7TH EDITION

FINANCIAL INSTITUTIONS + MARKETS

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Solutions Manual

Chapter 2
The payments system

Overview of Australia's payments system

1 Why are payment orders more efficient payment instruments than barter?

Barter is a simple form of trade where goods and services are exchanged for each other. Its efficiency is limited because it requires a coincidence of wants, meaning that trade is only possible when two people each want what the other has to offer.

Trade is more efficient when money is used to pay for goods and services because it does not rely on a coincidence of wants between buyers and sellers. Money includes cash and payment orders (such as EFTPOS, cheques and credit cards) that are payment instructions that can be used to settle transactions. (p. 30)

2 What does T+3 mean and how is a bond trade settled?

Transactions in the financial markets are made in two stages. The first is a binding agreement (a trade) between a buyer and seller to exchange a stated quantity of an item for a specified price. The second stage is settlement, when the buyer pays the seller and the item's ownership is transferred. This typically occurs a number of days after the agreement is struck, depending on the conventions in the market. 'T+3' means that settlement occurs three days after the trade date. This is the usual arrangement in the bond market. (p. 30)

3 How do ADIs make payments to each other?

Each ADI has an account with the RBA known as an *exchange settlement account* (ESA) which enables them to make payments to other ADIs. The funds held in these accounts are referred to as 'ES funds'. (p. 30)

4 What are exchange settlement accounts and what is their role in the payments system?

Each ADI has an account with the RBA known as an exchange settlement account (ESA) which contains their ES funds.

Their role in the payment system is to facilitate payments between ADIs (or with the RBA) in order settle payments. ESAs are used to settle both retail and wholesale payment orders.

- The retail system requires ADIs to make payments to each other in order to settle the large number of inter-ADI payment orders used by ADI customers each day.

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- Wholesale payments arise because ADIs need to pay each other for transactions that occur between them, mostly arising from trades in the financial markets.

In each case the RBA transfers the agreed amount from the ESA of the paying ADI to the receiving ADI using the Reserve Bank's Information and Transfer System (RITS). (pp. 30-1)

5   What are the requirements and benefits of exchange settlement accounts?

The RBA maintains ESAs for ADIs on the condition that an ADI cannot overdraw their account (i.e. ESAs must always have a positive balance).

The main benefits of the accounts are:

- they enable ADIs to provide their customers with payment services since these can be settled by transfers of ES funds,

- the RBA pays interest on the end-of-day account balance, and

- they are very safe. (p. 30-1)

6   Describe the arrangements represented in Figure 2.1.

Figure 2.1 illustrates the basic structure of the payment settlement system. Central to the system are the exchange settlement accounts (ESAs) that ADIs have with the RBA. All payments between ADIs are settled by transfers of ES funds using the Reserve Bank's Information and Transfer System (RITS).

Some payments are settled on a real-time gross settlement (RTGS) basis. These are the payments to settle trades between ADIs in:

- the debt (money and bond) markets - based on instructions from the market's clearinghouse (Austraclear), and

- the foreign exchange market - based on instructions from the SWIFT payment delivery system.

Other payments are net settled. These are:

- the retail payment orders which are the inter-ADI payment instructions initiated by ADI customers, and

- payments that are processed through the batch feeder facility. This facility nets groups of payments, such as trades in the share market, for immediate net settlement. (pp. 31-2)

7 **Use the contents of Table 2.1 to describe the payments system.**

Table 2.1 describes the dimensions of the Australian payments system during 2012. It classifies payments as either *retail* (payments by individuals and normal business payments) or *wholesale* (financial markets transactions and payments between ADIs and the RBA).

Retail payment methods include cash, payment cards, cheques, credit and debit cards, direct credits and debits and BPAY. Wholesale payments employ a process known as real-time gross settlement.

The data in Table 2.1 show that in 2012 the average value of non-cash payments per business day was about $210-$$227 billion in total of which wholesale payments comprised the majority ($150-$167 billion). The number of non-cash payments, however, was dominated by retail payments (31 million) compared with only 35 000 to 40 000 wholesale payments. (pp. 31-2)

8 **What is the Payments System Board and what are its main responsibilities?**

The RBA is responsible for the regulation of the payments system. In 1998 it established the Payments System Board (PSB) which is responsible for controlling risk, promoting efficiency and promoting competition (for payment services) within the payments system. (p. 32)

The retail payments system

9 **Explain the purposes of authorising and verifying payment orders.**

An ADI will process a payment order when:

- it is authorised (by PIN or signature) to transfer funds from the depositor's account (by the depositor) and

- it has verified (by PIN or inspection of the signature) that the payment order is not fraudulent.

The purpose of authorisation is to allow depositors to make payments whereas verification protects the depositor (and the ADI) from fraudulent use of the depositor's funds. (p. 33)

10 **Describe the clearing and settlement steps in the deferred net settlement process.**

The clearing process is conducted after the close of business and its purpose is to consolidate the day's inter-ADI payment orders so as to establish the net amount each ADI is required to pay or receive. This is the 'netting' part of the deferred net settlement (DNS) system.

The RBA is advised of the net cleared amounts and at 9 a.m. the next business day it makes the required ES funds transfers from the accounts of the paying ADIs and to the receiving ADIs' accounts. This is the 'deferred settlement' part of DNS. (p. 33)

11   Calculate the multilateral net position in a three-bank system where:

    a.   Bank X makes payments to Banks Y and Z totalling $50 and $90, respectively

    b.   Bank Y makes payments to Banks X and Z totalling $70 and $125, respectively

    c.   Bank Z makes payments to Banks X and Y totalling $55 and $100, respectively.

		Receiving bank			Total payments
		X	**Y**	**Z**	
Paying bank	X	–	$50	$90	$140
	Y	70	–	125	195
	Z	55	100	–	155
Total receipts		125	150	215	
Less total payments		140	195	155	
Multilateral net position		−15	− 45	60	

Net clearing has revealed the day's payment orders require Bank X to pay $15, Bank Y to pay $45 whereas Bank Z is due to receive $60. (pp. 33-4)

12   Explain how settlement risk arises in the deferred net settlement process. How does netting impact the amount at risk?

For DNS, the delay between the end-of-day clearing and the next business day settlement poses settlement risk. This is the risk an ADI will not pay the net cleared amount that it owes because it has insufficient ES funds.

The practice of netting payments greatly reduces the amount of ES funds required to settle the day's deposits, and so reduces the system's settlement risk. For example, in 2012 the DNS transfers averaged $3.5 billion compared to average daily retail payment orders of $60 billion. (pp. 33-4)

13   What are direct entries? Explain their dominance in terms of the value of retail payments.

Direct entries (or transfers) are pre-authorised and verified electronic payment orders. Direct credits allow businesses (and other organisations) to make payments to the individual ADI accounts of a group, such salary payments to employees, or welfare payments to recipients. Whereas direct debits allow businesses (or other organisations) to receive payments from large groups, such as loan repayments, insurance premiums and gym memberships.

Figure 2.4 shows that direct entries dominant other payment orders in terms of the value of payments. This is because they are very efficient and convenient as a result of being pre-authorised and pre-verified, and since they are electronic. (p. 35, p. 37)

14   **Explain how debit and credit cards operate as payment orders and how they differ from each other.**

A debit card is issued by an ADI to enable a depositor to access funds in their deposit account. They can be used at ATMs, EFTPOS terminals or over the counter at a branch of the ADI.

A credit card is issued by a credit card company in association with an ADI that allows the card holder to make payment orders drawn on funds supplied by the credit card company. When the payment orders are deposited by merchants they are processed through the DNS system in the same way as debit card payments. The credit card company bills the card holder monthly on a specified billing date for purchases made with the card and so provides the card holder with a period of interest-free credit, provided the amount due is paid in full. This benefit is not available with debit card payments since they use the card holder's funds to make the payment. Should the credit card holder only pay the minimum required amount, the company provides the card holder with credit for the balance, up to the card holder's limit (on which interest is charged). This facility also is not available with a debit card. (p. 36)

15   **Explain how cheques serve as payment orders. How are they authorised, verified and settled?**

A cheque is a written payment order to pay the stated party the stated sum from the drawer's deposit account with an ADI.

The cheque is authorised by the drawer's signature and then deposited by the cheque's recipient into their ADI account. The funds are credited to the depositor's account immediately, and the cheque (if inter-ADI settlement is required) is included in the daily deposits for DNS settlement, and is therefore settled the next business day. However, access to the funds by the depositor is delayed (usually by three business days) while the cheque is verified.

Verification ensures the signature is the drawers' and that they have sufficient funds to make the payment. If the cheque fails verification the payment will be reversed. (p. 33, pp. 35-6)

16   **Review the findings of the survey of payment instruments used by consumers that are presented in Bagnall, Chong and Smith (2011).**

The study surveyed consumers regarding their use of payment instruments to pay for purchases. It found that traditional payment methods – cash, credit card, debit card and cheque – continue to be used for the majority of payments made by individuals in Australia. Note that study did not include the use of direct entries. Its main findings were:

- Cash remains the most widely used payment method and the leading method for low-value payments (under $40). Nevertheless the use of cash has fallen as cards are being substituted for cash for some of these payments.

- Cards are the dominant payment method for mid-sized transactions, with the share of card payments made using credit cards increasing with payment value.

- BPAY, internet/telephone banking and cheques are important payment methods for higher-value payments, particularly those greater than $500, although overall cheque use continues to fall. Internet/telephone banking and the specialised online payment systems are used for only a small proportion of total consumer payments. The risk of fraud was identified as being the most significant deterrent to further adoption of online payments.

(http://www.rba.gov.au/publications/consultations/201106-strategic-review-innovation/issues/references.html)

17   Explain the batch feeder facility and why its use should improve the stability and efficiency of the retail payment system.

The batch feeder facility settles specific groups of inter-ADI payments. The payments are netted (at specified times throughout the day) and then presented for immediate settlement. It has had long-standing use in the settlement of share market trades and in 2013 it was extended to encompass direct entry payments. This means that most direct entry payments are settled the same day as deposit. The batch feeder facility improves the payment system's efficiency and stability because it is faster (than DNS) and reduces the system's settlement risk. (pp. 38-9)

18   Review the Payments System Board's planned reforms and improvements to the payment system.

The PSB has plans to replace DNS with faster and more efficient arrangements by 2016.

Its first objective has already been met. This is the use of a batch feeder facility to settle direct entry payments in cleared batches throughout the day. Other PSB reforms are:

- Most other retail payments to be settled on a 24/7 real-time gross basis.
- To facilitate more remittance information with electronic payments.
- A more efficient cheque settlement system. (pp. 38-9)

The wholesale payments system

19   Identify the main transactions that are settled by RTGS.

Real-time gross settlement (RTGS) is used mainly to settle wholesale financial market transactions. Figure 2.5 shows that payment instructions from SWIFT in relation to the Australian dollar settlement of foreign exchange market trades are the largest source of payments, followed by trades in the wholesale bond and money markets submitted by Austraclear. Other transactions include transfers between ADIs (including DNS transfers) and payments between ADIs and the RBA. (pp. 39-40)

20   **Explain how RTGS clears and settles payments.**

Payment instructions are fed into RITS which arranges them in a queue and processes each individually throughout the business day. A payment is cleared by ensuring the paying ADI has sufficient ES funds. When cleared, the payment is then settled by an immediate transfer of the specified funds between the ESAs of the paying and receiving banks. (p. 39)

21   **Explain how RTGS avoids settlement risk but creates liquidity pressures for the ADIs that make wholesale payments.**

Settlement risk is eliminated by RTGS because payment instructions are settled immediately and irrevocably once a payment is cleared.

However, RTGS creates liquidity pressures for ADIs. An ADI knows from its trading records the total amounts of their wholesale payments and receipts before the start of each day, and so can ensure they have adequate ES funds to settle these payments. However, they do not know the scheduling of individual RTGS payments throughout the day and thus may face liquidity pressures if they are required to make a series of payments before they receive funds. This could cause them to be unable to settle further payments and result in gridlock in the system. The RBA provides two mechanisms to ADIs to manage intraday illiquidity – these are RBA repos and the auto-offset process. (pp. 39-41)

22   **What are the features and purpose of intra-day repos?**

In order to relieve intra-day liquidity pressures arising from RTGS, the RBA provides ADIs with temporary funds via intra-day (interest free) RBA repos.

An RBA repo is arranged by the RBA agreeing to buy eligible securities (such as government bonds) from an ADI on the basis that the securities will be repurchased by the ADI at the same price later that day. The RBA pays for the securities with ES funds before 9am, providing ADIs with additional liquidity with which to facilitate the day's payments. (p. 41)

23   **What was the approximate daily value of intra-day repos in 2012/13 and what was the approximate ratio of intra-day ES funds to RTGS payments? Refer to Figure 2.5 and 2.6.**

Figure 2.6 shows the average value of intra-day RBA repos was approximately $15 billion dollars in mid-2013. These funds in conjunction with the opening ESA balances established by ADIs (of less than $1 billion) represent about 10% of the RTGS payments settled each day as shown in Figure 2.5.

RBA repos (and the auto-offset mechanism in RITS) improve the payment system's efficiency because they mean that a relatively small amount of ES funds held by ADIs are effective in settling a much larger value of payments. (pp. 40-2)

The management of ES funds by ADIs and the RBA

24   Describe the inter-bank overnight market and its relevance to the payments system.

This is a market where banks can deposit funds with one another on an overnight (one-day) basis. Funds held by ADIs in the inter-bank overnight market earn the cash rate and can be moved immediately into or out of ESAs using RTGS.

The market contributes to the stability of the payment system by providing ADIs with a location for their 'excess' or 'reserve' ES funds. These are required because of the variability in an ADI's day-to-day payment system obligations. (pp. 42-3)

25   What is the 'cash rate'?

The cash rate is the interest rate in the inter-bank overnight market. The RBA implements monetary policy by keeping the cash rate at its specified target rate. (p. 43, p. 45)

26   Why do ADIs hold fewer funds in their ESA than they deposit in the inter-bank overnight market?

ADIs must always hold funds in their ESAs and these accounts cannot be overdrawn. But since they earn the cash rate less 25 basis points on their ES balances, ADIs will minimise the amount of these funds. ADIs prefer to hold their liquid funds in the inter-bank overnight market because these balances earn the cash rate. Balances held in the inter-bank market can be immediately moved to ESAs if required. (p. 43)

27   Why do banks prefer to rely on their deposits in the inter-bank overnight market (for extra ES funds) than to borrow the funds overnight from the RBA?

A solvent ADI that has inadequate ES funds at the end of the day (due to miscalculation or operational problems) can borrow overnight from the RBA. This is arranged as an overnight repo with the repurchase price calculated to impose a penalty interest rate equal to the cash rate plus 25 bps. This liquidity facility is rarely used because of the penalty interest rate, with ADIs preferring to rely on the reserves they hold in the inter-bank overnight market. (p. 43)

28   What is meant by the 'financial system's liquidity'? Explain how payments by the RBA add to the financial system's liquidity.

The financial system's liquidity refers to the aggregate balance of ESAs at the start of the day plus changes to these balances that will result from payments made by or to the RBA that day.

Payments to the RBA and payments by the RBA change the aggregate balance of ESA's and the financial system's liquidity. Payments by the RBA, such as social security payments, are paid to their recipient's ADI through their ESAs. These payments cause ESA balances to increase (above the level that ADIs desire in their ESAs), and so ADIs will transfer the additional amounts to the inter-bank overnight market. This causes the supply of funds in that market to increase and so puts downward pressure on the price

of funds – this is the cash rate. To prevent unintentional changes to the cash rate each day the RBA will conduct market operations to offset the impact of its payments on the financial system's liquidity. (pp. 44-5)

29   Describe how the RBA conducts its market operations.

Market operations refers to trading in securities by the RBA. These transactions are settled immediately through RTGS and so add to or reduce the overall level of liquidity.

Each day the RBA estimates the impact of the payments it makes (on behalf of the government) on ESA balances. At 9.30 it conducts market operations to offset these payments.

The RBA will sell securities to ADIs on days when it makes payments (on behalf of the government) to the system. Likewise, the RBA will buy securities from ADIs on days when it (on behalf of the government) receives payments from the system. In each case market operations stabilises the balance of aggregate ESAs, so that balances in the overnight inter-bank market and the cash rate are also stable.

The RBA will also conduct market operations to enforce a change to the cash rate, when it changes its cash rate target. This is covered in chapter 7. (pp. 45-6)

30   Explain how the RBA uses market operations to maintain the level of the cash rate.

Payments by the RBA (such as welfare payments) will increase the aggregate ES balance since the funds are paid from the RBA's accounts to those of ADIs, whereas payments to the RBA (such as the payment of taxes) will reduce the aggregate ES balance since these are paid by ADIs to the RBA's accounts. The changes in ES balances would flow-on to the overnight market, as this is where banks keep their reserves, and could change the cash rate which is the interest rate in that market.

In order to keep the cash rate in line with its target, each business day the RBA estimates the net impact on ES funds of their transactions. The RBA then uses market operations to offset the net impact of its dealings on the financial system.

It sells securities when it is offsetting a net inflow to the financial system (i.e. into ESAs) and it buys securities when it is offsetting a net outflow of funds (from ADIs). The effect of these trading operations is to leave the financial system's liquidity (i.e. ESA balances) unchanged and to avoid any unintentional impact on the cash rate. (pp. 45-6)