

The Development of Electronic Card Transaction Statistics

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Abstract

Debit and credit cards are now commonly used to pay for many goods and services purchased in New Zealand. Cards are used as a payment method across a wide range of industries, both within and outside the retail sector, and over recent years have grown to represent a significant proportion of consumption expenditure. Statistics New Zealand has obtained access to data that measures this payment channel and has recently published the experimental Electronic Card Transaction series (ECT), which measures the number and value of debit and credit card transactions with New Zealand-based merchants. This information can be used as an indicator of the change in the level of consumption expenditure and economic activity in general.

1. Introduction

Consumer spending makes up approximately 60 percent of total spending in the New Zealand economy. This area of the economy is mainly measured by the monthly Retail Trade Survey (RTS). The survey is used by analysts as one of the main barometers of current economic activity and it feeds directly into quarterly economic growth statistics.

Debit and credit cards are now commonly used to pay for many goods and services purchased in New Zealand. Cards are used as a payment method across a wide range of industries, both within and outside the retail sector, and over recent years have grown to represent a significant proportion of consumption expenditure. Statistics New Zealand has obtained access to data that measures this payment channel and has compared this to the RTS time series to determine if card transaction data is a reliable indicator or predictor of changes in retail sales.

This paper describes this analysis and the results, and includes discussion on:

- the initial potential seen for electronic card transactions data
- an examination of the coverage and characteristics of the data
- how the data compares with the Retail Trade Survey series results
- the decision to publish and the positioning of the data
- possible future developments with this data source.

2. The initial potential seen for electronic transactions data

Electronic card transactions data are generated in the process of administering New Zealand-based electronic transactions, and are supplied to Statistics NZ in a highly aggregated form. The potential uses of this data, more commonly known as eftpos, were first investigated by Statistics New Zealand in 1999 and later updated in 2001. The investigation compared movements in transactions data (actuals) with the RTS and noted differences in movements were similar to the movement sample errors in the RTS. This analysis demonstrated that electronic transactions data had potential to be a very timely indicator of retail sales, albeit the uptake of the technology and the increase in usage of electronic cards was very strong prior to 2000. Uptake and usage has continued to increase but at a slower rate more recently.

Statistics NZ started receiving monthly transactions data aggregated by industry from late 2004 and in July 2005 commenced a project to investigate the potential uses of this data source. The investigation centred around the potential use of the data as an indicator of retail sales and whether it could be used to supplement or replace data currently surveyed by the monthly RTS. The investigation examined the feasibility of producing a monthly indicator of retail sales based on the data. Provided data of sufficient detail became available, other potential applications of the data were also to be investigated. These included the potential of the data to provide estimates of spending by overseas visitors to New Zealand, to improve coverage of the services sector, and to develop estimates of regional spending. An initial investigation using the aggregate data generally concluded that the level of ECT in many of the service industries outside retail was too low to be a useful indicator, although this investigation needs to be revisited if more detailed data become available. The availability of more detailed data is still under discussion with the data suppliers. This paper is concerned with the investigation of the aggregate ECT data as a potential indicator of the monthly RTS.

3. The characteristics and coverage of electronic card transaction data

Electronic card transaction data are supplied to Statistics NZ monthly, aggregated by industry (supplier defined). The industry classification used is a merchant category and is specific to the bank card industry. It has similarities with the Australian and New Zealand Standard Industrial Classification (ANZSIC) used to compile and publish most economic data in New Zealand. For example, many of the categories can be directly related to a specific ANZSIC code. In some cases merchant categories cannot be matched to any single ANZSIC code.

The ECT data are supplied in a more timely way than normal survey data and are available several weeks before the RTS results.

Coverage

Inclusions

- all debit, credit and charge card transactions with New Zealand-based merchants
- card-present transactions at the point of sale, whether authorised by PIN or signature
- card-not-present transactions (for example, payments of invoices, mail order, telephone and Internet sales via credit card, direct debit from credit cards) where the card is not presented directly at a point of sale terminal
- goods and services tax (GST).

Exclusions

- all credit card transactions with non New Zealand-based merchants, for example via the Internet, telephone, mail-order
- transactions by New Zealand card holders while overseas
- cash, cheque or hire purchase transactions
- automatic payments or direct debits from bank accounts
- Internet bank account payments
- withdrawals from ATMs.

Notes

- GST is included in the data and is not separately identified
- Cash out is included in the data from one of the respondent companies, but excluded by the other.
- Manual, voucher-based credit card transactions are included by one of the respondents, but excluded by the other.

4. Statistical series produced from the data

In order to compare electronic transactions data with the RTS, Statistics NZ has constructed three different series (aggregations) from the transactions data to investigate the correlation with the RTS. These series were constructed by matching the industry codes supplied by the respondents to the ANZSIC classification used by Statistics NZ.

The series are:

Electronic card transactions (ECT) – total

- Includes data for all industry classes; a census of all electronic transactions.

ECT – retail industry

- A subset of total electronic card transactions covering the following ANZSIC industries: retail trade (ANZSIC division G); accommodation, cafes and restaurants (ANZSIC division H); and personal services (ANZSIC subdivision 95 of division Q).

ECT – core retail industry

- A subset of retail electronic card transactions, excluding the motor vehicle-related industries (ANZSIC groups G531 motor vehicle retailing and G532 motor vehicle services).

The ECT retail and core series in theory have the same industry coverage as the RTS retail and core retail series respectively.

Prior to any time series comparisons of the ECT and RTS series the coverage and characteristics of the two series were compared and contrasted to determine how closely the two series related on a conceptual basis.

5. Differences observed in the concepts and coverage of the ECT and RTS series

A significant proportion of spending using debit and credit cards takes place in the retail sector. The RTS also surveys sales information about the retail sector from a monthly sample of retail establishments.

Users should be aware that a number of differences have been identified between the two series that affect comparisons. These are described below:

Designed sample survey versus administrative data source

The RTS is a sample survey designed to give certain quality estimates across the range of output totals, for example, total sales by industry. The electronic transaction data coverage is "as found" rather than designed. The coverage is variable in the sense that it represents a changing proportion of spending by industry over time. The RTS estimates are subject to known sample error and unknown but assumed small non-sample error, whereas the electronic transaction estimates are subject to unknown non-sample error.

Timeliness

Electronic transaction data are generated in the process of administering New Zealand-based electronic transactions and as such can be produced in a much more timely fashion than survey results. Accordingly, electronic transaction data are available several weeks before survey results produced from the RTS.

Coverage

The RTS includes payments made by cash, cheque and hire purchase in addition to electronic card transactions:

Table 1

	Cash sale	Credit sale
ECT	Debit card	Credit card Charge card
RTS	Debit card Cash Cheque	Credit card Charge card Hire Purchase

GST

Electronic card transaction data collected includes GST, whereas the RTS collects sales excluding GST.

Timing issues

There are a number of timing issues that can also affect comparisons:

- Electronic transactions occur instantly at the point of sale, whereas many retailers operate on an accrual accounting basis (recording a sale before any money has changed hands).
- Instalments on lay-bys may be paid electronically but are not recorded as a sale by the retailer until the goods are picked up.
- Gift vouchers may be purchased electronically but are not recorded as a sale until they are redeemed.

Classification issues

Statistics NZ has developed ECT series that relate to the industry coverage of the RTS. This has been done by matching the industry codes supplied by the respondents to the ANZSIC classification used by Statistics NZ. There are instances where the classification allocations used by the respondents differ from those used by Statistics NZ. This results in some coverage differences at the industry and overall retail level, and potentially some overstatement of the ECT retail industry levels. One problem area in regard to electronic transaction data is in identifying retail activity from wholesale activity. These sectors are differentiated in official statistics and through the RTS and the Wholesale Trade Survey. They do not seem to be differentiated within electronic transaction data and much wholesale activity appears to be included with retail. The impact of this on ECT retail data levels cannot be fully assessed, as source data are only supplied in aggregate form, but retail levels are estimated to be overstated by less than five percent.

Usage of ECT by industry varies

While the retail and core ECT components nominally have the same industry coverage's as the RTS the usage of electronic transactions across industries varies. For example, some industries such as motor vehicle retailing have low or virtually no electronic card activity. In industries where the usage of electronic transactions is lower it is less likely to be indicative of retail sales. This variability in electronic transaction usage is discussed later in the paper.

Changes in share of spending by electronic card transactions

Over the past few years the uptake of electronic transaction technology among retailers and increasing card usage by consumers have led to an increasing share of retail sales by electronic transactions, resulting in the ECT series having a much steeper trend than the RTS. This increase in share is slowing over time, particularly in industries where the availability of the technology is approaching full coverage. However, it is still impacting significantly on the movements in electronic card transactions. Users should be aware that movements in electronic card transactions are overstated by this increasing share when comparing the ECT series with the RTS.

Electronic card transaction processing outages

Occasionally there are processing outages which prevent customers from being able to make transactions at the point of sale. Where these are significant in extent and duration they can affect the ECT results. The last significant outage occurred in December 2005. The impact of this is particularly visible in the seasonally adjusted decreases in the ECT series for December 2005.

The paper now describes the analysis of the electronic transaction data compared with the RTS. This includes looking at the share of retail sales that electronic transactions make up. It then moves onto a comparison of the ECT and RTS time series.

6. The ECT share of retail spending

The electronic transaction share of retail spending reflects the uptake of the technology by merchants and card usage by card holders. This share can be approximated by dividing the value of retail ECT, adjusted for GST, by retail sales as estimated from the RTS. It should be noted that the level of GST in the data can only be approximated, as GST is not identified in the data supplied. For this analysis the GST has simply been removed from the total using the current rate of 12.5 percent. The electronic transaction data includes cash out from one supplier and zero rated goods and services, which impact on the actual level of GST in the data meaning our estimate is only approximate.

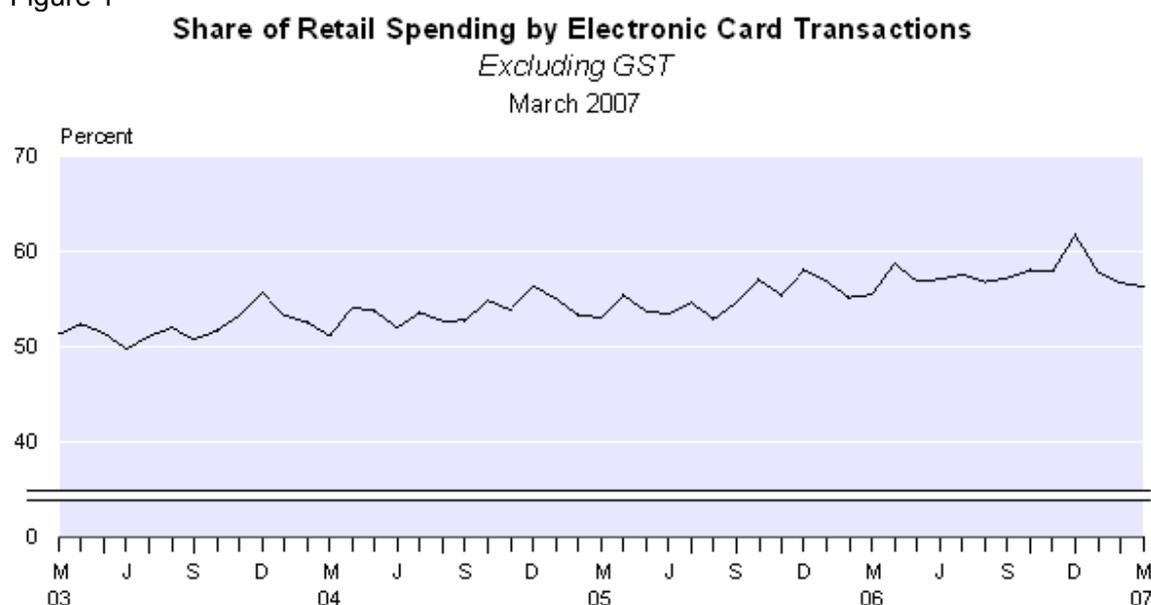
The level of share is important because one might expect that a higher electronic transaction share would imply a higher correlation with the RTS.

Share of retail spending

Our investigations have established the following:

- The electronic transaction share of retail spending is increasing over time although the rate of increase is generally slowing (Figure 1)
- For the year ended March 2007, retail ECT, adjusted for GST, was estimated as 58 percent of RTS sales and core ECT was estimated as 67 percent of core RTS sales. By comparison, the electronic transaction shares were 55 percent for retail and 65 percent for core retail for the year ended March 2006.

Figure 1



Electronic transaction share by industry

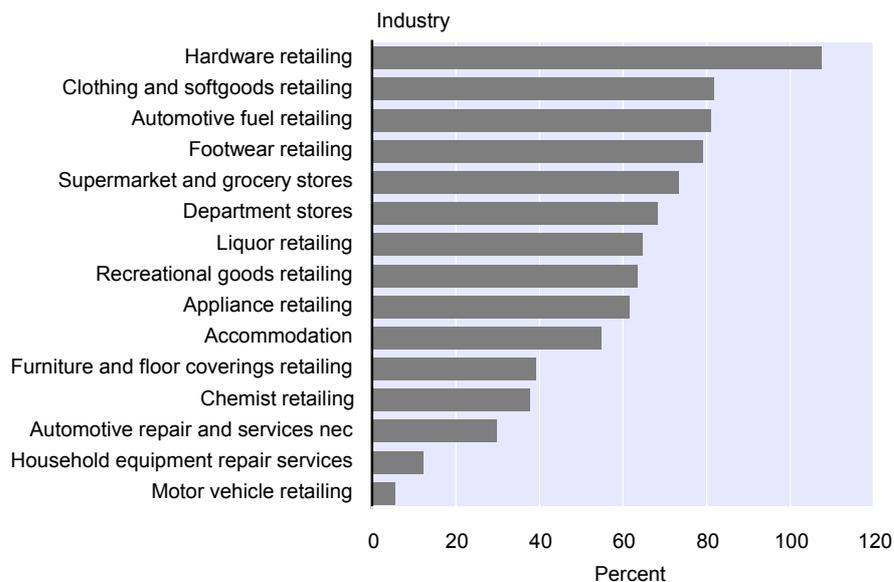
- The level of electronic transaction share varies significantly across the industries making up the RTS coverage (Figure 2).
- The share is higher in industries such as supermarkets and grocery stores, automotive fuel retailing, clothing and softgoods, footwear, and department stores. It is much lower in industries such as automotive repair and services not elsewhere classified (nec) and motor vehicle retailing.

The personal and household goods hiring, and hardware industries have electronic transaction shares over 100 percent. This indicates differences in the classifications used by the data suppliers compared with those used in official statistics. This difference appears to be mainly in distinguishing retail and wholesale activity. The industry breakdown from the data suppliers does not appear to distinguish between retail and wholesale activities in regard to the hardware industry, for example, and these appear combined. Accordingly when this industry is compared to the RTS equivalent the electronic transaction value is larger and not directly comparable in terms of the merchants covered.

Figure 2

Share of Retail Trade Survey Sales by Electronic Card Transactions

By selected industries



Volatility in electronic transaction share of spending

- The electronic transaction share can vary considerably on a month to month basis
- This has been observed at the total retail level and for the core retail industries (excluding motor vehicles)
- The supermarket and accommodation industries appear to show some seasonal variation in electronic transaction share. Supermarkets consistently have a lower electronic transaction share in December and January whereas there is no consistency regarding the month with the highest share (Figure 3). In the accommodation industry December and January consistently have the highest monthly electronic transaction shares (Figure 4).

Figure 3

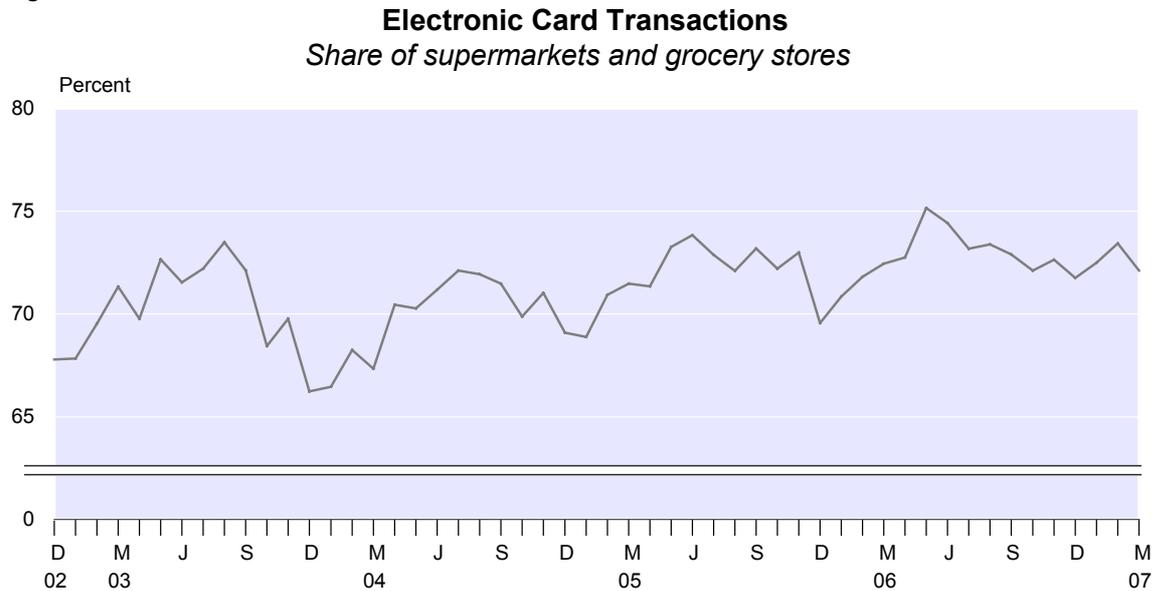
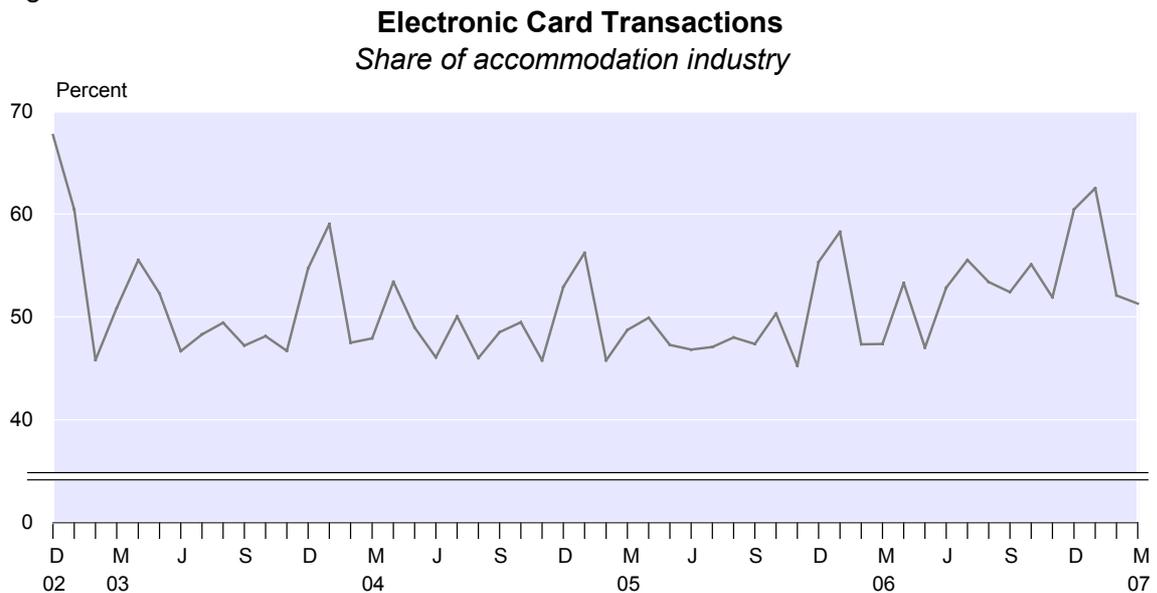


Figure 4



There may be various reasons for the volatility in the electronic transaction share of spending

- The RTS is the denominator in the electronic transaction share calculation. As has been discussed previously, although the two series are measuring something similar, they are not measuring the same thing. There are differences in design, timing of transactions and classifications.
- There are seasonal influences on card usage patterns in some industries such as accommodation, where there is a clear seasonal peak in the electronic transaction share in December/January each year.

- In some cases the use of gift cards, Christmas club vouchers, purchase schemes and lay-bys impacts on the relative share of electronic transactions during December and January.
- The long-term trend in the electronic transaction share, while still increasing in the retail industries, is tending to flatten off, which would appear to indicate that the uptake of the technology and card usage is nearing effective limits in these industries. This is more apparent in the core retail industries.

7. Time series comparison between ECT and the RTS

Method

The time series for ECT and RTS have been compared to determine how well the two series are correlated.

- The analysis has compared movements in unadjusted (actual), seasonally adjusted (SADJ) and trend series for ECT and the RTS.
- The retail ECT series has been compared with the RTS total and the core retail ECT series has been compared with the core retail component of the RTS.
- The following factors have been considered:
 - direction of each series
 - size of movements
 - the relative strength of the trends.
- The time period used is from October 2002 onwards.
- Unlike the electronic transaction share calculations, GST remains included in the ECT data for the time series comparisons

Results

The following is a summary of the results.

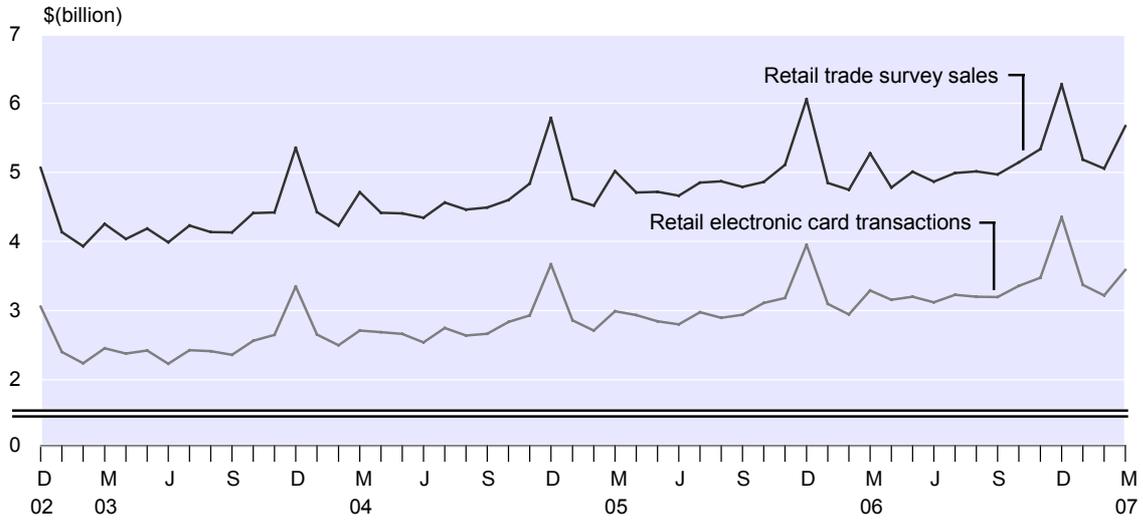
7.1 Comparison of unadjusted (actuals) ECT series with the RTS

Levels

- The ECT and the RTS series have strongly seasonal patterns – peaking in December each year. (Figures 5 and 6)

Figure 5

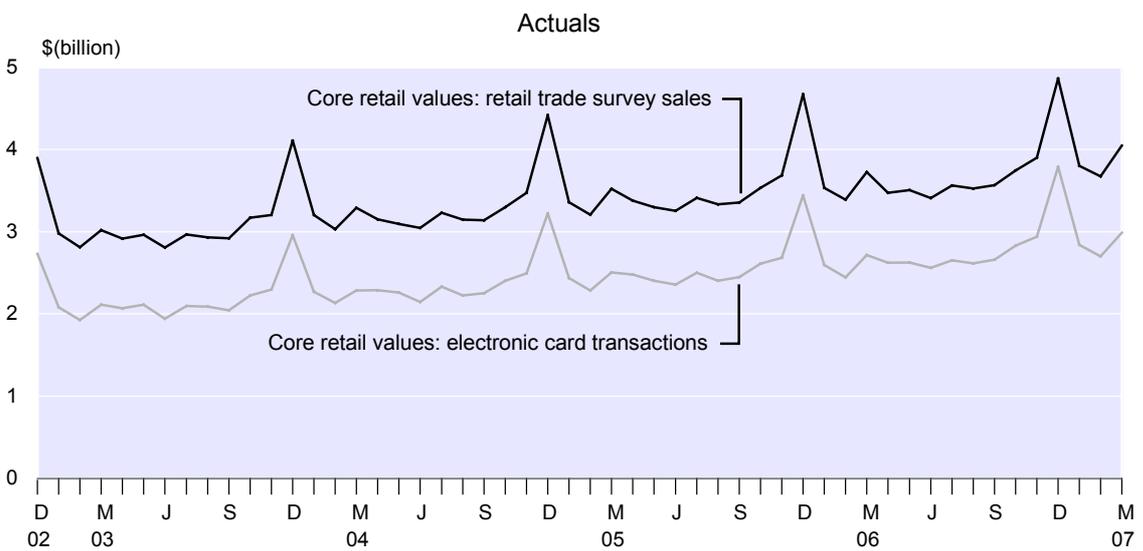
Retail Trade Survey Sales and Retail Electronic Card Transactions
Actuals



- The higher share of electronic transaction data in the core retail industries is evident from comparing the actuals (Figure 6)

Figure 6

Retail Trade Survey Sales and Electronic Card Transactions
Core retail values



Movements

- ECT actuals almost always move in the same direction as the RTS actuals each month
- From October 2002 there have only been five months when the RTS and retail ECT series have moved in different directions, and two months when the respective core retail series have moved in different directions. (Tables 2 and 3)
- Although the ECT series almost always move in the same direction as the RTS, movements in the two series have differed in magnitude. To gauge the significance of these differences they have been compared with the movement sample error for the RTS total series which is +/- 2 percent.
- For retail ECT compared with the RTS the differences are greater than +/- 2 percent 50 percent of the time. For core ECT and the core RTS the difference is greater than +/- 2 percent only 25 percent of the time.
- The largest difference between the movements in the monthly series is 7.8 percent for retail in December 2006 and 4.3 percent for core retail in April 2004
- When compared to the same month of the previous year the movements in ECT data have always been larger than the RTS apart from a couple of occasions

Table 2

Comparing Actual Monthly Movements of Retail ECT and Total RTS
Month on Previous Month

	2002		2003		2004		2005		2006		2007	
	Percentage change from previous month											
	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS
January			-21.4	-18.4	-20.9	-17.3	-22.1	-20.2	-21.6	-20.0	-22.6	-17.4
February			-6.7	-4.9	-5.8	-4.4	-5.2	-2.1	-4.9	-2.1	-4.4	-2.5
March			9.5	8.2	8.4	11.4	10.4	11.0	11.8	11.1	11.4	12.2
April			-3.1	-5.1	-0.9	-6.3	-1.9	-6.1	-4.1	-9.4		
May			1.8	3.7	-0.9	-0.2	-2.9	0.1	1.5	4.8		
June			-8.0	-4.8	-4.6	-1.4	-1.6	-1.1	-2.6	-2.9		
July			9.0	6.1	8.3	5.1	6.3	4.1	3.5	2.6		
August			-0.5	-2.3	-3.9	-2.3	-2.7	0.4	-0.9	0.4		
September			-2.4	0.0	0.9	0.7	1.5	-1.7	-0.1	-0.9		
October	12.1	6.3	8.6	6.7	6.4	2.4	5.8	1.4	5.0	3.6		
November	3.9	2.8	3.3	0.2	3.4	5.2	2.3	5.2	3.5	3.8		
December	25.3	19.3	26.7	21.2	25.2	19.6	24.2	18.6	25.3	17.5		

movements have different directions
 largest difference

Table 3

Comparing Actual Monthly Movements of Core ECT and Core RTS
Month on Previous Month

	2002		2003		2004		2005		2006		2007	
	Percentage change from previous month											
	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS
January			-23.8	-23.4	-23.3	-22.0	-24.3	-24.0	-24.5	-24.4	-25	-21.9
February			-7.5	-5.8	-6.0	-5.4	-6.2	-4.4	-5.9	-4.0	-4.9	-3.4
March			9.6	7.4	7.1	8.5	9.6	9.8	11.2	9.9	10.6	10.2
April			-2.0	-3.3	0.1	-4.2	-1.2	-4.1	-3.5	-6.9		
May			2.0	1.5	-1.3	-1.8	-3.0	-2.3	0.2	1.0		
June			-8.1	-5.3	-5.0	-1.6	-1.9	-1.3	-2.4	-2.8		
July			8.1	5.7	8.8	6.1	6.1	4.8	3.5	4.5		
August			-0.5	-1.2	-4.6	-2.5	-3.9	-2.4	-1.4	-1.1		
September			-2.1	-0.4	1.2	-0.3	1.9	0.8	1.7	1.3		
October			8.9	8.5	6.9	5.1	6.7	5.3	6.4	4.9		
November	4.9	3.0	3.2	1.1	3.7	5.2	2.7	4.2	3.8	4.1		
December	28.1	26.8	28.9	28.2	29.3	27.3	28.4	26.8	29	24.8		

movements have different directions
 largest difference

Conclusions – actuals

- Month on month movements in ECT actuals provide a good indication of the direction of the RTS actuals as the two series almost always move in the same direction. This is particularly the case where the movements in ECT are strongly positive or negative.
- Monthly movements in actuals have differed in magnitude. The differences are more pronounced for retail. For core retail the differences are generally less than the sample error for RTS monthly movements.
- The consistently stronger year on year results for ECT demonstrates the stronger trend of ECT compared to the RTS because of continuing increases in the uptake of the technology by merchants and increasing card usage.

7.2 Comparison of the seasonally adjusted and trend series

The monthly seasonally adjusted (SADJ) data for the RTS is widely used as an indicator of current economic conditions. Electronic transaction data is timelier than the RTS; therefore, could ECT be used as a predictor of movements in the RTS SADJ series? Users consulted prior to publication of the ECT series indicated that a difference of approximately +/- 0.5 percent between a predictor series and what it is trying to predict would be acceptable. Accordingly to be a consistent predictor of the RTS the ECT SADJ series should be within +/- 0.5 percent of the RTS result.

In the case of the RTS this is a very difficult and probably unrealistic expectation to meet. The RTS series itself has movement sample errors for the monthly actuals of around +/- 2 percent at the total level.

For a quality assessment of the seasonally adjusted ECT series please refer to the appendix.

Retail ECT compared with the RTS – results of SADJ comparisons

- The retail ECT SADJ series generally has higher movements than the RTS as indicated by the higher median for monthly changes (Figure 7)
- The ECT SADJ series is more volatile than the RTS SADJ series as indicated by the higher maximum and lower minimum values for the series
- Since October 2002 the retail ECT SADJ series has moved in the same direction as the RTS about 70 percent of the time (Table 4)
- The ECT and RTS series are generally close to zero when the directions differ
- The differences in the monthly movements between retail ECT and the RTS have been below or around +/- 0.5 percent approximately 50 percent of the time since October 2002.
- The greatest difference in the monthly movements between the two series is 4.1 percent in January 2006. As discussed previously a significant system outage occurred on one day in December 2005 which impacted on the ECT SADJ series and comparisons with adjacent months (Figure 8).

Figure 7

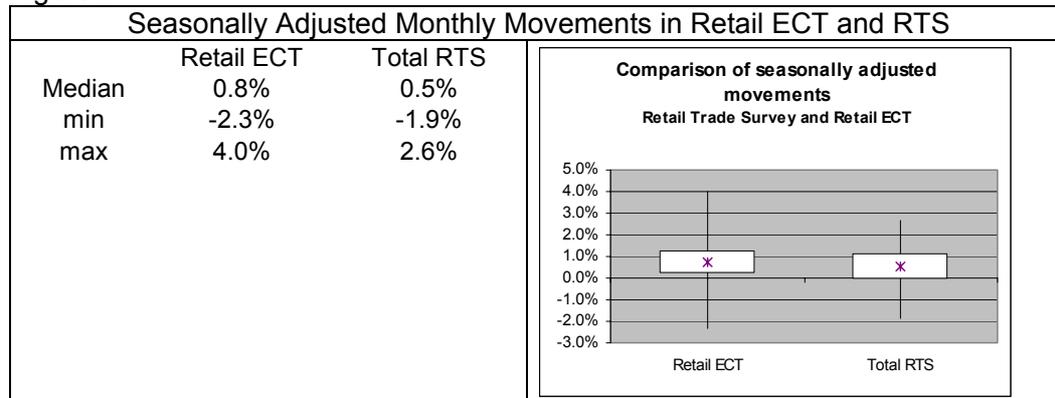


Figure 8

Retail Trade Survey Sales and Retail Electronic Card Transactions
Monthly percentage change
Seasonally adjusted series

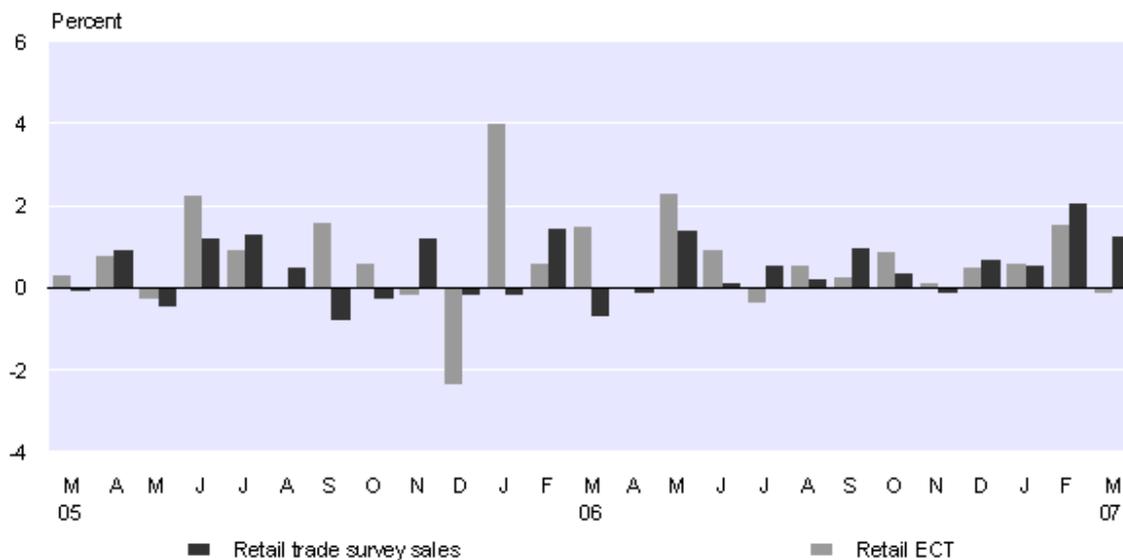


Table 4

Comparing Seasonally Adjusted Monthly Movements of Retail ECT and Total RTS
Month on Previous Month

	2002		2003		2004		2005		2006		2007	
	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS
January			0.8	-0.1	0.5	2.6	1.7	1.1	4.0	-0.1	0.6	0.5
February			1.0	0.7	0.4	-1.9	1.2	1.1	0.6	1.4	1.6	2.1
March			0.3	-0.9	1.8	2.6	0.3	-0.1	1.5	-0.7	-0.1	1.3
April			-0.2	-0.05	1.2	-0.4	0.8	0.9	0.1	-0.1		
May			0.8	1.5	1.1	0.6	-0.3	-0.4	2.3	1.4		
June			0.0	0.4	0.2	1.0	2.3	1.2	0.9	0.1		
July			2.1	0.7	1.0	0.5	0.9	1.3	-0.3	0.6		
August			1.0	0.5	0.5	0.6	0.0	0.5	0.6	0.2		
September			-0.5	0.3	1.2	0.4	1.6	-0.8	0.3	1.0		
October			1.5	1.4	-0.2	0.2	0.6	-0.3	0.9	0.4		
November	0.7	0.0	1.6	0.3	1.4	1.3	-0.1	1.2	0.1	-0.1		
December	1.3	1.2	1.1	-0.1	-0.5	-0.2	-2.3	-0.2	0.5	0.7		

 movements have different directions
 Largest difference

Core retail ECT compared with the core RTS – results of SADJ comparisons

- When looking at the core retail industries, where the electronic transaction share is higher, the series comparison might be expected to be closer.
- The ECT and RTS core series both show less volatility than the Retail series. (Figure 9)
- Since October 2002 the core ECT SADJ series has moved in the same direction as the core RTS about 60 percent of the time. (Table 5)
- ECT and RTS series are generally close to zero when the directions differ.
- The differences in monthly movements between core ECT and the core RTS have been below or around +/- 0.5 percent just under 50 percent of the time.
- The greatest difference in the monthly movements between the two series is 3.5 percent in January 2006.

Figure 9

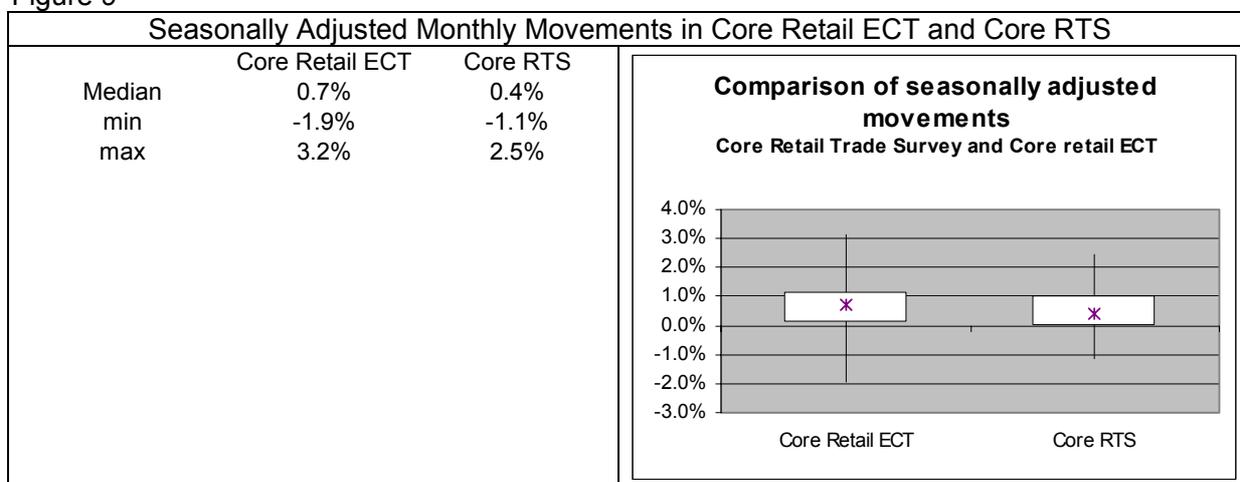


Table 5

Comparing Seasonally Adjusted Monthly Movements of Core ECT and Core RTS
month on previous month

	2002		2003		2004		2005		2006		2007	
	Percentage change from previous month											
	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS	ECT	RTS
January			0.6	-0.8	-0.1	1.6	1.6	1.0	3.2	-0.4	0.7	1.0
February			0.7	1.4	0.9	-1.1	0.8	0.9	0.3	1.1	1.5	2.5
March			1.1	-0.4	1.6	2.4	0.2	0.6	1.6	0.1	-0.4	0.8
April			0.2	-0.04	0.9	-0.6	0.6	0.4	-0.3	-0.3		
May			1.1	1.5	1.0	0.7	0.0	-0.3	1.7	1.0		
June			-0.3	0.3	-0.1	1.5	2.1	1.4	0.8	0.1		
July			1.7	0.2	1.4	0.8	0.7	0.9	-0.1	1.4		
August			1.1	0.9	0.2	0.6	-0.3	-0.9	0.8	-0.2		
September			-0.3	0.4	1.3	-0.6	1.0	0.8	1.3	2.0		
October			1.0	1.4	-0.8	0.1	0.7	1.2	1.6	0.2		
November	1.0	-0.5	0.7	-0.3	1.5	1.5	0.1	0.1	0.1	-0.05		
December	1.0	1.0	0.7	0.2	0.1	-0.2	-1.9	0.4	0.5	0.2		

movements have different directions
Largest difference

Conclusion of the SADJ comparisons

- The monthly SADJ series for ECT and RTS generally move in the same direction
 - About 70 percent of the time for retail and just under 60 percent for core retail
- The ECT and RTS series are generally close to zero when the directions differ
- Movements in the retail and core ECT series are within ± 0.5 percent of the RTS and core RTS about 50 percent of the time.
- The median movements are higher for ECT than the RTS indicating the stronger trend in ECT.
- Movements in the ECT series are more volatile than their RTS counterparts.

7.3 Comparison of ECT and RTS trend series

Results

- The retail and core ECT trend series have both trended up at a faster rate than their RTS counterparts for the last four years for which we have data. (Figures 10 and 11)

Figure 10

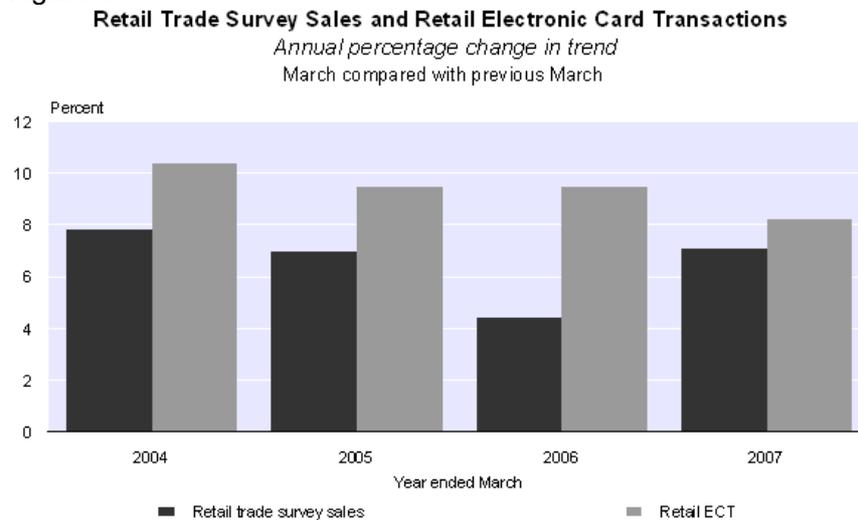
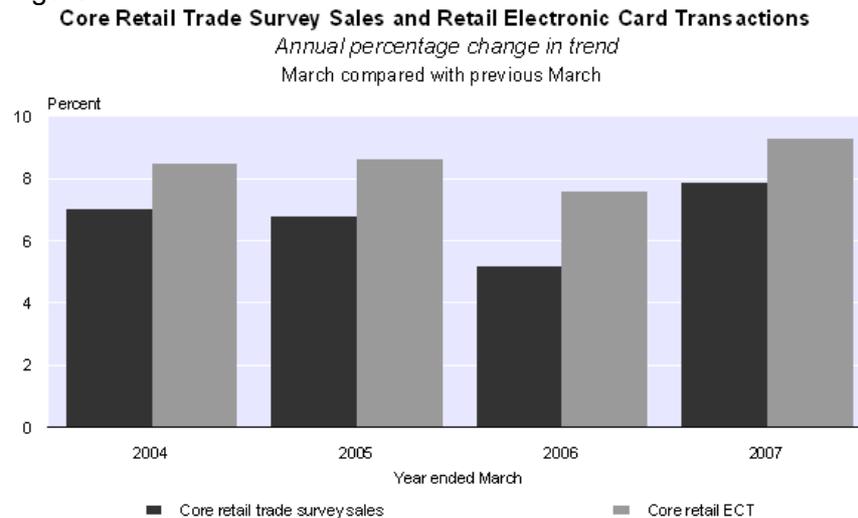


Figure 11



Overall conclusions of the ECT and RTS analysis

- Month on month movements in ECT actuals provide a good indication of the direction of the RTS actuals as the two series almost always move in the same direction. This is particularly the case where the movements in ECT are strongly positive or negative.
- Monthly movements in actuals have differed in magnitude. The differences are more pronounced for retail. For core retail the differences are generally less than the sample error for RTS monthly movements.
- The monthly SAdj series for ECT and RTS generally move in the same direction
 - About 70 percent of the time for retail and just under 60 percent for core retail.
- The ECT and RTS series are generally close to zero when the directions differ.
- Movements in the retail and core ECT SAdj series are within +/- 0.5 percent of their RTS counterparts about 50 percent of the time.
- The ECT series is a predictor of the RTS about 50 percent of the time
- The retail and core ECT trend series have both trended up at a faster rate than their RTS counterparts for the last four years for which we have data

What about the differences?

- The ECT and RTS actuals look relatively close at first sight.
- Two key differences emerge however on further analysis:
 - ECT has a wider range of month to month movements
 - ECT has steeper trend.
- Differences between electronic transaction data and the RTS become more apparent once the series are seasonally adjusted.
- In addition the stronger trend of electronic transaction data can be observed in the seasonally adjusted results.

8. Potential uses of electronic transaction data

Given the results of the analysis of electronic transaction data, what are its potential uses? To assess this, a number of potential users were contacted to discuss the results of the analysis and to canvass views on potential uses of electronic transaction data. The users included representatives from, other government departments, the economists of the major banks, economic research organisations and business journalists.

Consultation was done via personal visits and also a focus group. As a result of this consultation the following consensus view of the potential uses of electronic transaction data was developed.

Benefits of electronic transaction data

The users contacted identified the following benefits of electronic transaction data:

- timeliness – electronic transaction data are available several weeks before the RTS data so provide one of the earliest sources of information on consumer expenditure
- the data are a census of actual transactions – not subject to sample error
- the closeness of the unadjusted ECT data results to the RTS supports the credibility of the RTS results
- the electronic transaction data themselves are simple to understand – everyone can relate to it
- electronic transaction data clearly show consumer behaviour related to electronic transactions.

Some direct comments made about the potential usefulness of electronic transaction data

- “We’d use it to forecast one month ahead. If it’s a strong number, it tells you the RTS will be a strong number.”
- “This would give you a feel really, we have indicator models already so you would see whether they agree with each other.”
- “Household spending is one of the key indicators and if you get something credible 3 weeks before the RTS data you currently get, that’s another important piece of information.”

Potential issues/weaknesses with electronic transaction data

- there will be a perceived lack of confidence in the data until it has been in the market for some time - it would need to gain credibility over time as an indicator of consumer spending
- outages in electronic card transaction systems that impact on the data time series
- possible changes in consumer behaviour that impact on the coverage of the data.

General consensus

There was a general consensus among the users contacted that because of the extensive coverage and timeliness of electronic transaction data, it provided a useful early indicator of consumer spending and could be used to supplement and support other economic data. Users wanted to see the data published as a series in its own right.

9. Decision to publish

Given that electronic transaction data is a timely indicator of consumption expenditure and the positive user interest in the data, Statistics NZ decided to publish ECT as a stand alone data series. The publication of the ECT series commenced in February 2007 with the release of the January 2007 data. Back data were also published with the series commencing in October 2002. As far as we are aware this is the first time statistics on electronic card transaction data has been published by a national statistical office.

Due to the developmental nature of this work, Statistics NZ has released ECT as an experimental series. Reasons for this include:

- The industry classification used in the data is applied by the suppliers and specific to meet the needs of that industry. This coding is not always consistent with the classifications used in official statistics and is therefore not always directly comparable.
- Some industries have embraced electronic transaction technology, whereas other forms of payment are more prevalent in others.
- For some industries the level of electronic transaction activity may be very low and therefore not necessarily a good representation of the actual spending in that industry. A good example of this is in motor vehicle sales where transactions tend not to be conducted using debit or credit cards.
- There is strong interest in the potential use of this data as an early indicator of retail spending activity; however the limitations outlined above merit positioning the series as experimental.

The data are published monthly by the end of the month following the reference month. The timing of the publication will be moved forward approximately one week from July 2007 for the June 2007 reference month onwards.

10 Possible future developments

Statistics NZ is continuing to work with the data suppliers to discuss access to more detailed data. Access to more detailed data would allow for further investigation of the following:

- the relationship of electronic transaction data to the RTS
- application of standard industry coding to electronic transaction data to improve its comparability with other published statistics
- the behaviour of data dis-aggregated by industry and region
- data aggregated by country of origin – related to overseas visitors to New Zealand
- seasonal factors with sub-monthly data.

In the short term Statistics NZ is investigating the feasibility of publishing some industry information based on the current aggregate data supplied.

Statistics NZ wishes to thank the private sector for the supply of data for publication and for the ongoing cooperation regarding this rich data source.

References

Beaven R, Templeton R, Statistics New Zealand (2001). *Analysing the Retail Market Via Electronic Fund Transfers*.

Crequer J., Statistics New Zealand (2006). *Quality Assessment of the ECT Seasonally Adjusted Series*.

Appendix

Quality Assessment of ECT to July 2006

John Crequer, Statistical Methods, 27 July 2006

This report is intended to address a number of statistical and methodological issues on the assessment of the quality of the Electronic Transaction Data series in relation to the Retail Trade Survey series to the end of July 2006.

The following question is addressed.

Why is the seasonally adjusted ECT so different from RTS?

1. Seasonal adjustment of the RTS
2. Seasonal adjustment of ECT
3. The differences

Why is the seasonally adjusted ECT so different from the RTS?

Both the ECT and RTS seasonal adjustments are of high quality. The differences in the seasonally adjusted figures are due to the actual series being different. While the two series measure similar things they are not measuring the same things and nor are they measuring in the same way. The relationship between the two series is also affected by changes in the penetration of ECT and the steeper trend of ECT compared with RTS.

1. Seasonal adjustment of the RTS

The Retail Trade Survey is seasonally adjusted indirectly at the aggregate level. There are 24 separate series which feed into the aggregate, not all of which are adjusted. The series itself is a good adjustment, having the following statistics in the following table at the aggregate level. Core retail is total retail excluding the four motor vehicle related ANZINDs.

Quality Measure	Total Retail	Core Retail
Months for Cyclical Dominance (MCD)	2	2
One month movement Seasonal part	95%	97%
12-month movement Trend part	95%	97%
Trend filter length	13	13

- The MCD is the number of months before the noise in the trend is dominated by the signal of the trend. This is often used as an indicator of the number of months a change in the direction of the trend must be observed before reporting that a turning point has occurred. An MCD of 3 or better is considered good and of publishable quality.
- The percentages indicate the amount of movement in the series which can be accounted for by the seasonal or trend components; one expects a good proportion of the one month movement to be accounted for by the seasonality in a highly seasonal series with a good seasonal signal and similarly for the trend at 12 months. Percentages over 65 for both seasonal and trend components are considered good and of publishable quality.
- The length of the trend filter is an indication of how many observations must be smoothed to obtain a good estimate of the trend. Generally the longer the trend filter the noisier the series.

2. Seasonal adjustment of ECT

The ECT is adjusted directly at the aggregate level, the direct series being of slightly better quality than the indirect adjustment. Each of the series from the suppliers is aggregated to form a composite for Total ECT, Retail ECT and Core Retail ECT. The series are short by normal Statistics New Zealand standards but the series still adjust well. However, we might have slightly larger revisions as the seasonal components might not be as well estimated due to the fewer observations of each month, or season, which we have available, because of the shorter series.

Quality Measure	Total ECT	Total Retail ECT	Core Retail ECT
Months for Cyclical Dominance	1	1	1
One month movement Seasonal part	94%	95%	96%
12-month movement Trend part	99%	99%	99%
Trend filter length	9	9	9

Note that the trend filter length is shorter for the ECT series, due to slightly less noise in the trend estimation.

3. The differences

On the basis of the above summary statistics, it would seem that the ECT series is a slightly better adjustment than the RTS. Certainly the trend signal seems to be coming through a little clearer, with the MCD being lower across all the ECT series. There is little variation between the series in the number of partial and zero weighted observations. Both series show strong seasonality in December with either lesser seasonal effects or no detectable seasonality in other months.

In summary, both series are very good adjustments, showing strong seasonal and trend signals.

So why are the seasonally adjusted figures so different for the two series?

At the risk of stating the obvious, the seasonally adjusted figures are different because the original series are different. Although we know that the two series, RTS and ECT, are measuring something similar, we also know that they are not measuring the same thing. The differences between the two series are written up elsewhere but we can distinguish them on at least the following:

- Cash, credit, hire purchase etc (RTS) versus electronic transactions (ECT)
- timing of accounting for sales versus instantaneous time stamping
- coverage designed to give certain quality estimates across the range of output totals versus variable coverage, "as found" rather than designed (variable in the sense of varying across ANZINDs and time).
- To rephrase the last point, estimates subject to known sample error and unknown but assumed small non-sample error versus estimates subject to an unknown non-sample error.

Any one of these differences could make the two series quite different in the actuals. Any differences in the actuals will be reflected in the seasonal adjustment. When these differences are not systematic effects captured by the seasonal adjustment or trading day co-efficients then they will remain within the trend or irregular. Even if we are prepared to assume that the systematic components of the two seasonal models are the same, then we are still left with

differences in the movements of the two series due to the differing irregular components. These effects, due to the differences listed above, may be enough to push the relationship between the two seasonally adjusted series outside the 0.5% range.

One of the sources for these differences is the changing rate of penetration of ECT transactions over time. This may be characterised as a change to the coverage of the ECT within the Retail sphere and a change of the coverage of the ECT outside Retail. These changes make the interpretation of the relationship between ECT and RTS much more interesting because it is not a constant for the length of the series. However, the degree to which it will affect the interpretation of the relationship has not yet been quantified.

The actuals themselves look, at first sight, to be relatively close. However, on closer inspection at least two differences emerge

- the ECT series has a wider range of month to month movement than the RTS
- the ECT series has a steeper trend than the RTS

These differences will become more pronounced when the series are seasonally adjusted. Seasonal adjustment attempts to remove the seasonal component from the observed series, leaving the trend and irregular. If one series has a much stronger trend than the other then this will be observed in the seasonally adjusted movements. In comparing RTS and ECT then, we would expect to see larger movements in the ECT seasonally adjusted series than the RTS counterpart as the trend of the ECT is steeper than that of the RTS.