
Reserve Bank payment system operations: an update

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Electronic payment systems play a vital role in the economy and financial system of any modern society. The Reserve Bank plays a key role in the New Zealand payment system. In particular, it operates the Exchange Settlement System Account (ESAS) and the NZClear securities settlement system. In this article, we outline the nature of the Bank's involvement, and recent developments, in these systems.

Introduction

Electronic payment systems – retail and wholesale – are now a vital cornerstone of commerce. Payment systems need to provide the highest levels of security, resilience and efficiency.

After briefly outlining our other payment system roles, this article focuses on the Reserve Bank's direct involvement in the operation of the New Zealand payment system, as provider and operator of the Exchange Settlement Account System (ESAS) and NZClear.

Reserve Bank payment system roles

The Bank's payment system roles include:

Regulator

Under the Reserve Bank of New Zealand Act, the Bank has specific regulatory powers over aspects of the payment system.² A key aspect of these responsibilities is to make recommendations to the Minister of Finance on applications for payment systems to be "designated". Designation gives legislative backing to the finality of settlements that are effected in accordance with the system's rules, a vital element in providing certainty in the event of a failure of, in particular, a financial institution.³ In the case of securities settlement systems, the Bank and the Financial Markets Authority are joint regulators.

"Banker to the banks"

Approved financial institutions can open an exchange settlement account (ESA) at the Reserve Bank. The Bank has provided such accounts since its inception, and perhaps the most important feature of ESAs is that the balances are essentially free of credit risk. Financial institutions hold balances in their ESAs at the Bank (accounts must be kept in credit) and use those accounts to make payments to other financial institutions. The Bank is therefore, in colloquial terms, "banker to the banks". ESAs have been opened by ten registered banks, CLS Bank International (the international vehicle for the settlement of many foreign exchange transactions), and New Zealand Depository Limited (a subsidiary of NZX Limited).

The Reserve Bank also provides an account for the Crown to facilitate the Government's own banking arrangements

Overall demand for settlement cash from the financial system fluctuates. The ability to influence the supply of settlement balances, or the price paid on (or charged for) those balances is the essence of monetary policy. The Bank undertakes open market operations to maintain a reasonably stable total level of settlement cash, smoothing flows to and from the Crown and ensuring that short term interest rates on interbank lending are not materially different from the OCR - the interest rate paid on deposits held in exchange settlement accounts.

In recent years, the overall level of settlement cash held by financial institutions has been in the range of \$6 billion to \$8 billion. During the 2008/09 international financial crisis the Bank provided additional liquidity to the system and at the height of the crisis the aggregate of

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² For more details on the Bank's oversight role, see Chan and Irvine (2008).

³ For more details on designation and finality, see DeSourdy (2004).

settlement balances was for a brief period in a range of \$10-11 billion.

Provider of system infrastructure and operation of systems

The focus of this article, however, is on the design and conduct of the two payment systems the Bank operates. These systems are:

- ESAS, the system which operates the exchange settlement accounts, processes payment instructions between settlement account holders.
- NZClear (formerly known as the Austraclear New Zealand system) which primarily allows members of that system to settle the sale and purchase of securities lodged in the system by simultaneously exchanging title to the securities and payment for those securities. This feature is known as “delivery versus payment” and the simultaneous exchanging of the elements to a transaction eliminates what is known as “settlement risk” (the risk that one party to a transaction performs its settlement obligations but the other party fails to do so). In addition to settling securities transactions, NZClear is a facility which allows members to make payments of cash to each other.

ESAS and NZClear are real-time gross settlement systems ('RTGS'). That means each transaction entering these systems is settled individually and in real-time (there is no accumulation of transactions for batch settlement for example).

ESAS and NZClear are also both designated settlement systems under the Reserve Bank Act. The NZClear designation took effect only quite recently, in October 2012. In order to achieve designation, changes were made to the NZClear Rules after consultation with members and the new rules took effect from March 2012. NZClear is regulated jointly by the Reserve Bank's Prudential Supervision Department and the Financial Markets Authority. All dealings on these issues between the Bank's Financial Services Group and Prudential Supervision Department occur on an arm's length basis.

NZClear has around 120 members in New Zealand and Australia, encompassing not just banks but also

custodians, trustee companies, brokers and funds managers. NZClear's main role, to settle securities transactions, is largely a commercial activity and is conducted with the objective of achieving a commercial profit. By contrast, ESAS supports a core policy function of a central bank, underpinning the conduct of monetary policy (and the system thus operates on a cost-recovery basis).

Relationship between ESAS and other payment systems

ESAS records the transfer of funds between financial institutions themselves and is, thus, at the apex of the payments system. Each transfer within ESAS can reflect settlement of a single transaction or settlement of the net value of a large number of underlying transactions. For example, a single payment within ESAS can represent the net value of thousands of underlying transactions between the customers of two financial institutions. One of those institutions sends authorised instructions to ESAS to transfer an amount equal to the net value of the underlying transactions from its own ESAS account to that of the other institution. ESAS itself does not record the details of the underlying transactions (these are recorded and separately exchanged by the two financial institutions by a process known as “interchange”).

There are four primary ways ESAS can receive instructions to effect transfer of funds between accounts (not all of which are used by every account holder):

- ESAS account holders use NZClear to send instructions directly to ESAS. These instructions are initiated by NZClear members who are required to use an ESAS account holder as their bank. Transactions will settle in NZClear if the relevant NZClear member has sufficient funds (or credit) with their bank and that bank has sufficient funds in their ESAS account to pay the bank for the NZClear member receiving the funds.
- ESAS account holders are members of a SWIFT⁴

⁴ SWIFT stands for the Society for Worldwide Interbank Financial Telecommunication. SWIFT is a global messaging network which provides entities with a secure means of sending and receiving messages such as electronic payment instructions. SWIFT is a co-operative institution based in Belgium and owned by the world's major financial institutions.

closed user group known as 'AVP' (Assured Value Payment). This facility is used by banks to transfer cleared funds (typically high value transactions, such as house settlements) on behalf of one of its customers to a customer of another bank. ESAS will receive authenticated instructions from an account holder which is a member of the AVP closed user group. The system will process the instructions debiting one ESAS account and crediting another, providing the ESAS account holder making the payment has sufficient funds in their ESAS account.

- ESAS accountholders are members of a SWIFT closed user group known as 'SBI' (Settlement before Interchange). This operates in a similar way to AVP but the membership of this closed user group is administered by Payments NZ Limited rather than the Bank. SBI is described in more detail below.
- ESAS account holders can enter transactions directly into ESAS rather than submitting instructions via NZClear or via SWIFT. Direct entry is used only rarely, generally when operation of either of the NZClear or

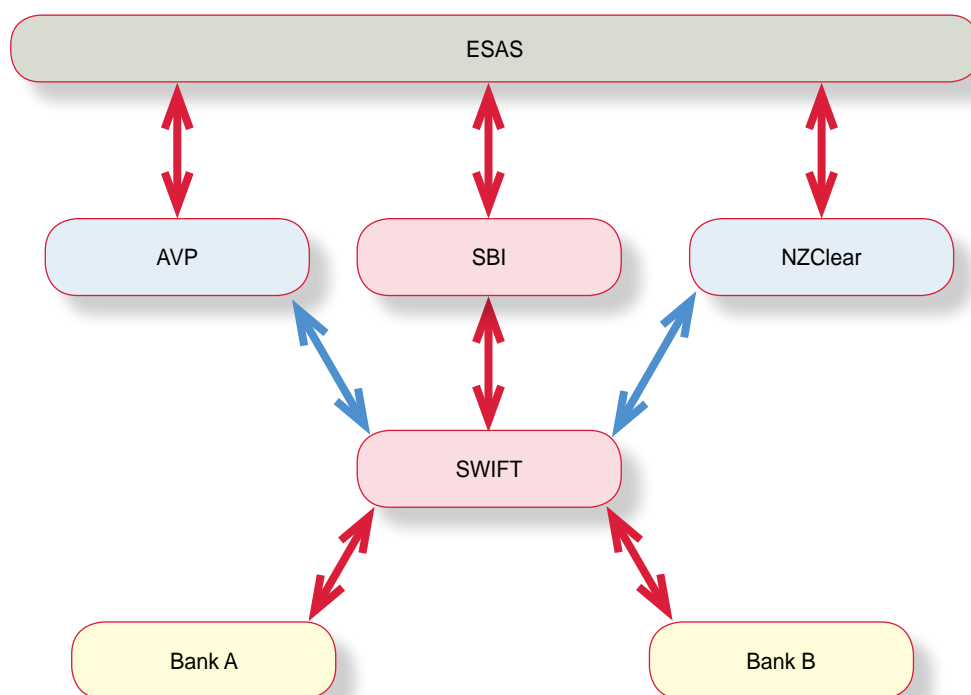
SWIFT interfaces has been interrupted or when a financial institution has lost its connection to ESAS.

How ESAS and NZClear services are delivered

ESAS and NZClear are two distinct services. Each service is governed by separate contracts (the ESAS Terms and Conditions and the NZClear Rules respectively.⁵)

Despite being distinct services, ESAS and NZClear operate on the same computer platform. The two groups of users have separate logical access, but having ESAS and NZClear on the same computers provides account holders and members with economies of scope. As a result, the systems are cheaper to operate than they otherwise would be. Having the Bank as operator of both systems also provides more easily for synergies in areas such as liquidity management (for example the NZClear system has a module which allows ESAS account holders with eligible collateral to generate liquidity to meet short term and time critical payment requirements using an automatic reverse repo facility).

Figure 1
How ESAS and NZClear services are delivered



⁵ The ESAS and NZClear contracts can be found at <http://www.rbnz.govt.nz/payment/nzclear/4662693.pdf> and <http://www.rbnz.govt.nz/payment/ESAS/2781190.pdf>

ESAS account holders and NZClear members are linked to the Bank's systems via telecommunications networks which allow data entry, authorisation and processing to occur throughout the day. Both systems are typically open for 23.5 hours⁶ per day, with the banking day, for settlement account purposes, ending at 8:30am.

ESAS and NZClear services are provided by the Bank's Financial Services Group which is headed by the Chief Financial Officer. Bank staff provide help desk services to ESAS account holders during core processing hours, from 7.30am to 12.15am the following day.

The Bank's information technology section (Knowledge Services Group) provides technical support, particularly with respect to telecommunications and internet connectivity and security. Key software support and development services are outsourced to Datacom Systems (Wellington) Limited. All these parties work closely together to deal with issues and make sure the extensive programme of systems maintenance and development work is kept on schedule.

In 1990, the Bank was granted a licence to operate the NZClear system in New Zealand for 25 years. The system (then known as the Austraclear New Zealand system) was developed by Austraclear Limited for use in Australia and was subsequently adapted for use in New Zealand. In 1996, the Bank commissioned Austraclear Limited to develop ESAS and this was done by the addition of a new module to the Austraclear New Zealand system. The development of ESAS also entailed utilising some of the existing Austraclear programmes. Following consultation with the industry, in 2010 the Bank purchased the right to use the Austraclear New Zealand computer code in perpetuity.

Business developments

The most significant recent business development for ESAS is the introduction of "settlement before interchange" (SBI) for retail transactions. SBI became fully operational in 2012 and replaces the processing formerly undertaken by Interchange and Settlement Limited (ISL).

The ISL model provided for central collation of retail transaction information which was interchanged overnight with subsequent bilateral deferred settlement of the net value of all transactions between banks the next morning. By contrast, under SBI, each bank progressively prepares interchange files containing retail transactions with customers of another bank at various times during the banking day. Those files are released to SWIFT where they are held until a message is received confirming that interbank settlement has occurred in ESAS.

A settlement request for the net value of the transactions in each file is sent to ESAS and once the settlement is effected between the two banks' ESAS accounts, the file containing the underlying customer details is then released by SWIFT and is received by the destination bank. Settlement in ESAS of the net value of underlying transactions in the file occurs before the interchange process is completed. The key benefit of SBI is that it brings forward the timing of settlement and reduces the pipeline of incomplete transactions in the event that a bank fails during the course of the banking day.

To facilitate SBI, the Bank provided an additional interface to ESAS and has extended the hours of operation of its RTGS help desk.

Both ESAS and NZClear proved robust through the global financial crisis, a period of considerable uncertainty. These systems provide certainty to financial institutions - in particular certainty that funds for a transaction have been received and their receipt is not contingent on any other factors, and certainty that once the funds are received the transaction cannot be unwound or revoked.

Table 1 shows average daily transaction volumes and values passing through ESAS. The average value of transactions has fallen from a high of \$39 billion per day prior to the crisis to nearer \$25 billion per day now. This is consistent with a similar trend in other countries, reflecting reduced activity in foreign exchange markets in particular. The average daily number of transactions passing through ESAS continues to rise. This is partly due to the introduction of SBI in February 2012 which has added approximately 500-600 transactions per day to ESAS.

Table 2 shows key average daily statistics for

⁶ NZClear members who are also account holders in ESAS have access to NZClear for 23.5 hours per day. Other NZClear members can use the system to settle transactions for 7.75 hours per day.

Table 1
Key ESAS statistics

Year ended 30 June	2006	2007	2008	2009	2010	2011	2012
Average daily transaction volumes (number)	5472	6081	7,024	7,156	6,929	7,383	8,518
Average daily transaction values (\$bn)	36.6	36.3	38.9	36.8	28.6	26.6	25.1

Table 2
Key NZClear statistics

Year ended 30 June	2006	2007	2008	2009	2010	2011	2012
Average daily transaction volumes (number)	1123	1077	1119	973	899	854	963
Average daily transaction values (\$bn)	9.6	6.6	6.3	6.8	7.0	7.6	8.9

Table 3
Value of securities held in NZClear

Year ended 30 June	2006	2007	2008	2009	2010	2011	2012
Fixed interest (\$bn)	75.6	76.7	84.9	118.4	118.2	132.4	143.7
Equities (\$bn)	18.7	22.4	15.6	12.7	13.4	16.5	17.2

NZClear, which mainly handles New Zealand securities transactions. The number of transactions remains in a relatively tight range, but the average value of transactions settled each day has increased materially. Some of this is no doubt related to the considerable growth in assets held in the system for its members (table 3), in turn mostly because of the rapid growth in New Zealand government securities on issue over the last few years.

Systems developments

In 2007 and 2012, major changes were made to the computer architecture of the ESAS and NZClear systems. In 2007, in addition to using new hardware, the systems underwent a complete rewrite with all screens changing from the original character-based layout to a Windows or graphical user interface layout and construction.

The 2007 systems upgrade coincided with the development of internet-based access to NZClear and ESAS (replacing the previous dial-up facility). Most larger

members continue to access ESAS and NZClear using a dedicated telecommunications network established by the Bank and operated by Telecom Corporation of New Zealand Limited (with another provider providing alternate access and failover facilities in the event of an emergency).

The systems upgrade in 2012 involved a complete hardware replacement and provided improved systems performance and considerable room to accommodate future increases in transaction volumes. Moreover, this upgrade increased the number of back up environments that are available to the Bank in the event of a physical outage at one of the Bank's processing sites.

A number of new interfaces have been added to NZClear to automate processing and reduce operational risk. NZClear is now linked to the two main securities registries (Computershare and Link Market Services). These links allow members to electronically deliver or lodge securities into the NZClear system by entering details into NZClear which then electronically effects the

transfer of securities between NZClear's account at the securities registry and the security account at the registry used by that member. A similar interface was developed jointly by the Bank and the operator of NZX's central counterparty settlement system to facilitate movement of securities between NZClear and the NZX system by NZClear members who are also members of the NZX system. These interfaces process more than 70,000 transactions each year.

For many years the Bank has had computers in both Auckland and Wellington which operate ESAS and NZClear. By alternating production and back-up between these sites every few months the Bank provided a very high level of confidence that system failover to the back-up computer would be effective if an emergency such as a large earthquake or a flood impacted the production computer. The opening of a Bank office in Auckland, which has skilled staff familiar with the Bank's operations, provides assurance that help desk and related support services can be provided to ESAS and NZClear users if the Bank's main office in Wellington is ever unable to provide those services.

The Bank consults with account holders and members on all material systems developments. Each quarter an NZClear user advisory committee reviews the Bank's performance as system operator and provides input to the Bank's decision-making on the system

Risk management

Risk identification and management are crucial elements in the successful operation of ESAS and NZClear. In addition to day-to-day procedures and self-assurance programmes undertaken by the Bank's Financial Services Group, and internal audits by the Bank's Risk Assessment and Assurance division, ESAS and NZClear are audited by PricewaterhouseCoopers as agent for the Auditor-General. At the end of each quarter an external audit report is prepared in respect

of the internal controls for the reconciliation of securities holdings recorded within NZClear and held at the relevant securities registries in the name of New Zealand Central Securities Depository Limited (a wholly owned subsidiary of the Bank). External audit reports are addressed to the Governor of the Bank, are reviewed by the Bank's Board audit committee and published on the Bank's website.

Conclusion

ESAS and NZClear are vital elements of New Zealand's financial infrastructure, and it is high priority for the Bank to ensure that these systems continue to operate with the highest levels of availability and resilience. Effective risk management, updates to software and hardware, and a responsiveness to users' needs in extending the range of functional services are each an integral part of delivering on that commitment.

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