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SPPI for Banking Services in Canada

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Introduction

The purpose of this paper is to provide a brief overview of the SPPI program for banking services, currently in development in the Producer Prices Division at Statistics Canada. The structure of this paper follows the Content Development Framework set out by the Voorburg Group on Service Statistics.

1. Definition of the Service Being Collected

The Depository Credit Intermediation industry is defined in the 2007 North American Industrial Classification System (NAICS) as establishments primarily engaged in accepting deposits and lending funds and for whom deposits are the principal source of funds loaned. Establishments in this industry include chartered banks, trust companies, deposit-accepting mortgage companies, caisses populaires, local credit unions, and provincial government savings establishments that channel deposits to governments.

Under NAICS category 52211 Banking, the industry comprises establishments primarily engaged in accepting deposits and issuing loans. Examples of establishments in this industry are establishments of chartered banks, trust companies and deposit-accepting mortgage companies that are primarily engaged in accepting deposits and issuing loans.

2. Pricing Unit of Measure Collected

This industry, like other financial intermediaries, provides some of its services for a fee and some others without specific charges. Thus, some of the revenue is received directly from customers in the form of service charges, but for a significant portion of the revenue no specific transaction fee is charged. Financial intermediaries finance a variety of their services by retaining part of the interest revenue they earn from investing the funds of their depositors. In a sense, the Canadian banking services SPPI is based on a “derived” price that has two-subcomponents;

1. Explicit fees charged for explicit banking services. Examples include account charges (overdraft, minimum balance).
2. Implicit fees for implicit services. The implicit fee is calculated as the spread or difference between two interest rates.

The SPPI for Banking Services is currently in development and several experimental series have been constructed for the following product lines (see Table 1) by Schedule type.



Table 1: Product Lines

Product Lines	Schedule I	Schedule II	Schedule III
Personal loans for non-business purposes	In scope	In scope	Not in scope
Other non-mortgage loans	“	“	“
Residential mortgage	“	“	“
Non-residential mortgage	“	“	“
Demand and notice deposits	“	“	“
Fixed-term deposits	“	“	“

The Schedule type refers to a class of banks. **Schedule I banks** are domestic banks and are authorized under the *Bank Act* to accept deposits, which may be eligible for deposit insurance provided by the Canadian Deposit Insurance Corporation. **Schedule II banks** are foreign bank subsidiaries authorized under the *Bank Act* to accept deposits, which may be eligible for deposit insurance provided by the Canada Deposit and Insurance Corporation. Foreign bank subsidiaries are controlled by eligible foreign institutions. **Schedule III banks** are foreign bank branches of foreign institutions that have been authorized under the *Bank Act* to do banking business in Canada. These branches have certain restrictions. Schedule III banks are not currently in scope for development, due to data limitations.¹

The data source for calculating the SPPI is administrative and comes from returns filed by all chartered banks in Canada to the *Office of the Superintendent of Financial Institutions* (OSFI), which include quarterly income statements and monthly balance sheets from 1996 to 2008 for all Canadian Schedule I and II banks. The income statements and balance sheets contain all transactions, economic resources and obligations worldwide for these banks.

3. Market Conditions and Constraints

3.1 Size of Industry²

Banks play a key role in the Canadian financial system. Canada has one of the most accessible banking systems in the world with 96% of Canadians having an account with a financial

¹ Financial statements are available only for two currently active schedule III banks from the current data source. For smaller banks, accounting numbers usually present greater volatility for the calculation of an index.

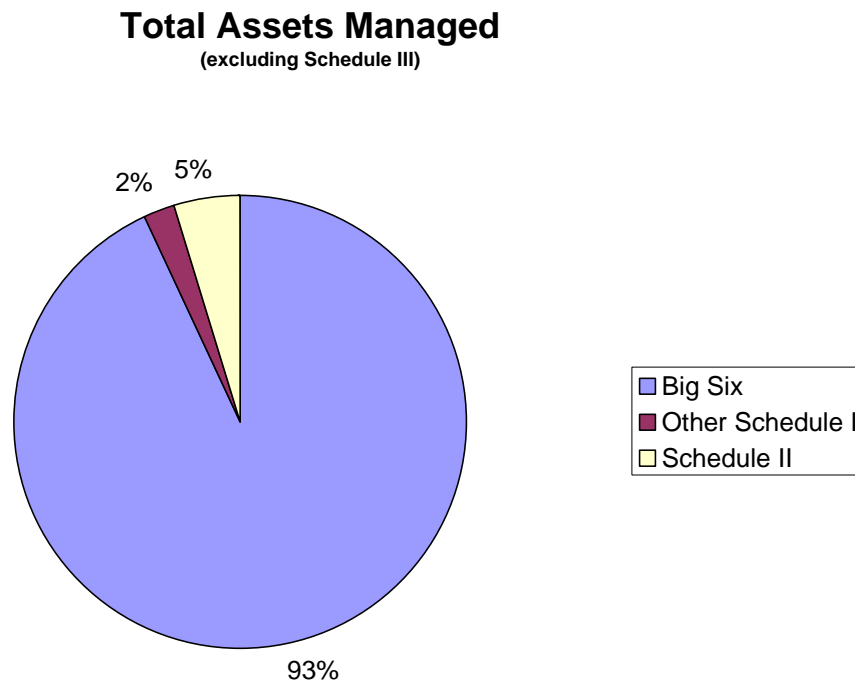
² All figures in Canadian dollars.



institution.³ In a survey published by the world economic forum in October 2008 Canada was found to have the world's soundest banking system.⁴

As of January 2009, there are approximately 76 chartered banks operating in Canada, which collectively hold the largest amount of assets and employ the largest amount of individuals among all financial intermediaries. These banks comprise of 21 domestic banks, 25 foreign subsidiaries and 23 full-service foreign bank branches and 7 foreign bank lending branches. In total, these institutions manage over \$3.0 trillion in assets. The banking industry in Canada is very concentrated when compared to other countries such as the United States.⁵ Based on OSFI data, the market share for the largest 8 firms is 97.3%. In the terms of assets managed, the Big Six, as they are referred to in Canada, account 93%, excluding the Schedule III banks (see Figure1).⁶

Figure 1: Concentration of Banking Industry in Canada (as of 1st Quarter, 2009)



Source: Quarterly Survey of Financial Statistics for Enterprises, Statistics Canada.

³ Source: Canadian Bankers Association (www.cba.ca)

⁴ Canadian Banks the soundest in the world: report. CTV.ca Thursday, October 9.

http://www.ctv.ca/servlet/ArticleNews/story/CTVNews/20081009/canadian_banks_081009/20081009?hub=TopStories

⁵ To put this in context, Canada has only 21 domestic banks, while according to the Federal Department of Industry and Commerce (FDIC), there were 8,430 FDIC-insured commercial banks in the United States as of August 22, 2008..

⁶ The Big Six are: BMO Bank of Montreal, CIBC (Canadian Imperial Bank of Commerce), National Bank of Canada, RBC Royal Bank, ScotiaBank (The Bank of Nova Scotia), and TD Bank Financial Group.



Within Canada the major domestic banks offer a full range of banking, investment and financial services. They have nation wide distribution networks. Along with this they are also active in the United States, Latin America, the Caribbean, and other parts of the world. There are many large international banks present in Canada operating through either through a subsidiary, representative office, or branch of the parent bank.

There are many factors within the Canadian banking industry that have created this successful environment. Some factors are; the high level of regulation (see section 3.2), the high level of capital, the industry concentration, and the low levels of risk taken on by the banks in Canada

Canadian banks are among the best capitalized in the world, exceeding the norms of the Bank for International Settlements by considerable margins. This high level of capital has provided a cushion against loan losses and allowed banks to continue lending. Recently, the banks have been strengthening their capital levels by raising new capital from investors in the marketplace. In the first quarter of 2009 banks increased their capital levels. The median Tier 1 ratio (i.e. ratio of a bank's core equity capital to its total assets) of the Big Six banks rose to 10.8 from 10 percent in the previous quarter.⁷

3.2 Special Conditions and Restrictions

Canadian banking has five primary regulators; again, *the Office of the Superintendent of Financial Institutions* (OSFI), the *Department Finance Canada*, the *Bank of Canada* and *Canada Deposit Insurance Corporation* (CDIC) for prudential regulation and *the Financial Consumer Agency of Canada* (FCAC) for consumer matters.⁸ Canada's *Bank Act* is reviewed and updated every five years to ensure the regulatory structure is keeping pace with change in the industry. For example a revision was made in 1997 allowing online virtual banks to exist within Canada.

In 2001 *Bill C-8* was an additional measure to keep up to date and amend banking in Canada by making significant changes to the structure of the financial services sector. It expanded access to the payments system and significantly blurred the distinctions between the different kinds of financial institutions. On the consumer side, a variety of consumer-protection measures were implemented, most notably the creation of the Financial Consumer Agency of Canada. *Bill C-8* also changed the ownership structure of financial institutions by allowing the creation of bank holding companies, and by instituting a new size-based ownership regime for banks and converted life insurance companies.

Chartered banks are governed by federal financial regulations set out under *the Bank Act*, which defines the three types of chartered banks (Schedule I, Schedule II and Schedule III banks). Schedule I banks are authorized to accept deposits which may be eligible for deposit insurance provided by the Canada Deposit Insurance Corporation. Schedule II banks differ from Schedule

⁷ The Tier I capital ratio is the ratio of a bank's core equity capital to its total assets, which is required to cover unexpected losses. In theory, the higher the ratio, the better a bank's ability to absorb or contend with unexpected losses.

⁸ In reality, the banking industry in Canada can have up to 33 separate regulatory agencies, depending on the jurisdiction in question and if the bank has international business activity.



I banks in that they are foreign bank subsidiaries controlled by foreign institutions. Schedule III banks are foreign bank branches that may not accept deposits of less than \$150,000.

Given the high degree of regulation and the scrutiny already placed on the banking sector, surveying the banks directly for pricing information is extremely difficult due to the high response burden. . The process for modifying the content of data currently collected is quite complicated and requires much consultation and approval at various stages. For example, data requests falling under the scope of data already regulated by FIC, must be presented to FIC for discussion, justification and approval.⁹ This process alone can take up to 2 years, depending on their schedule and agenda priorities. Data needs beyond the scope of FIC must be presented to and accepted by the *Canadian Bankers Association* (CBA) in order to be successful. The CBA advocates on behalf of all banks (domestic, foreign subsidiaries and foreign branches) operating in Canada. The CBA works with its members to provide analysis and advice and contributes to the development of public policy on banking and other financial services. With surveys already in place to measure turnover, SPPI-specific surveys will require solid grounds for approval and endorsement from this most-influential group

3.3 Record Keeping Practices

Banks have a large reporting burden for several reasons – they are heavily regulated by Canadian government, they are scrutinized by shareholders for performance, and special interest groups also want information on the activity of banks (consumer groups, small business organizations, etc.). As a result, banks have to keep up-to-date detailed information on their holdings and activities.

Although banks keep much of this data in large repositories of electronic , this information is not available to all users. Much of the financial data used within Statistics Canada for regulated financial institutions comes from reports these institutions provide the regulatory agencies - either the Bank of Canada or OSFI. Regulated banks use the same format to report to both OSFI and Statistics Canada. The difference between the two sets of reports resides in the fact that the data provided to Statistics Canada covers operations booked in Canada while OSFI is also interested in consolidated worldwide activities. Although Statistics Canada is very dependent on these administrative sources, it has few levers to influence the decisions on what data is collected. Although participation in *the Financial Information Committee* (FIC) is the main way to ensure access to information vital to its programs, Statistics Canada is limited to observer status only on this committee.

In the early stages of developing an SPPI for banking services, administrative data available through already established reporting procedures is used, namely OSFI and the Statistics Canada's own *Quarterly Survey of Financial Statistics for Enterprises* (QFS). As the data needs become refined and more detailed, the next step will be either approach the FIC and/or the CBA to make the case of increased data reporting from the banking industry.

⁹ FIC is a sub-committee of the *Financial Institutions Supervisory Committee* (FISC). FIC is responsible for all content specifications for the information reports to be filed by financial institutions. The committee consists of senior representatives of Finance Canada, OSFI, Canada Deposit Insurance Corporation and the Bank of Canada.



4. Standard Classification Structure and Detail Related to the Area

This 5-digit NAICS for Banking is further disaggregated into two 6-digit sub-groups, *NAICS 522111 - Personal and Commercial Banking Industry*, and *NAICS 522112 - Corporate and Institutional Banking Industry*. *NAICS 522111 - Personal and Commercial Banking Industry* comprises establishments primarily engaged in accepting deposits from, and issuing loans to, personal or small-and medium-sized businesses. Establishments of chartered banks, trust companies and deposit-accepting mortgage companies that are primarily engaged in these activities are included.

Meanwhile, *NAICS 522112 - Corporate and Institutional Banking Industry* comprises establishments primarily engaged in issuing loans to large businesses, governments or other large institutional clients, using funds primarily obtained from related personal and commercial banking establishments. Corporate and institutional banking provide deposit and other services to their clients. Establishments of chartered banks that are primarily engaged in issuing loans to the above-mentioned clients are included.

As mentioned, the main source of data for the SPPI is administrative. Currently, data is retrieved from a database administered and maintained by OSFI. The main variables used to price banking services are (presented in three groups):

Group A) Interest Variables

- Interest income from securities holdings
 - Deposits with regulated financial institutions
 - Securities issued or guaranteed by Canadian federal government provinces municipal or school corporations
 - Other Securities
- Interest income from loan assets
 - Non-mortgage loans
 - Individuals for non-business purposes
 - Others
 - Mortgages
 - Residential
 - Non-residential
- Other

Group B) Variables for Loan/deposit balances.

- Personal loans for non-business purposes
- Other non-mortgage loans
- Residential mortgage
- Non-residential mortgage
- Demand and notice deposits
- Fixed-term deposits

Group C) Explicit fees

- Explicit charges for total loans
- Explicit charges for total deposits

Data from the *Quarterly Survey of Financial Statistics for Enterprises* (QFS) administered by STC is also being assessed for adequacy. The main difference between the two sources is that the former (OSFI database) provides data on a booked-worldwide basis, while the latter (QFS) does for booked-in-Canada activity.

5. Evaluation of Standard vs. Definition and Market Conditions

When the banking SPPI is eventually published, key users of the banking SPPI will be the Canadian System of National Accounts (SNA), and policy departments. The SNA needs three deflators: one for the implicit fees (interest margins) of loans, including mortgages and non-mortgages; one for the implicit fees for deposits; and one for explicit service charges. These deflators should only *concern activities booked in Canada*.

Policy departments, such as Bank of Canada, Department of Finance and Industry Canada, need to have SPPIs by *product line* (e.g. mortgage loans, small business loans, deposits, brokerage services, investment banking, securitization, etc.) and *by type of financial firm* (Schedule I, II, III banks, Credit Unions, etc) to inform financial regulation and to conduct productivity research. As a result, they prefer SPPIs that cover banks' activities *worldwide*. Therefore, the issue of booked in Canada versus booked worldwide is an important consideration, resulting in the potential compilation of additional series.

On the product side, the implementation of the North American Product Classification System (NAPCS) will have to be addressed over the coming years, as Statistics Canada integrates NAPCS in all domains. Limited availability of product detail from the administrative data sources may hinder how deep into the product classification the SPPI can go. As well, the turnover program at Statistics Canada is still mainly enterprise-based, so the product detail needed for sampling and weighting is limited.

Producer Prices Division will also need to integrate banking SPPIs into the overall PPI to measure overall producer price trends at the five digit NAICS level. To meet these various requirements, detailed data sets and flexible approaches to calculation will be required. On this front, the existing classification structure (NAICS) used to produce the SPPI are consistent with the turnover surveys. Also, the sample source for the SPPI and turnover surveys is the same – STC's Business Register. As a result, sample comparison and clean up is easier to do between both surveys. Industry level estimates of price change and turnover will also be directly comparable.

6. National Accounts Concepts and Measurement Issues for the Area Related to GDP Measurement¹⁰

The Canadian System of National Accounts (CSNA) produces national annual constant dollar Input Output tables which provide the benchmark GDP values for the Monthly Industry GDP estimates at constant prices. These GDP benchmark also feed the productivity estimates.

The method of *double deflation* is used to derive constant price value-added by industry, which is the difference between deflated gross output and the sum of deflated intermediate inputs and net taxes on products.

The industry gross output of the banking industry at constant prices is derived as the sum of the deflated output for all commodities produced by the banking industry. The deflated industry output is the result of applying a wide range of deflators to all the relevant commodity output. Hence, the output deflator is critical in the estimation of the output at constant prices.

For the banking and other deposit credit intermediation industry, there are three major commodities, namely a) implicit charges, deposits, banking and other depository credit intermediation, b) implicit charges, loans, banking and other depository credit intermediation, and c) paid charges, banking and other depository credit intermediation, which contribute to 25%, 27% and 20% respectively of the current dollar industry output in 2005.

For intermediate inputs, a deflator is estimated for each commodity in the intermediate demand of an industry. The deflator is derived as a ratio of net domestic supply¹¹ of the commodity in current prices to the constant price net domestic supply of the same commodity. The industry estimate is a summation of commodity estimates at constant prices.

The formal steps used to obtain gross output and intermediate inputs in constant prices are presented in *APPENDIX B*.

From the Canadian SNA perspective, there are three main challenges or areas for improvement with regards to banking services:

1. upcoming changes to how current dollar estimates are produced and their compliance with SNA 2008,
2. choice of reference rates in current dollar estimates and the output deflators, and
3. quality adjustment of services provided by banking.

¹⁰ Estimation of Value-Added for Banking and Other Depository Credit Intermediation (5A0130) in the Input Output Framework prepared by Veronica S. Yei (IAD analyst) on November 13, 2008.

¹¹ Net domestic supply = Output + |imports| – exports – re-exports



7. Pricing Method(s) and Criteria for Choosing Various Pricing Methods

7.1 Concept of User Cost

In Canada, the user cost of money approach is used to define the pricing mechanism for banking services, where we specify a user cost equation for a unit of deposit and a unit of loan. The unit is measured in terms of base period dollars. For each unit of deposit with characteristic i , the user cost of a unit of deposit held for one period is given by

$$u_{di} = \frac{r_i(1-k) + s_{di} - r_{di}}{1 + r_i} \quad (1)$$

where for the group of deposits with characteristic i ,

- u_{di} = user cost of a unit (dollar) of a deposit (or asset),
- r_i = opportunity cost to financial intermediary of a unit of deposit,
- k = (non-interest bearing) reserve requirement per unit of deposit,
- s_{di} = (explicit) service fee received for a unit of deposit, and
- r_{di} = interest paid on a unit of deposit.

Multiplying (1) by the discount factor $1 + r_i$, we obtain the current period price of a unit of deposit, p_{di} , assuming the user cost is paid at the end of the period ($1 - k$ is dropped from the equation because there is no capital reserve requirement in Canada).

$$p_{di} = (r_i - r_{di}) + s_{di} \quad (2)$$

To find the user cost of a unit of loan (or liability), j ,

$$u_{lj} = \frac{r_{lj} + s_{lj} + c_j - (r_j + \pi_j)}{1 + r_j} \quad (3)$$

where for the group of assets (loans) with characteristic j ,

- u_{lj} = user cost of a unit (dollar) of a loan,
- r_{lj} = interest received/charged on a unit of loan,
- s_{lj} = (explicit) service fee for a unit of loan,
- c_j = capital gain to financial intermediary from a unit of loan,
- r_j = opportunity cost to financial intermediary of a unit of loan,
- π_j = provision for loan losses.

We multiply Equation (2) by the discount factor $1 + r_j$ to obtain the current period price of a unit of loan, p_{lj} .

$$p_{lj} = (r_{lj} - r_j) + s_{lj} + c_j - \pi_j \quad (4)$$

Note that r_i and r_j are also known as “reference rates”. When the SNA uses the GDP approach to measure output, capital gains are excluded from GDP. We therefore exclude the capital gains term (c_j) in our methodology in order to be consistent with the SNA.¹² It is also argued that when the banks set up prices, loan loss provisions are already factored in and reflected by the spread we are measuring, then π_j should only contain unexpected loan losses. Since it is not possible for us to distinguish the expected and unexpected portion of such loan losses given only information on aggregated explicit charge for loan impairment, we also drop π_j from the above equation. Therefore, the loan price becomes:

$$p_{lj} = (r_{lj} - r_j) + s_j$$

Finally, we must account for the change in the real value of a dollar asset and discount the asset balance by an appropriate discount factor for producers. This discount rate can be the same reference rate used to calculate the margin, or, some universal short-term risk-free rate such as three-month T-Bill rate.

7.2 Calculating the Price

In order to calculate a price, we take the three-month average of monthly loan/deposit balances to match the interest income/expenditure reported in quarterly income statements - note that the loan balances reported on balance sheets are net of allowance for impairment. Since the price for banking service is reflected both in implicit charges (interest) and explicit charges (fees), ideally, we need data on both at all disaggregated levels. However, the OSFI returns only provide fees for aggregate loans and deposits, which limits our ability to calculate explicit prices for lower level product lines. Based on the information provided, we are however able to calculate the quarterly prices for the product lines listed in Table 1 of Section 2.

In our experimental work, we use the following reference rates: 3-month T-Bill rate, Bank of Canada target rate, 3-month corporate paper rate, 90-day term deposit rate, 1-year GIC rate, 3-year GIC rate, 5-year GIC rate, 2-year government bond rate, 5-year government bond rate, consumer loan rate, LIBOR (London Inter-bank Offered Rate), and securities rate. LIBOR rates are downloaded from the British Bankers’ Association. The securities rate is calculated as the rate of return for the securities portfolio held by a bank. A bank’s liabilities are usually of shorter term than its loans. The securities portfolio can balance the maturity difference and help satisfy uncertain liabilities and meet demand for new loans. Banks should be indifferent at the margin between putting an extra dollar into loans and the securities portfolio, thus the yield on the securities portfolio provides a good proxy for the opportunity cost of banks’ funds.¹³ The

¹² Besides, the unrealized capital gains may fluctuate as prevailing interest rates change, adding extra volatility into the prices.

¹³ The securities portfolio here includes assets such as deposits with other financial institutions, government notes and other securities, which may have some risk exposure. See Appendix I for details of how the securities rate is calculated.

duration of securities portfolio is determined by the bank’s need to manage interest rate risk and earn a positive spread. All the other rates are obtained from CANSIM.

The Voorburg Group *Quality Assurance Framework* is used as a guide for the evaluation of the banking services SPPI. These results classify the design of the survey as “*Best*,” “*Good*,” or “*Poor*” regarding an accurate price collection (see Table 2).

Table 2: Point Ranges

Category A (“Best”)	<ul style="list-style-type: none"> ▪ True transaction price ▪ 100% quality change accounted for ▪ Frequency correlates directly with price change ▪ Robust sample (excellent size and representation)
Category B (“Good”)	<ul style="list-style-type: none"> ▪ Good proxy for transaction price ▪ Significant quality change accounted for ▪ Frequency correlates closely with price change ▪ Semi-robust sample (fair size and representation)
Category C (“Poor”)	<ul style="list-style-type: none"> ▪ No relation to transaction price ▪ No significant quality change accounted for ▪ Frequency does not correlate with price change ▪ Weak sample (poor size and representation)

After assessing the banking services SPPI, it was determined that it ranked as a *Category B* which is quite satisfactory given the fact that list prices from an online price schedule are being used. See Appendix A, Table 3: *PPI Quality Assessment Framework* for the complete assessment.

8. Quality Adjustment Methodology(s)

As part of the development of a banking services SPPI, addressing the challenge of quality change for banking services is paramount. Innovations such as ATMs, internet banking, extended hours, and debit and credit cards have increased consumer access to credit and other banking services, while lowering operating costs for banks. There are also analogous quality improvements for the commercial side as well. Research is under way to explore the question of how to evaluate quality change from a practical and quantifiable perspective.

9. Evaluation of Comparability with Turnover/Output Measures

The level of comparability between the SPPI and turnover data is high. First, both survey programs use the same industry classification system (NAICS, and then eventually NAPCS). Second, the SPPI sample overlaps almost exactly the sample for the turnover survey, the Quarterly Survey of Financial Statistics (QFS), so the same units are defined and covered. This frame ultimately is derived from the Business Register. Coherence analysis is conducted between the SPPI and the QFS to ensure both series are providing reasonable trends. When outliers or anomalies are found (mostly in the sample), they are confronted and discussed with the QFS analysts.



10. Summary

Developing an SPPI for the banking services in Canada has proved to be a challenging undertaking. Development is nearing completion. Conceptually, several questions still remain that must be answered before producing a robust and accurate price index.

- 1) *What is the appropriate choice of a reference rate for risky loan assets? Should it be the risk free rate or should it comprise rates containing some risk premium, such as the securities rate?* We feel that the risk free rate is more appropriate than a securities rate, primarily because it is consistent with the SNA definition, which argues for using a risk free reference rate. Additionally, the securities rate calculated from banks' financial statements is prone to bias due to timing and other accounting anomalies. However, given that the choice of reference rates yields highly different indexes, we feel this issue merits further consideration.
- 2) *What is the appropriate choice of reference rate for fixed-term deposits? Would the medium-term risk free government bond rates be more suitable than the securities rate?* Again, we prefer the risk free rate with matched maturity as the reference rate for fixed-term deposits.
- 3) *The experimental banking SPPIs calculated to date exhibit a great deal of volatility. This effect can make trends in our indexes more difficult to identify. Does it make sense to smooth the series, and if so, how?* A portion of this volatility can be attributed to accounting practices and discrepancies, which result in timing differences and measurement issues for the variables used to construct the index. Also, seasonal effects and other irregularities can cause fluctuations in the series. One way to address such concerns is to apply various data smoothing techniques. Such an approach may help us improve our capture of cyclical and secular movements in our indexes.
- 4) *Key players and products lines have been quite stable throughout the period under review. We are considering updating the basket (product lines and their weights) every 5 years. Is this sufficient for this industry?* Current convention is to update our basket every 5 years (this is a target). However, is this optimal in order to maintain a series that is relevant and representative for this industry? Are more frequent updates needed?



APPENDIX A:

Table 3: PPI Quality Assessment Framework

Points	Category and Questions	Score
	1. Shipment Price (Weight = .10)	
	<i>Select a. or b.</i>	
0	a. Price represents order pricing, actual price at shipment may well be different.	
100	b. Price represents the completion of service or a proxy measure for the completed transaction.	X
	2. Representative of current period production (Weight = .10)	
	<i>Select a. or b.</i>	
50	a. Emergence of new product lines or critical new product features has not occurred since the index reference period or since sample augmentation last done.	X
0	b. Emergence of new product lines or critical new product features has occurred since the index reference period or since sample augmentation last done.	
	<i>Select c. or d.</i>	
50	c. Product substitution usually occurs when an item becomes obsolete or, if model pricing applies, the models are regularly updated to reflect changes.	X
0	d. Product substitution usually does not occur when an item becomes obsolete or, if model pricing applies, the models are not regularly updated to reflect changes.	
	3. Transaction price (Weight = .25)	
	<i>Select the one most prevalent in the industry</i>	
100	a. The price is the real transaction price or a list price that can always be assumed to be equal to the transaction price.	
50	b. The price is a list price not equal to the transaction price.	
100	c. The price is a unit value for a homogeneous group of products.	X
50	d. The price is a unit value for a non-homogeneous group of products.	
75	e. The price is a model price.	
50	f. The price is constructed from input cost plus profit and overhead mark-up.	
	4. Output price (Weight = .25)	
	<i>Select the one most prevalent in the industry</i>	
100	a. Recorded price reflects an actual transaction or average of actual transactions.	X



75	b. Recorded price reflects a model transaction incorporating the pricing of all features found in an actual transaction.	
50	c. Recorded price reflects a model transaction incorporating the pricing of only some of the features found in an actual transaction.	
50	d. Recorded price reflects some components of a transaction.	
50	e. Recorded price reflects input costs plus overhead and profit margins incorporating the pricing of all features found in an actual transaction.	
25	f. Recorded price reflects input costs plus overhead and profit margins incorporating the pricing of some of the features found in an actual transaction.	
0	g. Recorded price reflects charge out rates for fixed labor inputs not directly tied to a specific quantity of output.	
	5. Timely measure (Weight = .10)	
	<i>Select a. or b.</i>	
50	a. Pricing data reflect the service provision in the current period and are not lagged.	X
0	b. Pricing data are lagged.	
	<i>Select c., d., or e.</i>	
50	c. Pricing data reflect an average over the entire period.	X
40	d. Pricing data reflect an average of multiple measurements over a portion of the period.	
25	e. Pricing data reflect a single point in time.	
	6. Constant quality maintained (Weight = .20)	
	<i>Select a. or b.</i>	
100	a. Rapid changes to product specification are not expected or, if they are, a good method to explicitly quality adjust is in use.	
0	b. Rapid changes to product specification are expected and no explicit quality adjustment method is in use.	X
	Total =	80
	Type A point range = over 90	
	Type B point range = 70 to 90	X
	Type C point range = less than 70	



APPENDIX B:

Overview of SNA Methodology for Constant Price Estimates of Bank Output

The following depicts the current methodology (in the absence of actual deflators) for obtaining the output deflators for the three major commodities – *Deposits, Loans and Paid Charges*.

i.) Implicit Charges, Deposits, Banking and Other Depository Credit Intermediation

1. The output deflator of implicit charges, deposits, banking and depository credit intermediation is an implicit price index, where the current dollar estimates of the commodity output (C_t), produced by Industry Accounts Division, is divided by the projected constant price estimates (K_t)

$$IPI_t = \frac{C_t}{K_t} \times 100$$

2. The constant price estimates (K_t) is projected from the value of the base year by the growth of the volume projector (Q_t/Q_0)
3. The volume projector (Q_t) is indeed in dollar value, which is calculated by applying the interest margin of the base year to the sum of average annual balances in real terms at t. (see equation below)
4. The average balances for liabilities in nominal terms (AB_t) are deflated using all-items CPI, and the interest margin is the difference between the effective and reference interest rate at the base period
5. The average liability balances cover categories on demand deposits, notice deposits, fixed term deposits, sub-ordinated debt and other interest-bearing liability
6. Effective interest rate (ER_t) is the total interest expenses divided by the total liability balances.
7. The reference rate (RR_t), which is the pure cost of borrowing funds, is a rate from which the risk premium has been eliminated to the greatest extent possible and which does not include any intermediation services. In the input-output framework, the reference rate is the geometric mean of a number of monthly rates¹⁴ reported by Bank of Canada.
8. In summary, the volume projector Q_t :

$$Q_t = (RR_0 - ER_0) \times \left(\frac{AB_t}{CPI_t} \right)$$

ii.) Implicit Charges, Loans, Banking and Depository Credit Intermediation

¹⁴ The reference rate is a geometric mean of T-bill rate for 1, 3, and 6 months, bond yield for 1, 2, 3, and 5 years, reported monthly by Bank of Canada. This period covers the time span where most financial intermediation decisions are made



1. The output deflator of implicit charges on loans is an implicit price index, where the current dollar estimates of the commodity output (C_t), produced by Industry Accounts Division, is divided by the projected constant price estimates (K_t)

$$IPI_t = \frac{C_t}{K_t} \times 100$$

2. The constant price estimates (K_t) is projected from the value of the base year by the growth of the volume projector (Q_t/Q_0), in a very similar fashion as that of the implicit charges for deposits
3. The volume projector (Q_t) is indeed in dollar value, which is calculated by applying the interest margin of the base year to the sum of average annual balances in real terms at t .
4. The average balances for loans (i.e., bank assets) in nominal terms (AB_t) are deflated by the purchasing power of money, where the all-items CPI is utilized, and the interest margin is the difference between the effective and reference interest rate at the base period
5. The average annual balances on bank assets cover mortgages, personal loans, other loans for business purposes, loans to government and financial institutions, securities¹⁵, and other interest-earning assets, etc.
6. The effective interest rate (ER_t) for bank assets is the total reported interest income divided by the total asset balances, both obtained from Industrial Organization and Finances Division (IOFD) via Income and Expenditure Accounts Division (IEAD).
7. The reference rate (RR_t) used is the same as that in the implicit charges on deposits, which is the pure cost of borrowing funds. It is the rate from which the risk premium has been eliminated to the greatest extent possible and which does not include any intermediation services. In the input-output framework, the reference rate is the geometric mean of a number of monthly rates¹⁶ reported by Bank of Canada. The reference rate used for this commodity is the same as that of the commodity for implicit charges on deposits
8. In summary, the volume projector Q_t :

$$Q_t = (ER_0 - RR_0) \times \left(\frac{AB_t}{CPI_t} \right)$$

iii.) Paid Charges, Banking and Depository Credit Intermediation

¹⁵ Security covers those issued or guaranteed by provinces, municipal, or school corporations

¹⁶ The reference rate is a geometric mean of T-bill rate for 1, 3, and 6 months, bond yield for 1, 2, 3, and 5 years, reported monthly by Bank of Canada. This period covers the time span where most financial intermediation decisions are made



1. The output deflator of paid charges is an implicit price index (IPI), where the current dollar estimates of the commodity output $[(\sum_{i=1}^2 C_{it}) + CATB_t]$ is divided by the projected

constant price estimates $[(\sum_{i=1}^2 K_{it}) + KATB_t]$.

$$IPI_t = \frac{(\sum_{i=1}^2 C_{it}) + CATB_t}{(\sum_{i=1}^2 K_{it}) + KATB_t} \times 100$$

2. Paid charges (i.e., non-interest income) cover items charged by depository taking intermediaries (DTI) as well as Alberta Treasury Branches (ATB).
 - a. For DTI, the items are further sub-divided into two groups, namely charges related to assets or liability¹⁷ and charges not related to assets or liability¹⁸.
 - b. For ATB, only three items are covered – service charge, credit fees and foreign exchange.
3. a. To project the constant price estimates for items from DTI, we estimate each item in the two categories:
 - 1) For the first group¹⁹, the constant price estimates of each item is projected from the base year using the movement of the projector which is the corresponding current dollar assets or liability balances deflated by all-items CPI.
 - 2) For items in the second group, however, a proxy is used to calculate the IPI for each item, where the total current dollar estimates of group 1 is divided by its projected constant price estimates. Then, this IPI is applied to each item in group 2 in order to obtain the constant price estimates.
- b. To project the constant price estimates for items from Alberta Treasury Branch, the projector being used is the CPI-deflated ATB deposits.

¹⁷ From RY0506, Group 1 paid charges cover charges on retail deposit accounts, commercial deposit accounts, standby commitment and other loans, mortgage fees, and acceptance fees.

¹⁸ From RY0506, Group 2 paid charges cover charges on other payment services, guarantees and letter of credit, investment management and custodial services, other commission fees and foreign exchange revenue other than trading

¹⁹ For paid charges of retail deposits accounts, we adopted the CPI – financial starting from RY0405