



**RESERVE BANK OF AUSTRALIA**

**REDUCING FOREIGN EXCHANGE  
SETTLEMENT RISK IN  
AUSTRALIA**

**A PROGRESS REPORT**

**September 1999**

The research for this report was undertaken by Bernie Egan, Mustafa Yuksel and Nathan Hale from the Bank's Payments Policy Department.

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## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>V</b>
<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1 BACKGROUND.....	1
1.2 MAIN FINDINGS OF THE 1997 SURVEY.....	1
1.3 OBJECTIVES OF THE 1998 RBA SURVEY .....	2
<b>2. METHODOLOGY .....</b>	<b>3</b>
2.1 DEFINITION .....	3
2.2 LOCATION OF FOREIGN EXCHANGE SETTLEMENT EXPOSURE.....	3
2.3 COMPARING 1998 AND 1997 RESULTS .....	3
2.3.1 <i>Sample selection</i> .....	3
2.3.2 <i>Data collection</i> .....	4
2.4 CAVEAT .....	4
<b>3. SETTLEMENT PRACTICES IN THE AUSTRALIAN FOREIGN EXCHANGE MARKET .....</b>	<b>5</b>
3.1 CURRENCIES .....	5
3.2 SETTLEMENT METHODS.....	5
3.3 DURATION OF EXPOSURES.....	5
3.3.1 <i>Introduction</i> .....	5
3.3.2 <i>The data</i> .....	6
3.3.3 <i>Cancellation times</i> .....	7
3.3.4 <i>Presenting the data</i> .....	8
3.3.5 <i>AUD cancellation times</i> .....	8
3.3.6 <i>USD cancellation times</i> .....	9
3.3.7 <i>JPY cancellation times</i> .....	10
3.3.8 <i>Reconciliation times</i> .....	10
3.3.9 <i>AUD reconciliation times</i> .....	11
3.3.10 <i>USD reconciliation times</i> .....	12
3.3.11 <i>JPY reconciliation times</i> .....	13
3.3.12 <i>AUD sold - USD purchased</i> .....	13
3.3.13 <i>USD purchases and sales</i> .....	14
3.3.14 <i>AUD purchases and sales</i> .....	16
3.3.15 <i>Other currencies</i> .....	16
3.4 THE USE OF BILATERAL NETTING .....	17
3.5 MAGNITUDE OF EXPOSURES .....	19
3.6 COMMENT .....	19
<b>4. RISK MANAGEMENT PRACTICES .....</b>	<b>20</b>
4.1 INTRODUCTION .....	20
4.2 EXPOSURE LIMITS .....	20
4.3 REDUCING THE TIME AT RISK .....	20
4.4 CONTINUOUS LINKED SETTLEMENT (CLS).....	21
4.5 IMPACT OF RTGS.....	22
4.6 OTHER MEANS TO REDUCE RISK .....	22
<b>5. NEXT STEPS AND CONCLUSIONS .....</b>	<b>23</b>
5.1 ACTION BY THE RBA .....	23
5.2 ACTION BY PARTICIPANTS.....	23
5.3 CONCLUSION.....	23

**ANNEXES**

ANNEX A - MEASURING FOREIGN EXCHANGE SETTLEMENT EXPOSURE

ANNEX B - SAMPLE QUESTIONNAIRE

ANNEX C - SURVEY RESPONDENTS

ANNEX D - CURRENCY DATA

ANNEX E - CANCELLATION AND RECONCILIATION TIMES

ANNEX F - HOURS AT RISK PER CURRENCY PAIRING

ANNEX G - GLOSSARY

## **EXECUTIVE SUMMARY**

This report sets out the progress that has been made since 1997 in reducing foreign exchange settlement risk in Australia. It is based on a survey undertaken in late 1998 which built on earlier work reported by the Reserve Bank in December 1997.

The introduction in Australia of a real-time gross settlement system and legislation giving legal certainty to netting contracts have provided a foundation for reductions in foreign exchange settlement risk. Some banks have reduced their foreign exchange exposures by improving cancellation and reconciliation times, although considerable scope exists for further reductions. Individual banks can do more to reduce risk through improvements to procedures: they can negotiate with their correspondents to allow for later cancellation times for payments and to improve the timeliness of statements of receipts, and they can streamline back office systems to improve the reconciliation process.

Significant reductions in settlement risk have been made through netting. It is unfortunate that at the time several Australian banks were on the verge of joining the sole remaining multilateral netting scheme, its operations were suspended. Nevertheless, further reductions can be made using bilateral netting.

Critical to reducing settlement risk is a thorough understanding of that risk by each bank; what it is and how to measure it. It is apparent, however, that not all those people who are managing the risk have that thorough understanding.

The Reserve Bank has continued to be active in industry developments, both local and international, to reduce foreign exchange settlement risk. In particular, the Continuous Linked Settlement (CLS) Bank proposal is showing considerable promise and a number of banks in Australia, either directly or through their head offices, are shareholders of CLS Services. It is expected that the AUD will become an "eligible CLS currency" in early 2001 and the Reserve Bank is working closely with CLS Services and its shareholder banks to meet that target.



# 1. INTRODUCTION

## 1.1 Background

In 1997, the Reserve Bank of Australia (RBA) issued *Foreign Exchange Settlement Practices in Australia*, a study based on a survey of the major participants in the Australian foreign exchange market. The RBA's study aimed to assess the extent of foreign exchange settlement risk in Australia and how Australian banks'<sup>1</sup> management of this risk compared to overseas banks. That study was also partly in response to a study by the central banks of the Group of Ten (G10) countries<sup>2</sup>, the results of which were published by the Committee on Payment and Settlement Systems (CPSS) of the Bank for International Settlements (BIS) in March 1996.

At the time it released its report, the RBA undertook to conduct a follow-up survey to monitor progress in managing and reducing foreign exchange settlement risk. That survey was conducted in October 1998 and is the basis of this report. Similarly, the CPSS assessed individual bank, industry and central bank progress in reducing settlement risk in the G10 countries in its *Reducing Foreign Exchange Settlement Risk: A Progress Report*, issued in 1998.

## 1.2 Main findings of the 1997 survey

The 1997 RBA survey found that banks in Australia faced foreign exchange settlement risks similar to those in the G10 countries. This risk has two components: the value at risk and the length of time that banks are exposed to the risk. The banks surveyed made foreign exchange payments for their own account worth, on average, just over \$A120 billion each business day during April 1997. This reflected Australia's position as the world's ninth largest foreign exchange market<sup>3</sup>, but of particular concern was the length of time that Australia's banks were exposed to risk. Exposures lasting in excess of 24 hours were the norm, which allowed exposures from one day to accumulate with those of the next. For many currency pairs, the period of exposure lasted for over three business days. The reconciliation practices adopted by many of the banks surveyed fell far short of international best practice.

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<sup>1</sup> The term "banks" is used in the remainder of this report as shorthand for authorised foreign exchange dealers. While not all Australian banks are foreign exchange dealers and not all foreign exchange dealers are banks, the bulk, by value, of foreign exchange dealing in Australia is undertaken and settled by banks. It should be noted though, that both bank and non-bank foreign exchange dealers were represented in the two surveys conducted by the RBA.

<sup>2</sup> The Group of Ten countries are Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States.

<sup>3</sup> According to the latest BIS survey of activity in global foreign exchange markets, which was conducted in April 1998, the Australian market ranked ninth in terms of global turnover, while the AUD was the eighth most actively traded currency. Both of these rankings are unchanged from April 1995 when the previous BIS survey was conducted. However, the AUD's ranking has increased slightly since 1998. The recently introduced euro replaced the Deutsche mark and the French franc which were both higher placed than the AUD.

### **1.3 Objectives of the 1998 RBA survey**

The second survey provided the basis for assessing:

- the extent of progress by Australian banks in managing foreign exchange settlement risk;
- how progress compared with that in the G10 countries; and
- what further steps are needed to ensure that participants in the Australian market are operating at international best practice in managing their foreign exchange settlement exposures.



## 2. METHODOLOGY

### 2.1 Definition

Foreign exchange settlement exposure is defined as:

*A bank's actual exposure - the amount at risk - when settling a foreign exchange trade equals the full amount of the currency purchased and lasts from the time a payment instruction for the currency sold can no longer be cancelled unilaterally until the time the currency purchased is received with finality.*<sup>4</sup>

The definition addresses only the *size* and *duration* of the credit exposure that can arise during the foreign exchange settlement process. It says nothing about the *probability* of an actual loss.

A standard methodology for measuring this risk used in both surveys is described in *Annex A*.

### 2.2 Location of foreign exchange settlement exposure

This study focuses on those foreign exchange transactions where the settlement risk is borne in Australia. It captures all the AUD and foreign currency payments/receipts on the Australian books of banks. It does not capture the AUD related payments/receipts settled by Australian banks acting as correspondent (agent) for banks recording the transaction on books outside Australia. Thus, the settlement risk arising from a transaction undertaken by the London office of a bank but written on the Australian books is borne by the Australian entity and therefore included in this study. On the other hand, the settlement risk arising from the AUD leg of a transaction on the New York books of a bank but settled by an Australian correspondent is borne by the New York entity, not the correspondent, and is not captured by this study.

### 2.3 Comparing 1998 and 1997 results

In the 1997 survey, only data on gross flows (i.e. before netting) was sought. While some banks had netting arrangements in place, the legal position in Australia at that time was uncertain. Netting arrangements in Australia have since been given legal certainty by the *Payment Systems and Netting Act 1998*. Accordingly, the 1998 survey (see *Annex B*) sought data on settled foreign exchange transactions, both on a gross basis (i.e. before netting) and on an amount settled basis (i.e. after netting under bilateral netting arrangements).

#### 2.3.1 Sample selection

The 1998 survey was of 21 banks. The sample consisted of the same banks as in 1997 with three omissions which have respectively withdrawn from the Australian market, merged and commenced booking business in another jurisdiction. As the three banks were relatively small players in the Australian foreign exchange market, their absence from the 1998 survey does not materially affect comparisons with the 1997 results.

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<sup>4</sup> BIS (1996), *Settlement Risk in Foreign Exchange Transactions*, p.8.

The 21 banks surveyed accounted for some 90 per cent of local market turnover. *Annex C* has a complete list of respondents.

While it was the RBA's intention, in the interests of consistency, to conduct the 1998 survey during April, the same month as the 1997 survey, this was not practical. Given the pressures on banks associated with the introduction of RTGS and the reporting burden associated with the April 1998 BIS triennial survey of foreign exchange turnover, it was decided to delay the survey until October 1998. Banks' regular reporting of foreign exchange turnover suggests no significant seasonality between April and October.

### **2.3.2 Data collection**

The 1998 survey sought quantitative and qualitative information on foreign exchange settlement practices. It closely mirrors the survey conducted by the G10 central banks during October/November 1997.

There were several changes in the design of the 1998 survey reflecting the introduction of RTGS and the passing of the *Payment Systems and Netting Act 1998*. Information on multilateral netting was sought, but subsequent to the survey the services of the sole remaining multilateral netting scheme, the Exchange Clearing House Limited (ECHO), were suspended.

### **2.4 Caveat**

Despite participation in the previous survey, several respondents again experienced difficulties in completing the survey. As in 1997, the RBA held follow-up discussions with several respondents in order to correct obvious errors or omissions and to clarify some responses. This error-checking process delayed the release of this report.

Despite this follow-up process, the RBA remains sceptical about elements of the quantitative data supplied by some banks. This was also the case with the 1997 survey. However, it believes that the information detailed in this report is a fairly accurate representation of the settlement practices of the broad Australian market.

### 3. SETTLEMENT PRACTICES IN THE AUSTRALIAN FOREIGN EXCHANGE MARKET

#### 3.1 Currencies

During October 1998, banks participating in the survey reported foreign exchange settlements in 44 currencies.<sup>5</sup> A complete list of currencies, together with the number of traders per currency, can be found in *Annex D* of this report. All respondents indicated that they had settled transactions in AUD, USD, JPY, CAD, DEM and GBP, while only a few respondents had not settled transactions in CHF, FRF, HKD and NZD. The rankings of the currencies were largely unchanged from 1997, especially amongst the major traded currencies.

When measured in terms of value, USD and AUD settlements again dominated, accounting for roughly three quarters of all foreign exchange activity in Australia.<sup>6</sup> The USD represented around half of total payments and receipts, indicating that it is on one side of virtually all foreign exchange transactions where the settlement risk is borne in Australia. When settlements in JPY, DEM, GBP and NZD are added to those in USD and AUD, these six currencies accounted for over 95 per cent of the value for the month, the same result as in the 1997 survey.

While the average daily values of transactions in all other currencies were much smaller than those recorded for the six most actively traded currencies, the value of an individual transaction in one of these currencies, on any given day, could be large. Thus it should not be assumed that foreign exchange settlement risk is only an issue for actively traded currencies.

#### 3.2 Settlement methods

Foreign currency payments and receipts were made principally through the use of a nostro account held with another (i.e. unrelated) bank (*Annex D*). Some Australian banks also used a parent or subsidiary to settle foreign currency transactions. Most survey respondents directly settled AUD transactions. These were essentially the same findings in 1997.

#### 3.3 Duration of exposures

##### 3.3.1 Introduction

The duration of foreign exchange settlement exposure - i.e. the time during which the bank is at risk - lasts from when the sold currency can no longer be cancelled

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<sup>5</sup> This is down 7 from the 51 currencies settled in April 1997, but the decline is not material as some minor currencies are only settled by Australian banks infrequently.

<sup>6</sup> The survey asked for all foreign exchange settlements to be reported in terms of the original contracted currency. In order to aggregate these amounts, they were converted into a base currency, the AUD, at the average exchange rate prevailing for the month of October. Strictly, such conversions should have been made at the exchange rate applying at the time each individual transaction was entered into, but that would have been a very onerous task for the respondents. Given the relative stability of most currencies during the survey period, the RBA does not believe that the methodology adopted leads to a material difference in the analysis.

*unilaterally* until the time when the receipt of the bought currency is confirmed *with finality* (or has been identified as failed). A bank therefore has two avenues open to it in order to reduce the duration of the exposure:

- it can extend the period during which it can unilaterally cancel the instruction to deliver the sold currency; and/or
- it can reduce the period during which it confirms that the bought currency has been received with finality, or that it did not receive the bought currency from its counterparty.

The RBA's 1997 report calculated the duration of settlement risk for the industry as the difference between the average cancellation time and the average reconciliation time (both weighted by value). That provided a benchmark against which the results of subsequent surveys could be measured. This report also uses that measure. However, the results of the two surveys have highlighted that weighted averages frequently mask what is happening in individual banks - one large bank may, for example, distort the picture of what is happening in the industry more broadly. The current report thus describes the experience of the individual banks, although for confidentiality reasons they have not been identified.

The analysis concentrates on the USD, AUD and, to a lesser extent, JPY. These three currencies accounted for over 80 per cent of settlements during October. A listing of industry-weighted average cancellation and reconciliation times for all currencies settled by Australian banks during October can be found in *Annex E*, along with summary statistics illustrating the degree of variation in the results.

### **3.3.2 The data**

In framing the 1997 survey, considerable effort was made to ensure consistency of responses between banks. The subsequent analysis, though, cast doubt as to whether this had been achieved, including in the reporting of cancellation and reconciliation times. Consequently the issue of consistency was at the forefront when the 1998 survey was prepared. Again though, the RBA is far from confident that the basis of the various banks' reporting of their cancellation and reconciliation times is consistent.

The RBA has identified a number of reasons behind the differences in reporting:

- a poor understanding within some reporting banks of the issues;
- a poor understanding of the issues by overseas correspondent banks which were requested by their Australian principals to provide data for the survey;
- inadequately documented agreements establishing correspondent arrangements; and
- different interpretations amongst the reporting banks as to when receipts are reconciled and fails identified. There were two aspects to this. First, the accounting systems for banks, especially the larger banks, can be quite complex and contain a number of layers of accounts. One bank may consider the reconciliation of foreign exchange receipts complete on the basis of reconciling

one account, while another may not consider it complete until a full reconciliation of all affected accounts has been undertaken. The second aspect relates to banks' internal processes to identify discrepancies and to determine that it has "identified final and failed receipts of bought currencies".

Consideration was given to inviting all the participants in the survey to review their responses in the light of industry aggregates. In fact, during discussions some banks requested this. The decision taken by the RBA, however, was to assume that the original survey responses represented each bank's understanding of foreign exchange settlement risk. Consequently, variations in cancellation and reconciliation times reflected not only that individual banks had different durations of risk for the same currencies, but also that different banks had different understandings of the risk.

### **3.3.3 Cancellation times**

The operating hours of the respective payments systems set the broad parameters for the cancellation of payments. Ideally it should not be necessary for the cancellation deadline to be any earlier than the opening of the relevant payments system.<sup>7</sup> The second parameter is the close of the relevant payments system. By then, the paying bank has either delivered the local currency or has failed to do so. The later the cancellation deadline, the shorter the duration of the settlement risk. At first glance then, the ideal cancellation deadline would be just before the close of the payments system.

But there are times when removing risk from one part of the financial system simply adds risk to another part without any reduction in risk overall. That could be the consequence of moving all foreign exchange related payments to late in the day, especially in an RTGS system. In Australia around half, by value, of AUD payments made each day are related to foreign exchange transactions. These payments are not made in isolation from domestic payments. For example, a foreign exchange related payment may fund the purchase of domestic securities. Therefore, to unilaterally move all AUD foreign exchange related payments to late in the day (to reduce the duration of foreign exchange settlement risk) could disrupt the redistribution of liquidity in the domestic payments system and increase the danger of system gridlock.

There are, nonetheless, steps banks may be able to take to achieve later cancellation times. Banks making payments, either as principal or correspondent, should examine whether their own internal systems can be improved, including to enable the cancellation of a payment without disrupting other payments due to be made. Improved correspondent relationships could include cancellation deadlines - possibly stipulating a time up to which the ability to cancel is guaranteed followed by a (later) "best efforts time". Few Australian banks have legally enforceable agreements with their correspondents for cancelling payments. Although somewhat surprising, such an outcome is consistent with the experience in the G10 countries.

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<sup>7</sup> This is the "reference cancellation deadline" used in the two CPSS surveys.

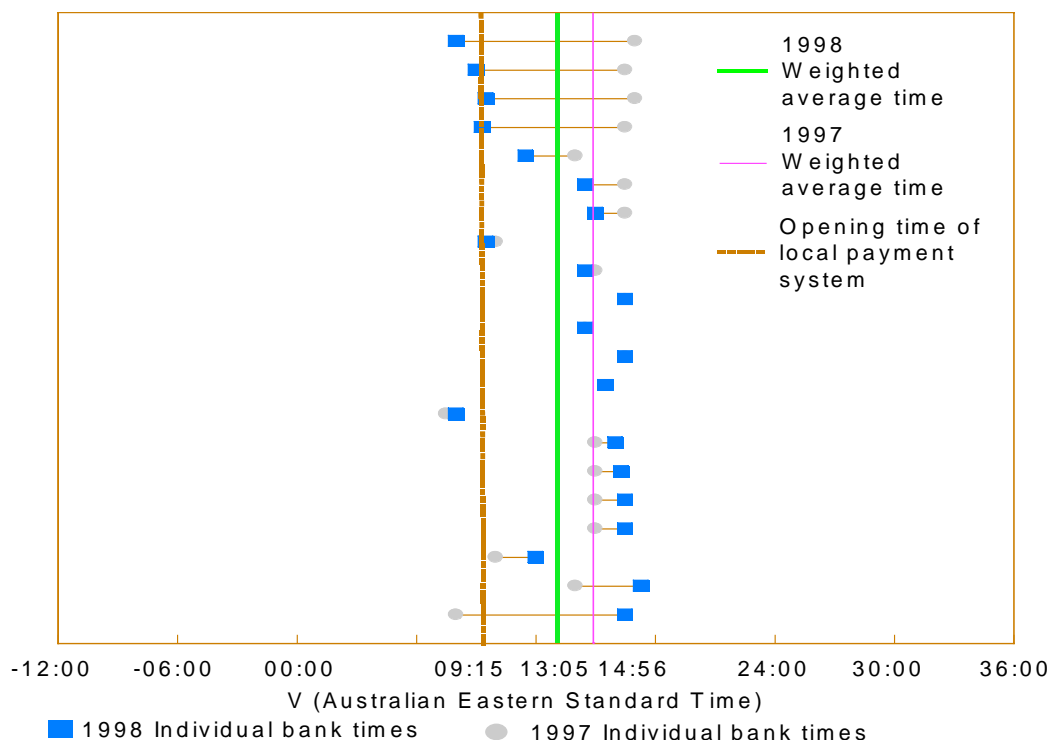
### 3.3.4 Presenting the data

The following sections include graphical presentations of some of the survey data. The  $x$  axis represents time, with 09.00 being 9 am on settlement date, V. A continuous, rather than a 24 hour, clock is used so that 36.00 is midday on V+1. The vertical lines show the opening (closing) time of the local payments system and the weighted average<sup>8</sup> cancellation (reconciliation) times reported in the 1997 and 1998 surveys. The actual cancellation and reconciliation times for each bank surveyed are represented by a light circle for 1997 and a dark square for 1998. As noted earlier, individual banks are not identified and their positions on the various diagrams vary.

### 3.3.5 AUD cancellation times

Diagram 1 shows the 1998 weighted average AUD cancellation time is slightly earlier in the day, thus marginally increasing the period at risk. This is largely the result of a small number of banks moving their cancellation deadlines from late in the day, under the net deferred settlement system through which high value payments were settled in April 1997, to earlier in the day under the RTGS system. Importantly though, from a risk reduction perspective, with only a few quite small exceptions (in terms of time) all banks surveyed had a cancellation deadline for foreign exchange related AUD payments after the opening of the payments system.

**Diagram 1**  
**AUD Cancellation Times<sup>9</sup>**



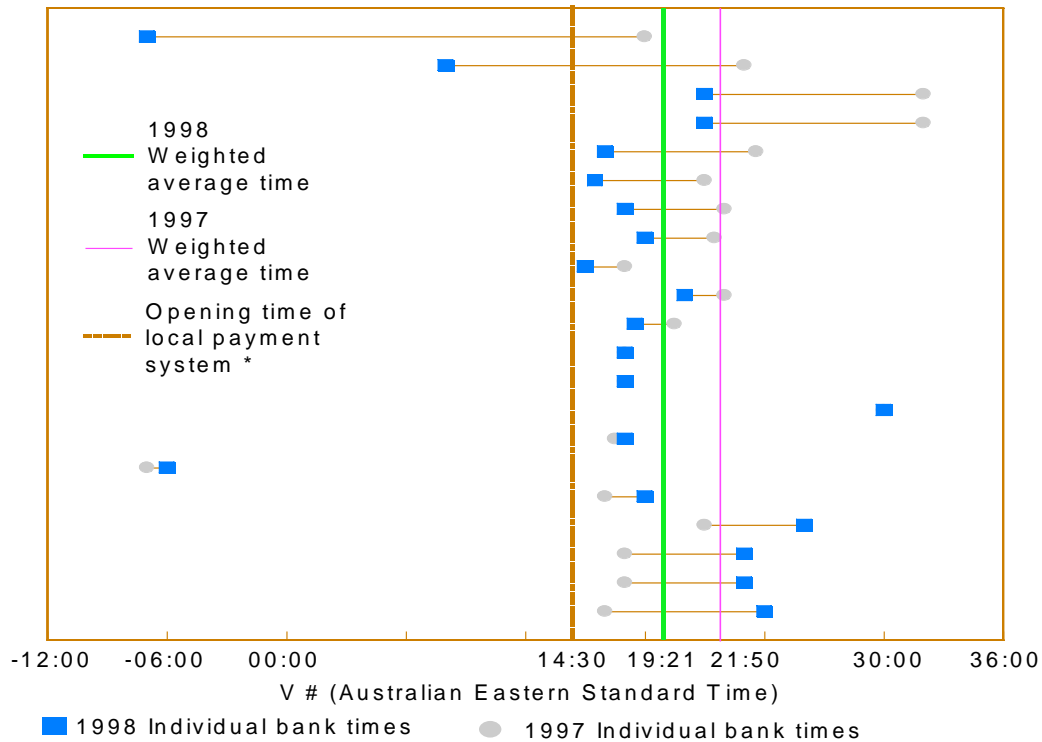
<sup>8</sup> The weights applied to the 1997 numbers were derived from the gross value of payments and receipts, whereas the 1998 times were weighted using the netted values which had been collected for the first time. Netted values better reflect the amounts at risk, although the weighted average times derived from the netted amounts are little different to the weighted average times derived from gross amounts.

<sup>9</sup> Refer to Sections 3.3.2 and 3.3.4.

### 3.3.6 USD cancellation times

In Diagram 2, it can be seen that most banks are able to cancel payments quite some time after the US payments systems' opening times. That is, at least partly, because while the US payments systems (both Fedwire and CHIPS) open at 00.30 local time, few payments are made before 09.00. (The early opening was introduced as part of a strategy to achieve overlap between payments systems in various countries.)

**Diagram 2**  
**USD Cancellation Times<sup>10</sup>**



- \* By the time of the second survey, the opening times of the two main interbank funds transfer systems (Fedwire and CHIPS) had been brought forward to 00.30.
- # In the last week of October 1998, daylight saving commenced in Australia but ended in the USA. This does not materially affect the results because cancellation times are essentially unchanged during daylight saving.

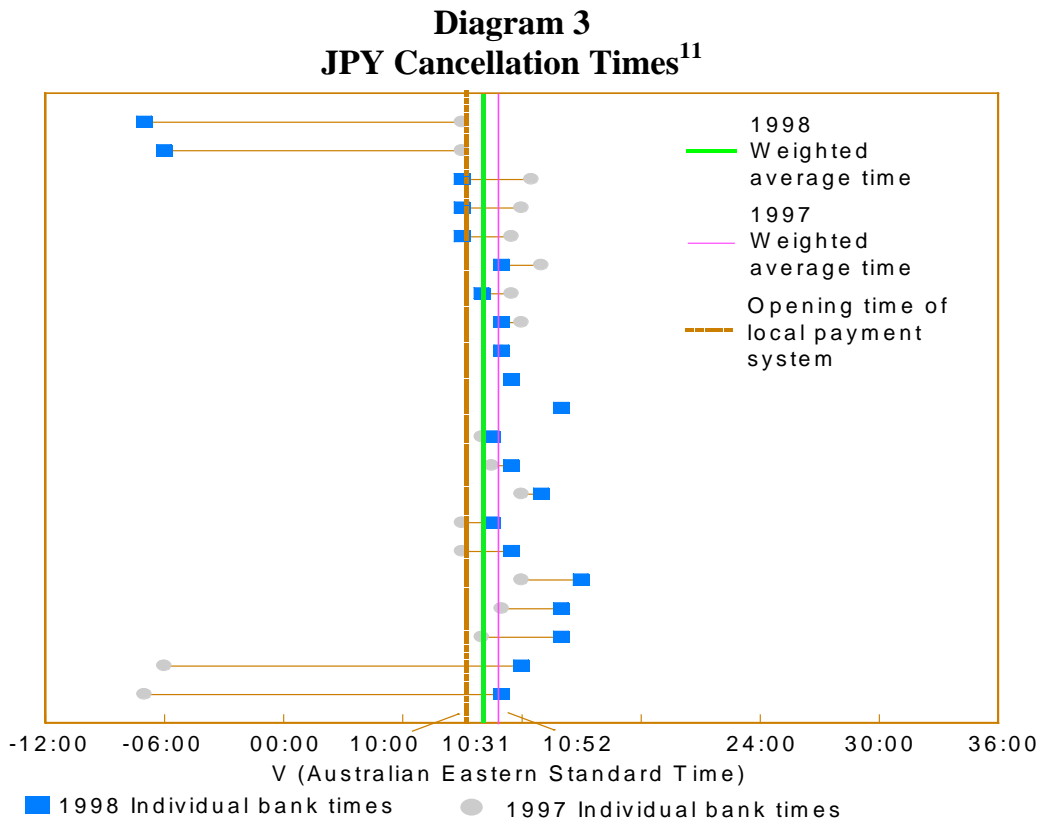
The weighted average cancellation time for USD settlements is also a little earlier than was the case with the 1997 survey. But the diagram also shows that the weighted averages mask significant changes between individual banks. Interestingly, at least one of the banks which reported a significantly earlier cancellation time in 1998 than in 1997 did so not because of a change in the arrangements with its correspondent, but because, on reflection, it believed that the later (i.e. 1997) cancellation time could only be achieved on a best efforts basis. The uncertainty implicit in such reporting is a cause for concern. It is important to note that a likely reason why a bank will seek to cancel a foreign exchange related payment is because the counterparty has either not delivered, or is expected to be unable to deliver, the currency on the other side of the transaction. In such times of crisis, it is important that banks and their correspondents have a clear understanding of their contractual arrangements.

<sup>10</sup> Refer to footnote 9.

Some banks have extended USD cancellation times. For example, a bank reporting one of the earliest cancellation times has since established a 24 hour service to allow cancellation of USD payments up until the opening of the US payments systems. This is a welcome development.

### 3.3.7 JPY cancellation times

The weighted average cancellation time for JPY changed very little between the two surveys (Diagram 3).



However, two banks reported much improved (i.e. later) cancellation times, while another two banks reported cancellation times much earlier than was the case in 1997 – in one case a bank adopted a stricter interpretation of the cancellation deadline in 1998, suggesting perhaps that the 1997 time was on a different (i.e. best efforts) basis. Thus, the apparent deterioration in its cancellation time is due not to any actual changes in settlement practices or correspondent arrangements, but to a changed interpretation of the same question over the two surveys.

### 3.3.8 Reconciliation times

It is in the area of reconciliation (rather than cancellation times) that Australian banks appear to have the greater scope to reduce the period they are exposed to settlement risk. Banks should seek ways to minimise the period from when a payment is due to be received until they know with certainty that it has been received (or has failed). Where banks are direct participants in the payments system of the currency being

<sup>11</sup> Refer to footnote 9.



received, it is only their own systems that dictate the speed of the reconciliation process. Where correspondents are used, banks should require that nostro statements are forwarded promptly and, ideally, in a format compatible with their own reconciliation systems.

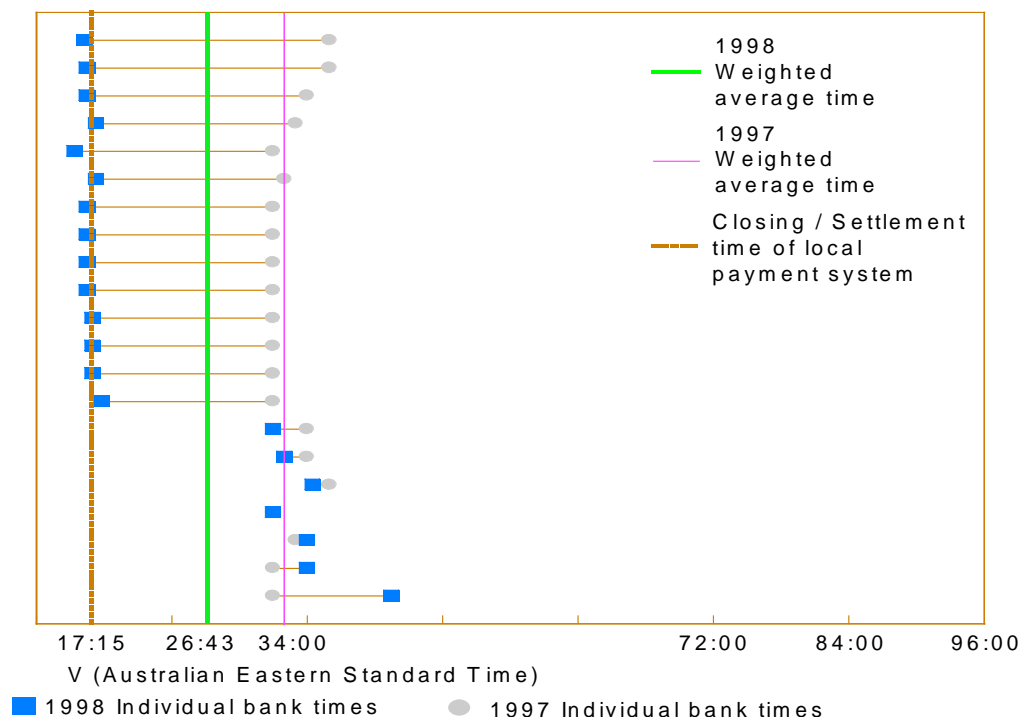
While the front offices of many Australian banks operate over extended hours, possibly involving two or more shifts, the back offices generally operate only during normal business hours. As the receipt of nostro statements is related to the closing time of overseas payments systems, not Australian business hours, there can be quite a delay in reconciling receipts where the nostro statement is received during the Australian night.

### 3.3.9 AUD reconciliation times

When high-value payments were settled under Australia's net deferred settlement system, receipt with finality was not achieved until 09.00 on the morning after value date. In practice, many banks commenced their reconciliation of AUD payments soon after the close of the payments system so that they were able to confirm received and failed payments immediately after the 09.00 settlement the next morning.

Under RTGS payments become final as they are made. As shown in Diagram 4, many banks reported that the reconciliation of their AUD payments was complete by the close of the Australian payments system, reflecting internal systems that were able to track payments during the course of the payments day. Typically nostro agents do not prepare intraday statements, so banks using nostro agents must await end-of-day statements before commencing their reconciliations.

**Diagram 4**  
**AUD Reconciliation Times<sup>12</sup>**

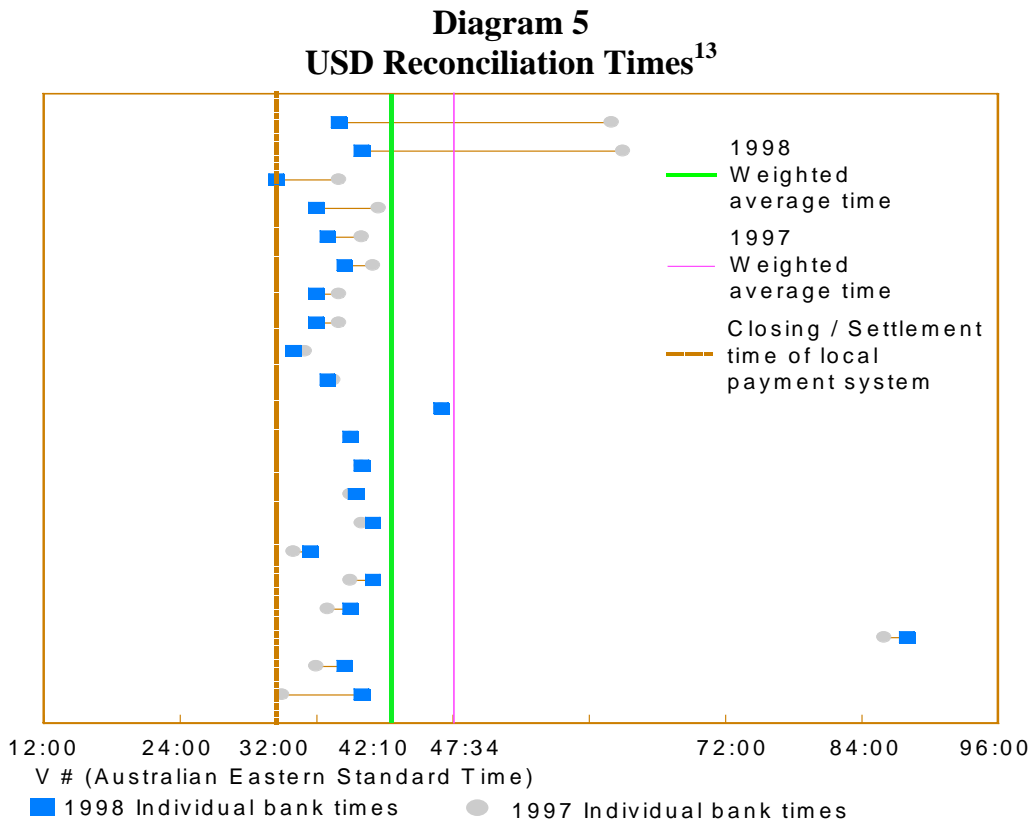


<sup>12</sup> Refer to footnote 9.

Banks that write their global AUD business on their Australian books have found it difficult to track receipts during the course of the day. Further enhancements were required to take full advantage of the benefits of RTGS, from a reconciliation perspective, including for the business written locally.

### 3.3.10 USD reconciliation times

The weighted average reconciliation time for the USD also fell significantly; by five hours. However, as Diagram 5 illustrates, this improvement owed more to two banks making very large reductions in reconciliation times, than to an industry wide improvement. For most banks, reconciliation times for the USD were little changed; further reductions should be possible.



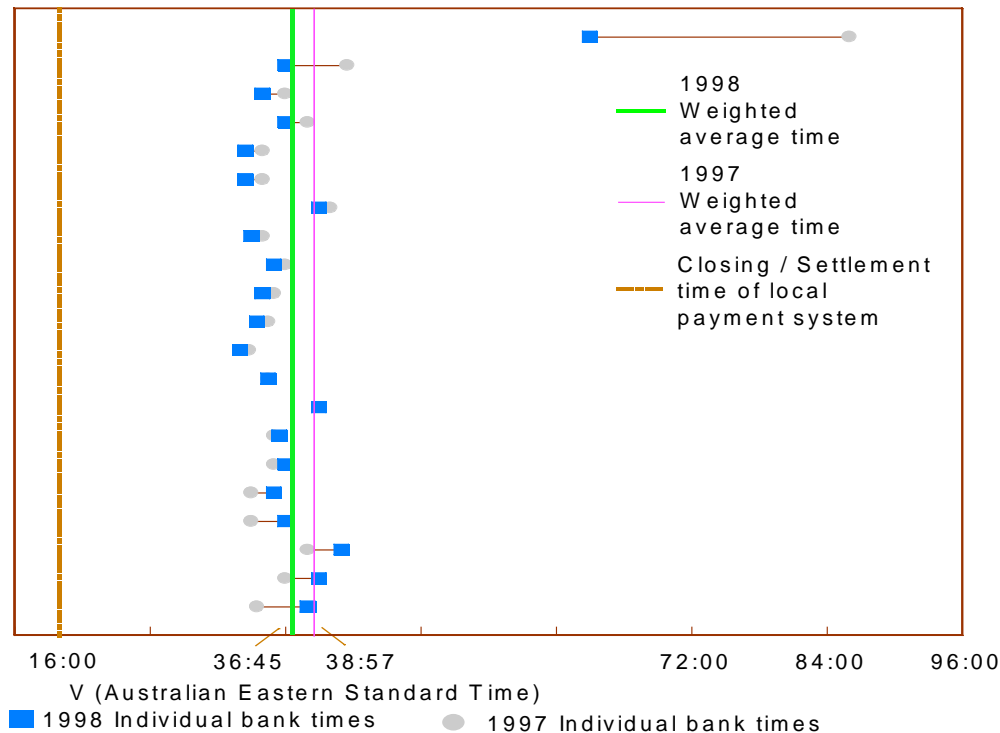
# In the last week of October 1998, daylight saving commenced in Australia but ended in the USA. This does not materially affect the results because reconciliation times are essentially determined by US time.

<sup>13</sup> Refer to footnote 9.

### 3.3.11 JPY reconciliation times

There was a small reduction in the weighted average JPY reconciliation time (Diagram 6), but it was almost entirely due to one large bank, which previously reconciled a long time after other banks, moving closer to the norm.

**Diagram 6**  
**JPY Reconciliation Times<sup>14</sup>**



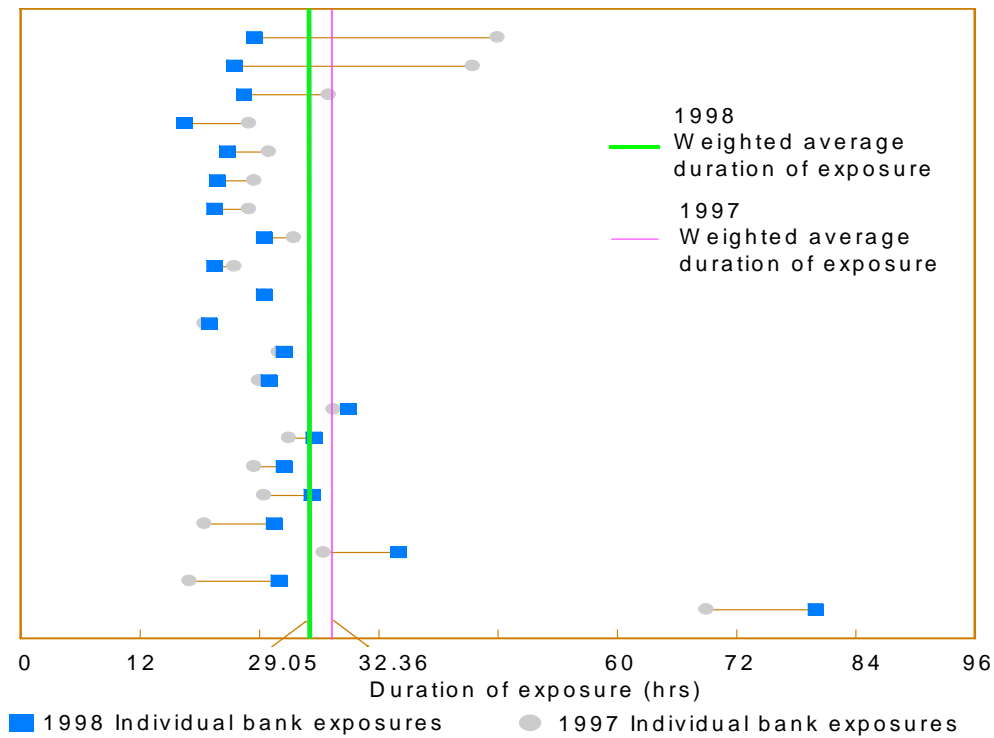
The reconciliation of JPY payments is one example where the constraint on significant reductions in times is the operational hours of the back offices of Australian banks. Typically, the nostro statements from JPY correspondents are received late in the Australian evening. While some banks undertake automated matching overnight, the reconciliation is not completed until back office staff commence work the next morning.

### 3.3.12 AUD sold - USD purchased

Because the most significant currency pairing in the Australian market is the AUD/USD and because the duration of the risk is longer when it is the USD that is purchased, it is worth examining the changes in times for individual banks for this critical currency pair. Diagram 7 below is a variant of the earlier diagrams and brings together the individual bank data for AUD cancellation times and USD reconciliation times. The *x* axis records elapsed time, not time of day (which was the *x* axis on Diagrams 1 to 6).

<sup>14</sup> Refer to footnote 9.

**Diagram 7**  
**Duration of Exposure: AUD Sold – USD Purchased<sup>15</sup>**



While the weighted average duration fell between 1997 and 1998, it can be seen that a significant number of banks reported an increased duration of risk.

### 3.3.13 USD purchases and sales

As noted earlier, the USD is on one side of virtually all foreign exchange transactions in the Australian market; the only other currency pairings of note involve trading against the AUD, JPY and DEM.<sup>16</sup> Table 1 shows the results for the more significant currency pairs traded in the Australian market, along with 1997 results. Importantly, the significant variations in the duration of foreign exchange settlement risk, depending on whether a bank is on the bid (buy) or offer (sell) side of the transaction, are again only partly explained by time zone differences.

<sup>15</sup> Refer to footnote 9.

<sup>16</sup> For further information see 'Survey of Foreign Exchange and OTC Derivatives Turnover', Reserve Bank of Australia Media Release, 29 September 1998, and 'Australian Financial Markets', Reserve Bank of Australia *Bulletin*, March 1999.

**Table 1**  
**Industry weighted average exposure in hours**  
 (April 1997 figures are in brackets)

<b>Currency pair</b>	<b>USD bought</b>	<b>USD sold</b>
AUD/USD	29 (33)	7 (12)
USD/DEM	26 (31)	18 (22)
USD/JPY	32 (37)	17 (17)
NZD/USD	33 (37)	17 (18)
GBP/USD	25 (29)	29 (24)
USD/CHF	27 (32)	17 (30)
USD/FRF	27 (32)	21 (20)
USD/MYR	29 (35)	14 (27)
USD/SGD	31 (36)	21 (24)
USD/HKD	31 (35)	17 (18)

Because the United States is in the “last” time zone, the length of foreign exchange settlement risk is generally shorter for transactions where the USD was sold, rather than where the USD was bought. That there is settlement risk in transactions where the USD was sold reflects cancellation and reconciliation practices rather than time zone differences, which work in favour of the bank paying USD (i.e. AUD is received before USD is paid).

There has been a uniform reduction in the duration of settlement risk for the main currency pairs involving USD purchases. However, as was noted earlier, this is almost entirely because two banks (accounting for some 20 per cent of USD receipts) reduced their reconciliation by 24 hours. These banks were outliers in 1997; their current times now match the industry. Apart from these there have been only marginal gains in relation to USD purchases.

For USD sales, the reductions in risk are due to improvements in reconciliation times for the bought currencies. But again for many of the currency pairs, changes from the 1997 survey were not evenly spread amongst the banks. For example, the GBP/USD outcome largely reflected two banks, which together accounted for over half of all GBP receipts, reporting a deterioration in reconciliation times.

### 3.3.14 AUD purchases and sales

As noted earlier, the overwhelming majority of foreign exchange transactions in AUD involve the USD on the other side. However, some direct cross-rate trading does occur, albeit in low volumes, against other currencies. Table 2 shows the weighted average time, in hours, that foreign exchange transactions are at risk for the five most actively traded AUD pairs.

**Table 2**  
**Settlement risk on AUD transactions in hours**  
 (April 1997 figures are in brackets)

Currency pair	AUD bought	AUD sold
AUD/USD	7 (12)	29 (33)
AUD/JPY	16 (23)	24 (25)
AUD/DEM	11 (17)	24 (30)
AUD/NZD	18 (24)	24 (26)
AUD/GBP	9 (16)	35 (32)

The data above makes clear that foreign exchange settlement risk on AUD transactions is much more than a time zone problem. Settlements involving AUD payments against receipts of JPY and NZD are at risk for around 24 hours (virtually unchanged from 1997), despite the small time zone differences that exist between Sydney, Tokyo and Wellington. As in 1997, not one of the respondents to the survey reconciled these payments before the Australian market re-opened next morning, although settlement with finality is achieved during the Australian day or early evening. The extended period of risk for these currencies is thus due not to time zone differences, but to the settlement practices adopted by the banks themselves.

### 3.3.15 Other currencies

Table 3 lists the weighted average cancellation and reconciliation times for the main currencies traded in Australia, both for 1997 and for 1998. These 12 currencies collectively accounted for over 99 per cent of the total value of foreign exchange settlements in October 1998.

**Table 3**  
**Weighted average cancellation and reconciliation times\***  
**(hours)**

Currency	1998 Times		1997 Times		Change#		Total Gain#
	Cancel	Identify	Cancel	Identify	Cancel	Identify	
AUD	13.1	26.7	14.9	34.0	-1.9	-7.3	5.4
CAD	18.7	43.9	21.0	54.5	-2.2	-10.6	8.4
CHF	14.9	36.1	15.5	51.5	-0.7	-15.4	14.8
DEM	15.8	36.9	16.7	43.7	-1.0	-6.8	5.9
ECU	14.9	53.9	22.3	43.1	-7.4	10.8	-18.2
FRF	15.1	40.0	15.2	41.7	-0.1	-1.7	1.6
GBP	17.2	48.0	18.3	46.3	-1.0	1.7	-2.8
HKD	11.3	36.4	12.2	39.8	-0.8	-3.4	2.5
JPY	10.5	36.8	10.9	39.0	-0.3	-2.2	1.9
NZD	9.1	36.6	10.5	40.1	-1.4	-3.6	2.1
SGD	11.0	40.7	11.6	45.6	-0.5	-4.9	4.4
USD	19.3	42.2	21.8	47.6	-2.5	-5.4	2.9

\* The times are reported on a decimal basis, e.g. a time of 09.50 hours represents 9.30 am on V.

# For cancellation times a negative change represents a deterioration since 1997, while for reconciliation times a negative change represents an improvement over 1997.

Table 3 shows that where there have been improvements since 1997, they have been achieved mainly through earlier reconciliation times. Cancellation times for the major currencies have, in fact, deteriorated since 1997.

More detailed information on these and the remaining currencies settled during October 1998 can be found in *Annexes D, E and F*.

### 3.4 The use of bilateral netting

Legally enforceable netting reduces settlement exposures because only the smaller, net amounts are settled. Accordingly, the 1998 survey sought detail on banks' bilateral netting practices.

Tables 4 and 5 compare Australian practice with banks in the G10 countries.

**Table 4**  
**Number of Counterparties Used for Bilateral Netting**

	% of banks having this number of counterparties for bilateral netting	
No. of counterparties for bilateral netting	Australia	G10*
0 counterparties (i.e. no bilateral netting)	38%	23%
1-20 counterparties	29%	34%
21-100 counterparties	24%	23%
Over 100 counterparties	10%	19%
	} 62%	} 77%

\* Data are from the 1998 CPSS report

**Table 5**  
**Use of Bilateral Netting With Major Counterparties**

Top counterparties ranked by value of trades	On average, banks netted bilaterally with this many of their top counterparties#	
	Australia	G10*
Top 10	2	4
Top 25	3	7
Top 50	6	12

\* Data are from the 1998 CPSS report

# Including all banks in the survey (i.e. including banks with no counterparties for bilateral netting)

Australian banks lag behind G10 banks in the use of bilateral netting, with only 62 per cent of Australian banks engaged in bilateral netting with their counterparties compared to 77 per cent of G10 banks surveyed by the CPSS. Further, Australian banks make use of bilateral netting with only half the number of major counterparties compared to the G10 banks. Nevertheless, while individual Australian banks have been using bilateral netting for some time, it should be borne in mind that it was only since July 1998 that there has been legal certainty to netting in Australia.

Despite a lower usage of netting, Australian banks have achieved the same reduction in their gross settlement amounts - 15 per cent - as the G10 banks. Table 6 shows the effectiveness of netting for Australian and G10 banks.



**Table 6**  
**Effect of Bilateral Netting**

	Australia	G10*
A. Share (%) of gross settlement flows subject to netting	20%	29%
B. Percentage (%) reduction in gross settlement flows due to netting	15%	15%
Strength of Netting# (B/A)	76%	50%

\* Data are from the 1998 CPSS report

# Effect of netting on the portion of the gross flows to which it was applied

### 3.5 Magnitude of exposures

The 1997 report showed that the amount at risk accumulated as the exposure from day one settlements was not fully extinguished when the exposure from day two settlements started to build. Since then improvements in settlement practices (discussed in Section 3.3) have meant that the accumulation of risk from one day to the next is of less significance for most banks. Further, netting has reduced the values at risk. Nevertheless, we estimate that the foreign exchange settlement risk borne by Australian banks remains in excess of \$A100 billion a day. While this is a welcome reduction, it still exceeds the combined capital of the banks.

### 3.6 Comment

The results reported in this survey suggest that progress by individual banks in improving cancellation and reconciliation times has been disappointing; reductions in the duration of risk have been modest. Improved reconciliation times are due mainly to the introduction of RTGS in Australia and the gains reported by one or two banks which were outliers in 1997.

Receipts often continue to be confirmed late on the business day following value date or later. Such delays are internal and under the control of banks, though remedying them may require their back offices operating a late/night shift.

The G10 central banks did not include the AUD in their surveys and so no direct comparisons can be made for AUD/USD transactions, the most significant currency pair traded in the Australian market.<sup>17</sup> However, some comparisons can nonetheless be made. The 1998 CPSS survey found that the cancellation and reconciliation times in the G10 for twelve key currencies as a whole both improved by about an hour since 1996. For Australia there has been a deterioration of about two hours in cancellation times and an improvement in reconciliation times of about five hours, for a net reduction in the duration of risk of three hours.

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<sup>17</sup> The same also applies to NZD/USD transactions; a currency pair more actively traded in Australia than either GBP/USD or USD/CHF, but one which is not traded widely in most of the G10 countries.

## **4. RISK MANAGEMENT PRACTICES**

### **4.1 Introduction**

The RBA questionnaire asked respondents to describe the risk management practices that they employ when settling foreign exchange transactions and to note changes to their processes and systems since April 1997. The common themes arising from the responses are discussed below.

### **4.2 Exposure limits**

Little has changed in the way banks manage foreign exchange settlement exposures with individual counterparties. The risk continues to be managed mainly by the use of mandatory limits applied to settlement exposures which are monitored at least daily. Counterparty exposure limits are usually applied to the global operations of the banks surveyed.

Most respondents produced daily reports for senior management of breaches of counterparty limits. These breaches are investigated and must be approved or otherwise actioned.

Few banks managed aggregate exposures. One bank reported that it could not manage aggregate exposures due to system limitations. In place of limits on aggregate exposures, some respondents have set limits on the net open position in any one currency. While net open positions may capture the cumulative exposure to one currency, they do not capture the combined risk created by exposures in several different currencies.

Given the limited progress in this area, the RBA again strongly encourages Australian banks to improve the measurement and management of their settlement exposures, both across currencies and across time, as outlined in the 1997 survey (see also *Annex A*) and in the 1996 and 1998 CPSS reports.

### **4.3 Reducing the time at risk**

Respondents were asked about plans to shorten the periods of “irrevocability” and “uncertainty” as described in *Annex A*. Several respondents reported that they had no such plans, in some cases because they believed that they operated at best practice and/or their periods of exposure were already the shortest possible. All banks will be able to identify themselves in Diagrams 1-7 and compare their results with those of other banks.

Several banks indicated that they were negotiating with their correspondents to formalise and/or improve cancellation and reconciliation times. One aims to have the flexibility to delay payment orders until the opening time of the local payments system.

Few banks have established legally enforceable agreements regarding cancellation deadlines with their correspondent banks although, as shown in Table 7, the G10 experience is similar.

**Table 7**  
**Documentation of cancellation deadlines**

	Australia	G10*
Share (%) of banks with documented cancellation times for a majority or all of the currencies settled	14%	14%
Share (%) of banks with no documented cancellation times	76%	68%

\* Data are from the 1998 CPSS report

Several respondents reported upgrading their foreign exchange settlement systems to improve the reconciliation process, thereby reducing reconciliation times. A number of approaches to achieving this are being used. These include the installation of new systems which focus more on exception reporting, the automatic input and reconciliation of correspondent statements and requesting correspondents to send SWIFT MT910 messages (i.e. confirmations of credit) as payments are received. Banks are also consolidating nostro accounts, allowing them to focus on the more critical accounts.

#### **4.4 Continuous linked settlement (CLS)**

The major international initiative to reduce foreign exchange settlement risk is the establishment of CLS Bank by the world's largest commercial banks. The CLS Bank will be a US-chartered (and supervised) bank, operating out of London for time zone reasons. To remove foreign exchange settlement risk, banks would settle both legs of each foreign exchange transaction across the CLS Bank's books on a payment-versus-payment basis. Settlement commitments would be known at the beginning of each day and banks would only pay into the CLS Bank their net short positions in each currency and would receive their net long positions. These payments would be made through settlement accounts that the CLS Bank would hold with the respective central banks. Banks can go into overdraft in individual currency accounts but would have to keep their overall balance with the CLS Bank in credit at all times. The CLS Bank's core hours of operation will be from 7.00 to 12.00 Central European Time. In Australia, this equates to 15.00 to 20.00 and 17.00 to 22.00 in summer.

There are over 60 shareholders in the holding company for CLS Bank, including the four Australian major banks and the head offices of several foreign banks operating in Australia. The RBA has made clear its view that the AUD should be included as an eligible CLS currency.

CLS Bank is expected to commence operations in late 2000 with the AUD becoming an eligible currency in early 2001.

CLS Bank has the potential to lead to very significant reductions in foreign exchange settlement risk, albeit at a cost. However, despite this potential, banks should bear a number of factors in mind:

- CLS Bank is still 18 months away and is unproven;
- not all currencies will be settled by CLS Bank;
- not all transactions in the eligible currencies will be settled by CLS Bank; and
- not all banks will be able to directly access the services of CLS Bank and will have to use correspondent banks to avail themselves of its risk reduction capabilities.

The need to manage settlements undertaken outside CLS Bank will continue and new arrangements will have to be developed to manage those settlements undertaken in CLS Bank.

#### **4.5 Impact of RTGS**

Internationally, the trend towards establishment of RTGS systems for the settlement of high-value payments such as foreign exchange transactions has continued. Over 80 per cent of foreign exchange flows on the Australian books of banks can now be settled on an RTGS basis. However, it should be stressed that the introduction of RTGS systems only provide banks with the *opportunity* to reconcile final receipts. As noted earlier, Australian banks have yet to do so, especially in the Asia-Pacific time zone, thereby prolonging their exposures unnecessarily.

#### **4.6 Other means to reduce risk**

The 1997 report discussed other potential means of reducing risk, including multilateral netting and the introduction of non-deliverable foreign exchange contracts. Despite the potential benefits available from multilateral netting there now seems little likelihood of that avenue of risk reduction being available, at least in the foreseeable future. (The services of the sole surviving scheme at the time of the 1997 report were suspended early in 1999.) Some work continues to be undertaken on non-deliverable contracts, but at this time the private sector is concentrating on the CLS solution.

## **5. NEXT STEPS AND CONCLUSIONS**

### **5.1 Action by the RBA**

The 1997 survey concluded that foreign exchange settlement risk in the Australian market was too large and lasted too long. The RBA's latest study shows that while some reductions have been achieved, more needs to be done. The RBA will continue to:

- encourage individual banks to address the issue;
- encourage industry initiatives; and
- establish an environment in which Australian banks can take advantage of initiatives to reduce/remove foreign exchange settlement risk.

The RBA is currently working towards ensuring that the necessary changes to the Australian payments system to accommodate the CLS initiative are implemented.

The RBA is a member of the CPSS sub-group on foreign exchange settlement risk. This forum enables the RBA to keep abreast of international developments in the area of settlement risk, to identify changes in world best practice and to ensure that Australia has a voice in such discussions.

### **5.2 Action by participants**

As discussed earlier, the progress reported by individual banks has for the most part been disappointing.

The recent release by the Basel Committee on Banking Supervision of a consultative paper entitled "Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions" is a valuable contribution. It emphasises, in particular, that exposures can be reduced substantially by renegotiating correspondent banking relationships and improving back office procedures. In this way, cancellation deadlines for payment instructions can be extended and confirmation of final payments can be received and reconciled much earlier.

While the ability to settle netted values through CLS is in some doubt, netting provides a valuable tool for reducing the magnitude of the risk. As discussed in Section 4.4, CLS Bank will not be the total solution to foreign exchange settlement risk.

### **5.3 Conclusion**

The RBA's 1997 report found that foreign exchange settlement risk was not as well understood or managed as it should be. While this follow-up report has shown that there has been increased awareness of the issues and that progress has, in fact, been made in reducing risk, it has also showed that much still needs to be done. The RBA remains committed to further progress.

## ANNEX A

### MEASURING FOREIGN EXCHANGE SETTLEMENT EXPOSURE

Although settling a trade involves numerous steps, from a settlement risk perspective a trade's status can be classified according to five broad categories:

*Status R:*        *Revocable.* The payment instruction for the sold currency either has not been issued or may be unilaterally cancelled without the consent of the counterparty or any other intermediary. No settlement exposure exists for this trade.

*Status I:*        *Irrevocable.* The payment instruction for the sold currency can no longer be cancelled unilaterally either because it has been finally processed by the relevant payments system or because some other factor (e.g. internal procedures, correspondent banking arrangements, local payments system rules, laws) makes cancellation dependent upon the consent of the counterparty or another intermediary; the final receipt of the bought currency is not yet due. In this case, the bought amount is clearly at risk.

*Status U:*        *Uncertain.* The payment instruction for the sold currency can no longer be cancelled unilaterally; receipt of the bought currency is due, but the bank does not yet know whether it has received these funds with finality. In normal circumstances, it expects to have received the funds on time. However, since it is possible that the bought currency was not received when due (e.g. owing to an error or to a technical or financial failure of the counterparty or some other intermediary), the bought amount might, in fact, still be at risk.

*Status F:*        *Fail.* The bank has established that it did not receive the bought currency from its counterparty. In this case the bought amount is overdue and remains clearly at risk.

*Status S:*        *Settled.* The bank knows that it has received the bought currency with finality. From a settlement risk perspective, the trade is considered settled and the bought amount is no longer at risk.

Diagram A.1 illustrates this simplified description of the foreign exchange settlement process. To classify trades according to the categories indicated, foreign exchange dealers need to know the following three critical times for each currency that they trade:

- (i) the unilateral payment cancellation deadline;
- (ii) when the currency purchased is due to be received with finality; and
- (iii) when final and failed receipts are identified.

**Diagram A.1**  
**The changing status of a transaction**

Status R	Status I	Status U	Status S or Status F
Trade	Unilateral cancellation deadline for sold currency	Final receipt of bought currency due	Identify final and failed receipts of bought currency

These times depend on the characteristics of the relevant payments systems as well as on individual banks' internal settlement practices and correspondent banking arrangements. Nevertheless, once these times are determined and the status of each trade appropriately classified, it is a relatively straightforward calculation to measure foreign exchange settlement exposure, even in the absence of real-time information.

Banks that always identify their final and failed receipts of bought currencies as soon as they are due can determine their exposures exactly. For these banks, current exposure equals the sum of their *Status I* and *F* trades. In contrast, those that do not immediately identify their final and failed receipts cannot pinpoint the exact size of their foreign exchange settlement exposures. The uncertainty they face reflects their inability to know which of their *Status U* trades have or have not actually settled (i.e. they do not know the amount of bought currencies that should - but might not - have been received on time). Faced with this uncertainty, banks should be aware of both their minimum and maximum foreign exchange settlement exposures. The following general guidelines can be used to measure these two extremes.

**Minimum exposure:** **Sum of *Status I* and *F* trades.** This is the value of the trades for which a bank can no longer unilaterally stop payment of the sold currency but has not yet received the bought currency.

**Maximum exposure:** **Sum of *Status I*, *F* and *U* trades.** This equals the minimum exposure plus the amount of bought currencies that should - but might not - have been received.

In compiling this report, the RBA has assessed the industry's risk profile by using maximum exposure as the benchmark. The industry's actual exposure will usually fall well short of this amount, but it is instructive for participants to know the magnitude of a potential 'worst-case scenario'.<sup>18</sup>

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<sup>18</sup> The amounts at risk presented earlier in this report explicitly assume that there were no failures to settle in any currency on an average day. No information was sought from survey respondents on failed transactions and, thus, the exposures presented in Chapter 3 only measure the sum of *Status I* and *U* transactions.

**ANNEX B**

**SAMPLE QUESTIONNAIRE**



**RESERVE BANK OF AUSTRALIA**

**CONFIDENTIAL**

**SURVEY OF FOREIGN EXCHANGE  
SETTLEMENT PRACTICES - OCTOBER 1998**

**Institution:** .....

**Contact:** Name: ..... Title: ..... Phone no.: .....

**Alternative contact:** Name: ..... Title: ..... Phone no.: .....

Please complete this survey (affixing additional sheets where there is insufficient space) for the calendar month of October 1998 and return it no later than 20 November 1998 to:

Payments Policy Department  
Reserve Bank of Australia  
GPO Box 3947  
SYDNEY NSW 2001

Any questions may be directed to either Bernie Egan on (02) 9551 8705 or Nathan Hale on (02) 9551 8750.







- <sup>1</sup> For each of the currencies, please indicate, using ‘A’, ‘B’ or ‘C’, the principal method of settlement, where:
- **A** indicates that correspondent banking services in the currency were provided by a local clearing bank that is not affiliated with your institution other than on a commercial basis;
  - **B** indicates that correspondent banking services in the currency were provided by a related entity of your institution (eg separately incorporated parent or subsidiary);
  - **C** indicates that your institution (include branches/head office, but not a separately incorporated parent or subsidiary) settled itself.
- For example, an Australian bank that uses its UK subsidiary to settle its GBP transactions should insert ‘B’ under ‘GBP’, whereas if it used its London branch it would insert ‘C’. The Australian branch of a US bank, ‘XYZ Bank Inc’, settling its GBP transactions using the London branch of ‘XYZ Bank Inc’ would insert ‘C’ under GBP, whereas if it used the UK subsidiary of ‘XYZ Bank Inc’ it would insert ‘B’.
- <sup>2</sup> At what time do you routinely issue your payment instructions for value on day V?
- <sup>3</sup> Ignoring best effort arrangements or any other possible form of special handling, what is your routine deadline for *unilaterally* cancelling (or delaying or amending) *with certainty* your payment instructions for value on day V (i.e. what is the time after which such cancellation could depend on the consent or “best efforts” of your correspondent bank, the beneficiary, the beneficiary’s correspondent bank, or some other intermediary)? If your back office or correspondent has more than one way to execute your payment instructions in a particular currency (eg via a large-value transfer system or via book-entry transfer) and the cancellation deadlines differ according to the method used, please list the *earliest* time.
- <sup>4</sup> Assuming your counterparty (via its correspondent bank etc) has successfully made the payment “on time” given the terms of the trade, by what time will the funds be credited to your account - i.e. what is the latest time your correspondent in the currency concerned will credit your account *with finality*? (Note that where a payment could be received by your correspondent at any time during the payment system day, you should report a time no earlier than the close of the payment system.) If funds can be paid to you in more than one way (eg via a large-value funds transfer system or via book-entry transfer), please list the latest time a final payment can reach you via any of the relevant options and still be considered “on time”.
- <sup>5</sup> At what time do you usually *identify* final and failed payments to you for value on day “V”? For example, this may be the time when you routinely complete the reconciliation of an electronically transmitted nostro statement. Please separately provide brief details of any significant delays in identifying final and failed payments for settlements due during October.
- <sup>6</sup> For each time, please indicate the hour and minute - in Australian Eastern Standard Time (AEST) - using the 24-hour clock. (Please use 00:00 for midnight and 12:00 for midday). For each day, please use V to indicate value day, V-1 (or V-2 etc) to indicate one (or two etc) business day(s) before value day, and V+1 (or V+2 etc) to indicate one (or two etc) business day(s) after value day. *Example: 8:30 pm on the day after settlement day should be shown as “20:30 V+1”.*
- <sup>7</sup> Please reply “yes” if the indicated time and day is based on a legally enforceable agreement or arrangement. Otherwise reply “no”.

2. Please indicate the notional value expressed in millions of the relevant currency, before netting, of foreign exchange settlement receipts and payments made by your institution, on its Australian books, during the month of October 1998. Include transactions with subsidiaries, but exclude inter-desk or inter-branch transactions. Round to the nearest million and do not include any currencies where the total value settled during the month was less than one million.

Currency	Total		of which, notional value settled under bilateral netting agreements		of which, value settled on a trade-by-trade basis	
	Payable (Sum of columns 3 & 5) (1)	Receivable (Sum of columns 4 & 6) (2)	Payable (3)	Receivable (4)	Payable <sup>8</sup> (5)	Receivable <sup>9</sup> (6)
AUD <sup>10</sup>						
CAD						
CHF						
DEM						
EUR						
FRF						
GBP						
HKD						
JPY						
NZD						
SGD						
USD						



3. Please indicate the actual value, after netting, of foreign exchange settlement receipts and payments made by your institution during the period 1 October to 30 October 1998 (expressed in millions of the relevant currency).

Currency	Total		of which, actual flows to settle bilaterally netted trades		of which, actual flows to settle individual, non-netted trades	
	Payments (Sum of columns 3 & 5) (1)	Receipts (Sum of columns 4 & 6) (2)	Payments (3)	Receipts (4)	Payments <sup>11</sup> (5)	Receipts <sup>12</sup> (6)
AUD						
CAD						
CHF						
DEM						
EUR						
FRF						
GBP						
HKD						
JPY						
NZD						
SGD						
USD						



4. This section is only to be completed by those institutions that have undertaken modelling preparatory to joining a multilateral netting scheme (eg ECHO). Please briefly outline the basis of your modelling, including whether it is dependent on other financial institutions joining the scheme, and the time it was undertaken.

Currency	Total actual flows to settle individual, non-netted trades <sup>13</sup> ('m)		Estimated reductions in columns (1) & (2) following settlement of multilaterally netted trades <sup>14</sup>	
	Payments (1)	Receipts (2)	Payments (3)	Receipts (4)
AUD				
CAD				
CHF				
DEM				
EUR				
FRF				
GBP				
HKD				
JPY				
NZD				
SGD				
USD				



Other currencies (specify)

Currency	Total actual flows to settle individual, non-netted trades <sup>13</sup> ('m)		Estimated reductions in columns (1) & (2) following settlement of multilaterally netted trades <sup>14</sup>	
	Payments (1)	Receipts (2)	Payments (3)	Receipts (4)

<sup>13</sup> Should equal Question 3 columns (5) and (6)

<sup>14</sup> Use either values or percentages depending on your modelling

5. This question is seeking information on the number of foreign exchange trading counterparties your institution, on its Australian books, has and the extent to which there are arrangements with these counterparties to settle on a bilateral net basis. For the purposes of this question, “counterparty” is defined on a “settling entity” rather than “institutional” basis; a counterparty may include any bank, non-bank financial, or corporate entity. References to “top 10, top 25, top 50 counterparties” refer to counterparty rankings by *value* of trades

	Number of counterparties
How many FX trading counterparties does your institution <i>currently</i> have in total?	
<i>Bilateral netting</i>	
With how many of its <i>total</i> FX counterparties does your institution have arrangements to settle trades on a bilaterally netted basis?	
With how many of its <i>top 10</i> FX counterparties does your institution have arrangements to settle trades on a bilaterally netted basis?	
With how many of its <i>top 25</i> FX counterparties does your institution have arrangements to settle trades on a bilaterally netted basis?	
With how many of its <i>top 50</i> FX counterparties does your institution have arrangements to settle trades on a bilaterally netted basis?	

6. (a) Please describe the current duties, responsibilities and reporting structure of the person(s) charged with managing, on a day-to-day basis, your institution's foreign exchange settlement exposures with individual counterparties. Please discuss any significant changes that have taken place since the April 1997 survey.
- (b) Please describe the current duties, responsibilities and reporting structure of the person(s) charged with managing, on a day-to-day basis, your institution's aggregate settlement exposures. Please discuss any significant changes that have taken place since the April 1997 survey.
7. Please describe any plans your institution may have to shorten the periods of "irrevocability"<sup>15</sup> and "uncertainty"<sup>16</sup> it currently faces during the routine settlement of foreign exchange trades. Please include specific targets and proposed dates for meeting these targets. In particular, please indicate the extent to which your institution plans over the next year to implement improvements to the times listed in Question 1 regarding unilateral payment cancellation deadlines and the identification of final and failed receipts.
8. Please describe your institution's current process for controlling counterparty credit exposures associated with foreign exchange settlements. (For example, in measuring its counterparty credit exposures, does the institution aggregate bilateral foreign exchange settlement exposures with other credit extensions? Are bilateral foreign exchange settlement exposures subject to the same or different limits than those applied to other credit extensions? Are limits applied globally or on a decentralised basis among the institution's trading centres? Are limits mandatory or indicative? How are exposures in excess of the limits handled?) Please outline any significant changes to your institution's processes that have taken place since the April 1997 survey, or that you propose to implement.
9. Please outline any significant changes to your institution's foreign exchange dealing arrangements/processes associated with European Monetary Union.

<sup>15</sup> The time between your institution's unilateral cancellation deadline of the sold currency and the time by which the final receipt of the bought currency is due.

<sup>16</sup> The time it takes your institution to identify the final or failed receipt of the bought currency after it is due.

**ANNEX C****SURVEY RESPONDENTS**

1. ABN AMRO Australia Limited
2. Australia and New Zealand Banking Group Limited
3. Bankers Trust Australia Limited
4. BankWest
5. Banque Nationale de Paris
6. Chase Manhattan Bank
7. Citibank N.A.
8. Colonial State Bank
9. Commonwealth Bank of Australia
10. Deutsche Bank AG
11. IBJ Australia Bank Limited
12. Macquarie Bank Limited
13. Midland Bank plc
14. National Australia Bank Limited
15. Rabobank Nederland
16. Societe Generale Australia Limited
17. St George Bank Limited
18. Suncorp-Metway Limited
19. Toronto Dominion Australia Limited
20. UBS Australia Limited
21. Westpac Banking Corporation

## ANNEX D

## CURRENCY DATA

Currency	No. of banks	Settlement method			Gross monthly settlements (AUD million)		Ranking by turnover*
		A	B	C	Payments	Receipts	
AED	1	-	1	-	~	7	35 (44)
ATS	9	7	-	2	239	144	22 (26)
AUD	21	4	-	17	464,373	475,376	2 (2)
BDT	2	1	1	-	~	~	44 (46)
BEF	12	9	-	3	345	352	18 (21)
CAD	21	13	2	6	13,586	12,593	8 (14)
CHF	18	13	1	4	14,552	12,204	7 (7)
CNY	1	1	-	-	12	12	29 (43)
DEM	21	11	2	8	159,256	161,519	4 (3)
DKK	7	7	-	-	244	208	21 (24)
ESP	11	9	-	2	285	323	19 (18)
FIM	9	9	-	-	42	46	26 (23)
FJD	4	2	-	2	15	3	31 (32)
FRF	19	14	1	4	11,710	10,985	9 (8)
GBP	21	9	3	9	74,041	72,731	5 (6)
GRD	6	5	1	-	6	4	33 (35)
HKD	19	8	2	9	4,630	4,780	11 (11)
IDR	9	6	1	2	439	454	16 (13)
IEP	6	5	-	1	58	99	25 (28)
INR	7	5	1	1	13	8	30 (31)
ITL	14	11	-	3	2,170	2,214	12 (16)
JPY	21	13	2	6	168,552	165,500	3 (4)
KRW	1	1	-	-	2	2	37 (#)
LKR	3	2	1	-	~	1	41 (38)
MUR	1	1	-	-	~	~	42 (45)
MXN	1	1	-	-	4	Nil	36 (#)

\* April 1997 rankings are in brackets.

Currency	No. of banks	Settlement method			Gross monthly settlements (AUD million)		Ranking by turnover*
		A	B	C	Payments	Receipts	
MYR	3	2	1	-	18	20	28 (9)
NLG	10	6	-	4	1,313	1,242	13 (17)
NOK	8	8	-	-	166	150	23 (20)
NZD	20	15	3	2	48,881	46,730	6 (5)
PGK	3	2	1	-	13	1	32 (33)
PHP	7	5	-	2	75	94	24 (37)
PTE	6	5	-	1	27	24	27 (27)
SAR	1	1	-	-	1	1	38 (25)
SBD	1	1	-	-	2	Nil	39 (36)
SEK	8	7	-	1	423	393	17 (19)
SGD	16	9	1	6	5,578	5,734	10 (10)
THB	8	7	-	1	580	561	15 (15)
USD	21	11	2	8	1,031,076	988,257	1 (1)
VUV	2	1	1	-	1	~	40 (42)
WST	1	-	1	-	1	Nil	43 (41)
XEU	7	6	1	-	675	645	14 (12)
XPF	4	4	-	-	6	3	34 (39)
ZAR	7	6	-	1	271	250	20 (22)

Where:

- A indicates use of an unassociated correspondent bank;
- B indicates use of a related corporate entity (e.g. parent/subsidiary); and
- C indicates direct responsibility for settlement.

\* April 1997 rankings are in brackets.

(#) Currency not listed in 1997 survey.

~ Values round to zero when converted into AUD equivalents.

## ANNEX E

## CANCELLATION AND RECONCILIATION TIMES

Currency	Cancellation Times*				Reconciliation Times*			
	Earliest	Median	Latest	Wgt'd Avg #	Earliest	Median	Latest	Wgt'd Avg #
AED	16.5	16.5	16.5	16.5	395.0	395.0	395.0	395.0
ATS	-6.0	16.0	16.5	15.7	32.0	35.5	65.0	52.5
AUD	8.0	14.5	17.3	13.1	15.4	17.0	43.5	26.7
BDT	11.5	13.5	15.5	13.1	275.5	506.3	737.0	737.0
BEF	-15.0	16.0	21.0	15.3	32.0	35.5	65.0	41.5
CAD	-7.0	17.0	23.0	18.7	32.5	40.0	65.0	43.9
CHF	-6.0	16.0	21.0	14.9	32.5	36.0	41.0	36.1
CNY	-2.0	-2.0	-2.0	-2.0	32.5	32.5	32.5	32.5
DEM	-7.0	16.0	22.0	15.8	32.0	36.0	41.0	36.9
DKK	16.0	16.0	17.0	16.2	32.5	36.7	65.0	50.2
ESP	-7.0	16.0	17.0	15.8	32.5	36.0	65.0	45.7
FIM	13.0	16.0	18.0	16.0	32.5	39.0	65.0	50.6
FJD	6.0	8.5	12.0	8.9	63.0	269.0	377.0	241.7
FRF	-8.0	16.0	21.0	15.1	32.0	36.0	65.0	40.0
GBP	-8.0	16.0	23.0	17.2	32.5	38.5	65.0	48.0
GRD	-7.0	16.3	21.0	16.7	34.0	40.1	65.0	51.1
HKD	-7.0	12.0	15.5	11.3	32.3	35.5	64.0	36.4
IDR	-13.0	-7.0	11.0	-9.3	32.5	36.0	63.0	40.8
IEP	15.0	17.8	22.0	17.7	32.5	43.1	185.0	52.0
INR	-7.0	12.5	15.0	12.5	32.5	185.0	737.0	112.3
ITL	-7.0	16.0	19.0	16.8	32.5	37.0	63.0	39.4
JPY	-7.0	11.0	15.0	10.5	32.0	35.5	63.0	36.8
KRW	14.0	14.0	14.0	14.0	107.0	107.0	107.0	107.0
LKR	-9.5	12.0	13.0	12.0	185.0	442.5	521.0	473.0
MUR	15.5	15.5	15.5	15.5	58.5	58.5	58.5	58.5
MXN	-14.5	-14.5	-14.5	-14.5	39.5	39.5	39.5	39.5

\* The times are reported on a decimal basis, e.g. a time of 09.50 hours represents 9.30 am on V.

# Weighted by net settlement amounts

Currency	Cancellation Times*				Reconciliation Times*			
	Earliest	Median	Latest	Wgtd Avg #	Earliest	Median	Latest	Wgtd Avg #
MYR	12.0	12.0	14.0	13.2	32.5	33.0	34.0	32.9
NLG	-7.0	13.0	21.0	10.0	32.5	38.0	65.0	46.4
NOK	-6.0	16.3	19.0	9.2	32.5	35.8	65.0	41.3
NZD	-8.0	11.0	12.0	9.1	32.0	34.8	61.0	36.6
PGK	8.0	9.0	12.0	8.3	42.0	228.0	377.0	377.0
PHP	-7.0	10.0	17.0	-4.6	32.5	57.0	185.0	50.3
PTE	12.0	16.3	17.0	15.9	32.5	41.7	65.0	53.4
SAR	-2.0	-2.0	-2.0	-2.0	59.5	59.5	59.5	59.5
SBD	12.0	12.0	12.0	12.0	185.0	185.0	185.0	185.0
SEK	-6.0	16.3	19.0	16.3	32.2	36.1	65.0	44.8
SGD	-7.0	12.0	16.0	11.0	32.2	35.8	65.0	40.7
THB	-7.0	11.5	16.0	11.7	32.0	37.5	81.0	43.5
USD	-7.0	17.5	30.0	19.3	32.5	38.5	88.0	42.2
VUV	-11.0	-2.0	7.0	5.9	302.5	411.8	521.0	521.0
WST	6.0	6.0	6.0	6.0	63.5	63.5	63.5	63.5
XEU	-15.0	16.0	16.5	14.9	32.0	43.0	65.0	53.9
XPF	7.0	9.0	13.0	7.5	185.0	626.9	737.0	671.5
ZAR	-7.0	16.0	18.0	15.1	32.5	38.0	65.0	40.1

\* The times are reported on a decimal basis, e.g. a time of 09.50 hours represents 9.30 am on V.

# Weighted by net settlement amounts



## ANNEX F

## HOURS AT RISK PER CURRENCY PAIRING

## 1. Major traded currencies \*

Buy	Sell								
	USD	AUD	DEM	JPY	NZD	GBP	CHF	FRF	CAD
USD		29 (33)	26 (31)	32 (37)	33 (37)	25 (29)	27 (32)	27 (32)	23 (27)
AUD	7 (12)		11 (17)	16 (23)	18 (24)	9 (16)	12 (18)	12 (19)	8 (13)
DEM	18 (22)	24 (30)		26 (33)	28 (33)	20 (25)	22 (28)	22 (29)	18 (23)
JPY	17 (17)	24 (25)	21 (22)		28 (29)	20 (21)	22 (23)	22 (24)	18 (18)
NZD	17 (18)	24 (26)	21 (23)	26 (29)		19 (22)	22 (25)	21 (25)	18 (19)
GBP	29 (24)	35 (32)	32 (30)	37 (35)	39 (36)		33 (31)	33 (31)	29 (25)
CHF	17 (30)	23 (37)	20 (35)	26 (41)	27 (41)	19 (33)		21 (36)	17 (31)
FRF	21 (20)	27 (28)	24 (25)	30 (31)	31 (31)	23 (23)	25 (26)		21 (21)
CAD	25 (33)	31 (40)	28 (38)	33 (44)	35 (44)	27 (36)	29 (39)	29 (39)	

## 2. European currencies \*

Buy	Sell								
	USD	DEM	XEU	ATS	BEF	DKK	ESP	FIM	GRD
USD		26 (31)	27 (25)	26 (31)	27 (30)	26 (32)	26 (32)	26 (31)	25 (37)
DEM	18 (22)		22 (21)	21 (27)	22 (26)	21 (28)	21 (28)	21 (27)	20 (33)
XEU	35 (21)	38 (26)		38 (26)	39 (25)	38 (27)	38 (28)	38 (26)	37 (33)
ATS	33 (52)	37 (57)	38 (51)						
BEF	22 (36)	26 (41)	27 (35)						
DKK	31 (28)	34 (34)	35 (28)						
ESP	26 (29)	30 (34)	31 (29)						
FIM	31 (20)	35 (25)	36 (20)						
GRD	32 (38)	35 (43)	36 (37)						

\* Based on weighted average times. April 1997 figures are in brackets.

## 2. European currencies \* (continued)

Buy	Sell								
	USD	DEM	XEU	IEP	ITL	NLG	NOK	PTE	SEK
USD		26 (31)	27 (25)	24 (32)	25 (31)	32 (30)	33 (33)	26 (32)	26 (32)
DEM	18 (22)		22 (21)	19 (28)	20 (27)	27 (26)	28 (29)	21 (28)	21 (28)
XEU	35 (21)	38 (26)		36 (27)	37 (26)	44 (26)	45 (29)	38 (27)	38 (27)
IEP	33 (42)	36 (47)	37 (41)						
ITL	20 (24)	24 (29)	25 (23)						
NLG	27 (44)	31 (49)	31 (44)						
NOK	22 (33)	26 (38)	26 (32)						
PTE	34 (21)	38 (26)	38 (20)						
SEK	25 (26)	29 (31)	30 (25)						

## 3. Asian currencies \*

Buy	Sell								
	USD	JPY	CNY	HKD	IDR	MYR	PHP	SGD	THB
USD		32 (37)	44 (36)	31 (35)	52 (57)	29 (35)	47 (37)	31 (36)	30 (40)
JPY	17 (17)		39 (27)	25 (27)	46 (48)	24 (26)	41 (29)	26 (27)	25 (32)
CNY	13 (60)	22 (71)							
HKD	17 (18)	26 (29)							
IDR	21 (20)	30 (31)							
MYR	14 (27)	22 (38)							
PHP	31 (348)	40 (359)							
SGD	21 (24)	30 (35)							
THB	24 (28)	33 (39)							

\* Based on weighted average times. April 1997 figures are in brackets.

#### 4. South Pacific currencies \*

Buy	Sell							
	USD	FJD	NZD	PGK	SBD	VUV	WST	XPF
USD		33 (44)	33 (37)	34 (36)	30 (41)	36 (34)	36 (43)	35 (41)
FJD	222 (114)							
NZD	17 (18)							
PGK	358 (83)							
SBD	166 (571)							
VUV	502 (271)							
WST	44 (713)							
XPF	652 (125)							

#### 5. Other currencies \*

Buy	Sell							
	USD	AED	BDT	INR	LKR	MUR	SAR	ZAR
USD		26 (31)	29 (33)	30 (35)	30 (35)	27 (32)	44 (42)	27 (31)
AED	376 (715)							
BDT	718 (499)							
INR	93 (43)							
LKR	454 (178)							
MUR	39 (67)							
SAR	40 (160)							
ZAR	21 (52)							

\* Based on weighted average times. April 1997 figures are in brackets.

## ANNEX G

## GLOSSARY

<b>AED</b>	United Arab Emirates dirham
<b>AEST</b>	Australian Eastern Standard Time
<b>ATS</b>	Austrian schilling
<b>AUD</b>	Australian dollar
<b>Austraclear</b>	A private sector company that operates the main securities depository in Australia. Members may use the transfer system operated by Austraclear to make foreign exchange confirmations and deliver the AUD leg.
<b>BDT</b>	Bangladeshi taka
<b>BEF</b>	Belgian franc
<b>BHD</b>	Bahraini dinar
<b>BIS</b>	Bank for International Settlements
<b>BND</b>	Brunei dollar
<b>CAD</b>	Canadian dollar
<b>CHF</b>	Swiss franc
<b>CHIPS</b>	Clearing House Interbank Payments System. The large-value transfer system used in the United States principally for settlement of international USD payments, such as those arising from foreign exchange transactions.
<b>Close-out netting</b>	An arrangement to settle all contracted but not yet due liabilities to and claims on an institution by one single payment, immediately upon the occurrence of one of a list of defined events, such as the appointment of a liquidator to that institution ( <i>see netting by novation and obligation netting</i> ).
<b>CLS</b>	Continuous linked settlement - a process for simultaneous settlement of both legs of a foreign exchange transaction.
<b>CLS Services</b>	A UK company founded by the G20 banks to oversee the implementation of continuous linked settlement ( <i>see CLS and G20</i> ).
<b>CNY</b>	Chinese renminbi

<b>CPSS</b>	Committee on Payment and Settlement Systems of the BIS
<b>Credit risk/ exposure</b>	The risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter. In exchange-for-value systems, the risk is generally defined to include replacement risk and principal risk.
<b>CYP</b>	Cypriot pound
<b>DEM</b>	Deutsche mark
<b>DKK</b>	Danish kroner
<b>ECHO</b>	Exchange Clearing House Limited, a UK-based company which, until recently, offered multilateral netting services for foreign exchange transactions in eligible currencies.  The services of ECHO are currently suspended.
<b>ECU</b>	European currency unit
<b>EMEAP</b>	Executive Meeting of East Asian and Pacific central banks. The member countries are Australia, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, New Zealand, the Philippines, Singapore and Thailand.
<b>ESP</b>	Spanish peseta
<b>EUR</b>	SWIFT code for the euro
<b>Exchange rate risk</b>	<i>See market risk</i>
<b>Fedwire</b>	The real-time gross settlement system operating in the United States.
<b>FEYCS</b>	Foreign Exchange Yen Clearing System. The large-value transfer system used in Japan principally for settlement of international JPY payments, particularly those arising from foreign exchange transactions.
<b>FIM</b>	Finnish markka
<b>Final (finality)</b>	Irrevocable and unconditional
<b>FJD</b>	Fiji dollar

<b>Foreign exchange settlement exposure</b>	The amount at risk when a foreign exchange transaction is settled. This equals the full amount of the currency purchased and lasts from the time that a payment instruction for the currency sold can no longer be cancelled unilaterally until the time the currency purchased is received with finality ( <i>see credit risk/exposure and foreign exchange settlement risk</i> ).
<b>Foreign exchange settlement risk</b>	The risk that one party to a foreign exchange transaction will pay the currency it sold but not receive the currency it bought. This is also called cross-currency settlement risk or principal risk; it is also referred to as Herstatt risk, although this is an inappropriate term given the differing circumstances in which this risk has materialised.
<b>FRF</b>	French franc
<b>G10</b>	The Group of Ten Countries: Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States.
<b>G20</b>	The Group of Twenty; an association of twenty large commercial banks from Europe, North America and Asia.
<b>GBP</b>	Pound sterling
<b>GRD</b>	Greek drachma
<b>HKD</b>	Hong Kong dollar
<b>IDR</b>	Indonesian rupiah
<b>IEP</b>	Irish pound
<b>INR</b>	Indian rupee
<b>ITL</b>	Italian lira
<b>JPY</b>	Japanese yen
<b>KES</b>	Kenyan shilling
<b>KRW</b>	Korean won
<b>KWD</b>	Kuwaiti dinar
<b>Liquidity risk</b>	The risk that a counterparty (or participant in a settlement system) will not settle an obligation for full value when due. Liquidity risk does not imply that a counterparty or participant is insolvent since it may be able to settle the required debit obligations at some time thereafter.

<b>LKR</b>	Sri Lankan rupee
<b>Market risk</b>	The risk that an institution or other trader will experience a loss on a trade owing to an unfavourable exchange rate movement ( <i>see replacement cost risk</i> ).
<b>MTL</b>	Maltese lira
<b>MUR</b>	Mauritian rupee
<b>MXN</b>	Mexican peso
<b>MYR</b>	Malaysian ringgit
<b>Netting</b>	An agreed offsetting of positions or obligations by trading partners or participants. The netting reduces a large number of individual positions or obligations to a smaller number of positions or obligations. Netting may take several forms which have varying degrees of legal enforceability in the event of default of one of the parties ( <i>see also close-out netting, netting by novation and obligation netting</i> ).
<b>Netting by novation (novation)</b>	Satisfaction and discharge of existing contractual obligations by means of their replacement by new obligations (whose effect, for example, is to replace gross with net payment obligations). The parties to the new obligations may be the same as to the existing obligations or, in the context of some clearing house arrangements, there may additionally be substitution of parties ( <i>see close-out netting, netting and obligation netting</i> ).
<b>NLG</b>	Netherlands guilder
<b>NOK</b>	Norwegian krone
<b>Nostro account</b>	An account held by one bank with another bank, generally for the purpose of making and receiving payments. The account may be denominated in the domestic currency or, more typically, in a foreign currency. Derived from the Latin for 'mine'.
<b>NZD</b>	New Zealand dollar
<b>Obligation netting</b>	The legally binding netting of amounts due in the same currency for settlement on the same day under two or more trades. Under an obligation netting agreement for foreign exchange transactions, counterparties are required to settle on the due date all of the trades included under the agreement by either making or receiving a single payment in each of the relevant currencies. Depending on the legal system, obligation

netting can find a legal basis in constructions such as novation, set-off or the current account mechanism (*see close-out netting, netting and netting by novation*).

<b>OMR</b>	Omani rial
<b>Operational risk</b>	The risk of incurring interest charges or other penalties for misdirecting or otherwise failing to make settlement payments on time owing to an error or technical failure.
<b>Payment versus payment (PVP)</b>	A mechanism in a foreign exchange settlement system that ensures that a final transfer of one currency occurs if and only if a final transfer of the other currency or currencies takes place.
<b>PGK</b>	Papua New Guinea kina
<b>PHP</b>	Philippines peso
<b>PKR</b>	Pakistani rupee
<b>Principal risk</b>	<i>See foreign exchange settlement risk</i>
<b>PTE</b>	Portuguese escudo
<b>PVP</b>	<i>See payment versus payment</i>
<b>RBA</b>	Reserve Bank of Australia
<b>Replacement cost risk/ replacement risk</b>	The risk that a counterparty to an outstanding transaction for completion at a future date will fail to perform on the settlement date. This failure may leave the solvent party with an unhedged or open market position or deny the solvent party unrealised gains on the position. The resulting exposure is the cost of replacing, at current market prices, the original transaction ( <i>see credit risk/exposure and market risk</i> ).
<b>RITS</b>	Reserve Bank Information and Transfer System. A system operated by the RBA primarily for the settlement of transactions in government securities. All foreign exchange transactions with the RBA are settled using RITS.
<b>RTGS</b>	Real-time gross settlement; the final and irrevocable settlement of transactions on an individual basis.
<b>SAR</b>	Saudi Arabian riyal
<b>SBD</b>	Solomon Islands dollar
<b>SEK</b>	Swedish krona



<b>Settlement</b>	An act that discharges obligations in respect of funds or securities transfers between two or more parties.
<b>SGD</b>	Singapore dollar
<b>Simultaneous settlement</b>	The settlement of payment obligations in different currencies at the same time. A simultaneous settlement system would not pay out any currencies to any participant before all relevant participants pay in all of the currencies they owe ( <i>see payment versus payment and settlement</i> ).
<b>SWIFT</b>	Society for Worldwide Interbank Financial Telecommunication
<b>Systemic risk</b>	The risk that the failure of one participant in a payments system, or in financial markets generally, to meet its required obligations when due will cause other participants or financial institutions to be unable to meet their obligations (including settlement obligations in a transfer system) when due. Such a failure may cause significant liquidity or credit problems and, as a result, might threaten the stability of financial markets.
<b>TARGET</b>	Trans-European Automated Real-time Gross settlement Express Transfer system. The payments mechanism used in the European Union to process cross-border transactions in euro on a real-time gross settlement basis. TARGET is comprised of an RTGS system in each country and the bilateral linkages between these systems.
<b>THB</b>	Thai baht
<b>TRL</b>	Turkish lira
<b>USD</b>	United States dollar
<b>Vostro account</b>	An account held by one bank for another bank, generally for the purpose of making and receiving payments. The account is typically denominated in the domestic currency of the bank providing the account. Derived from the Latin for 'yours'.
<b>VUV</b>	Vanuatu vatu
<b>WST</b>	Western Samoan tala
<b>XEU</b>	SWIFT code for the European currency unit (ECU)
<b>XPF</b>	Central Pacific franc
<b>ZAR</b>	South African rand