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**DATA QUALITY ISSUES REGARDING THE PRODUCTION OF INFORMATION ON FINANCIAL  
DERIVATIVES: THE AUSTRALIAN EXPERIENCE**

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*This document has been prepared by D. Cullen, ABS Australia and will be presented under item 4 of the draft agenda*

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## **DATA QUALITY ISSUES REGARDING THE PRODUCTION OF INFORMATION ON FINANCIAL DERIVATIVES: THE AUSTRALIAN EXPERIENCE**

### **Introduction**

1. Implementation of SNA and BPM recommendations on recording financial derivatives in the Australian National Accounts (ANA) and Balance of Payments and International Investment Position (BoP) has been difficult and is still under development. The main difficulties arise from significant differences between SNA/BPM and the treatment of financial derivatives in commercial accounting practice, prudential supervision regimes and market research statistics. These statistical difficulties arise from different notions of income and profits, the use of derivatives (outside the financial sector) primarily for hedging purposes, and the concentration on trading volumes in market research statistics. This note documents the Australian experience in attempting to collect data from which to compile statistics to SNA principles, some possible ways forward to improve present methods, and some comments about priorities for improvements.

### **BPM5 Implementation**

2. Although Australia implemented the SNA93/BPM5 recommendations (see attachment 1 for a summary of SNA recommendations) in the BoP statistics a year earlier (1997) than in ANA (1998), the development of data collection for derivatives was undertaken jointly by the International Investment and Financial Accounts work groups within ABS. Data collection concepts and definitions were developed, consultations were undertaken with a variety of potential data providers, and data collection instruments were drafted with the main objectives of meeting BPM5 timetable and data needs.

3. There are additional data dimensions over SNA that are desirable for BoP: direct/non-direct, country of counterparty, currency of denomination and remaining term to maturity classifications were overlaid on the basic intertemporal reconciliation of opening balance + transactions + valuation changes + volume changes = closing balance classified by asset or liability. Although users of statistics had indicated that a breakdown by type of derivative contract would be useful, it became clear in testing feasibility of data collection that providers were struggling with the very large and technically demanding data requirement, and the type of derivative contract classification was an early casualty. In the context of recent discussions about a type of derivative classification for SNA93, it is worth noting that the not only was provider burden an issue, but there are some difficulties in devising a workable type of derivative contract classification. For example a swap may be a "cross currency" contract to one counterparty, and an "interest rate" contract to the other.

4. Implementing the reduced BOP data collection instrument required significant discussion with data providers in order to induct them into the reporting regime if they were significant participants in the derivatives market. A selected example of the data collection instrument is provided in attachment 2. The information paper ABS cat.no. 5365.0 *Information Paper: Upgraded Balance of Payments and International Investment Statistics* foreshadowing their first inclusion in the BoP noted:

*The data are not comprehensive. The nature of the derivative contracts, which often can change from being an asset to a liability as reference prices or indexes change, and their*

*use in hedging other risks, means that some data providers cannot readily and separately identify cross-border derivative positions that are assets from those that are liabilities. Instead, a net derivative position is reported. Other providers, that do distinguish between asset positions and liability positions, cannot separate the periodic derivative settlements into those that relate to assets and those that relate to liabilities. Some providers cannot yet separately distinguish the valuation of derivatives used to hedge other financial instruments and therefore report both the derivative and the underlying instrument bundled together. Therefore, the information reported to the ABS .... represents a degree of netting in both the positions and transactions flows. It is expected that the reporting of this information will progressively improve as accounting standards develop and reporting systems are upgraded to provide better gross measures of the assets and liabilities involved.*

### **ANA Implementation**

5. Most Financial Accounts data sources contained some rudimentary derivatives positions information, and the first approach to compiling derivatives data to meet SNA93 recommendations for financial accounts was based on modelling transactions and revaluations from this positions data, by reference to market research (turnover) and prudential supervision (notional principal) data. The information paper ABS cat.no. 5254 .0 *Information Paper: Upgraded Australian National Accounts: Financial Accounts* introducing the SNA93 changes for the Financial Accounts noted:

*Estimates of financial derivatives are now included in the financial accounts. Whilst derivatives data for the more recent time periods are provided by surveys, earlier data are not available. However, the quality of reporting of transactions in surveys is lower than for other data items. Thus there is a significant amount of imputation in the estimates.*

The model was intended to be a stop-gap whilst a major data collection modernisation and harmonisation project in respect of regulated financial institutions was undertaken by ABS in partnership with the Australian Prudential Regulation Authority (APRA) and the Reserve Bank of Australia (RBA).

6. The ABS/APRA/RBA data modernisation project aimed to synthesise all data requirements of the three agencies into one reporting regime. Given the dominating position in derivatives markets of licensed banks, the key factor to success in measuring derivatives was positions and flows data reported to SNA concepts by banks. However, the prudential approach to reporting derivatives is based on commercial accounting standards, and thus provided gross (nominal) and net positions data. These data could not be unbundled into liability and asset required for SNA, nor were flow data needed for prudential purposes. Additionally, the prudential data were needed for whole-of-entity and included significant amounts of exposures by foreign branches, and counterparty detail was not needed. In these circumstances it was agreed that a supplementary derivatives schedule to meet ABS requirements would be included in the consultation package for the project for discussion with licensed banks. The draft schedule (ARF 320.6) devised for this purpose is shown in attachment 3.

7. Detailed consultation with the 6 large Australian banks that undertake most of the derivatives business disclosed a list of difficulties similar to the ones noted in the BoP implementation (see para 5). It was also noted that bank accounting systems had been designed to generate a net mark-to-market position, and a net profit/loss result on the whole derivatives book. Significant expensive systems development work was needed to implement the SNA concepts, and this was of little value to the banks or to the regulator. System work on derivatives would divert scarce resources from implementing other parts of the modernisation package that were more important to all participants (for example ABS was seeking improved data on bank deposits and loans by sector of counterparty as part of the package). In these

circumstances it was agreed that form ARF 320.6 was a high cost lower priority item and was withdrawn from the project.

### **Summary of Problems with Direct Collection**

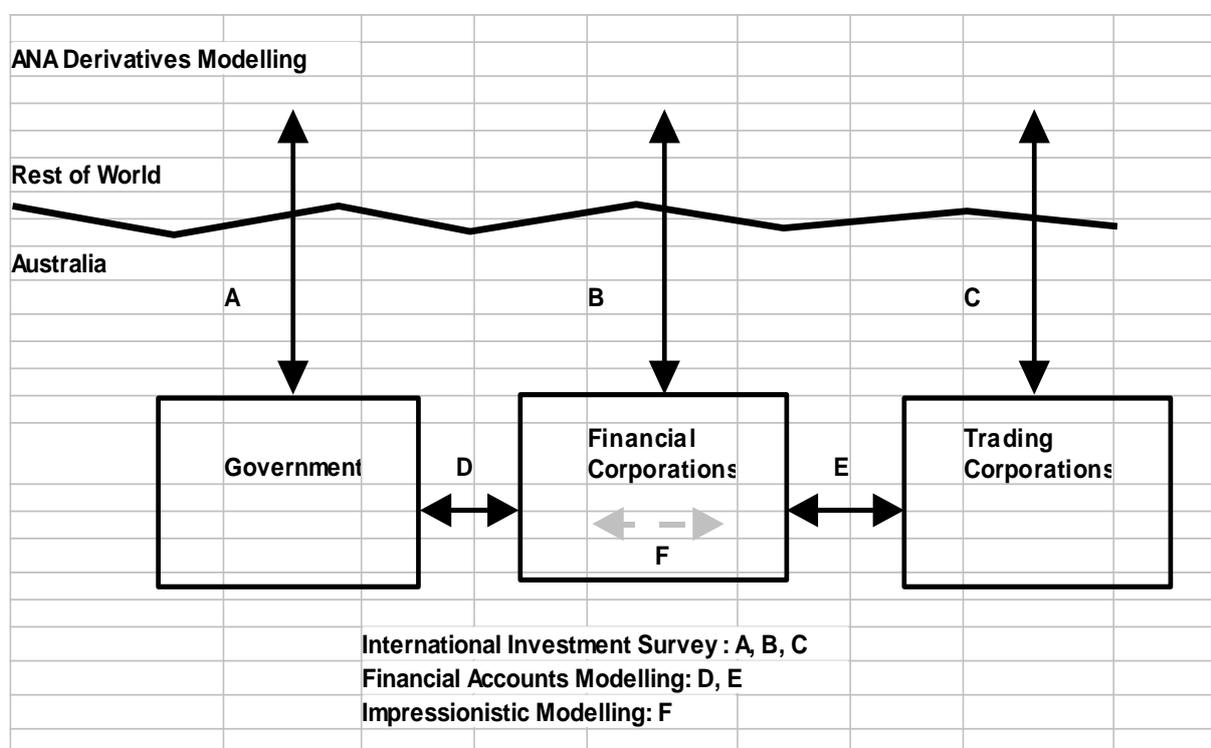
8. The problems encountered in attempting to collect data to SNA requirements by survey were:
- separation of contracts in a net asset position from contracts in a net liability position;
  - identifying contracts moving from a net asset to net liability position (or vice versa) through valuation changes;
  - identification of new contracts to a position during a period and settled contracts disappearing from a position during a period;
  - partitioning changes in value during a period into transactions, value changes and volume changes;
  - summarising contracts in a position by sector of counterparty;
  - for trading corporations and government entities: separation of derivatives from assets/liabilities being hedged;
  - providing stock and flow data by type of derivative contract
9. These problems arose mainly because commercial accounting standards and SNA have very different views of derivatives. To implement an SNA view would require significant systems development work by data providers.

### **Modelling Derivatives Statistics**

10. With the collapse of the attempt to measure derivatives positions and flows through direct collection methods from banks for ANA, there was little point in persevering with direct collection methods for other institutional sectors. Indeed, the banking data would have provided a significant amount of the data for other sectors. Furthermore, whilst banks could distinguish derivative contracts in their accounts, many trading corporations and government entities accounted for derivatives on a hedged basis (i.e. indistinguishable from the asset or liability against which the derivative was acquired as a hedge). It was decided that the stop-gap model referred to in para 5 should be enhanced pending pursuing alternative measurement options.

11. The enhanced modelling was undertaken based on known facts about practices in the derivatives markets. One of the practices that simplified the modelling was the conservatism of trading corporations and governments in the use of derivatives. This followed a well-publicised failure of an electrical engineering firm in the mid-1980s where their treasury operation undertook derivatives trades for profit, and were caught exposed to an asset that depreciated rapidly. This example and some examples from other countries has resulted in the use of derivatives mainly for hedging. Furthermore, most hedging contracts tend to be arranged with or advised by the corporation's relationship bankers or foreign parent. Similarly, the 1980s saw a round of improved financial management practices for government agencies, most notably by concentrating all financial market dealing by state governments through the establishment of central borrowing authorities. As a result of these practices, very little net lending (in an SNA sense) takes place through derivatives for trading corporations or government agencies, nor is there a significant amount of trading in existing positions outside the financial sector. The large and growing turnover volumes observed in market research statistics was traced to significant trading activity *within* the financial sector. Such trading activity is considered to be of secondary interest in a national accounting context. This resulted in a

very much reduced objective for the derivatives model. The relationships in the model given priority are shown in the diagram.



12. The other major consideration in the specification of the model was the already known difficulty of deriving flow data from summary aggregate stock data. Without detailed knowledge of the contracts, most of which were over-the-counter (OTC) rather than exchange traded contracts, partitioning movements in net positions between transactions and valuation changes is impossible. The key to solving this difficulty was the relative success of the International Investment direct collection activity. Of course derivative positions and flows with the rest of the world for trading corporations, government and financial corporations could be used directly in the financial accounts. Furthermore, once the intra-financial sector trading was ignored, the domestic aggregates could be expressed as a function of flows to and from the rest of the world, using counterparty breakdowns of nominal principal data from Australian responses to BIS derivatives surveys (see [www.rba.gov.au/MediaReleases/2004/mr\\_04\\_10.html](http://www.rba.gov.au/MediaReleases/2004/mr_04_10.html)) and prudential surveys as allocators.

This very aggregated model generated plausible results which moved in line with expectations given exchange rate, interest rate and security price movements. There was some additional sketching in of an impression of detail for intra-financial sector trading, particularly for exchange traded derivatives (putting the "Monet" into monetary statistics?). With periodic updates to allocation weights from three yearly reports to BIS, this model is still in use.

### Potential Alternative Measurement Methods

13. Given the sub-optimal situation with modelling derivatives statistics, improved methods for measuring derivatives was placed on the forward research agenda in ABS. In forming views about the costs and benefits of the research project, a number of potential areas of investigation have been identified which may be of interest to WPFS participants. These are:

- **Stock/price modelling.** The notion here is that positions data are more tractable to data collection than transactions and other flows. If enough were known about the underlying assets for the positions, or the nature of the derivative contracts themselves, then market price movements could be applied to positions data to derive transactions and valuation changes. In Australia, a similar technique is applied to the long-term bonds positions data with some success. We understand this type of technique is used by the UK in generating derivatives estimates. A brief scoping of this method for Australia suggested that more detail by *type of derivative* was needed in the stock data than was available from APRA prudential form ARF 112.2 (see <http://www.apra.gov.au/Statistics/Revised-Authorised-Deposit-taking-Institution-ADI-reporting-requirements.cfm> ). The UK data seem to have solved the issues that arose in Australia in attempting to collect by type of derivative (see para 3 above). The type of derivative classification is needed to link to appropriate derivative or physical asset market price data, and this has some implications for the design of such a classification, as well as the implementation difficulties already noted. In this context some discussion of possible convergence of prudential and statistical models with regard to treatment of derivatives may be warranted;
- **Leverage from market research data.** A significant amount of data is collected on behalf of the relevant industry body (the Australian Financial Markets Association, AFMA). The data are *turnover* data by *type of product* (the type of product classification is not detailed enough to form direct linkage to pricing information), see <http://www.afma.com.au/afma:AFMR> . AFMA also compile comprehensive pricing data for OTC and exchange traded products. Some preliminary discussion with AFMA indicated that costs and benefits of additional types of detail in their existing collection method was problematic. However, some interest was expressed in the notion of a security-by-security approach, see below;
- **Security by security reporting.** The major sticking point with implementing draft APRA form ARF 320.6 was the systems development costs of each provider devising a system that tracked individual contracts in the portfolio over time and applying rules to allocate appearance, disappearance, market value change and progress payments to SNA concepts. ABS has had some experience with compiling statistics on domestic bond positions at market value and foreign portfolio holdings of Australian securities by custodians using the security by security method. The notion here is that data providers provide a report listing all individual derivative contracts with some key characteristics for each period, and ABS (or some other independent agency) develop the security tracking system to generate the results needed. The system development costs are therefore incurred only once. A variation on this notion that may address potential privacy and commercial-in-confidence concerns is that the software might be developed and tested independently, but supplied to all providers for them to run on their data. Details such as the characteristics necessary to make such a system viable and the computing power that might be needed to crunch the likely very large data holding would be the subject of a feasibility/ pilot project. One bank and AFMA expressed some interest in participating in a pilot exercise;

- **IFRS/IAS39, and Hedging Survey** . We also had some hopes that improved treatments and disclosures might eventuate from the revisions to commercial accounting standards. The hope was that some or all of the problems listed in para 8 might be addressed such that direct collection may become a viable option. There is some evidence from the International Investment Survey and the ABS Hedging Surveys (see para 14) that data providers have an improved capability for reporting derivatives through IFRS disclosure requirements and quality assurance work with ABS. Whilst we have not re-tested something along the lines of draft APRA form ARF 320.6 recently, a scan of the Australian version of the relevant accounting standards suggests that there probably will be issues arising from the different treatments applied to positions held as *investments*, positions held for *trading*, and positions held for *hedging*. These may not be severe for financial institutions, as accounting practices may tend to favour a *trading* (fair value) treatment for virtually all financial instruments, but consultations have not been undertaken.

## Objectives

14. This paper has concentrated on how to implement the SNA93 recommendations for derivatives. Given the difficulties encountered it is also worth considering the question of benefits, particularly in the context that in Australia the primary purpose of entering derivatives contracts is hedging (management of risk), and not net lending/borrowing in an SNA sense. The question then becomes how effective are the hedging strategies employed in aggregate. This is a question which is not addressed directly by SNA, although the impacts of hedging strategies can be seen through the revaluation account. It would take more detail to understand potential vulnerabilities than is normally provided in the presentation of balance sheet, revaluation and other volume changes accounts.

15. In this context WPFS participants might be interested in some work undertaken by ABS and RBA on hedging. Two special purpose hedging surveys have been conducted (2001, 2005). The results of the latest survey were published in ABS cat.no. 5308.0 *Foreign Currency Exposure, Australia, March 2005*. To quote one of the main findings *Banks had an expected net foreign currency exposure before hedging of -\$152.5b. After accounting for hedging through the use of foreign currency derivative contracts, the net foreign currency exposure was significantly reduced to \$0.8b*. In this context, future work in this area is likely to focus on providing information directly suited to policy questions rather than purely populating the SNA framework. Given this direction, the security-by-security investigation mentioned above could produce results for SNA and policy purposes not directly addressed by SNA statistics.

16. The author acknowledges valuable comments on this paper from Paul Mahoney, Assistant Statistician (A/g) International Accounts and Financial Statistics Branch, ABS.

## Attachment 1: SNA and Derivatives

1. SNA93 as originally drafted discussed derivatives in 11.34 to 11.43. Paragraph 11.34 discussed the issue of recognition of financial derivatives as financial assets. In essence the recommendation was to treat derivatives as contingent assets/liabilities (i.e. not recorded until a contingency crystallised) unless there was observable trading, see quote with my emphasis. This is in line with the then prevailing notion that derivatives were "off balance sheet" in commercial accounting.

*11.34 Many of the recently created financial instruments are linked to a specific financial instrument or indicator (foreign currencies, government bonds, share price indices, interest rates, etc.) or to a particular commodity (gold, coffee, sugar, etc.). The new instruments are therefore often referred to as derivative or secondary instruments. Since risk avoidance is frequently a motivation for the creation of these instruments, they are also often referred to as hedging instruments. **Some of these give rise to contingent assets and liabilities and thus are not included in the balance sheets or financial account transactions. Others give rise to property income flows but, as there is no underlying transaction in a financial asset, there are no entries in the financial account. A third class of derivatives may involve conditional rights similar to other contingent instruments, but these derivatives have market value and are tradable; transactions in these derivatives give rise to entries in the financial account.** An exhaustive treatment of derivatives is not possible here, and market innovations would render such a treatment incomplete or obsolete within a short period. Nevertheless, some general guidelines can be given on the basis of existing derivatives, and specific treatment in the SNA can be recommended for several broad classes of derivatives.*

2. Paragraph 11.35 addressed the question of distinguishing financial derivatives from the assets or liabilities linked to in a hedging strategy by an enterprise.

*11.35 The SNA recommends that derivatives should be treated as financial assets and that transactions in them should, in general, be treated as separate (mainly financial) transactions, rather than as integral parts of the value of underlying transactions to which they may be linked as hedges. This is because a different institutional unit will be the party to the derivative transaction than is the case for the underlying transaction that is being hedged. Moreover, the two parties to the derivatives may have different motives for entering into the transaction. One may be hedging, while the other may be dealing in derivative instruments or acquiring the derivative as an investment. Even if both parties are hedging, they may be hedging transactions or risks that involve different financial assets or even transactions in different accounts of the SNA. Therefore, if derivative transactions were treated as integral parts of other transactions, such treatment would lead to asymmetries of measurement in different parts of the accounts or to asymmetries of measurement between institutional sectors.*

### SNA Amended

3. Very soon after publication, the treatment of derivatives was revised after representations from many countries, including Australia, given the rapid development and usage of derivatives, and market practices to support their use. Whilst a large number of changes were made to SNA, the key change in the context this paper is the standard for recognition of financial derivatives as assets/ liabilities was changed to include tradeability (evidence for which was the availability of pricing information) and *offsetability* (ability to close out contracts in forward markets by creation of a new contract) as well as observed trading, see quote, my emphasis...

11.34 *Financial derivatives are financial instruments that are linked to a specific financial instrument or indicator or commodity, and through which specific financial risks can be traded in financial markets in their own right. The value of a financial derivative derives from the price of the underlying item: the reference price. **An observable market price or an index for the underlying item is essential for calculating the value of any financial derivative.** If a financial derivative cannot be valued because a prevailing market price or index for the underlying item is not available, it cannot be regarded as a financial asset. Unlike debt instruments, no principal amount is advanced to be repaid and no investment income accrues. Financial derivatives are used for a number of purposes including risk management, hedging, arbitrage between markets, and speculation. Financial derivatives enable parties to trade specific financial risks - such as interest rate risk, currency, equity and commodity price risk, and credit risk, etc - to other entities who are more willing, or better suited, to take or manage these risks, typically, but not always, without trading in a primary asset or commodity. **The risk embodied in a derivatives contract can be “traded” either by trading the contract itself, such as with options, or by creating a new contract which embodies risk characteristics that match, in a countervailing manner, those of the existing contract owned. The latter is termed offsetability, and is particularly common in forward markets or where there are no formal exchanges through which to trade derivative.***

4. Parts of para 11.35 were redrafted to reflect the extended recognition criteria, but still making the point that derivative contracts should be separated from the assets/ liabilities linked in a hedging strategy, see quote, my emphases...

11.35 *The SNA recommends that financial derivative instruments that can be **valued separately from the underlying item** to which they are linked should be treated as financial assets, **regardless of whether “trading” occurs on- or off-exchange.** Transactions in financial derivatives should be treated as **separate transactions, rather than as integral parts of the value of underlying transactions to which they may be linked.** The two parties to the derivatives may have different motives for entering into the transaction. One may be hedging, while the other may be dealing in derivative instruments or acquiring the derivative as an investment. Even if both parties are hedging, they may be hedging transactions or risks that involve different financial assets or even transactions in different accounts of the SNA. Therefore, if derivative transactions were treated as integral parts of other transactions, such treatment would lead to asymmetries of measurement in different parts of the accounts or to asymmetries of measurement between institutional sectors.*

5. Similar changes were made to the relevant parts of BPM5.

**Attachment 2: Selected example direct collection question (liability positions) of Survey of International Investment**

**7a** Derivative contracts of your Australian enterprise group in a net liability position with non-resident investors, by country – see Notes D4 and D5

Country of non-resident creditor	Opening position at 31-12-06	Changes during the quarter					Closing position at 31-03-07 (1+2-3+4+5+6=7)
		Transactions <i>see Note 2.8</i>		Valuation and other changes			
		Increases in liabilities <i>see Note D6</i>	Decreases in liabilities <i>see Note D7</i>	Market price changes <i>see Note 2.9</i>	Exchange rate variations <i>see Note 2.10</i>	Other changes <i>see Note 2.11</i>	
<i>see Note 2.6</i>	<i>see Note 2.7</i>	<i>see Note D6</i>	<i>see Note D7</i>	<i>see Note 2.9</i>	<i>see Note 2.10</i>	<i>see Note 2.11</i>	<i>see Note 2.7</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	\$A,000	\$A,000	\$A,000	\$A,000	\$A,000	\$A,000	\$A,000

Direct investors:

(non-residents holding 10% or more of the ordinary shares or voting stock of any Australian enterprise in your group, excluding related financial intermediaries)

17


Direct investment groups abroad:

(your non-resident subsidiaries, associates and branches, excluding related financial intermediaries)

19


Other non-resident counterparties:

(including related financial intermediaries)

21


**Total – Question 7a**

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## Attachment 3: Consultation Draft APRA Form ARF 320.6

**DRAFT Form ARF 320.6: Financial Derivatives****Financial derivatives in a net asset position with these counterparty sectors (including on and off balance sheet derivatives)**

		AUD Million			
		Opening Stock	Net Transactions	Other Changes	Closing Stock
<i>Resident Counterparties</i>					
	Domestic Exchanges (include exchange traded derivatives such as SPI's)				
	Banks				
	FCA Corporations				
	Financial auxiliaries				
	All other resident counterparties				
<i>Non-resident counterparties (including foreign exchanges)</i>					
	Total non-residents				
<b>Total</b>					

**Financial derivatives in a net liability position with these counterparty sectors (including on and off balance sheet derivatives)**

		AUD Million			
		Opening Stock	Net Transactions	Other Changes	Closing Stock
<i>Resident Counterparties</i>					
	Domestic Exchanges (include exchange traded derivatives such as SPI's)				
	Banks				
	FCA Corporations				
	Financial auxiliaries				
	All other resident counterparties				
<i>Non-resident counterparties (including foreign exchanges)</i>					
	Total non-residents				
<b>Total</b>					