services is to be developed following the "user-cost approach" discussed in 4.1, since the SNA definition of FISIM is based on the idea of the user-cost of deposits and loans. The exact method to estimate a SPPI for FISIM is to calculate constant price FISIM (separately for deposits and loans) and to derive a deflator for FISIM as Nominal FISIM/Constant price (real) FISIM.

Constant price (base 0) FISIM are defined as follows:

Constant price deposit FISIM at period t

$$= (rr_0-rd_0)*(\text{real balance of deposits at period t})$$
$$= (rr_0-rd_0)*(Dt \; / \; (\text{deflator for the value of money}))$$

Constant price loan FISIM at period t

$$= (rl_0-rr_0)*(\text{real balance of loans at period t})$$
$$= (rl_0-rr_0)*(L_t \; / \; (\text{deflator for the value of money}))$$

Hence, FISIM deflators are derived as follows

Deposit FISIM deflator at period t

$$= ((rr_t-rd_t) \; / \; (rr_0-rd_0))*(\text{deflator for the value of money})$$

Loan FISIM deflator at period t

$$= ((rl_t-rr_t) \; / \; (rl_0-rr_0))*(\text{deflator for the value of money})$$

These formula shows that SPPI for indirectly charged services (FISIM) consists of two parts, notably,
- interest rate differentials (rr_t-rd_t and rl_t-rr_t) and
- the deflator for the value of money.

In principle, the interest rate differentials part should be simultaneously and consistently defined with SNA definition of FISIM. That is, the same reference rate and the same r_d and r_l as in SNA should also be used for SPPI, or the rates adopted in SPPI should be passed on to SNA.

Although four countries (US, UK, Canada and Australia) reported their SPPI for banking and credit in 2009 (Oslo) and 2010 (Vienna) VG meetings, their consistency with SNA definition is not yet clear.

The consistency with SNA is also required for the second part, i.e. the choice of the deflator for the value of money. Since the value of money is believed to be best measured by the general price level, the natural candidates would be

1) GDP deflator,
2) CPI, or
3) other index for the general price level.

The most suitable indicator for the general price level would vary from country to country. In fact, among the reporting countries, US adopt domestic purchase price index and Australia (for CPI of banking services) uses CPI All-groups.

4.3 Choice of the reference rate

It is quite apparent that the choice of the reference rate significantly affects the measurement of FISIM, and hence turnover and SPPI for implicitly charged services by banks and credit granting institutions.

SNA definition of the reference rate states as follows:

-- A rate from which the risk premium has been eliminated to the greatest extent possible and which does not include any intermediation services (1993 SNA).

-- The reference rate should contain no service element and reflect the risk and maturity structure of deposits and loans. The rate prevailing for inter-bank borrowing and lending may be a suitable choice as a reference rate (2008 SNA).

It is also assumed in SNA that the single reference rate should be applied both to deposits and loans.

Theoretically, the "risk-free" market interest rate with an appropriate maturity should be the best candidate for the reference rate. However, it is not easy to actually find a market interest rate that fulfills these conditions.

In fact, the actual choice of the reference rate differs from country to country. Those are divided into three groups:

  1) use of certain market interest rate as the reference

-- UK adopts LIBOR (3-month interbank rate) for FISIM and SPPI for banking.
-- Norway basically uses NIBOR (3-month interbank rate) for national part and EURIBOR (3-month interbank rate) for international part of FISIM.

  2) use of certain average rate derived from banks' B/S and P/L

-- US adopt average rate earned by banks on US Treasury and US agency security for both FISIM and SPPI for banking.
--Japan plans to use average interest rate on financial institutions' borrowing from other financial institutions for FISIM.

  3) use of some mid-point rate

-- Australia uses the simple average of r_d and r_l for CPI for banking.

The choice of the reference rate should be considered based on the following perspectives:

- maturity

The maturity of the reference rate should broadly correspond to the maturity structure of deposits and loans. In this context, short-term (e.g. 3-month) interbank rates such as LIBOR could be too short compared with the average maturity of deposits, especially where fixed-term deposits occupies a significant share in banks total deposits. This mis-match in maturity could lead to negative prices/FISIM, especially when the money market rates becomes extraordinary low because of the strong easing of monetary policy (as actually experienced after the great financial crisis).

To use some average rate could be a solution to this problem. For example, the average maturity of the rate earned by banks on US Treasury and US agency security in the US case

is expected to fall between the average maturity of loans and deposits. In fact US report that they are successful in avoiding negative prices by using this rate as the reference. Japan also succeeded in eliminating negative FISIM by adopting the average rate.

If we should faithfully follow the theory of the user cost, which is regarded as the theoretical basis for FISIM, different reference rates should be used for deposits and loans (exactly, for each deposit and loan component), as their maturity is not the same. In fact, in its compilation of experimental SPPI for banking, Canada finds that an appropriate choice of the reference rate for each component can help to reduce negative prices.

Although the current SNA standard expects the single reference rate to be used, the use of different rates seems worth considering for future options. Theoretically, using multiple reference rates corresponding to the maturity of deposits and loans means that term premiums should be removed from FISIM, which is now on the international agenda.

- risk premium involved

Although 2008 SNA recommends use of interbank rates as the reference, they are not risk-free (contains risk premium on banks). A very rapid increase in the risk premium on banks could occur (as actually observed during the financial crisis period), and once this actually takes place, a lag in the adjustment of banks' loan rates (especially, long-term loan rates) could result in negative prices on bank loans

Thus, if the rates on government securities with wide range of maturities can be observed in the market, it might be better to use them as the reference.

Recommended Options for the choice of the reference rate

Option	Advantage	Risk	Aspects
Market interest rate	Observed directly, theoretically consistent	Maturity can be different from the averages of deposits and loans Possibly contains risk premium factor (interbank case)	Difficult to find an appropriate single market rate Inappropriate choice is likely to lead to negative prices
Average rate	Broadly reflects average maturity of deposits and loans	Needs detailed P/L and B/S data	Little risk of leading to negative prices
Mid-point rate	Simple calculation	Lacks of theoretical basis	No risk of leading to negative prices

4.4 Treatment of possible negative prices

As discussed in 4.3, it is above all important, and actually effective, to choose an appropriate rate as the reference in order to avoid negative prices. Especially, if negative prices are observed persistently, it is likely that the choice of the reference rate is not appropriate. However, even if we carefully and properly choose the reference rate, negative prices could still sometimes occur.

Other possible sources of negative prices reported are:

1) mis-match in timing of data collection between B/S and P/L
2) accounting anomalies (tax, etc.)

In these cases, careful treatment and correction of data is recommended.

3) difference in adjustment speeds in various interest rates

This would occur especially in the case of using certain short-term market rate (such as LIBOR) as the reference. Short-term market rates often show very rapid movements, while adjustments in rates on deposits and loans take much longer time because of the existence of fixed rate products. Rapid rises in the reference rate would result in negative loan prices, whereas rapid fall in negative deposit prices.

Smoothing of interest rates, such as taking moving averages, would be an effective solution to this problem, although there always is a risk of over-smoothing.

4) cross-subsidization / service bundling

It could often happen that banks use one of their products as a loss-leader, which is made up for by a higher price for another product. This could be a source of negative prices.
In such a case, aggregating the products might be effective.

5) official subsidization

In some countries, government owned banks provides significantly lower rates on their loans for certain policy purposes (financing home owners, SMBs, development of infrastructure, etc). If we calculate prices/FISIM on those loans using the same reference rate applied to private banks, they are likely to be negative.

In these cases, either i) estimating the government subsidies and adjusting prices/FISIM for them, or ii) using the separate reference rate for them, is recommended.

The simplest way of avoiding negative prices is to use some mid-point rate as the reference. Although mid-point reference is within the current SNA standards, it is subject to the critics of lacking theoretical basis.

> Thus, we should still find the way to deal with the remaining negative prices, after i) choosing an appropriate reference rate, and ii) conducting proper adjustments as stated above. Excluding them from SPPI/FISM, or set to zero, when they are negative would be a practical solution, although very tentative (without proper theoretical reasoning).

4.5 Possible quarterly/monthly measures

Turnover data for FISIM are usually collected from banks' financial statements (B/S and P/L). In many cases they are only available at most on quarterly basis and with certain/significant lags. If we use the same data sources to produce SPPI for banking, it should also be a quarterly series, and become available with lags.
Thus, if monthly SPPI for banking is needed along with other price indices, which are compiled monthly in many cases, we have to find out some different methodology to measure prices on implicitly charged banking services.

One of the possible solutions might be as follows:

1) implicit prices for deposits:

-- Chose several representative deposits, such as demand deposits, 3-month time deposits, etc.…

-- Listed rates applicable for deposits newly credited with banks (not the average of the stock of deposits) could be used.

-- Chose the appropriate reference rate for <u>each</u> representative deposit (not the single reference rate for all deposits).

-- The maturity of each representative deposit and the corresponding reference rate should be the same.

-- For demand deposits with no maturity, an average remaining period could be used.

-- Then, the price for each representative deposit can be calculated as:

$$(\text{reference rate}) - (\text{deposit interest rate})$$

.

   2) implicit prices for loans:

-- Chose some representative loan rates, such as short-term prime rate, long-term prime rate, standard mortgage rate, etc.

-- Listed Rates applicable to new loans (not the average of the stock of loans) could be used.

-- Chose the appropriate reference rate for <u>each</u> representative loan rate (not the single reference rate for all loans).

-- The maturity of each representative loan rate and the corresponding reference rate should be the same.

-- Then the price for each representative loan can be calculated as:

$$(\text{loan interest rate}) - (\text{reference rate})$$

This methodology is intended to observe i) representative, and ii) constant quality prices for each category of services, which is quite in line with the traditional notion of price indices and also consistent with the theory of user cost. Reported experimental SPPI for banking in Canada, which adopts 6 representative products, seems to be broadly following this way. It is also quite unlikely that this methodology might lead to negative measurement of prices.

In addition, monthly data for banks' deposit and loan balances are available in many countries as a part of monetary statistics. Combining these data with the SPPI data proposed above will enable statistical agencies to produce monthly turnover figures for indirectly charged banking services.

4.6 Quality adjustment issues

The challenge of quality change for the development of a banking services SPPI is important because banking services are facing a quite high amount of changes and improvements, e.g. innovations like ATMs, internet banking, extended hours, and debit and credit cards for consumers as well as for the commercial side. Research is under way to explore the question of how to evaluate quality change from a practical and quantifiable perspective.

As regards SPPI for indirectly charged services, the method proposed in 4.5 will be effective, to some extent, in collecting constant quality, representative prices for representative components of services. However, further quality adjustments will be necessary if services associated with representative products are expected to have significantly improved because of financial innovations, development of ICT, etc.

Quality adjustment issues are also very important for the proper calculation of FISIM. Since the current formula for FISIM uses the average interest rate on deposits/loans and a single reference rate, changes in the average quality of deposits/loans can be mis-measured as the changes in turnover. The solution to this issue would need further improvements in the definition of FISIM in SNA, and thus will be the future issues for discussion.

5.0 Summary and Further Suggestions

Although classifications are rather detailed in the new versions Banking and Credit industries in the countries under consideration seem to have a slightly different coverage (activities of holding companies, trust funds and similar financial entities are covered in US, Canada and Mexico whereas not included in Norway).

Turnover for indirectly charged banking services is simply calculated using the FISIM definition formula in SNA.

Data (B/S and P/L statements) availability is different from country to country, but minimum data (annual statements for chartered banks) are available in most cases.

SPPI for indirectly charged services are also defined by SNA, but the choice of the reference rate should be different from country to country, depending on the structure of financial markets as well as the composition of banks' deposit and loans.

Careful choice of the reference rate largely reduces the possibility of negative prices, but they still can occur in some occasions, and tentative treatments are necessary.

Monthly SPPI measure for indirectly charged banking services cannot be developed following the SNA methodology. An alternative method of collecting constant quality, representative prices and the corresponding reference rate is proposed in this paper.

If we could also change the SNA definition of FISIM to use these representative prices, further improvement of FISIM measure will be possible, which might be the future task for the international SNA forum.

Classifications

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