MEASUREMENT PROBLEMS IN THE CHANGING PATTERN OF INTERNATIONAL TRANSACTIONS, WITH PARTICULAR REFERENCE TO CANADIAN EXPERIENCE

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Canada

The unsolved problems of measurement of international transactions may have consequences which are serious both for policymakers and for those undertaking research. Emphasis is placed on the need for users of data to understand and take into account the limitations and qualifications attached to them.

The causes of deterioration in the quality of estimates of international transactions likely lie in their changing pattern. After a brief discussion of the basic sources and methods used, the paper selects for comment possible measurement problems related to inflation, taxation, illegal transactions, and affluence.

A description follows of the improvement to data which has been achieved through exchanges and comparisons between trading partner countries. Efforts to use econometric analysis to point to error sources have, however, proved less rewarding.

The paper concludes with a section on the linkage of flow and stock estimates.

PART I. THE SETTING

The consequences of unsolved problems of measurement of international transactions are of more than academic concern. They may well impact on the measurement of Gross National or Domestic Product and so contribute to inappropriate policy settings for the domestic economy—or, perhaps, provide a scapegoat for them. They may come into play in the establishment of policy prescriptions with respect to external payments, evidenced several times in relationships between Canada and the United States over the past ten or fifteen years. And, in less pressing times, they may have militated against efforts to create a viable international payments system, as nations strove for the impossible dream—adjustment globally to balance of payments positions which were statistical fictions.

Scholarly research may also be impeded by measurement problems. Statisticians are acutely aware that many econometric studies are developed technically to a far greater degree than is warranted by the quality of the data inputted to them. Indeed the capacity of data banks and the power of the computer to exploit them have tended to make less accessible basic knowledge of input limitations. The almost inevitable obscuring of qualifications may contribute to a spurious appearance of consistency and quality. Accurate perceptions of what is going on often require detailed knowledge of specific transactions and their motivations.

With this plea by statisticians that if their progeny are to serve useful and productive lives they—the progeny, that is—should not be stripped of the qualifications which necessarily surround them, and exposed naked (but not necessarily revealed) to users, we thought it might be helpful for us to discuss some

aspects of problems in the measurement of the changing pattern of international transactions, with particular reference to Canadian experience.[1]

That there are measurement problems needs no documentation. For the last 14 years, errors and omissions in Canadian balance of payments estimates have without exception reflected (on an annual basis) the net overestimation of receipts or the underestimation of payments, but in nine of the ten preceding years, with one exception, the net error lay in the opposite direction. The data may be expressed as a percentage of gross current account credits and debits as a convenient yardstick of their relative size, as shown in Statement 1. Recognizing the limitation of using such numbers as an indicator of the accuracy of the estimates, the impression of accelerating deterioration remains. It is not likely unique to Canada.

STATEMENT 1

ANNUAL NET ERRORS AND OMISSIONS IN THE CANADIAN BALANCE OF PAYMENTS EXPRESSED AS A PERCENTAGE OF GROSS CURRENT ACCOUNT CREDITS AND DEBITS

		Errors and Omissions		
Period	Years	Net (Percent)	Annual Credits (Percent)	Annual Debits (Percent)
1946–51	6	0.40	0.41	0.01
1952–54	3	1.85	0	1.85
1955–64	10	0.60	0.69	0.09
1965–75	11	1.47	0	1.47
1976–78	3	2.40	0	2.40

Thus, for example, during the ten year period ending with 1964 referred to in the preceding paragraph, net errors and omissions of almost Canadian $1 billion were equivalent to 0.6 percent of gross current account transactions. Balances in the nine years in which the unrecorded items constituted credits (on an annual basis) were equivalent to 0.69 percent, and the debit balance in the other year provided an offset of 0.09 percent.

There is a presumption not, unfortunately, subject to substantiation that the competence of balance of payments statisticians has not declined and a hope, at least, that any reduction in resources devoted to the field has been more than offset by productivity gains. The inference is that the likely cause of increasing problems of measurement lies in the changing pattern of international transactions.

While the purpose of this paper is to illustrate some of the measurement problems associated with these changing patterns, it should be recognized that this measurement takes place in a statistical environment which is itself changing. Reaction against the burden of paperwork and against intrusion into corporate

[1]Those who have read carefully the title of this paper will have noted that its modest objective rules out questions which relate to the formats and frameworks most appropriate for analysis of the several components of the system of national accounts.

and personal privacy, as well sometimes as a threat to statistical sources arising from the freedom of information movement, are all part of this environment. So, too, are the resource constraints which many government agencies face. In addition some governments have been known to design transactions in such a way as to lead, under normal procedures, in the direction of desired statistical outcomes. Whether one views these factors as positive or negative, they are nonetheless part of the statistical environment.

Before turning to specifics, it may be helpful to review briefly the principal data sources and methods employed. The materials out of which the balance of payments statistician constructs his estimates vary greatly in quality.

Some of the inputs to balance of payments statistics are derived from highly organized data systems originating in administrative needs. The best known and largest example is the statistics of commodity trade, but many other elements of the balance of payments are also dependent in whole or in part on administrative records. The statistical exploitation of such records is sometimes the only possible source of data and may in any event offer considerable economies to both the statistical agency and respondents. At the same time the data may suffer for statistical purposes because they have been designed to meet other needs whose criteria may not be totally relevant to the uses to which they must be adapted.

When administrative records have been effectively exploited, recourse is next made to statistical surveys, sometimes designed as parts of other statistical frames and sometimes specifically to fill gaps in balance of payments series. Statistical information is sought from many types of respondents including corporations, government agencies and departments, stock exchanges, banks, insurance companies and other financial institutions, and individual persons. Most of them are residents, but assistance is sought, and obtained voluntarily, from hundreds of others, resident elsewhere, either because it has proved impractical or uneconomic to identify fully Canadian parties to transactions with them or because of their possible impact on statistical series for Canada compiled in other countries. Canada tends more than most countries to exploit the data sources of its trading partners.

The combination of administrative records and statistical surveys cannot alone cover the full gamut of international transactions. "Measure what is measurable and make measurable what is not measurable" said Galileo Galilei. It is here where the ingenuity of the balance of payments statistician is called upon. He or she must be an assiduous reader of current chronicles, exploring the minutiae of available data, identifying overlaps and gaps, and contriving, as best as may be done, their remedies. This involves the tapping of whatever expert knowledge may be available, the identification and development of new data sources and indicators, analysis, understanding and intuition. The statistician must recognize that the failure to make an estimate is in effect an assumption that no transaction occurred. He or she must eschew the temptation to pour an ever increasing proportion of his resources into the refinement and extension of the known, at the expense of the unknown.

This brief description probably applies to the construction of balance of payments estimates in most countries. In some, however, exchange controls or their vestigial remains, the exchange ticket system, are also used.

When all the sources have been exploited and inter-related, the balance of payments statistician analyses, evaluates, and, where appropriate, modifies the results in the light of the times and conditions at home and abroad, and of his own experience. At its best, the balance of payments must be a hand-crafted product. "To protect yourself against overgeneralization," said Marion Harper Jr., "fondle enough of the building blocks so that your insight into the problem is personal."[2] It is to some of these building blocks that we address ourselves.

PART II. SOME SOURCES OF PROBLEMS AND THEIR EFFECTS

The problems experienced in constructing balance of payment estimates are many and varied. Their mix and causes reflect a changing society. For purposes of this paper four factors underlying the changing pattern of international transactions have been selected and some topical examples of associated measurement problems are described.

1. *Inflation Related Transactions*

Included under this grouping are impacts on exchange rates, interest rates, gold transactions, and hot money.

(a) *Exchange Rates*

Although, as will be illustrated later, inputs to measurements of Canada's flows and stocks vis-a-vis the rest of the world are frequently derived independently, some items can be obtained in only one or other of the forms. This is particularly the case for many types of capital movements in short-term forms, which can usually be derived only from stock or census data.

An exception in the case of Canada, which is unusual internationally, rests in the case of short-term money market instruments, where a system of recording flows has been established. As shown in Statement 2 the net movements are but the tip of the iceberg.

STATEMENT 2

INTERNATIONAL FLOWS OF CANADIAN MONEY MARKET INSTRUMENTS

	Gross Flows	Net Movements
	(Millions of dollars)	
1976	20,044	974
1977	28,101	425
1978	41,308	−24

The derivation of a flow series from a stock series may be simply a matter of finding the differences between stock levels at two points in time. On the

[2] *What is Marion Harper Saying?* Fortune, January 1961.

other hand, this may lead to quite perverse results. To derive a flow series in respect of changes in banking assets and liabilities taking the form of foreign currency denominated claims, one must know (or assume) the exchange rates employed in determining the balance sheet stocks at each point in time, the effective average exchange rate applicable to the transactions contributing to the change in stocks, and the amounts of losses and any recoveries taken into account between the two stock dates.

But the problems encountered in using banking data may be simple relative to other stock series. While banking data are likely to readily distinguish between items denominated in domestic and in foreign currencies, many other estimates of balance of payments flows are derived from company records and reports where this is not the case. If the balances reported include items denominated in other currencies, the change in these balances will rarely represent an appropriate measure of the flow—the value in domestic currency of the flows contributing to the change in the reported balances. In a world of relatively fixed exchange rates this problem could be largely ignored, except for formal devaluations. Since August 1971, however, the volatility of exchange rates has called for extra care to ensure that unrealized exchange rate gains or losses are not included in estimates of balance of payments flows.

Necessity for corrections when moving between stocks and flows is not, of course, confined to foreign currency items, as domestic currency data may also be affected by valuation changes. The problems are not dissimilar from those associated with the estimation of inventory changes.

A case in point relates to the measurement of capital movements occasioned by changes in the chartered banks' net foreign currency position with non-residents. As shown in Statement 3 the arithmetic change ($504 million) in the value of the banks' net foreign currency position with non-residents in 1969 differed by only $2 million from the valuation of that change (i.e. after eliminating exchange rate effects). In 1977, however, the difference was $217 million.

STATEMENT 3

CANADIAN CHARTERED BANKS FOREIGN CURRENCY ASSETS AND LIABILITIES

	Assets	Liabilities	Net Assets
	(Millions of dollars)		
December 31, 1969	6,751	4,645	2,106
December 31, 1968	4,549	2,947	1,602
Change in balance	+2,202	+1,698	+504
Balance of payments flow	+2,210	+1,704	+506
December 31, 1977	19,388	18,267	1,121
December 31, 1976	16,934	14,646	2,288
Change in balance	+2,454	+3,621	−1,167
Balance of payments flow	+807	+2,191	−1,384

In 1969 there was virtually no movement in the external value of the Canadian dollar while in 1977 in a floating exchange rate situation, there was a fall of almost 8 percent vis-a-vis the United States dollar.

(b) *Interest Rates*

High rates of inflation are accompanied by high interest rates. While some sectors of the economy are squeezed, other sectors become highly liquid. The combination of high interest rates and liquidity has led to increased activity in the financial markets and to the emergence of new financing techniques to satisfy specialized needs.

High and volatile interest rates aggravate measurement problems in the balance of payments in that many income flows cannot be measured directly but rather are calculated by applying an average interest rate to a balance outstanding at a particular point in time. This treatment is followed in Canada, for example, in the case of bank claims on and liabilities to non-residents, and of money market instruments held by non-residents. If institutional factors dictate interest rates that differ from the averages used as representative, errors in the estimates will result. The high level of interest rates will compound the absolute error.

A brief description of the estimation of interest payments to non-residents on Canadian money market instruments will illustrate some of the potential difficulties. Statement 4 shows quarterly data for 1975 and 1978, including gross sales to non-residents and repurchases (including maturities) from them, the

STATEMENT 4

INTEREST PAYMENTS ON CANADIAN MONEY MARKET INSTRUMENTS

	1975				
	IQ	IIQ	IIIQ	IVQ	Year
	(Millions of dollars)				
Holdings at end of period	1,223	1,288	1,193	1,282	1,282
Gross sales in period	2,477	2,260	1,790	1,556	8,083
Gross purchases in period	2,146	2,195	1,885	1,470	7,696
Interest rate (percent) (average in period)	7.39	7.24	8.03	8.94	7.90
Interest paid to non-residents (net of withholding tax where applicable)	34	35	38	42	149

	1978				
	IQ	IIQ	IIIQ	IVQ	Year
	(Millions of dollars)				
Holdings at end of period	2,561	2,632	2,596	2,798	2,798
Gross sales in period	4,596	4,809	5,136	6,101	20,642
Gross purchases in period	4,723	4,768	5,190	5,985	20,666
Interest rate (percent) (average in period)	7.27	8.00	8.84	9.98	8.52
Interest paid to non-residents (net of witholding tax where applicable)	59	65	69	90	283

balances held by non-residents at the end of each period, the interest rates used and the estimate of interest paid.

Interest rates in respect of commercial paper are applied in the Canadian data to all paper except treasury bills, for which separate rates are available. The average of weekly rates during the quarter is applied to the average of month end holdings in the quarter. To the result is added a further amount to represent interest payments on money market paper held for less than a month—the normal investment period is about 12 days. Withholding tax is deducted where applicable.

Given the very large and growing flows involved, minor errors in the assumptions can materially alter the estimates. Similar problems arise in respect of banking data.

(c) *Gold*

With the decline in the external (and internal) value of some major international currencies, particularly the United States dollar, the price of gold has soared in the past few years. This has been fuelled by and has occasioned large-scale international transactions.

Gold, however, is a commodity unlike any other. While there are transactions related to its industrial use, the bulk of transactions occur because of gold's perceived investment qualities as a store of value.

Balance of payments concepts require that merchandise transactions should be recorded when there is a change of ownership. For most commodities, import and export data are obtained from customs documents, i.e. when the goods cross a customs and/or national frontier. In the case of gold, however, there are numerous transactions where gold is held and traded by investors outside their own countries. This necessitates the development of special arrangements to measure gold transactions on a change of ownership basis, with horrendous measurement problems.

(d) *Hot Money*

At times of political and economic uncertainty investors seek to protect themselves, to the extent possible, by shifting their funds to the most secure location and currency. Current exchange rate arrangements coupled with inflation and the political uncertainties, especially those in the Middle East, and the fourfold increase in the price of crude petroleum in late 1973, have produced a very unstable situation in which there have been massive capital flows between currencies. The problems of trying to capture these movements statistically are as at least as enormous as those of attempting to control them.

2. *Taxation*

Not entirely dissociated from inflation, high levels of taxation also face the balance of payments statistician with problems. Inducements arise for companies (or individuals) to either locate in a particular place or organize their affairs in a specific fashion to avoid or evade taxes. For example, a company which imports oil may establish in a tax haven country a subsidiary which itself buys oil from an oil

producing country, transports it and sells it to its parent company. The selling price may be set to maximize profits in the tax haven and minimize them in the home country. The statistician has to identify such situations and then decide whether the earnings of the subsidiary are investment income, a reduction of import costs, or a mixture of both.

Another problem associated with tax havens relates to the bilateral distribution of investment flows. How, for example, should flows between a parent company and a subsidiary set up in a tax haven to hold its investments in operating subsidiaries in third countries be classified? If there is only one operating subsidiary in a third country it becomes easy to look through the holding company and attribute the transactions to the country in which the operating company is located. The problem becomes more difficult if there are operating subsidiaries in more than one country.

3. *Illegal Activities*

The simple recognition that there can be international transactions which are illegal—for either one or both of the parties to them—avoids the necessity within the context of this paper of arguing as to the propriety or impropriety of reflecting them within the system of national accounts. Whether a growth in illegal activities is an element of the changing pattern of international transactions is difficult to establish.

While conventional wisdom would suggest that the wickedness of the world does contribute to current problems of measurement, fraudulent activities are not new. One cannot help wondering how successfully balance of payments statisticians would have fared in unscrambling the international statistical complications of Robert Harley and the South Seas Company or of Ivan Kreuger and Kreuger and Toll.

One is hesitant to make specific pronouncements in respect of more current examples of venality, but a number of scandals involving corporate fraud and theft with international implications have occupied the attention of Canadian media, legislatures and courts in recent years. It would probably be fair to say in respect of them that the relevant transactions were not often captured in the ordinary operation of the statistical system. Where possible their effects have been reconstructed and included in the estimates as information emerged from subsequent investigations. But there remain great holes.

(a) *Fraud and Theft*

The deliberate theft of assets by a company's management or by others is unlikely to be caught in the normal reporting system. To take a specific situation, one cannot help wonder how fully the transactions related to IOS were covered statistically in the countries involved. Some of the principal companies were incorporated in, although not resident in, Canada. So far as we can discover, Canadians were not important parties to the transactions of IOS, although some statistical returns have shown large amounts which are assumed to be related to the activities of the Receiver.

(b) *Bribery and Questionable Commission Payments*

Considerable attention has been given in the press in recent years to the practice of some companies of paying what, in effect, may be bribes in order to win orders. It is, of course, possible that such payments may be legal in one country but not in another. In some circumstances it might be difficult to distinguish between a bribe and a legitimate payment of commission. The recipients of such payments, if they are acting on a personal basis, as they very often appear to be, would probably evade the normal statistical reporting system.

On the payments side, if the payer feels that there is any sensitivity about the payment it is possible that he would omit such payments from any statistical reports he might make. If companies agree to abide by a new international code of behaviour which prohibits such payments, the problem will be reduced in size, but probably not be altogether eliminated.

The searching out of such payments by Canadian firms has generally revealed that they had been included in reported payments, although respondents had not usually gone out of their way to describe them!

(c) *Lotteries*

For many years the conduct of lotteries on any significant scale was an offence under the Criminal Code in Canada. This effectively precluded a good deal of domestic enterprise and, notwithstanding legal harassment, there was major Canadian participation in the Irish Hospital Sweepstakes. Estimates of the illegal flows were constructed on the basis of published lists of prize winners. But by no means all such activities are so well advertised.

(d) *Organized Crime*

The size of organized crime in Canada is unknown. Nevertheless, many observers feel that it is a big business which operates, of course, outside the scope of the normal statistical system. There is also some evidence that, as in many other sectors of our economy, the Canadian activity is really a branch operation of United States organizations. Within the system we are undoubtedly missing flows of income, management fees, commissions and for technical know-how. We have no immediate hopes of plugging this gap in our system.

(e) *Smuggling*

Perhaps the earliest illegal activity occasioning problems in the measurement of international transactions was the continuing propensity of the public to avoid payment of customs and excise duties. Smuggling has, at times, loomed large in the balance of payments.

During the period of the Noble Experiment, trade statistics in the United States understandably reflected no imports of alcoholic beverages. But for part of the period significant exports to the United States appeared in Canadian data. Later these exports disappeared, but fortuitously a ready market for the product appears to have developed on the islands of St. Pierre and Miquelon, a French possession of just under 100 square miles conveniently located just off the coast of

Newfoundland. With a population of just a few thousand, St. Pierre and Miquelon became Canada's ninth largest export market. In the interests of realism, appropriate adjustments were made to the balance of payments estimates of both Canada and the United States.

At a later time, taxes in Canada were increased on tobacco so immoderately as to cause a sharp drop in consumption of the tax paid variety—accompanied by seizures on a significant scale of wholesale quantities of tobacco products imported illegally. In response, estimates of smuggled tobacco were incorporated in the import series. (In due course the taxes were reduced.)

Apart from such cases of wholesale smuggling, it is reasonable to suppose that over the years the stream of Canadian travellers returning home carry in their baggage occasional purchases abroad which are not declared. Returning Canadians now number about 40 million a year, against a total population of 23 million. It has generally been assumed, perhaps somewhat sanguinely, by the statisticians that any "retail" smuggling appears in the estimates for travel expenditures. The reasoning is that those who voluntarily and anonymously return by mail travel expenditure questionnaires are not likely to "correct" them by distinguishing between declared and undeclared purchases.

If the pattern of smuggling has changed in recent years, it may well have done so because of illegal traffic in drugs. No adjustment for this traffic has been incorporated in import data for balance of payments purposes. Estimates of enormous sums involved in respect of the use of heroin, in particular, have been made from time to time, by the health and law enforcement authorities. But when allowances are made for the very large domestic distribution networks which are necessarily involved and for the mark-ups at each level, the international transactions, at least for Canada, pale against the domestic totals.

When all is said and done, however, one would have indeed to be an optimist to believe that unmeasured illegal transactions are not significant.

4. *The Affluent Society*

The increasing proportion of consumption devoted to services, increasing international specialization within the service economy, and integration of capital markets are all characteristics of wealthy societies. Since the measurement of flows related to services is in theory much more difficult than measurement of commodity flows, this change in mix has probably contributed to a deterioration in the quality of the statistics.

A few examples drawn at random from a wide range will illustrate the nature of the difficulties. With rising income and longer holidays common in industrialized countries, opportunities for either more exotic or more frequent holidays have expanded. To cater to this market the travel industry has devised the package holiday.

In countries such as Canada where travel expenditure estimates are derived from a sample of travellers, these totals, of course, may contain a high degree of sampling error. With the multiplicity of air fares often available to the traveller between two points depending on the season, length of stay, whether the trip is booked ahead or not, etc. there are often difficulties in identifying the inter-

national transportation cost of a traveller's total expenditure, yet this is a critical element of the final estimate.

Other aspects of the travel measurement problem are the extended stay abroad of some segments of the population, for example, the annual migration from Canada to the southern United States of many Canadian pensioners or wealthy individuals. While the sampling of travellers should catch their expenditures, the allocation by month or quarter is difficult.

Many problems are posed, too, by the activities of wealthy itinerants who often have residences in many parts of the globe so that it may be difficult to determine just where they are resident and to ensure that the treatment of all their transactions is consistent.

The purchase of real estate abroad is also a reflection of increased affluence. Many people purchase real estate in foreign countries—particularly recreational properties which can serve also as an investment. The measurement of such transactions—the purchase and subsequent capital and income flows—is very difficult. If the property is purchased through a real estate agent in the purchaser's country there is a possibility that the purchase may get into the reporting system. Most such transactions, however, seem to be made in the country where the property is located and escape the reporting system.

Another difficult area is entertainment—both the arts and sport. Artists command huge fees, although the net amount they take away, or bring back with them is probably considerably smaller. We don't have such activities surveyed in our balance of payments reporting system but they obviously account for some millions of dollars of net expenditures by Canada each year.

Sports stars pose a similar problem although here there is probably a net inflow into Canada due to the fact that, although 14 of the 17 teams which made up the National Hockey League last season were located in the United States, virtually all the players were Canadians who resided in Canada in the off-season.

The computer has revolutionized many business practices, and has led also to the emergence of various computer service industries such as time sharing bureaux. The development of ever more powerful computers has dictated that service bureaux should attract business from ever wider catchment areas. Where these areas cross international borders, it may be difficult to identify customers and get them into the reporting system.

Capital markets between countries such as Canada and the United States have become so integrated that it is largely irrelevant to an investor whether he deals with a stockbroker or investment dealer in his own country or in the country with which his markets are integrated. From the statistician's point of view, of course, there is a crucial difference. A reporting system can be established to record transactions executed through domestic intermediaries or directly with non-residents by major investors. The identification of all investors who may deal directly abroad is probably, however, beyond the capacity of most, if not all, reporting systems.

Another form of market integration is where an industry in one country is integrated with its counterpart in another through common ownership and commercial policies—for example the automobile industry in Canada and the United States following the Auto Pact of 1965. Major statistical difficulties emerged as a result both in Canada and in the United States.

PART III. SOME SYSTEMATIC APPROACHES

One technique for improving estimates of balance of payments flows lies in the application of comparative advantage—the selective use of partner country data. Unlike most statistical series, those for the balance of payments and the international investment position of a country have, in principle, a mirror image in the counterpart series of trading partners abroad.

Statisticians, particularly those of Canada and the United States, have long taken a keen interest in the relationship of counterpart measures. This interest reflects a number of concerns. At the technical level the progress made in measurement, analysis and presentation may spark similar innovations in counterpart countries. Exploration may reveal statistical errors and gaps which can be corrected, or may suggest the use of a single component measure by both countries, either for reasons of superior quality or of economy.

While there are limits on the degree to which such interchanges are practical, many transactions can be measured more easily from the point of view of one of the parties to them than from the other. It is obviously easier to secure data in respect of bank deposits from the banks rather than from their depositors. For example, returns by residents of Canada (other than banks) identified as deposits abroad less than two-thirds of the deposit liabilities to Canadians recorded by the banks of some 9 countries at the end of 1976, and Canadian deposits although likely concentrated in these countries are undoubtedly not confined to them. Canada incorporates data from foreign sources in its estimates of balance of payments transactions whenever it can be established that the resulting data are superior.

Quite apart, however, from the advantage to a country of improving its own series, there are reasons—which have become more compelling with the passing years—for wishing to have series which, if not precise mirror images, are at least reconcilable. Recent efforts to develop econometric models which transcend national borders have been made extremely difficult by the existence of unexplained differences in counterpart measures. And finally, of paramount and critical importance politically, is the need for international economic and financial negotiations to proceed from a common perception of the facts by both parties.

The close economic and financial ties between Canada and the United States are evidenced by the fact that, in 1978, current account transactions between Canada and the United States accounted for 67 percent of the total of such transactions for Canada (and 17 percent for the United States).

Although the existence of almost four thousand miles of contiguous frontier, should, in principle, preclude the discrepancies in statistical timing normally attributable to the high seas, alarming disparities in the statistics of the two countries began to appear in the early sixties.

In consequence the balance of payments statistics for the two countries have, since the mid-sixties, been systematically reviewed and compared first under the aegis of a Technical Working Group on Canada/United States Balance of Payments Statistics established by policy officials of the two governments, and later by the responsible statistical authorities.

As gaps or deficiencies were identified, they were remedied by improved methodology or in some cases by the continuing exchange of data for incorpora-

tion in both Canadian and United States sets of estimates. Since Canada had already been exploiting to a greater extent than the United States the use of partner country data, refinements of United States data as a result of the exercise tended to be somewhat larger than in the case of Canada. As an example, Canada had long obtained from United States sources estimates of pension receipts but had not supplied to the United States figures for Canadian pension payments to that country, an item for the estimation of which the United States had no firm basis.

Two major problems were soon identified and remedied as a result of this work. It was discovered that, for most export shipments to Canada, charges for inland freight and insurance had not been properly reflected in the export values declared on United States documents. On the other hand, the values of assembled motor vehicles imported into the United States from Canada overstated the actual transactions prices charged by the Canadian subsidiaries, the exporters, to their United States parent organizations, the importers. The correction of these problems had very substantial effects. They shifted the United states perception of their current account position with Canada in 1968—by $528 million—from a deficit to a surplus. (By 1974 the two adjustments aggregated well over $1 billion).

Although these efforts brought the previous estimates of the balance on current much closer together, there continued to be differences, some explainable, some not. Of those which were explainable, some were a matter of classification of particular transactions within the bilateral balance of payments estimates for Canada and the United States, while others represented differences in geographic classification. But even when adjustments for these conceptual or system differences were made, there remained large differences in the current account which could not, on the basis of information then available, be explained. The reconciliation work at the aggregative level by the Technical Working Group suggested that the problems centred largely around the measures of Canadian imports and United States exports of commodities. While the joint Canada–United States Committee of Senior Officials on the Balance of Payments urged the importance of resolving the problem, the massive volume of trade data to be reviewed and reconciled presented a formidable obstacle.

The fears which had led those concerned with the balance of payments in both countries to initiate attempts at reconciliation soon proved well founded. A time of reckoning came with the introduction in August 1971 by the United States of new severe measures to protect its balance of payments. In their confrontation, political officials of the two countries both discovered that they were talking about two entirely different sets of figures.

From the developments of August 1971 came the impetus for a concerted effort by those responsible for trade statistics in the two countries. The centre of reconciliation activity now shifted to the United States–Canada Trade Statistics Committee.

A massive confrontation of trade data ensued, centred on the data for 1970, and reconciliation exercises have occurred annually since that time.

Using the 1974 data as illustrative, statistical problems, as shown in Statement 5, apart from those of classification, are revealed to have contributed to a difference of US $2.6 billion in the basic bilateral trade measures of the two

countries. (Not all of the difference in the trade series was applicable in the comparison of the balance of payments data since allowance for some part of it had already been made.)

STATEMENT 5

CANADA/UNITED STATES TRADE DATA RECONCILIATION, 1974

Canadian trade surplus:	(Millions of U.S. dollars)
As published in Canada	4
As published in United States	2,350
Difference	2,346
Due to geographic classification	−346
Due to transaction classification	81
Due to non-receipt of documents, timing and valuation differences, and errors	2,611

As the work of the Trade Statistics Committee became available, the balance of payments experts in the two countries again tackled the task of reconciling the current account balances. The implications of the new trade data for merchandise trade and other series as used in the balance of payments had to be determined, and the remaining problems resolved. In the end, the results for 1974 indicated a bilateral current account deficit for Canada of U.S. $1.7 billion. This compares with the Canadian published current account balance which indicated a Canadian deficit of US $1.6 billion, and with the United States published data which indicated a United States surplus of U.S. $1.2 billion.(Had it not been for the earlier correction of automotive transactions already referred to, the latter figure would have been $0.2 billion.)

In the Canadian data, receipts were raised by $0.3 billion, largely reflecting increases of $0.1 billion to merchandise exports and $0.4 billion to other services, which more than offset a reduction of $0.2 billion in receipts for inland freight. Canadian payments were raised by $0.4 billion, comprising net additions of $0.1 billion to merchandise imports and $0.4 billion to other services and a net reduction of $0.1 billion in inland freight.

The adjustments for reconciliation purposes to 1974 published data for United States balance of payments transactions with Canada involved raising United States receipts for services and unilateral transfers by $0.9 billion and payments by $0.5 billion. (Reconciliation adjustments included large classification changes to put the data on a common basis as well as measurement errors.)

As a result of the comprehensive annual reconciliations, it became possible not only to improve some of the basic data sources, but also to incorporate on an on-going basis within current quarterly estimates of the Canadian balance of payments projections of the adjustments likely to emerge from the annual reviews.

Work on the reconciliation of data for movements of capital between Canada and the United States is not nearly so well developed, and has not yet reached the stage where agreed figures have been produced. But some progress is being made in this difficult area.

While the work of reconciliation cannot reveal measurement faults which are common to the systems of both countries, it has led to improvements of the data in each and has provided some basis for greater confidence in the data than had heretofore existed. Yet errors and omissions in the Canadian estimates remain large.

It is encouraging to see that work has been initiated within the OECD on reconciling balance of payments data at a global level.

In another search for clues to the sources of the burgeoning balances of errors and omissions, those for the period 1963 to 1976 were subjected to intensive econometric analysis by Statistics Canada experts in this field. The first stage of this work involved the correlation of errors and omissions at time T to 24 series from the current and capital accounts at periods T, T-1, T-2, T-3, and T-4. Regression analysis was then employed to model three kinds of explanatory variables: (i) seven balance of payments series which had a relatively high correlation to the errors and omissions; (ii) variables which reflected "tight" and "easy" money situations; and, (iii) a variety of money market rates in Canada and the United States. Finally, a test based on rank sums was performed on the errors and omissions series as well as on the absolute value of the residuals from the most promising equation derived for it.

The results revealed a weak, albeit significant, association between the errors and omissions and, with various lags, (i) non-resident holdings of Canadian dollar deposits; (ii) obligations of sales finance and consumer loan companies; (iii) net capital movements in short-term forms; (iv) net exports of automobiles (at lags of two and three quarters); and (v) exports of iron ore lagged one period. Hypotheses can be developed for some of these relationships, but it has not been possible to translate them into improved measurement of the flows. Within the residuals of the "best" equation—the unexplained, non-systematic portions of errors and omissions that are ostensibly random—the origin of some specific impacts could be identified, notably the exchange crises engendered in Canada by the actions taken by the United States to protect its balance of payments in the early part of 1968 and the third quarter of 1971, together with subsequent rebounds, the upward pressure on the Canadian dollar in the early part of 1970 which led again to the withdrawal of fixed exchange rates, and movements coincident with political developments in the Province of Quebec in October 1970 and November 1976. But there were equally large residuals which could not be associated with influences of these types.

Part IV. Linking Flows and Stocks at the System Level

Canada's international investment position (more frequently, if less appropriately, known as the Canadian balance of international indebtedness) is a set of stock estimates constituting a balance sheet vis-a-vis the rest of the world. Closely allied to, and indeed reflecting, the capital movements shown in the balance of

STATEMENT 6

CANADA'S INTERNATIONAL INVESTMENT POSITION, YEAR-ENDS 1945 AND 1974, AND SOME ESTIMATED FACTORS IN THE CHANGE

	Book value year-end 1945	Capital movements 1946–1974		Other factors in change					Book value year-end 1974
		As published	Reclassifications	Investment position reclassifications, etc.[1]	Valuation adjustments	Union with Newfoundland and identified migrations and bequests	Exchange rate effects	Undistributed earnings	
	1	2	3	4	5	6	7	8	9
	Billions of dollars								
ASSETS									
Direct investment	0.7	4.4	—	0.6	−0.5	—	0.1	3.9	9.3
Portfolio investment	0.6	0.7	—	—	0.3[2]	—	—	2.3[2]	3.9
Miscellaneous investment	—	1.8	1.1	—	0.2	—	—	—	3.1
Government of Canada credits	0.7	0.8	0.3	—	0.2[3]	—	—	—	2.0
Government of Canada subscriptions to international investment agencies	—	0.6	—	—	—	—	—	—	0.6
Canadian long-term investment abroad	2.0	8.4	1.5	0.6	0.2	—	0.1	6.2	18.9
Net official monetary assets	1.7	4.2	—	—	0.3	—	−0.4	—	5.8
Other Canadian short-term holdings of foreign exchange	0.1	2.8	—	−0.5	—	—	0.2	—	2.7
Short-term receivables	0.1	5.2[4]	4.7	0.5	−0.4[5]	—	—	—	10.1
GROSS ASSETS	3.9	20.5	6.2	0.6	—	—	−0.1	6.2	37.5

LIABILITIES									
Direct investment	2.7	14.2	2.5	−1.9	−0.1	0.1	—	18.5	36.1
Government bonds	1.7	10.2	—	—	—	0.1	−0.3	—	11.6
Other portfolio investment	2.4	5.0	−1.6	−1.5	—	—	−0.1	5.0[6]	9.2
Miscellaneous investment	0.3	2.0	1.2	—	−0.1[6]	—	—	—	3.4
Foreign long-term investment in Canada	7.1	31.4	2.1	−3.4	−0.2	0.2	−0.5	23.6	60.3
Non-resident equity in Canadian assets abroad	0.2	—	—	3.6	−0.5	—	—	—	3.3
Official SDR liabilities	—	0.4	—	—	—	—	—	—	0.4
Total long-term liabilities	7.3	31.8	2.1	0.2	−0.7	0.2	−0.5	23.6	64.0
Non-resident holdings of Canadian dollars	0.3	1.8	—	—	—	—	—	—	2.0
Short-term finance company obligations	—	1.4	—	—	—	—	—	—	1.4
Other short-term payables	0.6	0.3[4]	4.0	0.4	—	—	—	—	5.4
GROSS LIABILITIES	8.2	35.3	6.2	0.6	−0.8	0.2	−0.5	23.6	72.6
NET INTERNATIONAL INDEBTEDNESS	4.2	14.7	—	—	−0.8	0.2	−0.4	17.4	35.3

[1]Column 4 includes, in addition to reclassifications, offset transactions involving the exchange of assets and liabilities between residents and non-residents which have not been shown as capital movements.

[2]No adjustment has been made prior to 1968 in respect of the net difference between transactions and book values of portfolio investment abroad, which consequently are reflected with undistributed earnings for the period 1946–67.

[3]Mainly deferred interest.

[4]Capital movements series D82 is shown as a receivable.

[5]Discrepancies.

[6]No adjustment has been made in respect of net difference between transactions and book values, which consequently re reflected with undistributed earnings.

Note: As figures are rounded individually, totals do not necessarily equal the sum of their component parts.

payments, the statement is substantially more comprehensive. (Most of the valuations employed in Canada's international investment position are book values, i.e. they reflect the values found in the accounts of the surveyed corporations.)

It has been one of the characteristics of the statistical system employed in Canada that estimates of the balance of payments and of the international investment position have been constructed largely independently. This approach has been the result of a number of considerations including the timeliness of particular estimates, inherent qualitative superiority and the minimization of statistical incest. Extensive comparison of the data submitted by individual respondents to the two survey systems facilitates the correction of errors in each. In principle it would be possible to develop a highly integrated set of inputs to balance of payments and investment position statistics but the costs, financial and non-financial, to both private and public sectors would not appear to warrant such a development.

From detail on the worksheets and other sources it is possible to provide a rough indication of how the pieces fit together. Statement 6 presents the results of such an exercise.

As the statement shows, a multiplicity of factors come into play in linking the two series (although if Canada were able to reflect in its balance of payments estimates of undistributed earnings on both direct investment in Canada and direct investment abroad, the net adjustment over the 29-year period 1946–74 would have been reduced from $14.6 billion to $1.8 billion).

Development work on the system of national balance sheet accounts has recently been completed and estimates have been published for the years since 1961 as part of the work on Canada's Financial Flow Accounts. The Rest of the World sector of the national balance sheet represents, essentially, a rearrangement of Canada's external assets and liabilities in order to conform to standard classifications employed throughout the financial flow accounts. The rearrangement primarily involves grossing up those items which appear in net form in investment position statistics and reclassifying various items. Consequently, total financial assets and liabilities for the Rest of the World differ from totals shown in the investment position, although the net balance of financial assets less liabilities is the same in each presentation.