

## Chapter 9. Financial and insurance activities

*This chapter presents practical guidance as well as main issues and challenges for compiling SPPIs for Monetary intermediation activities (ISIC 6419), Investment banking (ISIC 6499), Security and commodity contract brokerage (ISIC 6612), and Insurance (ISIC 651).*

## 9.1. Monetary intermediation activities (David Friedman, U.S. Bureau of Labor Statistics)

### 9.1.1. Industry description (ISIC 6419)

This industry class includes the receiving of deposits and/or close substitutes for deposits and extending of credit or lending funds. The granting of credit can take a variety of forms, such as loans, mortgages, credit cards, etc. These activities are generally carried out by monetary institutions other than central banks, such as banks, savings banks, and credit unions.

Included in these activities are both direct and indirect financial intermediation services. Indirect services include convenience, liquidity, security, and facilitation in borrowing and lending funds. These services do not have an explicit price and this presents a challenge in measuring banking output. Interest is a primary source of bank turnover. The spread (or difference) between interest earned on loans and interest paid to depositors is used to measure prices for these indirect services. This concept of financial intermediation services indirectly measured or FISIM is the recommended method for pricing loan and deposit banking services in the SNA.

There are a few countries that are either developing or have practical experience calculating an SPPI for banking services and, from this experience and research, a number of different ways to implement FISIM pricing has emerged. At the core of the different methods is the differing definitions of the service that financial intermediaries provide, specifically the activities they undertake to manage risk. Default risk and term risk are the two broad types of risk. Default risk covers the risk that a borrower will default, while term risk covers the risk that interest rates contracted to be paid on deposits or charged on loans will become misaligned with market rates during the term of the contract.

In the U.S., no explicit attempt is made to exclude interest payments that cover the defaults of others, thereby supporting the underlying concept that banks are assuming the risk of default. Adopting the risk assumption concept for banking is consistent with the U.S treatment of risk in the insurance industries.

In contrast, if it is assumed that banks set interest rates that not only support the loan services provided but also cover expected losses from defaulting loans, the risk is transferred (or pooled) and not assumed and is, therefore, not considered production by the financial intermediary. Non-production activities must be removed from FISIM prices and that is done through selection of an effective interest rate and selection of an appropriate reference rate. Ultimately, the reference rate selection and the determination of whether or not to attempt to adjust for loan write-offs will depend on which of these risk concepts is adopted.

### 9.1.2. Classification aspects

Monetary intermediation activities excluding central banking are classified in ISIC class 6419. This group includes the following activities:

- Receiving deposits;
- Extending credit or lending funds;
- Postal giro and postal savings bank activities;

- Credit granting for house purchase by specialized deposit-taking institutions;<sup>1</sup>
- Money order activities.

#### *9.1.2.1. Industry classification*

Annex A provides various industry classifications for each type of activity. A major difference between the NAICS and ISIC definitions is the treatment of credit unions. Under NAICS, credit unions are classified in their own industry, NAICS 522130. Specialised depository institutions that grant credit for house purchases are similar to savings and loan associations, which are classified in NAICS 522120. The U.S. equivalent of postal giro is automated clearing, classified in NAICS 522320. NAICS 522110 and 522120 include finance leasing services which are classified in ISIC 6491.

#### *9.1.2.2. Product classification*

Annex B maps the NAPCS product codes to the CPC structure for classes 7112 and 7113.

#### *9.1.3. Scope of the survey*

Ideally, as in the U.S., the banking indices should measure price change for both consumer and business transactions. Detailed service line indices reflect the major loan categories. By definition, each service line is either entirely consumer or entirely business in nature. All other indices include a mix of consumer and business transactions.

#### *9.1.4. Industry vs. product based SPPI*

Each U.S. banking sub-industry (Commercial Banking; Savings Institutions) is inclusive of the full range of banking products, which allows the flexibility to capture a representative sample of products from establishments classified in each industry for calculating industry based price indices. The similarity of products across these industries allows for the calculation of approximate product based indices as well. In the U.S., price data are collected by industry, but used for calculating both industry based and approximate product based indices for banking.

#### *9.1.5. Sample design*

It is ideal to sample the banking industries using probability proportional to size with turnover as the size measure. In the U.S., banks are sampled at the headquarters level. The U.S. Federal Deposit Insurance Corporation (FDIC) maintains a comprehensive list of commercial banks and savings institutions, as well as turnover data for each entity.

The industries are concentrated with the large banks being dominant. However, there are a large number of small banks. In the U.S., the largest banks are separated into three different sample units that correspond to the following banking activities:

- Loans;
- Deposits;
- Other banking services.

This strategy forms the basis for stratification and, in many cases, creates multiple reporting units for a single bank. Often, large banks will have separate officials and

separate records for these specific types of services. Each of the smaller banks is given a chance of selection as a single sample unit, and it is typical to have one official at these smaller banks that can provide the pricing information for all services offered within the bank.

Since item selection is restricted to a single type of service for larger banks, prices are not collected for secondary activities. For the smaller banks that are sampled by the entire business enterprise, little to no turnover is generated from secondary activities. Therefore, only services primary to the industry appear in the published indices in the United States.

#### ***9.1.6. Collection of information and specification of the service***

In the U.S., the unique item that is priced for loans and deposits is a homogeneous portfolio of accounts (for example, 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.

For initial data collection, representative portfolios and transactions are selected during a personal visit with respondents. The price determining characteristics are then captured for accurate pricing over time. The following characteristics are common for most banking services:

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

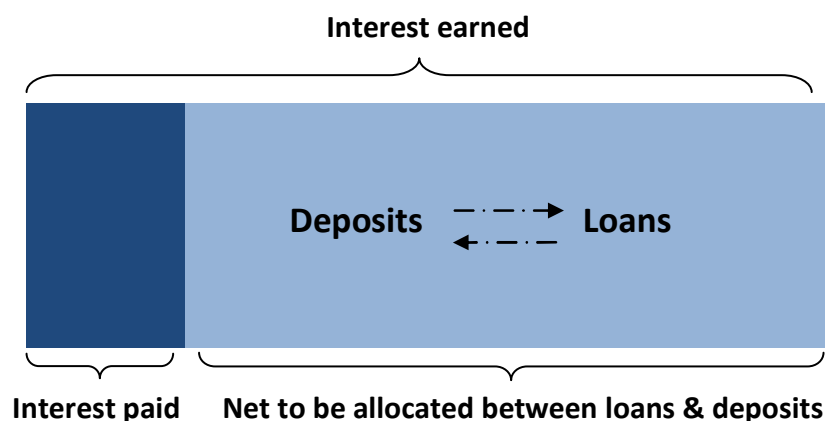
In Australia, for the compilation of a banking index for the CPI, a sample of products is selected from each institution to represent each major product category. Each product is assigned a weight to represent the entire product group.

#### ***9.1.7. Main pricing methods***

The primary challenge presented by the banking industry is measuring financial intermediation services indirectly measured or *FISIM* as defined in the United Nations System of National Accounts (SNA). Banks often provide services for which they do not explicitly charge by paying or charging different rates of interest to lenders and borrowers. The margin between the rates charged to borrowers and the rates paid to depositors represents the indirect price of the intermediation services, including safekeeping, recordkeeping, and risk management. The resulting net revenues of interest are used to defray bank expenses and provide an operating surplus. This scheme of interest rates avoids the need to charge customers individually for services provided and leads to the pattern of interest rates observed in practice.

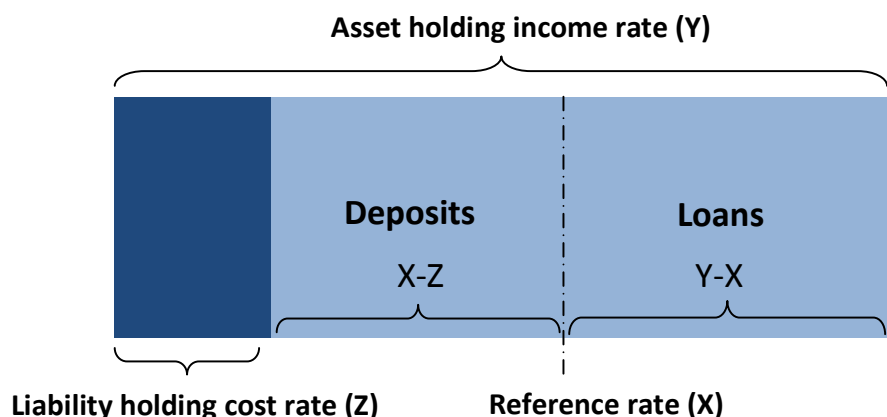
As a result, it is necessary to develop a methodology that not only captures directly priced services, but also reflects services priced indirectly. This methodology must allow for the calculation of prices for loans and deposits such that output can be allocated to both services.

Figure 9.1.1. Calculation of prices for loans and deposits



The user cost methodology is implemented in the U.S. The user cost for a financial service is the difference between the turnover it generates 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.” A single reference rate that includes a mix of maturities is recommended for calculating output for both loans and deposits. The Intersecretariat Working Group on National Accounts (ISWGNA) Task Force on FISIM continues to investigate various methods for calculating reference rates.<sup>2</sup> The reference rate is the pure cost of borrowing funds that does not include any intermediation services. In theory, the price of intermediation services associated with a loan is equal to the asset holding rate less a reference rate. The asset holding rate for a portfolio of loans is equal to the interest received plus service charges divided by the portfolio balance. For deposits, the price of the intermediation service is equal to a reference rate less the liability holding cost rate. The liability holding cost rate for a portfolio of deposits is equal to the interest paid to depositors less service charges divided by the portfolio balance.

Figure 9.1.2. Asset holding income rate



### 9.1.7.1. Unit value

In practice, the price of these services can be expressed as a unit value as shown below.

- For loans:

$$\begin{aligned} & \text{Price of loan portfolio} \\ &= \left\{ \left( \frac{\text{Interest income} + \text{fees}}{\text{Average loan balance}} \right) - \text{Reference rate} \right\} \\ & \times \text{fixed monetary value} \end{aligned}$$

Interest income includes all interest earned in a given month for the portfolio of loans being priced. This includes interest earned on both old and new loans. The average loan balance is calculated by averaging the ending daily balances of all loans in the portfolio over the month.

- For deposits:

$$\begin{aligned} & \text{Price of deposit portfolio} \\ &= \left\{ \text{Reference rate} - \left( \frac{\text{Interest payments} - \text{fees}}{\text{Average deposit balance}} \right) \right\} \\ & \times \text{fixed monetary value} \end{aligned}$$

Interest payments include all interest paid to depositors on the funds held in the portfolio in a given month. Fees include all fees earned by the bank, such as those for ATM withdrawals or insufficient funds. Again, the deposit balance is calculated by taking the average of the ending daily balances of the portfolio.

For both equations presented above, the calculation within the outer brackets results in a rate. This rate is multiplied by a fixed monetary value, such as \$1000 in the U.S., to convert the rate to the dollar value used in index calculation. When the price is positive, the service is considered an output. However, whenever the price is negative, the service is considered an input and the price is excluded from index calculation until it becomes positive.

Every month, banks provide the monthly interest, fees, and average balances from the previous month for each portfolio. A new reference rate is calculated each quarter. Because each bank manages their assets, liabilities, and low or no risk securities holdings differently to maximize profits, a bank-specific reference rate is preferred. The use of this rate in calculating prices is likely to eliminate the incidence of negative prices as well. The preferred reference rate is calculated for each bank by the dividing the quarterly interest income that the bank earns on U.S. Treasury securities and U.S. government agency obligations (excluding mortgage-backed securities) by the balance of these securities held by the bank. The rate on U.S. Treasury securities is used since these are considered the most free of risk. The reference rate is always lagged by one quarter, which is the period of time necessary for banks to adjust to changes in their investment portfolios. The bank-specific rate is calculated using quarterly Federal Deposit Insurance Corporation (FDIC) regulatory data. When FDIC data are not available for certain banks, a reference rate is estimated based on the weighted average rate of all sampled banks for which FDIC data is available. A separate average rate is calculated for each NAICS industry. In the U.S., calculating bank-specific reference rates, as opposed to use of national reference rate, is a recent development.

Since data reported to the FDIC is quarterly, the reference rate is converted to a monthly rate to correspond to the monthly data reported by the banks using the following formula:

$$\text{Monthly rate} = (1 + \text{Quarterly rate})^{1/3} - 1$$

This monthly rate is used for a three-month period.

Australia used a conceptually similar method in calculating a FISIM price in their CPI. A sample of products (weighted to represent the entire product group) is chosen and an interest rate margin for each product is calculated from the difference between the product yield and the reference rate. These margin rates are then applied to the balances on a series of sampled accounts to compute the dollar value of the margin. The balances are updated each period using a four quarter moving average of the all groups CPI to preserve the quantities associated with these balances.

#### *9.1.7.2. Percentage fee method*

In addition, in the U.S., the percentage fee method is used for pricing services for which the price is based on the value of assets, such as the management of trusts. Banks provide the actual value of the assets in the trust in addition to the fee percentage charged. The value of these assets is held constant over time and the current percentage fee, reported by the bank, is applied to this fixed value to obtain the price.

#### *9.1.7.3. Direct use of prices of repeated services*

Finally, in the U.S., the direct use of prices of repeated services method is used for all other banking services, such as sale of money orders and rental of safe deposit boxes. With this method, banks report the actual fee charged for performing the service.

#### *9.1.8. Quality issues*

A fundamental issue in pricing banking services is keeping monetary values stated in constant terms. Periodically, certain values included in the price calculations are adjusted to account for the time value of money. For example, the fixed monetary value used in calculating loan and deposit prices is adjusted once a year by the annual change in the gross domestic purchases price index calculated by the U.S. Bureau of Economic Analysis (BEA). For services such as trust management services, the value of the assets is adjusted by the rate of return earned on the fixed assets.

### 9.1.9. Weighting and aggregation

#### 9.1.9.1. Industry based indices

Table 9.1.1. provides the U.S. PPI industry based publication structures for the banking industries.

**Table 9.1.1. U.S. PPI industry based publication structures for the banking industries**

522110	Commercial banking
522110P	Primary services
5221101	Loan Services
522110101	Residential real estate loans, except home equity
522110102	Non-residential real estate loans
522110103	Home equity loans
522110105	Commercial, industrial, and agricultural loans
522110106	New and used auto and truck loans
522110107	Credit cards, overdraft credit, and related plans
522110108	Other loan services
5221102	Deposit services
522110201	Demand deposits
522110202	Time and other deposits
5221103	Trust services
5221104	Other banking services
522120	Savings institutions
522120P	Primary services
5221201	Loan Services
522120101	Residential real estate loans, except home equity
522120102	Non-residential real estate loans
522120103	Home equity loans
522120105	Commercial, industrial, and agricultural loans
522120106	New and used auto and truck loans
522120109	Credit cards, overdraft credit, and related plans
522120111	Other loan services
5221202	Deposit services
522120201	Demand deposits
522120202	Time and other deposits
5221203	Trust and other banking services
5221204	Other banking services

For each index series, the lower-level indices are aggregated using industry turnover data as weights. Although the indices are calculated using the Laspeyres formula, these weights are updated approximately every five years. Within the lowest level indices, each bank and the items selected within the bank are weighted using turnover provided by the bank at the time of data collection. These weights remain fixed throughout the life of the sample.

#### 9.1.9.2. Product based indices

Table 9.1.2. provides the U.S. SPPI product based publication structures for the banking industries. The U.S. covers only a portion of the banking output, thus weights represent only partial coverage.



**Table 9.1.2. U.S. PPI product based publication structures for the banking industries**

39	Credit intermediation services (partial)
391	Loan services (partial)
3911	Business loans (partial)
3912	Consumer loans (partial)
391201	Residential real estate loans (partial)
39120101	Residential real estate loans, except home equity (partial)
39120102	Home equity loans (partial)
391202	Vehicle loans (partial)
391203	Credit cards, overdraft credit, and related plans (partial)
3913	Other loans and loan services (partial)
392	Deposit services (partial)
393	Credit intermediation services, including trust services (partial)

As with the industry based series, indexes are aggregated using turnover data for each product line regardless of the product's industry of origin.

### 9.1.10. Specific aspects

The 2008 SNA states that no service element should be included in the reference rate, but does not refer to the reference rate as being risk-free.<sup>3</sup> The choice of an appropriate reference rate is likely the most significant methodological consideration in developing an SPPI using the FISIM concept, as the reference has a significant influence on price changes. In the U.S., the reference rate is chosen such that the risk premium is eliminated to the greatest extent possible. This is consistent with the assertion that banks receive transaction payments for the assumption of risk, including the risk of default. Note that this is also consistent with the treatment of risk in the U.S. pricing methodology for the insurance industries for which output there is defined as the assumption of risk as well. For banking, financial intermediation is defined as the assumption of risk that arises from taking money from depositors and lending it to borrowers.

Alternative methods for calculating the reference rate include the following:<sup>4</sup>

- Market interest rate such as LIBOR, EURIBOR – A market rate is directly observed and theoretically consistent, but it could include a risk premium. In addition, it would be difficult to find a single rate that is appropriate and that would not lead to negative prices;
- Average interest rate on funds borrowed by financial institutions from other financial institutions – An average rate broadly reflects the average maturity of loans and deposits, but the calculation requires detailed balance sheet (B/S) and profit and loss (P/L) data. There is little risk of negative prices;
- Mid-point rate – The average of deposit interest rates and loan interest rates. Australia has used the mid-point of weighted average borrowing and lending rates for each institution in the calculation of FISIM for the CPI. The midpoint represents a rate that would have been struck in the absence of financial intermediaries. The risk of negative prices using this rate is minimal.

#### *Negative prices*

The potential for negative prices can be problematic in pricing banking services. If the price for a service is perpetually negative, then that service is considered an input to the production process. These services do not present a measurement challenge, since they are not priced as output. However, there are instances when the price for a particular

banking service is negative in some months and positive in others. It is this type of negative price that presents a measurement challenge. Current U.S. index calculation methodology does not accommodate negative prices, and therefore, the negative price is excluded from calculation. A likely cause of the occasional negative price is the use of an industry-wide reference rate. Theoretically, collecting a bank-specific rate would likely diminish the number of negative prices significantly, since it is a more narrowly defined rate that is more closely aligned with the bank's business strategy. The U.S. recently began attempting to collect bank-specific reference rates when they are available.

Other sources of negative prices and potential solutions include the following:<sup>5</sup>

- Mismatch in timing for collecting B/S and P/L data – Careful treatment of data and corrections are recommended;
- Accounting anomalies – Careful treatment of data and corrections are recommended;
- Differences in the speed of adjusting various interest rates – Smoothing of interest rates, such as calculating a moving average, is a possible solution;
- Cross-subsidization or service bundling – Banks may use certain products as a loss-leader and compensate by charging a higher price for other products. Aggregating the products could resolve the negative price issue;
- Official subsidization – Some government-owned banks offer significantly lower rates for specific policy purposes. Using the same reference rate for these banks as used for privately owned banks could lead to negative prices. The calculation of separate reference rates or the estimation of government subsidies is recommended.

#### *Average Prices*

The variation in the number of days in a month contributes to some volatility in banking prices. For example, considering no other factors, banks have 31 days in January to collect fees and interest on a loan compared to 28 days in February. Loan balances can also change in the additional four days. The impact is unclear, since more loans could be paid off in the additional time and/or more loans could be made.

### **9.1.11. Overview of national methods**

#### *Australia*

The Australian Bureau of Statistics (ABS) currently excludes the financial services industry from its suite of PPI; however, the ABS may consider expanding the current scope of industries represented within the PPI in the longer term.

The Australian CPI introduced the FISIM methodology with the release of the 15th series CPI in the September quarter 2005 and that experience is relevant to SPPIs as well so it is presented here and was taken directly from the paper presented by the ABS at the 25<sup>th</sup> Voorburg Group meeting on Services Statistics in September 2010.

The deposit and loan facilities index includes a mid-point reference rate for each institution (as mentioned previously) to proxy the service-free rate. To calculate the indirect service charge in this index, monthly balance and interest flow data are obtained from financial institutions for each of their consumer products and in aggregate. For each sampled financial institution, a sample of products is selected to represent each of the

major product categories: current accounts, savings accounts, investment accounts, term deposits, retirement accounts, fixed and variable rate housing loans, personal loans, and credit cards. The specific product selected from each group (*e.g.* the sampled home loan product) is assigned a weight to represent the entire product group (*e.g.* housing loans).

The interest margin for each sampled product is calculated from the difference between the product yield and the reference rate. Because percentages (such as margin rates) are not prices, the latest period margin rates have to be applied to some monetary amounts (*e.g.* balance of the home loan account) in order to calculate the current period prices (the dollar margins). To preserve the quantities supporting the values of the account balances in the base period, the balances used to derive the dollar margins are updated to reflect a four-quarter moving average of the CPI All-groups.

The CPI Deposit and loan facilities index is calculated by weighting the indices for the sampled products according to the weight of the product group. To minimise the effect of any short-term accounting anomalies (such as posting of effects and adjustments of various types), the ABS constructs a three-month moving average of balances and interest flows and derives the required interest rates, reference rates, and margin rates from the smoothed data.

A particular challenge that has arisen in regards to sampling products is the presence of fixed rate products in the index. Within the Australian Financial industry, the high proportion of variable rate products (*e.g.* variable house loans) means that these dominate the reference rate. Effective yields on fixed rate products move at a much slower rate than the calculated reference rate. This induces a high level of price rate volatility on fixed rate products. There are three main problems associated with this: the possibility of negative prices, sensitivity to errors, and determining appropriate weights for these products.

#### *Canada*

Statistics Canada is currently developing an SPPI for banking services. This experimental work includes only chartered banks and focuses on traditional loan and deposit products offered by federally regulated banks that report to Canada's regulatory agency for financial institutions, the Office of the Superintendent of Financial Institutions (OSFI). Statistics Canada's Industrial Organization and Finance Division (IOFD) collects similar data on a "booked-in-Canada" basis (*i.e.* all those service activities that generate revenue recognised by Canadian business enterprises and therefore excluding activities they recognise as revenue for their foreign subsidiaries). These data, along with some financial market data, are used to estimate the SPPI and to test alternative assumptions in order to inform the final data collection and SPPI estimation strategy for this industry.

In the simplest form, the price of a unit of deposit for the Canadian SPPI is the difference between the reference rate and the effective rate banks pay on deposits, plus explicit fees per unit of deposit. The price of a unit of lending is the spread between the effective loan rate and the reference rate, plus explicit fees. To calculate the effective rate, interest income (expenditure) is divided by the outstanding balance. In order to keep the unit of measure constant, the outstanding balance is discounted<sup>6</sup> by the reference rate, which is assumed to be the opportunity cost for the banks.

The reference rates used are obtained mostly from the Bank of Canada (CANSIM table 176-0043) and the banks' financial statements. The use of financial statements allows for the construction of firm-specific reference rates. Since interest income or expenditure reported in the current period reflects interest rates set in the previous period, the market reference rates obtained from CANSIM are lagged by one period in order to

produce more appropriate results. Lagging one period assumes that financial institutions react quickly to changes in market rates.

Fitness of use is the primary limitation of the administrative data. The data are based on financial statements that use accounting conventions to satisfy the regulatory requirements imposed on banks by the Office of the Superintendent of Financial Institutions. Periodically, these requirements change resulting in changes to the data that may or may not reflect actual changes in business conditions. Also, the use of accounting conventions often results in data anomalies from a price measurement perspective that may be acceptable from an accounting perspective. Thus, there are many cases of negative prices, negative revenues, or abnormally large or small numbers as well as significant and unrealistic levels of volatility. Furthermore, there is an issue with the level detail for explicit fees being different from that of interest income and expense. This makes it difficult to systematically allocate explicit fee income between products.

Canada continues to explore methods of using the administrative data that are currently available in order to produce a high quality banking SPPI, while exploring the possibility of developing a survey for collecting prices for banking services.

## **9.2. Investment banking (David Friedman, U.S. Bureau of Labor Statistics)**

### **9.2.1. Industry description (ISIC 6499)**

This industry class includes other financial service activities primarily concerned with distributing funds other than by making loans, such as factoring activities, the writing of swaps, options and other hedging arrangements, the activities of viatical settlement companies, and own-account investment activities.

Within ISIC 6499, the U.S. calculates and publishes SPPIs for investment banking services (NAICS 523110). The U.S. does not calculate or publish SPPIs for factoring activities or the activities of viatical settlement companies. Own-account investment activities, also primary to ISIC 6499, constitute proprietary trading and are considered out of scope for formulating U.S. SPPIs, since no market output is generated from this activity.<sup>7</sup>

Investment banking services include the underwriting of securities, in which investment banking firms aid corporations, governments, and other institutions in raising capital through the issuance of debt and equity.

Investment banking firms also engage in the underwriting of securitised products such as mortgage-backed securities (MBS), asset-backed securities (ABS), and collateralised debt obligations (CDOs), whose values are derived from the values of other underlying securities. The creation of derivative securities is similar to the creation of equity and debt securities except that individual asset-backed securities are grouped into tranches or distinct groups. These tranches are sold individually to investors. The tranches resemble either a form of debt or equity depending on their risk profile.

Investment banking firms also engage in the writing of hedging arrangements, including the origination of swaps and forward rate agreements (FRAs).

In the U.S., investment banking services also include mergers and acquisition (M&A) advisory services, though these services are also offered by firms operating in other industries, such as management consulting firms. According to the concordance between

ISIC and CPC, M&A advisory services are an activity primary to ISIC 6619 - Other activities auxiliary to financial service activities, and are not covered in this section.

Business enterprises that offer investment banking services often also operate as trading principals who buy and sell securities on the behalf of clients but in doing so take legal possession of the securities and thereby assume trading risk. Banks operating as principals in securities trades generate turnover by earning the spread (or difference) between the price at which they purchase a security (the bid or offer price) and the price at which they sell that same security (the ask price). The bid-ask spread is used to measure prices for principal securities trades. Securities dealing activities on the behalf of others is considered primary to ISIC 6612 - Security and Commodity Contracts Brokerage.<sup>8</sup>

### 9.2.2. Classification aspects

Other financial service activities, except insurance and pension funding activities, not elsewhere classified, are classified in ISIC group 6499. This group includes the following activities:

- Other financial service activities primarily concerned with distributing funds other than by making loans:
  - Factoring activities
  - Writing of swaps, options, and other hedging arrangements
  - Activities of viatical settlement companies
- Own-account investment activities

#### 9.2.2.1. Industry classification

Annex A provides various industry classifications for each type of activity. There are several notable differences between the NAICS and ISIC classification structures.

- Within NAICS 523110 - Investment banking and securities dealing, there are five major service lines: Mergers and acquisition (M&A) advisory services; Underwriting and placement services; Securities dealing services (principal trades on the behalf of clients); Reverse repurchase agreements; and Securities lending services. Of these service lines, underwriting and placement services are considered activities primary to ISIC 6499. As mentioned in the industry description section, M&A advisory services are primary to ISIC 6619 and securities dealing services are primary to ISIC 6612. It should also be noted that reverse repurchase agreements and securities loans can be executed by business enterprises that are classified in a number of industries. Discussion of these lending activities is referenced in the chapter for ISIC 6612.
- Additionally, under NAICS, factoring activities are considered to be nondepository credit intermediation, not elsewhere classified, and are classified in NAICS 522298 - All other nondepository credit intermediation.
- The purchasing, pooling, and repackaging of loans for sale on the secondary market, classified in ISIC 6499, is classified in its own industry, NAICS 522294 - Secondary Market Financing.

- The activities of viatical settlement companies are classified in NAICS 523910 - Miscellaneous Intermediation. Own-account securities and commodities trading is also considered activity primary to NAICS 523910 - Miscellaneous Intermediation, though firms classified in a number of industries (particularly in the finance and insurance sector) also engage in proprietary own-account trading. As mentioned in the Industry description section, own-account trading is not considered in-scope activity for purposes of formulating SPPIs.

#### 9.2.2.2. *Product classification*

Annex B maps the NAPCS product codes to the CPC structure for subclasses 71190 and 71200.

#### 9.2.3. *Scope of the survey*

The ideal survey for investment banking services should measure the change in fees received by business enterprises for providing underwriting services, including advising the issuing entity on the terms of the offering, purchasing the securities from the issuer or assisting the issuer in selling the securities, and distributing the securities to public or private investors. Investment banking firms may act alone in an underwriting and perform all roles – advisement, underwriting, and sales – or they may act as part of an underwriting syndicate of firms and serve a smaller role, such as operating strictly as the selling firm. Underwritings fall into two categories of arrangements: *i*) firm commitment; and *ii*) best-efforts. In a firm commitment arrangement, the investment bank purchases the securities from the issuing company and then resells them to the public at a higher public offering price. The difference in price, or the gross spread, serves as compensation to the underwriter. In a best-efforts arrangement, the underwriter merely agrees to assist the issuing firm in selling the securities, but does not necessarily take possession of the entire issue. In this case, the underwriter acts only as an intermediary. In such an arrangement, the underwriter earns a percentage fee of the money raised for the client. Once securities are underwritten, they may be placed into public markets (public placement), or distributed only to a selected group of private investors such as insurance companies, investment companies, and pension funds (private placement). The type of market into which securities are placed can be price-determining, with private placements sometimes carrying lower fees, since the buyer pool may be known prior to placement, mitigating risk to the underwriter.

When banks underwrite asset-backed securities, they purchase specified types of assets that get pooled into tranches. For example, when underwriting a Mortgage-backed security (MBS), banks will purchase mortgages. Other types of assets that may comprise an Asset-backed security (ABS) include: credit card receivables, home equity loans, student loans, and automobile loans. The cash flows from the loan payments go to pay the holders of the securities. Collateralised debt obligations (CDOs) are also similar to ABS except that CDOs are backed by other debt securities like investment grade bonds or high yield bonds.

In the case of interest rate swaps in which two parties exchange fixed rate obligations for floating rate obligations (or vice versa), the fixed rate is agreed upon by both parties before they enter into the swap and is referred to as the “price” of originating the swap. Investment banks quote swap spreads in terms of the difference between the fixed rate they would accept (the ask) and the fixed rate they would pay (the bid) for the specified floating rate (*e.g.* the 3-month London Interbank Offered Rate or LIBOR). In pricing the

origination of swaps in the U.S., responding firms provide this bid-ask spread, which is then multiplied by a specified notional value of the swap to derive the price used in SPPI calculation. Similarly, forward rate agreements (FRAs) are forward contracts quoted in terms of interest rates in which two parties agree to exchange floating and fixed rate obligations at a specified time in the future, with payments determined by an underlying notional value. As with swaps, banks quote spreads on FRAs in terms of fixed interest rates, and the U.S. prices FRAs using the quoted bid-ask spread multiplied by the notional value.

#### 9.2.4. *Industry vs. product based SPPI*

In the U.S., many of the largest financial institutions offer services primary to each of the largest sub-industries in the financial services sector, including commercial banking, investment banking, securities brokerage, portfolio management, and investment advice. Apart from investment banking, these services are secondary activities for business enterprises in this sub-industry.

However, because the U.S. samples by NAICS industries, which within the financial services sector are narrowly defined, a publication structure based strictly on NAICS industry definitions would necessarily need to support a vast array of secondary activity. For this reason, the U.S. employs the strategy of producing industry based indexes that cover only investment banking activities. In practice, the U.S. creates sample units that represent specified activities, *i.e.*, investment banking activities only, in order to ensure that companies are properly included in the sampling frame for this industry. Therefore, secondary activities are not considered. Due to the exclusion of secondary activities in the U.S., there is no functional distinction between the industry based and approximate product based SPPIs for investment banking services. The sample design described below supports this strategy.

#### 9.2.5. *Sample design*

It is ideal to sample the investment banking industry using probability proportional to size (PPS) with turnover as the size measure. Due to difficulties in obtaining figures for in-scope turnover prior to data collection, the U.S. conducts a PPS sample using employment as the size measure.

For all respondents, initial data collection occurs at their headquarters. Typically, underwriting services are provided by large financial institutions that offer services primary to several industries within the financial services sector. In the U.S., the largest banks are separated into several different sample units that correspond to the following banking activities:

- Investment banking (ISIC 6499);
- Securities dealing (ISIC 6612);
- Securities brokerage (ISIC 6612);
- Other securities dealing services\* (ISIC 6612);
- Commercial banking (ISICS 6419);
- Portfolio management (ISIC 6630);
- Investment advice (ISIC 6619).



\* Refers to reverse repurchase agreements and securities lending services.

This strategy forms the basis for stratification and, in many cases, creates multiple reporting units for a single bank. Often, large banks will have separate officials and separate records for these specific types of services. Each of the smaller banks is given a chance of selection as a single sample unit, and it is typical to have one official at these smaller banks that can provide the pricing information for all services offered within the bank.

Because the largest business enterprises are sampled by service line rather than on an industry basis, the U.S. does not collect secondary production from any industry firms, and only services primary to the industry appear in the published U.S. industry SPPIs.

### **9.2.6. Collection of information and specification of the service**

#### *Underwriting and placement services*

At initial data collection, a recently completed underwriting transaction is selected during a personal visit with company officials. The respondent must select an underwriting transaction for which he/she can estimate the gross spread percentage and retained percentage fees in future periods. The following characteristics are typically collected for underwriting transactions and are held constant throughout the survey period:

- Type of underwriting – public, private;
- Type of client – based on industry, firm-client relationship, and other characteristics;
- Type of issue – initial offering, secondary offering;
- Type of offering – firm commitment offering, best efforts offering;
- Role of investment bank – all roles, underwriter, manager/co-manager, sales group;
- Type of securities issued – exchange-listed equity, corporate debt, municipal debt, etc.

Additionally, the following values are collected and are updated during the survey period:

- Size of offering – escalated by U.S. SPPI staff; see section on Pricing Methods for more details;
- Gross spread percentage – updated by respondent;
- Fee percentages for each role in which the bank served – all roles, underwriter, manager/co-manager, sales group – updated by respondent.

#### *Writing of hedging arrangements*

At initial data collection, a recently originated hedging arrangement (e.g. swap, FRA) is selected. The following characteristics are collected and held constant throughout the survey period:

- Referenced security, rate, or index;



- Number of months until settlement (FRAs);
- Duration of contract (swaps).

Additionally, the following values are typically collected and are updated during the survey period:

- Notional value – escalated by U.S. SPPI staff;
- Fixed rate bid-ask spread – updated by respondent;

## 9.2.7. Main pricing methods

### 9.2.7.1. Underwriting and placement services

In collecting prices for underwriting and placement services, the U.S. employs a hybrid of the model pricing and percentage fee methods.

Because each transaction of underwriting services is unique and non-recurring, it is necessary to employ model pricing to capture prices for this service line. Fees earned for underwriting services are typically derived from the total value of the issue being underwritten, so application of the percentage fee method in conjunction with model pricing is appropriate. During initial data collection, the U.S. asks survey respondents to identify a recently completed underwriting transaction for which the respondent can estimate both the gross spread and percentage fees in future periods. It is critical that, during the life of the survey, the respondent be able to estimate the gross spread and the percentage fees earned.

In order to reflect changes in the value of securities over time the U.S., implemented a procedure in which the values of the underwriting transactions are periodically updated by U.S. SPPI staff. For example, the values of equity security offerings are adjusted based on a broad index measure of the overall U.S. equity market.

The values of debt securities offerings are adjusted based on index measures of the overall changes in prices of the selected type of debt security.

#### Box 9.2.1. Example of a firm commitment equity underwriting transaction

##### Period 1 (base period):

Item Description: Public underwriting. Client ID: Company B. Client industry: insurance. Percentage fee. Firm commitment initial offering. Price represents role of manager and underwriter. Exchange listed equity.

Size of Offering:	\$50,000,000
Gross spread %:	3%
Dollar value of gross spread:	\$1,500,000 ( $=\$50,000,000 \times 3\%$ )
Manager fee:	20%
Underwriter fee:	20%
Total Fee:	\$600,000 ( $=\$1,500,000 \times 20\% + \$1,500,000 \times 20\%$ )

**Box 9.2.1. Example of a firm commitment equity underwriting transaction,  
*continued***

**Period 2:**

Item Description: Public underwriting. Client ID: Company B. Client industry: insurance. Percentage fee. Firm commitment initial offering. Price represents role of manager and underwriter. Exchange listed equity.

Size of Offering:	\$52,500,000
Gross spread %:	3%
Dollar value of gross spread:	\$1,575,000 ( $=\$52,500,000 \times 3\%$ )
Manager fee:	20%
Underwriter fee:	25%
Total Fee:	\$708,750 ( $=\$1,575,000 \times 20\% + \$1,575,000 \times 25\%$ )

Between periods 1 and 2, the value of securities traded in the U.S. equity market has increased by 5 percent; this change has been reflected in the updated value of the size of the offering. The respondent updates the gross spread percentage and the percentages retained for all roles in which the firm acted. In this example, the business enterprise serving as the underwriter in the referenced underwriting transaction now retains a fee of 25%, while the gross spread percentage and the manager's fee remain unchanged. The changes in both the estimated value of the securities and the change in the fee are both shown as price changes.

**9.2.7.2. Writing of hedging arrangements**

In collecting prices for the writing of hedging arrangements, the U.S. employs model pricing.

While firms may originate hedging arrangements in each survey period, it is unlikely that specific transactions of the same value (in real terms), duration (in the case of swaps), and referenced rate or security will recur in each period. For this reason, the swap or forward rate agreement specified in the base period serves as the basis for re-pricing in future periods, consistent with application of the model pricing method.

In order to reflect changes in the time value of money, the U.S. implemented a procedure in which the notional value referenced in FRA and swap contracts is periodically updated based on changes in a broad measure of U.S. inflation.

During each survey period, respondents are asked to estimate the bid and ask rates they would quote for entering into a swap or FRA with the characteristics specified in the contract selected at initial data collection.

### Box 9.2.2. Example of an interest rate swap

#### Period 1 (base period):

Item Description: Interest rate swap. Referenced interest rate: 3-month LIBOR. Notional value of swap: \$1,000,000. Duration of contract: 5 years.

Ask price	2.50%
Bid price	2.49%
Quoted Spread	0.01%
Notional Value	\$1,000,000.00
Dollar Value of Quoted Spread:	\$100.00 ( $=\$1,000,000.00 \times 0.01\%$ )

#### Period 2:

Item Description: Interest rate swap. Referenced interest rate: 3-month LIBOR. Notional value of swap: \$1,004,264.76. Duration of contract: 5 years.

Ask price	2.65%
Bid price	2.64%
Quoted Spread	0.01%
Notional Value	\$1,004,264.76
Dollar Value of Quoted Spread:	\$100.43 ( $=\$1,004,264.76 \times 0.01\%$ )

Between periods 1 and 2, the U.S. inflation measure has grown by roughly 0.4%; this change has been reflected in the escalated notional value of the swap. The respondent updates the bid and asks prices, holding all other characteristics constant.

### 9.2.8. Quality issues

An important methodological issue compilers developing SPPIs for this industry must address is whether the deal values upon which investment banks typically assess fees should be updated in future periods, and if so, which measures should be used as the basis for these updates. If the deal values are not updated, changes in investment banking turnover that result solely from changes in constant-quality deal valuations will be reflected directly in the measures of real output. This may lead to highly volatile output figures, as market valuations can fluctuate severely.

In the U.S., the values of underwriting transactions are updated based on broad index measures of security valuations. Indices that measure changes in the average values of new underwritings were considered, but ultimately rejected since the types of deals that occur in each period are highly variable. The broad security value indices were determined to be the most appropriate measure to estimate the level at which the securities offered in the originally selected underwriting transaction would be valued in the current period if they were to be re-transacted.

Because of the non-recurring nature of underwriting transactions, responding firms may find it difficult to estimate the fees earned for assisting in the hypothetical transaction of a previously completed underwriting. This issue, however, is not unique to investment banking and is evidenced among respondents for most industries in which services are unique and non-recurring.

### 9.2.9. Weighting and aggregation

#### 9.2.9.1. Industry based indices

Table 9.2.1. provides the U.S. PPI industry based publication structures for the investment banking and securities dealing industry.

**Table 9.2.1. U.S. PPI industry based publication structures for the investment banking and securities dealing industry**

523110	Investment banking and securities dealing
5231102	Dealer transactions
523110201	Dealer transactions, equity securities
523110202	Dealer transactions, debt securities and all other trading
5231103	Investment banking services
5231104	Other securities dealing services
523110SM	Other receipts

For each index series, the lower-level indices are aggregated using industry turnover data as weights. Although the indices are calculated using the Laspeyres formula, these weights are updated approximately every five years. Within the lowest level indices, each bank and the items selected within the bank are weighted using turnover provided by the bank at the time of data collection. These weights remain fixed throughout the life of the sample.

#### 9.2.9.2. Product based indices

Table 9.2.2. provides the U.S. PPI product based publication structures for investment banking services.

**Table 9.2.2. U.S. PPI product based publication structures for investment banking services**

403	Investment banking
4031	Investment banking
403101	Investment banking
40310101	Investment banking

As with the industry based series, indices are aggregated using turnover data for each product line regardless of the product's industry of origin.

It should be noted that both the U.S. industry based and approximate product based SPPIs for Investment banking include transactions of underwriting services and mergers and acquisition (M&A) advisory services.

Additionally, the approximate product based SPPI for Securities brokerage and dealing related services includes transactions of margin lending services and fees earned from the sale and distribution of mutual funds in addition to reverse repurchase agreements and securities lending services. For more details, please see the Security and Contracts Brokerage Services section in this *Guide*.

### 9.2.10. Specific aspects

Transactions in this industry are technically complex, due both to the actual mechanics of underwriting securities and the industry terminology used to describe the specifics of a given transaction. As stated in Section 3, Scope of survey, the provision of

underwriting and placement services for a given service may in practice be executed by one or more business enterprises acting as an underwriting syndicate, and depending on the sampled firm's level of seniority in the syndicate, in future periods the respondent may or may not be able to estimate the fee that would be earned for performing its role in the underwriting. The potential involvement of business enterprises other than the one sampled in performing underwriting services adds a degree of complication for data collectors. In order to ensure that only underwriting transactions in which the sampled business enterprise can estimate the gross spread and its percentage fee in future periods would be collected, the U.S. devoted additional resources to training data collectors for this industry. Extensive computer based training materials were prepared and presented in order to familiarise data collectors with industry terminology and collection procedures.

### **9.2.11. Overview of national methods**

The U.S. is currently the only country in the member states of the task force that worked on this version of the *Guide* that develops and publishes price indices in this industry. The methods and practices are discussed throughout this section.

## **9.3. Security and commodity contracts brokerage (Hina Kikegawa, Bank of Japan)**

### **9.3.1. Industry description (ISIC 6612)**

Business enterprises in this industry class engage in buying or selling securities on the behalf of individual and institutional clients. Transactions in which securities firms take legal possession of the securities being traded and thereby assume trading risk are referred to as principal transactions. For principal transactions, business enterprises in this industry generate turnover from the spread (or difference) between the price at which they purchase a security and the price at which they sell that security. Transactions in which securities firms do not take legal possession of the securities being traded but instead act as agents (*i.e.* brokers) are referred to as agency transactions. For agency transactions, business enterprises in this industry generate turnover on a transaction fee or commission basis.

Securities firms may also engage in lending transactions such as reverse repurchase agreements and securities loans. Repurchase agreements, commonly referred to as repos, are short-term lending agreements in which the borrowing party sells securities to the lending party with an explicit agreement to repurchase the securities at a specified time in the future (typically the next day). Reverse repurchase agreements refer to repurchase agreements, though from the perspective of the lender of the funds. In these arrangements, the lending party generates turnover through lending interest. The U.S. SPPI only captures prices for this lending activity. Securities lending transactions are arrangements in which one securities dealer loans securities to another dealer in exchange for collateral, typically cash or other securities. Securities loans provide the borrowing dealer with specific securities necessary for trade settlement. As with reverse repurchase agreements, the lending party in securities lending arrangements generates interest turnover. The U.S. SPPI captures prices for securities loans from the perspective of the lending party only.

#### *How the service industry is organized*

The deregulation of financial markets which took place in most advanced countries liberalised market entry and opened the market to a variety of securities companies. These include bank-affiliated, foreign based, and online securities companies, which have

expanded the range of channels through which financial products can be sold. Furthermore, the liberalisation of stock brokerage commissions has greatly impacted the operations of securities companies. As online brokerage services grew, commission rates were reduced significantly. Deregulation resulted in mergers between securities companies and tie-ups between securities companies and financial groups. This industry is concentrated in a small number of large firms in most countries.

*The price mechanisms and price determining factors*

For principal transactions, securities companies earn spreads or mark-up from the purchase and sale of securities. Examples of price determining characteristics are:

- Type of securities – corporate bonds, municipal bonds, government debt, domestic and foreign equities, options, futures, etc.;
- Price of the security;
- Price volatility of the security;
- Trading volume of the security;
- Bond rating (for debt securities);
- Time to maturity (for debt securities);
- Bond provisions (for debt securities).

For agency transactions, securities companies mainly charge flat fees or value based commissions. Examples of price determining characteristics are:

- Flat fees
  - Type of securities – domestic stocks, foreign stocks, options, exchange-traded funds (ETFs), bonds;
  - Type of client – institutional investor, retail investor;
  - Size of the client;
  - Method used to place trade order – online, by telephone, in person;
  - Trading volume of the client.
- Value based commissions
  - Type of securities – domestic stocks, foreign stocks, options, ETFs, bonds;
  - Type of client – institutional investor, retail investor;
  - Size of the client;
  - Method used to place trade order – online, by telephone, in person;
  - Trading volume of the client;
  - Market value of the traded securities;
  - Role of the firm – originating broker, non-originating broker;
  - Type of order placed – market order, limit order, stop order.

### 9.3.2. *Classification aspects*

#### 9.3.2.1. *Industry classification*

Security and commodity contracts brokerage services are classified in ISIC class 6612. This group includes the following activities:

- Dealing in financial markets on behalf of others (*e.g.* stock broking) and related activities;
- Securities brokerage;
- Activities of “bureaux de change”;
- Commodity contracts brokerage etc.

This class excludes the following activities:

- Dealing in markets on own account (ISIC 6499);
- Portfolio management, on a fee or contract basis (ISIC 6630).

Note that the exclusion of own-account dealing refers to proprietary trading in which a firm is not executing trades on the behalf of clients, but rather on the behalf of the firm’s own investment account.

Annex A provides various industry classifications for each type of activity.

#### 9.3.2.2. *Product classification*

Annex B maps the NAPCS product codes to the CPC structure for classes 7152 and 7159.

### 9.3.3. *Scope of the survey*

For “Securities brokerage services,” “Dealing in financial markets on behalf of others,” and “Activities of bureaux de change,” services are provided to all customers. Therefore, SPPIs should ideally measure the price changes for all customers (BtoB, government, consumers, and export).

For securities brokerage services, respondents may easily distinguish prices for enterprises and households, because they usually have different business units for different types of customers. In the U.S., securities brokerage services for both enterprises and households are covered. In Japan, only brokerage services for enterprises are covered, while in Korea, only retail brokerage services are covered. Canada plans to cover retail initially and include institutional as development progresses.

“Commodity contracts brokerage” services are primarily provided to institutional investors. However, in certain countries with large agricultural markets, these services are also provided to individual farmers. In such cases, coverage should extend to service activities provided to these customers.

For reverse repurchase agreements, the interest rates charged by lenders vary across the classes of securities to be repurchased. In the U.S., there are distinct market rates for reverse repurchase agreements involving debt securities issued by the U.S. Treasury, U.S government-sponsored enterprises, and private corporations, with transactions involving Treasury securities typically carrying the lowest rates. Due to differences in market repo

rates, the ideal survey would capture a representative sample of these different reverse repurchase agreements. Similarly, the lending rates for securities lending transactions in which other securities are posted as collateral vary according to both the securities loaned and the securities posted as collateral, and the ideal survey would capture securities lending transactions involving a diverse pool of securities.

#### ***9.3.4. Industry vs. product based SPPI***

Many of the largest financial institutions offer services primary to each of the largest industries in the financial services sector, including commercial banking, investment banking, securities brokerage, portfolio management, and investment advice.

Apart from securities brokerage, these activities are the secondary activities for business enterprises in this industry. If the secondary activities are significant, these activities should be considered.

In practice, however, countries such as the U.S. create sample units that represent specified activities, *i.e.*, securities brokerage activities only, in order to ensure that companies are properly included in the sampling frame for this industry. Therefore, secondary activities are not considered. Canada currently compiles product based SPPIs, which facilitate deflation of the national accounts.

#### ***9.3.5. Sample design***

Non-probability sampling and PPS sampling are common approaches;

- Japan, Korea and Canada use the non-probability sampling approach. The market is concentrated in a small number of large firms. The main criteria for selection are the market share of companies and the services they provide.
- The U.S. uses the PPS sampling with employment as the measure of size for sampling *s* and value of shipments and receipts obtained from sampled *s* used for selection of individual items.

#### ***9.3.6. Collection of information and specification of the service***

In Japan, the U.S., and Korea, data are collected from the respondents on a monthly basis. For initial data collection, representative transactions and price determining characteristics are specified with respondents' assistance.

The following characteristics are usually specified for this industry:

- Securities brokerage services:
  - Types of securities – domestic stocks, foreign stocks, options, ETFs, bonds, etc.;
  - Types of clients – institutional investors, retail investors;
  - Size of the clients;
  - Method used to place the trade orders – online, by telephone, in person;
  - Trading volume of the clients;
  - Execution price of securities traded;
  - Underlying security or rate (derivatives only);



- Type of contract – call, put (options only);
- Months to expiry (options only);
- Description of the strike price (options only).
- Securities selling or dealing services:
  - Types of securities – stocks, bonds, stock investment trusts, options;
  - Type of client – firms, individual investors;
  - Method used to place the trade orders – online, by telephone, in person;
  - Trading volume of the clients;
  - Offered prices of securities traded;
  - Bond rating – AAA, Aa1, etc. (bonds only);
  - Time to maturity (bonds only);
  - Underlying security or rate (derivatives only);
  - Type of contract – call, put (options only);
  - Months to expiry (options only);
  - Description of the strike price (options only).
- Mutual fund sales:
  - Types of mutual funds – active funds, passive funds;
  - Types of loads – front-end loads, back-end loads;
  - Purchased or redemption values of the funds.

In the U.S., a special case exists for the collection of trades of options securities. To maintain constant quality pricing in each survey period, several additional characteristics need to be held fixed. When an option is selected, in addition to its type, underlying asset, and time to expiry, a description of the strike price is also collected. This description includes its position (whether it is in or out of the money) and its degree of moneyness (the extent to which the strike price of the option differs from the current price of the underlying asset). For example, a call option, which represents the right to purchase the underlying asset at a specified price, may be transacted on security X, which has a current price of €27,960. The option may, for example, expire in 3 months and carry a strike price of €30,000. This option would be out of the money, since the option execution price of the call is higher than the current market price. This option would be the third-closest out of the money option as the call options with strike prices of €28,000 and €29,000 would be the first- and second-closest, respectively. When a dealer transaction for this option is collected in the U.S., in each survey period the respondent is asked to provide the bid-ask spread for the third-closest out of the money call option on a specified security that has a time to expiry of three months. When a brokerage transaction for this option is collected in the U.S., in each survey period the respondent is asked to provide the premium on the third-closest out of the money call option on a specified security that has a time to expiry of three months and the commission rate that would be charged for executing the trade. The premium is multiplied by the number of contracts traded and the commission rate charged to obtain the total commission.

- Reverse repurchase agreements and securities lending services:

For reverse repurchase agreements, the type of security to be repurchased is identified. For securities lending transactions, the type of security loaned and posted as collateral is collected. Respondents do not reference specific securities, but instead provide general rate information for all transactions of the selected type of security.

The following characteristics are collected for reverse repurchase agreements and securities lending transactions and are held constant throughout the survey period:

- Type of service – reverse repurchase agreement, securities lending;
- Type of client;
- Type of collateral posted – debt, equity (securities lending only);
- Type of security loaned – U.S. Treasury, mortgage-backed security, U.S. government sponsored enterprise bond, U.S. equity, global equity, etc. (securities lending only);
- Duration of loan/agreement (in days);
- Type of security to be repurchased – U.S. Treasury, mortgage-backed security, U.S. government sponsored enterprise bond, corporate bond (reverse repurchase agreements only).

Additionally, the following values are collected and updated during the survey period:

- Value of the securities loaned/to be repurchased – escalated by U.S. SPPI staff; see section on Pricing Methods for more details;
  - Lending fee percentage – updated by respondent (securities lending only);
  - Repo interest rate – updated by respondent (reverse repurchase agreements only).
- Commodity brokerage services, foreign currency exchange:

No member state of this task force currently compiles price indices for these services.

### **9.3.7. Main pricing methods**

The selection of the pricing method will depend on the type of pricing mechanisms used for a particular service, *i.e.* whether ‘flat fees’ or ‘value based commissions’ are used:

- When securities companies charge ‘flat fees’, data on the single fixed fee for the specified service should be collected. In this case, the direct use of prices of repeated services is the appropriate method;
- When securities companies charge ‘value based commissions’, the combination of the model pricing method and the percentage fee method is the appropriate method. Due to the differences in the definition of the unit transaction, methods to estimate prices vary;<sup>9</sup>
- For principal transactions on a spread or mark-up basis, the direct use of prices of repeated services is the appropriate pricing method;

- For lending transactions in which securities are posted as collateral, such as reverse repurchase agreements and securities loans, a combination of the model pricing method and the percentage fee method is appropriate.

#### 9.3.7.1. *Flat fees: Direct use of prices of repeated services*

When direct use of prices of repeated services is employed, the respondent specifies a representative transaction at the start of the survey.

For Securities brokerage services, flat fees are typically based on the value of the customer's trading accounts or the amount of trades they have made in the past. For example, a broker may charge €10 per trade for customers with less than €100,000 in their account and €5 per trade for customers with more than €100,000 in their account. The compiler, in consultant with the respondent, selects the representative transactions, *i.e.*, the representative customer groups and then tracks changes in the standard fee.

#### 9.3.7.2. *Value based commissions: combination of model pricing and percentage fee method*

The U.S., Korea, and Japan use the combination of the Model pricing method and the Percentage fee method. However, the practical methods to estimate prices vary according to the definition of the unit transaction.

The compiler should choose how the representative unit transaction is defined. The definition of the unit transaction will have an impact on the volume measurement (as discussed in Section 8).

There are three ways in which the unit transaction could be defined:

1. The nominal value of traded securities;
2. The number of traded securities – the U.S. and Korean approach;
3. The real value of traded securities – the Japanese approach;

In the second approach, the nominal value of traded securities is divided into “the number of traded securities” and “the price of those securities.” The number of traded securities is held constant while changes in the value of commissions received by brokers as a result of changes in the valuation of traded securities are considered as price changes. In the U.S. the number of traded securities is held constant at the sample price level, while in Korea the number of traded securities is implicitly held constant by using the average market price index (*e.g.*, KOSPI, KOSDAQ) as the inflator to adjust changes in traded securities values.

In the third approach, the nominal value of traded securities is discounted by the inflation rate of general prices. Increases in general prices result in deterioration in the quality of services provided, since the same transaction amount in nominal terms in two periods implies smaller amount of transaction in the real terms in the second period. The inflation rate of general prices thus can be taken as the rate of quality deterioration.

##### 9.3.7.2.1. *The nominal value of traded securities approach*

During the respondent initialisation process, respondents should specify the following two components in order to set the model services:

- The nominal value of traded securities; and

- The percentage fee charged for commission.

In subsequent months, respondents should update only the percentage fee. Prices are estimated as:

$$P_{t=0} = \text{nominal value of traded securities}_{t=0} \times \text{percentage fee}_{t=0}(\%)$$

$$P_{t=n} = \text{nominal value of traded securities}_{t=0} \times \text{percentage fee}_{t=n}(\%)$$

Changes in estimated prices are a function of changes in the broker's commission percentage only.

Box 9.3.1. is an example of the nominal value of traded securities approach

**Box 9. 3. 1. Example: a customer would like to purchase securities at time 0**

- Nominal value of traded securities is €2,000
  - 5 % charged for commission
- The price at time 0 is estimated as:  $P_{t=0} = €2000 \times 0.05 = €100$
- At time1, the percentage fee has been increased to 9 percent.
- The price at time1 is estimated as:  $P_{t=1} = €2000 \times 0.09 = €180$

#### 9.3.7.2.2. The number of traded securities approach

During the respondent initialisation process, respondents should specify the following three components, in order to set the model services:

- The number of traded securities;
- The securities price; and
- The percentage fee charged for commission.

In subsequent months, respondents should update only the percentage fee and the securities price. The number of securities traded is held constant over time.

Prices are estimated as:

$$P_{t=0} = \text{nominal value of traded securities}_{t=0} \times \text{percentage fee}_{t=0}(\%)$$

$$P_{t=n} = \text{number of securities}_{t=0} \times \text{securities price}_{t=n} \times \text{percentage fee}_{t=n}(\%)$$

Changes in estimated prices are a function of changes in both the broker's commission percentage, and the prices of the underlying securities, *i.e.*, market value of the particular securities selected. To ensure that these selected securities are representative of the market at the time of sampling, the U.S. uses a process in which the securities are statistically selected based on their market capitalization.

Box 9.3.2. is an example of the number of traded securities approach.

**Box 9.3.2. Example: a customer would like to purchase 100 shares of stock at time 0**

- 100 shares of stock
  - €20 per share
  - 5 percent charged for commission
- The price at time 0 is estimated as:  $P_{t=0} = 100 \times €20 \times 0.05 = €100$
- At time 1, the share price has doubled and the percentage fee has been increased to 9 percent.
- The price at time 1 is estimated as:  $P_{t=1} = 100 \times €40 \times 0.09 = €360$

**9.3.7.2.3. The real value of traded securities approach**

During the respondent initialisation process, respondents should specify the following two components in order to set the model services:

- The nominal value of traded securities;
- The percentage fee charged for commission; and
- The inflation rate of general prices: In addition, the inflation rate of general prices is used as the rate of quality change in order to hold the real value of traded securities constant.

In subsequent months, respondents should update only the percentage fee. The NSI should update the inflation rate of general prices. Prices are estimated as:

$$P_{t=0} = \text{nominal value of traded securities}_{t=0} \times \text{percentage fee}_{t=0}(\%)$$

$$\frac{P_{t=n}}{1 + \pi_{t=n}} = \text{nominal value of traded securities}_{t=0} \times \text{percentage fee}_{t=n}(\%)$$

With:  $\pi_{t=n}$  stands for the inflation rate from  $t = 0$  to  $t = n$

$$P_{t=n} = \text{nominal value of traded securities}_{t=0} \times [1 + \pi_{t=n}] \times \text{percentage fee}_{t=n}(\%)$$

Changes in estimated prices are a function of changes in both the broker's commission percentage, and the inflation rate of general prices.

Box 9.3.3. is an example of the real value of traded securities approach.

**Box 9.3.3. Example: a customer would like to purchase securities at time 0**

- Nominal value of traded securities : €2,000
  - 5 percent charged for commission
- The price at time 0 is estimated as:  $P_{t=0} = €2000 \times 0.05 = €100$
- At time 1, general prices have risen by 3 percent and the percentage fee has been increased to 9 percent.
- The price at time 1 is estimated as:  $P_{t=1} = €2000 \times 1.03 \times 0.09 = €185.40$ .

### *9.3.7.3. Spreads and mark-ups: Direct use of prices of repeated services*

For securities trades that are transacted on a spread basis, respondents first select a security type (e.g. corporate bond, government bond, stock option) and then select a specific security within that group. For the specific selected security, the respondent provides the price at which the firm would purchase the security (the bid or offer price) and the price at which the firm would sell the security (the ask price) as of the market open on the pricing reference date. The quoted spread, or the difference between the ask price and the bid price, is the price used in index calculation. In subsequent survey periods, the respondent provides the bid and ask prices for the selected security as of the open of the market on the pricing reference date in the given survey month.

In some instances, rather than providing bid and ask prices, respondents will instead provide the current market price of the selected security and the amount by which it marks up the security for sale. In these cases, the dollar value of the mark-up is the price used in index calculation.

### *9.3.7.4. Lending interest: Combination of the Model pricing method and the Percentage fee method*

While firms may transact reverse repurchase agreements and securities lending transactions involving the same broad classes of securities in each period, it is unlikely that specific transactions of the same duration and value (in real terms) will recur in each period. For this reason, the reverse repurchase agreement or securities lending transaction specified in the base period serves as the basis for re-pricing in future periods, consistent with application of the Model pricing method. Fees earned by lenders in reverse repurchase agreements and securities lending transactions are derived from the value of the securities loaned or to be repurchased, so application of the percentage fee method is appropriate as well.

In order to reflect changes in the time value of money, the U.S. implemented a procedure in which the values of securities involved in reverse repurchase agreements and securities lending transactions are periodically updated based on changes in a broad measure of U.S. inflation.

Fees for reverse repurchase agreements are calculated by multiplying the value of the securities to be repurchased first by the repo interest rate for the referenced class of security and then by the term (in days) of the agreement, divided by 360. In some countries, standard practice may be to instead divide by 365 in order to obtain a daily rate of interest.

Box 9.3.4. is an example of a reverse repurchase agreement.

### Box 9.3.4. Example of a reverse repurchase agreement

#### Period 1 (base period):

- Reverse repurchase agreement. Client: other securities dealer. Overnight repo. Treasury security.

Value of assets/securities traded:	\$ 275,000,000
Repo interest rate:	0.1236%
Term (Days/360):	1/360
Total fee:	\$ 944.17

#### Period 2:

- Reverse repurchase agreement. Client: other securities dealer. Overnight repo. Treasury security.

Value of securities traded:	\$276,172,810
Repo interest rate:	0.1529%
Term (Days/360):	1/360
Total fee:	\$1,172.97

Between periods 1 and 2, the inflation measure that is used has increased by roughly 0.4 percent; this change has been reflected in the escalated value of the securities traded. The respondent updates the repo interest rate while holding all other values fixed, including the term of the agreement.

Fees for securities lending transactions are calculated by multiplying the value of the securities loaned first by the lending fee percentage and then by the term (in days) of the loan, divided by 360

### 9.3.8. Quality issues

#### 9.3.8.1. The definition of the unit transaction and its impact on the volume measurement

The definition of the unit transaction has an impact on the volume measurement in this industry. Let us compare the effect of the three different approaches, using the situation presented in table 9.3.1.

**Table 9.3.1. Definition of the unit transaction**

	Number of securities traded	Securities Price	Percentage fee	Nominal output	Inflation rate of general prices
Time 0	100	€20	5%	€100	--
Time 1	300	€40	9%	€1080	3%

Table 9.3.2. shows the nominal output and also the results of the estimated real output based on the three approaches.

**Table 9.3.2. Results of the estimated real output based on the three approaches**

	Nominal output	Real output (time 0 =€100)		
		Nominal value of traded securities approach	Number of traded securities approach	Real value of traded securities approach
Time 0	€100	€100	€100	€100
Deflator ( $P_0/P_1$ )	--	€100/€180 = 1/1.8	€100/€360 = 1/3.6	€100/€185.40 = 1/1.854
Time 1	€1080	€1080×1/1.8 = €600	€1080×1/3.6 = €300	€1080×1/1.854 = €582.52

In the first approach, changes in the number of securities and the price of securities are reflected in the volume measurement.

In the second approach, changes in the number of securities are reflected in the volume measurement.

In the third approach, changes in the real value of traded securities are reflected in the volume measurement.

### 9.3.8.2. *Maintaining constant quality of service over time for principal transactions of debt securities*

The spread or mark-up earned on a given debt security is dependent on a number of underlying characteristics of that security that may change over time. For example, the bid-ask spread on a bond with a AAA credit rating may behave markedly differently if the credit rating were to be downgraded. Similarly, as debt securities approach their maturity dates, spreads typically narrow. In order to ensure that the underlying characteristics of debt securities remain constant over time, when fundamental spread-determining characteristics such as credit rating and time to maturity change, the U.S. asks respondents to provide substitute securities with time to maturity and credit rating closest to that of the original selected security. To facilitate the ease of substitution, during initial data collection, the U.S. asks respondents to provide spreads on debt securities from entities (*i.e.* companies, municipalities) that regularly issue debt.

### 9.3.9. *Weighting and aggregation*

Both in the U.S. and Japan, the lower level indices are aggregated using industry turnover data as weights. Korea currently publishes “Securities brokerage commissions” price indices only. The index formula is the fixed-weight Laspeyres formula.

The U.S. uses the total revenue of this industry in the Economic Census for the lower index weight calculation. These weights are updated approximately every five years. Within the lowest level indices, each security company is weighted by its own turnover provided at the time of data collection. These weights remain fixed throughout the life of the sample.

Japan uses two sources for weight calculation: *i)* the intermediate transaction value estimated in the Input-Output Tables for the “Major group” and “Group” weights



calculation; and *ii*) the results from statistics published by industry organizations for the “Items” weights calculation. These weights are updated every five years.

Korea mainly uses the Input-Output tables for weight calculation.

Table 9.3.3. provides the U.S. SPPI publication structures for securities brokerage services.

**Table 9.3.3. U.S. SPPI publication structures for securities brokerage services**

Index code	Index title
523120	Securities brokerage
523120P	Brokerage services, equities, and ETFs
5231201	Brokerage services
523120101	Brokerage services, exchange-listed equities
523120102	Brokerage services, all other securities

Table 9.3.4. provides the U.S. SPPI publication structures for principal securities transaction services.

**Table 9.3.4. U.S. SPPI publication structures for principal securities transaction services**

Index code	Index title
5231102	Dealer transactions
523110201	Dealer transactions, equity securities
523110202	Dealer transactions, debt securities and all other trading

The U.S. also publishes product based services indexes for securities brokerage and dealing services as shown in the table 9.3.5.

**Table 9.3.5. U.S. SPPI product based for securities brokerage and dealing service**

Index code	Index title
4011	Securities brokerage, dealing, investment advice, and related services
401101	Securities brokerage, dealing, and investment advice
40110101	Securities brokerage, dealing, and investment advice
401102	Securities brokerage and dealing related services
40110201	Securities brokerage and dealing related services

Table 9.3.6. provides the Japan’s CSPI (Corporate Services Price Index) publication structures for the securities and commodity brokerage services. The shaded “Items” are classified as falling into some other industries.

**Table 9.3.6. Japan's CSPI for securities and commodity contracts brokerage**

Major group			
	Group		
		Subgroup	
			Item
Finance and insurance			
	Financial services		
		Financial services	
		Domestic 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	

### 9.3.10. Specific aspects

#### *Treatment of bundled services*

For securities brokerage services, many of the large full-service securities companies provide their clients with a range of services in addition to executing their buy and sell orders such as the provision of investment advice and financial planning services, which are classified in some other industries. Examples of these bundled services are “wrap accounts” and “prime brokerage.”

The inclusion of the prices of these bundled services depends on: *i*) whether the service is primarily included in this service and/or *ii*) whether only charges for securities brokerage services can be distinguished.

Following these criteria, “wrap accounts” are not included in the U.S. securities brokerage industry price indices because “wrap accounts” are considered primary to NAICS 523930 - Investment Advice (ISIC 6619 -Other activities auxiliary to financial service activities). “Prime brokerage” can be included because the charges for the brokerage services, as the components of the prime brokerage, can typically be distinguished.

### 9.3.11. Overview of national methods

The U.S., Korea, and Japan are currently the only countries publishing price indices for the security and commodities brokerage industry. The methods and practices applied in each of these countries are discussed throughout this sub-chapter.

Canada is currently developing an SPPI for securities brokerage based on the unit value method.

## 9.4. Insurance (David Friedman, U.S. Bureau of Labor Statistics)

### 9.4.1. Industry description (ISIC 651)

Business enterprises in this industry group engage in underwriting annuities and insurance policies (assuming the risk, assigning premiums, and so forth) and investing premiums to build up a portfolio of financial assets to be used against future claims (financial intermediation). Insurance services are defined in terms of the type of risk being insured against, such as death, loss of employment because of age or disability, and/or property damage. Contributions and premiums are set on the basis of actuarial calculations of probable pay-outs based on risk factors from experience tables and expected investment returns on reserves.

Over the past ten years, the advent of new underwriting tools has helped insurers to better estimate the risk of future claims. One such tool is credit scoring, which enables insurance companies to differentiate between low- and high-risk policyholders, allowing them to charge the appropriate premium for the assumed risk. Most companies now use credit scoring, which has fostered competition in the industry and provided the consumer with more choices.

### 9.4.2. Classification aspects

#### 9.4.2.1. Industry classification

Insurance activities are classified in ISIC group 651. This Group includes the following types of insurance:

- ISIC 6511 – Life insurance:
  - Life insurance;
  - Annuities;
  - Disability insurance;
  - Accidental death and dismemberment insurance;
- ISIC 6512 – Non-life insurance:
  - Accident and fire insurance;
  - Health insurance;
  - Travel insurance;
  - Property insurance;
  - Motor, marine, aviation and transport insurance;
  - Pecuniary loss and liability insurance.

Annex A provides classifications from various systems by type of activity. Note that, in both the U.S. NAICS and ANZSIC systems, health insurance is classified separately from the other non-life insurance activities. In addition, accident insurance and fire insurance are classified separately in NAICS. NAICS 524127 - Title Insurance, and

NAICS 524128 - Other direct insurance (except life, health, and medical) carriers, are also covered by ISIC 6512. Included in NAICS 524128 are warranty insurance carriers and bank deposit insurance carriers.

In Canada, NAICS 524121 includes establishments that underwrite a combination of automobile, property, and liability insurance, with no one of the three types accounting for more than 70 percent of the nominal output. Each of the other NAICS insurance industries comprises establishments in which more than 70 percent of nominal output is derived from underwriting a particular type of insurance classified in that industry.

#### *9.4.2.2. Product classification*

Annex B maps the NAPCS product codes to the CPC Ver.2 structure for classes 7132 and 7133.

The U.S. SPPI also includes accidental death and dismemberment with life insurance services, but there is no NAPCS code for this service. Freight insurance falls under the NAPCS code that includes inland marine insurance. NAPCS products for multiple peril insurance can include both property and liability coverage, so the NAPCS codes for these products correspond to CPC codes for both general liability and property insurance.

#### *9.4.3. Scope of the survey*

The U.S. SPPI also includes accidental death and dismemberment with life insurance services, but there is no NAPCS code for this service. Freight insurance falls under the NAPCS code that includes inland marine insurance. NAPCS products for multiple peril insurance can include both property and liability coverage, so the NAPCS codes for these products correspond to CPC codes for both general liability and property insurance.

#### *9.4.4. Industry vs. product based SPPI*

The broad ISIC definition of the insurance industries (ISIC 6511 and 6512) that is inclusive of a wide range of insurance products allows for the flexibility to survey by industry and capture a representative sample of products from companies classified in the industry. The various NAICS industries are, conversely, more narrowly defined. In the U.S., insurance companies tend to offer insurance policies across these industries so an industry based publication structure would necessarily need to support a vast array of secondary activity. To insure that the largest business enterprises are represented in each 6-digit NAICS insurance industry in which they operate, the U.S. produces industry based indices that cover only the primary services for each insurance industry. As a result, the industry based and approximate product based insurance SPPIs are exactly the same in the U.S. The sample design described below supports this strategy.

#### *9.4.5. Sample design*

The ideal sampling strategy for the insurance industries is to sample using probability proportional to size with premium turnover as the size measure. In the U.S., many companies operate in more than one insurance industry, but may not operate separate profit maximizing centres (PMCs). This is especially true for companies that offer life and health insurance. Therefore, it is necessary to create separate PMCs, when they do not already exist, and give the company a chance of selection in each specific NAICS industry. For property and casualty insurance, the PMC is further broken down by line of insurance (e.g. private passenger auto, homeowners, etc.), and this forms the basis for

stratification. Since item selection is restricted to a single type of insurance, rather than inclusive of all activities of the business enterprise, secondary activities are excluded. Therefore, only services primary to the industry appear in the published indices in the United States. The number of items to be collected for each survey unit is determined by turnover. Within the survey unit, the number of items to collect for each service line is determined by the relative importance of each service line.

#### *9.4.6. Collection of information and specification of the service*

The policy underwritten by the insurer represents the unique service transaction. The policy lists the coverages for which restitution would be made to the policyholder to cover claims. The amount of risk being transferred to the insurer is clearly stated in terms of covered benefits (and benefits not covered) and the policy obligates the insurer to pay claims for all such occurrences.

For initial data collection, representative policies are selected following consultation with respondent representatives, typically from the actuarial department. It is necessary to capture detailed policy characteristics to facilitate constant quality pricing over time. The following policy characteristics are captured:

- Life insurance:
  - Type of policy - whether the policy is term, whole life, universal, etc. will have an effect on the premium amount. The premium for a term policy tends to be lower;
  - Age of insured - the older the insured, the higher the premium due to increasing mortality;
  - Sex of insured - premiums tends to be higher for males than for females;
  - Face amount of policy – the premium will increase as the amount of coverage increases in order to cover potential claims;
  - Smoker/non-smoker – the premium tends to be higher for people who smoke due to increased health risks which increase mortality;
  - Health of insured - the healthier the insured, the lower the premium will be since chance of premature death is expected to be lower;
  - Duration of the policy – this refers to the nth year of the policy (i.e. 1st year, 5th year, etc.). The premium or fees may change depending on how long the policy has been in force;
  - Riders - a policy may have a provision for additional coverage called a rider. A rider may provide additional coverage for spouse or children of the insured and will increase the premium otherwise payable.
- Property insurance:
  - Type of property or insured risk - provides the characteristics of the insured property or specific risk covered;
  - Type of coverage –provides the physical damages and liabilities covered by the policy;

- Dollar limit of coverage - maximum amount of money the insurer is legally obligated to pay in the event of a claim;
  - Coinsurance clause - percent of the value of the property to be reimbursed by the insurer;
  - Deductible – the insured bears the first part of any loss covered by the policy up to a specified amount;
  - Length of policy period - time frame for which the policy is in effect;
  - Perils covered - specific risks that the insurer assumes;
  - Location of the insured property - risks vary by geographic location;
  - Past loss experience – generally, the premium is lower if the insured has a past record of making fewer claims;
  - Valuation of insured property - either the actual cash value of the property, which adjusts for depreciation, or the replacement cost;
  - Valuation of risk exposure - monetary value for liability coverage.
- Health insurance:
    - Type of coverage - underwriters will require different information in order to provide prices for medical service plans, long-term care, and other services;
    - Amount of coverage (richness of benefits) – includes the number of covered services, the dollar amount of coverage for each service, and the maximum dollar amount of coverage;
    - Rate class - prices for the same service within the same group will differ according to the rate class. Generally, a family will pay a higher premium than an individual within the same group plan;
    - Voluntary vs. non-voluntary (contributory vs. non-contributory) - voluntary (contributory) group policies are policies for which the employee pays 100% of the premium. Non-voluntary (non-contributory) group policies are policies whereby the employer pays 100% of the premium. The percentage contribution of the employer or the employee can vary anywhere between 0% and 100%;
    - Group composition - the combination of gender and age ranges is an important factor in determining the premium. Therefore, companies require the age and gender of each person covered by the policy, including spouses and children;
    - Medical history – a previously healthy person will generally pay a lower premium than one who has a record of health care utilisation;
    - Occupation – a person employed in a dangerous occupation will generally pay more than one in a sedentary, low risk occupation. The classification code of the industry is usually used for underwriting purposes;
    - Geographic location - people who live in areas in which natural disasters often occur and/or pollution is a problem will generally pay higher premiums than those who do not. For large groups, or small groups which are geographically

dispersed, several geographic regions may apply. However, a national rate may be used if a group is very well dispersed throughout the nation;

- Earnings - As incomes rise, utilisation rates tend to increase. Thus, premiums tend to increase as income increases as well. Earnings will be most important in determining a price for accident insurance. Maximum benefits paid are usually based on income;
- Smoking Status - Smokers generally pay higher premiums than non-smokers.

### 9.4.7. Main pricing methods

#### 9.4.7.1. Type of prices

In the U.S. service producer price index program, the primary output of the insurance industries is the assumption of risk, or transfer of risk from the policyholder, and financial intermediation. Financial intermediation represents the investments made to partially offset the size of the premium payment. The primary type of price for measuring this output is the premium plus the return on investment. This price can be expressed as:

$$\text{Price} = \text{Premium} (1 + r)$$

Where  $r$  is the annual return on the invested portion of the premium for the particular type of insurance that is being priced. This rate is stated as a percentage of all premiums paid. This type of price is collected for all property and health insurance services and any life insurance service for which the policyholder pays a set premium.

Mutual companies, whose policyholders are also the stockholders of the company, typically pay out a dividend to the policyholders on an annual basis. In such cases, the dividend would be subtracted from the premium to obtain a net transaction price. This price can be expressed as:

$$\text{Price} = \text{Premium} (1 + r) - \text{Dividend}$$

For some types of life insurance, premiums may vary at the discretion of the policyholder, making them an inaccurate measure of the output. Instead of obtaining premiums, the various fees charged to administer the policy are collected as a proxy for the premium, taking the total fees and investment return as the price.

For universal and variable life insurance policies, the price collected is expressed as follows:

$$\text{Price} = (MC + EXP + P + C)(1 + r)$$

Where  $MC$  = mortality costs,  $EXP$  = expenses,  $P$  = profits,  $C$  = contingency allowances and  $r$  = earned rate on investments

For annuities, companies receive a consideration (premium) that is variable, but they only retain a portion of it. All money invested in the annuity, net of any fees and/or interest retained by the insurance company, is intended to be returned to the annuitant. The outputs from annuities are measured by fees and/or interest.

For variable deferred annuities, the fee methodology used for universal and variable insurance was adapted to measure the output of these annuities. Fees charged for provision of these annuities are generally set as a percentage of the account value. These fees cover expenses, mortality risks, and investment management.

For fixed-rate annuities, a company's turnover is the difference in the interest that they earn and interest that they credit to the annuitant. The difference is applied to the account value. In addition to this interest spread, companies may charge a flat administrative fee.

The price measure for immediate annuities is the actuarial rate. This is the rate at which the provider derives the premium or consideration. It is calculated as the present value of the payment of one dollar every month for the expected duration of the annuity.

#### *9.4.7.2. Pricing approach*

The U.S. SPPI uses model pricing to track price movement over time. Companies provide estimated premiums or fees for a "frozen" policy. Initially, the type of policy to be priced is selected by probability proportionate to size item sampling at the establishment. Respondents then choose actual policies of the selected type that are representative of their business in terms of price movement and coverage. Subsequently, the premium determining characteristics are held constant, while the policy is priced on an annual or semi-annual basis. The respondent estimates the current premium for this "frozen" policy by using current charges applied to the policy characteristics of the policy. This premium remains unchanged until the policy is priced again.

In order to hold the real values of coverage constant, periodic adjustments are made to account for inflation. For homeowners' insurance, the dollar limit of coverage is adjusted annually to account for construction price inflation. The assumption is that the policyholder is insuring to secure a constant flow of services from the insured property. If there is price inflation affecting the cost of repair or replacement of the damaged property, the coverage limit should be escalated to reflect this increase. This adjustment is made annually on the anniversary date of the policy. This reflects what actually occurs; companies make these coverage adjustments at the time of policy renewal. For sampled policies, spreading policy anniversary dates throughout the year smoothes overall industry price behaviour.

The data sources used for these adjustments vary based on the type of coverage. For example, in the case of worker's compensation insurance, the workforce in the group is held constant (same number of people in the same jobs), but the wage rates are adjusted using the Bureau of Labor Statistics' Employment Cost Index to account for general wage inflation.

An alternative to model pricing is to follow the selected policy over time using the direct use of prices of repeated services method. With this method, respondents are asked to provide the actual premium charged to the policyholder and to identify any modifications to the policy each year on the anniversary (or renewal) date. Any changes in benefits over time must be factored out so that index movements reflect only changes in price and not changes due to additional benefits. To maintain constant quality, the companies must be able to provide the value of the risk change associated with any change to the policy characteristics.

#### *9.4.8. Quality issues*

A fundamental issue in pricing insurance services is identifying and adjusting for changes in risk. For changes in explicitly endogenous risk factors such as changes in coverage or deductibles, respondents typically have suitable cost data to allow for meaningful cost based quality adjustment.<sup>10</sup> However, for changes in exogenous risk



factors that go beyond the scope of policy negotiations, such as an increased incidence of theft or a severe hurricane season, a particular business enterprise is not likely to have sufficient data to definitively quantify risk. Only data sources external to the business enterprise will be robust enough to identify short-term vs. long-term changes in risk and, in most cases, it is not practical to obtain this information and use it for quality adjustment. One exception is for private passenger auto insurance. The U.S. obtains information used to quality adjust for changes in auto insurance risk from an external data source.<sup>11</sup>

However, it is not always clear when a shift in underlying risk occurred. Decisions must be made in real time, and sufficient data may not be available in the current time period to identify and quantify the effect of these changes.

Another issue related to quality is new item bias. This is especially problematic when pricing a frozen policy. Over time, this policy may no longer be representative. Mandated coverages may change or new insurance products may be introduced. Although bias may not be as prevalent when following an actual policy, it can occur if the general population has changed their preferences for the type of insurance product that they purchase or if the policy represents a smaller portion of the company's business. To minimise new item bias, the insurance industries may require more frequent sampling than other industries. In addition, many mandated coverage changes are captured during normal pricing activities.

#### 9.4.9. *Weighting and aggregation*

Table 9.4.1. provides the U.S. SPPI industry publication structures for the insurance industries.

**Table 9.4.1. U.S. PPI industry publication structures for the insurance industries**

Index code	Index title
524113	Direct life insurance carriers
524113P	Primary services
5241131	Life insurance policies
524113101	Individual life insurance policies
52411310101	Term life insurance policies
52411310102	Whole life insurance policies
52411310103	Universal life insurance policies
52411340104	Other individual life insurance policies
524113102	Group life insurance policies
5241132	Annuities
524113201	Variable deferred annuities
524113202	Fixed-rate deferred annuities
524113203	Immediate annuities
5241133	Disability insurance policies

**Table 9.4.1. U.S. PPI industry publication structures for the insurance industries, *continued***

524126	Direct property and casualty insurance carriers
524126P	Primary services
5241261	Private passenger auto insurance
5241262	Homeowners insurance
5241263	Commercial auto insurance
5241264	Non-auto liability insurance
524126402	Medical malpractice insurance
524126403	Product liability and other non-auto liability insurance
5241265	Commercial multiple peril insurance
5241266	Workers compensation insurance
5241267	Other property and casualty insurance
524114	Direct health and medical insurance carriers
524114P	Primary services
5241141	Medical service plans
524114101	Comprehensive medical service plans
52411410101	Group managed care medical service plans
52411410102	Group fee-for-service medical service plans
52411410103	Individual comprehensive medical service plans
524114103	Non-comprehensive medical service plans
52411410301	Dental service plans
52411410302	Supplemental Medicare service plans
52411410303	Other medical service plans
5241142	Health insurance

For each of these index series, the lower level indices are aggregated using industry turnover data (premiums plus investment income) as weights. Although the indices are calculated using the Laspeyres formula, these weights are updated approximately every five years. Within the lowest level indices, each insurance company is weighted by its own turnover provided at the time of data collection. These weights remain fixed throughout the life of the sample.

The U.S. also publishes product based services indices for insurance as shown in the table 9.4.2. below.

**Table 9.4.2. U.S. product based services indices for insurance**

Index code	Index title
411101	Life insurance
411102	Disability insurance, including accidental death
411103	Health and medical insurance
41110	Property and casualty insurance
412101	Annuities

#### 9.4.10. Specific aspects

While individual policies may vary, most transaction characteristics and terminology are standard throughout the industry (*i.e.* a policy that is medical malpractice at one company would be considered a malpractice policy at another company).

However, one problematic situation in property insurance is that a sampled policy may include two lines of insurance. For example, it is not uncommon for a homeowner's policy to include inland marine coverage, which is a service line in itself, in addition to the regular homeowner's coverage. Another difficulty is that companies may also vary on

how they categorise motorcycle (auto vs. other) and motorhome insurance (auto vs. homeowners).

Recordkeeping practices dictate how the policies are categorized and priced in both situations. In the first, the premium for inland marine coverage is excluded from the price if the company separates the premiums in their records; otherwise it is included. In the second case, the policy's categorisation will depend on that of the company.

#### 9.4.11. Overview of national methods

##### *Canada*

Canada is currently developing indices for non-life insurance activities. Indices will be calculated for each 5-digit NAICS industry. Depending on the approach recommended, commercial insurance could be excluded. For auto and property insurance, which represent the bulk of net premiums written, the portion of commercial coverage within each line represents approximately 5% and 10%, respectively. Each industry will be sampled at the establishment level with no stratification.

##### *Japan*

Japan compiles price indices on Property and Casualty insurance services, including Fire insurance, voluntary motor vehicle insurance, compulsory motor vehicle insurance, and marine and other transportation insurance services. Indices are focused on business to business transactions. The model pricing method is mainly used.

Since Japan defines the unit transaction in insurance service as the real value of coverage, the nominal value of coverage is discounted by the inflation rate of prices of the insured property. For example, the inflation rate of the Building Construction Cost Index is used for adjustments in the nominal value of building damage coverage.

##### *Netherlands*

In the Netherlands, public service sectors like health care and insurance are characterized by regulated tariffs. Statistics Netherlands has developed a statistical method for price and volume measurement of non-life insurance services using the net measurement approach. The general idea behind this approach is that the insurance industry retains a margin for the provision of services or activities (*e.g.* policy administration). For the net approach, nominal value is expressed as

$$P_{i,t} + ES_t - EL_t$$

$P_{i,t}$  denotes total premiums earned for product group  $i$  in year  $t$ ,  $ES_t$  denotes the expected investment income to premium ratio in year  $t$ , and  $EL_t$  denotes expected loss (claims) in year  $t$ . Dutch data is used to estimate yearly expectations of loss and investment income.

In the model, premiums are set according to expected loss, to which insurers may add their expectation about investment income.<sup>12</sup> Expected loss and its “relative handling cost” are used to characterize insurance services which have different values depending on the type of non-life insurance. Expected loss is expressed as follows:

$$\mu_i^p P_{i,t} + \mu_i^s P_{i,t} ES_t$$

Premiums and investment income are distributed over risk and handling costs, so parameters  $\mu_i^p$  and  $\mu_i^s$  denote the fractions of premiums and expected investment income,

respectively, that cover total expected loss for product group  $i$ . Parameters  $\mu_i^p$  and  $\mu_i^s$  are set to values between 0 and 1.

$\mu_i^p$  is expected to take some value smaller than 1, while  $\mu_i^s$  could be equal to 1. In that case, investment income is entirely used to cover expected loss, so that handling cost exclusively consists of (a fraction of) premiums. In this model version, different sources of risk arising from loss and investment income are combined and premiums are set through the handling cost parameter  $\mu_i^p$ . The idea behind this model version is that investment income is used to compensate (a part of) losses incurred. Model versions where the  $\mu_i^s$  are equal to zero imply that investment income is assigned to handling cost and that a part of the premiums is used to cover losses.

## Bibliography

### *Monetary intermediation activities:*

Auer, J., and Kazuhiko I. (2011), *Banking and Credit, Reference Rate and Negative Prices*, 26<sup>th</sup> Voorburg Group meeting, Newport, United Kingdom available at:

<http://www4.statcan.ca/english/voorburg/Documents/2011%20Newport/Papers/2011%20-%2002.pdf>

Bathgate, D. (2009), *United States Producer Price Index for Banking*, 24<sup>th</sup> Voorburg Group meeting, Oslo, Norway, available at:

<http://www4.statcan.ca/english/voorburg/Documents/2009%20Oslo/Papers/2009%20-%2025.pdf>

Swick, R., Bathgate D., and Horrigan, M., (2006), *Services Producer Price Indices: Past, Present, and Future*, Paper prepared for the National Bureau of Economic Research, 36 Conference on Research in Income and Wealth Summer Institute, Cambridge, MA, 83 p., available at:

<http://www.bls.gov/bls/fesacp1060906.pdf>

Barosevic, M., Lewis C., and Cullen, D., (2011), *Financial Intermediation Services Indirectly Measured (FISIM) in the CPI*, 58th World Statistics Congress of the International Statistical Institute, Dublin, Ireland available at:

<http://2011.isiproceedings.org/papers/650260.pdf>

Apsitis, M., and Morgan, M., (2010), *The Australian Perspective on Financial Intermediation Services*, 25<sup>th</sup> Voorburg Group meeting, Vienna, Austria, available at:

<http://www4.statcan.ca/english/voorburg/Documents/2010%20Vienna/Papers/2010%20-%2050.pdf>

### *Investment banking:*

Barosevic, M., Lewis C., and Cullen, D., (2011), *Financial Intermediation Services Indirectly Measured (FISIM) in the CPI*, 58th World Statistics Congress of the International Statistical Institute, Dublin, Ireland available at:

<http://2011.isiproceedings.org/papers/650260.pdf>

U.S. Bureau of Labor Statistics, (2008), *PPI Fact Sheet for Producer Price Indexes for Security and Commodity Contracts Intermediaries and Brokerages – NAICS 5231*, BLS Website, available at:

<http://www.bls.gov/ppi/ppinaics5231.htm>

*Investment banking:*

Barosevic, M., Lewis C., and Cullen, D., (2011), *Financial Intermediation Services Indirectly Measured (FISIM) in the CPI*, 58th World Statistics Congress of the International Statistical Institute, Dublin, Ireland available at:

<http://2011.isiproceedings.org/papers/650260.pdf>

U.S. Bureau of Labor Statistics, (2008), *PPI Fact Sheet for Producer Price Indexes for Security and Commodity Contracts Intermediaries and Brokerages – NAICS 5231*, BLS Website, available at:

<http://www.bls.gov/ppi/ppinaics5231.htm>

*Security and commodity contracts brokerage:*

Ribe, M., (2003), *Financial Services in Swedish Price Indices*, 7<sup>th</sup> Ottawa Group meeting, Paris, France available at:

[http://www.ottawagroup.org/Ottawa/ottawagroup.nsf/home/Meeting+7/\\$file/2003%207th%20Meeting%20-%20Ribe%20Martin%20-%20Financial%20Services%20in%20Swedish%20Price%20Indices.pdf](http://www.ottawagroup.org/Ottawa/ottawagroup.nsf/home/Meeting+7/$file/2003%207th%20Meeting%20-%20Ribe%20Martin%20-%20Financial%20Services%20in%20Swedish%20Price%20Indices.pdf)

*Insurance:*

Bathgate, D., (2004), *Price Indexes for Property and Casualty Insurance*, Voorburg Group Meeting, Ottawa, Canada available at:

<http://www4.statcan.ca/english/voorburg/Documents/2004%20ottawa/papers/2004-030.pdf>

Bathgate, D., (2011), *United States Producer Price Indexes for Non-Life Insurance*, Voorburg Group meeting, Newport, United Kingdom available at:

<http://www4.statcan.ca/english/voorburg/Documents/2011%20Newport/Papers/2011%20-%202036.pdf>

Swick, R., Bathgate D., and Horrigan, M., (2006), *Services Producer Price Indices: Past, Present, and Future*, Paper prepared for the National Bureau of Economic Research, 36 Conference on Research in Income and Wealth Summer Institute, Cambridge, MA, 83 p., available at:

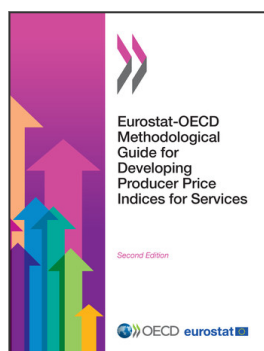
<http://www.bls.gov/bls/fesacp1060906.pdf>

Chessa, A. G., (2011), *A New Method for Price and Volume Measurement of Non-Life Insurance Services: A Statistical Approach*, Voorburg Group meeting, Newport, United Kingdom available at:

<http://www.voorburggroup.org/Documents/2011%20Newport/Papers/2011%20-%2031.pdf>

## Notes

1. Credit granting for house purchasing by specialised non-deposit taking institutions are in ISIC Class 6492. Credit card transaction processing and settlement activities are in ISIC Class 6619.
2. Source: Preliminary Report of the ISWGNA Task Force on FISIM
3. Source: Preliminary Report of the ISWGNA Task Force on FISIM
4. See Auer, J., and Kazuhiko I., (2011).
5. *Ibid.*
6. Present value discounting is required in order to maintain a constant unit of measure. Since the outstanding balances are period-end values and since the real value of money is eroded over time, the nominal balances must be reduced so that they are reflective of their real value in the base period. The nominal values are discounted through multiplication by a discount factor  $[1/ (1+r)]$ ; where  $r$  is the discount rate, which is the opportunity cost of capital. For the purpose of the Canadian Banking SPPI, the discount rate has been primarily the relevant reference rate.
7. As discussed under Classification Aspects, there are significant differences between how ISIC and NAICS treat these activities but ISIC 6499 appears to be the closest match
8. For more details, please see the Security and Commodity Contracts Brokerage section in this Guide.
9. See section 9.3.7.2.
10. Examples of these kinds of factors include the addition of a terrorism clause to property and casualty insurance policy and, for health insurance, the removal of lifetime maximums.
11. See Bathgate (2011).
12. See Chessa (2011).



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