Electronic Indicators of Economic Activity

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There is a rich array of timely high-frequency electronic data that potentially is informative about current economic conditions. In particular, data on electronic transactions and internet searches can be useful complements to more standard indicators of economic activity. While a limited selection of electronic data is currently used by national statisticians in the production of economic indicators, electronic data are likely to become an increasingly important source of information.

Introduction

Assessing current economic activity is an important part of macroeconomic policymaking. However, official economic statistics can take some time to compile and to be published. For example, quarterly gross domestic product (GDP) figures are released around nine weeks after the end of the relevant quarter. As a result, the Reserve Bank looks at a range of more timely, but less complete, indicators to gauge current conditions in the economy, such as the various business surveys and the Bank's business liaison program.[1]

Over recent years, however, technological developments, and the digitisation of information and activity, have generated a vast array of electronic data, which can potentially be analysed on a daily basis, or even in real time. Some of these data cover very large numbers of individuals and businesses – far more than many traditional surveys used by statistical agencies – and have the potential to be useful for monitoring and measuring aggregate economic conditions. While official statisticians are increasingly using electronic data in the production of economic indicators, this is still very much in its infancy.[2] Economists and policymakers are also making greater use of electronic data to understand economic developments and as a cross-check on data from official agencies.

This article examines the usefulness of wholesale and retail electronic transactions data and internet search data in assessing current economic activity. Given the growth of electronic payments and internet use by Australian households and businesses, these data can help to track economy-wide spending and activity. While wholesale and retail payments data already provide some additional information on national accounts aggregates, and internet search data also appear promising as economic indicators, these sources are expected to become even more useful in the future, as new technology is adopted and electronic means of payment evolve further. As such, these data are worth monitoring more closely.

Wholesale Payments

Payments generated by corporates and financial institutions reflect a wide range of activities such as purchases of goods, business investment, imports and exports, and financial transactions. Recently, wholesale payments data have attracted attention

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1 For an overview of the main business surveys in Australia and how they are used by the Reserve Bank, see Park (2011).

2 For example, the Australian Bureau of Statistics (ABS) makes use of electronic tax collection data and Medicare data.

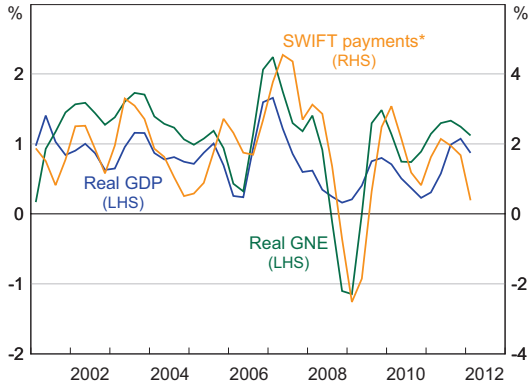
as a potential economic indicator, with the financial message service provider SWIFT releasing an index that helps to predict OECD GDP growth using SWIFT payments sent on behalf of corporate customers.[3] SWIFT (2012) suggests that inclusion of customer-to-customer payment volumes data can improve the explanatory power of a simple model of GDP growth.

In Australia, data are available on the SWIFT payments settled across the Reserve Bank Information and Transfer System (RITS), which is Australia's real-time gross settlement system.[4] Although banks can use various payment instruments for their customers' transactions, large-value corporate customer payments will usually be sent using SWIFT, particularly wholesale transactions relating to business investment.

These data have several advantages over other more established indicators of economic activity. They are very timely, with a day's payment data available at the conclusion of each business day. They cover a very large number of payments and being actual fund transfers of banks and their customers are free from reporting error and revisions. However, RITS transaction data do have some limitations. The data include financial transactions and clearly exclude many small transactions by individuals and businesses, while shifts between payment methods can introduce volatility. Also, payments between two customers holding accounts at the same bank will not normally be sent to RITS for settlement and are therefore not captured in the data. The historical time series is also relatively short compared with more established indicators. While electronic payments data clearly have their limitations, it is worth noting that existing measures, such as GDP and gross national expenditure (GNE), are also imperfect estimates of actual economic activity.

Nevertheless, SWIFT payments track changes in these measures of economic activity reasonably well (Graph 1, Table 1).[5] Interestingly, the number, rather than the value, of payments is more highly correlated with economic activity. This may be because volatility in the values series is affected by large financial transactions, such as swaps, which are not directly relevant for measuring economic output and demand. The relationships with real and nominal measures of economic activity are similar. Given the greater emphasis on real measures of activity in economic analysis, the following analysis focuses on the usefulness of electronic payments as an indicator of *real* measures of economic activity.

Graph 1
SWIFT Payments and Economic Activity*
Trend, quarterly growth



* Number of SWIFT interbank payments settled in RITS, 7-period Henderson trend
Sources: ABS; RBA

Another way to assess the usefulness of wholesale payments data is to observe whether they can improve the explanatory power of models of economic activity. A test that represents a relatively low hurdle is whether wholesale payments contain information not already provided by a lag of the

3 SWIFT uses message types to distinguish between different business purposes; the index constructed by SWIFT (2012) includes customer-to-customer payments (SWIFT MT103 payments) but does not include bank-to-bank payments (SWIFT MT202 payments).

4 Other payments settled in RITS include retail transactions such as direct entry, cheques and card transactions, as well as transactions arising from wholesale debt securities, equity and money market transactions. For further discussion on the settlement of payments in RITS, see Gallagher, Gauntlett and Sunner (2010).

5 For the purposes of this article, the SWIFT data were aggregated and seasonally adjusted at a quarterly frequency, after being lagged by one month; the quarterly SWIFT data have a stronger relationship with official measures of economic activity when lagged by one month, which is consistent with invoicing arrangements that typically allow some time for payment after receipt of the service or good.

Table 1: Correlations between SWIFT Payments and Economic Activity[a]
March 2001 to March 2012, quarterly

	SWIFT payments	
Economic variable	Value	Number
Real GDP	0.17	0.49
Real GNE	0.31	0.56
Real domestic demand	0.27	0.40
Nominal GDP	0.38	0.48
Nominal GNE	0.32	0.51
Nominal domestic demand	0.30	0.35

(a) Contemporaneous correlations based on seasonally adjusted data; RITS data are available from July 1998, but possible structural breaks restrict analysis to 2001 onwards
Source: RBA

economic activity variable itself, that is, whether payments can improve the fit of a baseline model where growth in the economy is modelled as a simple autoregressive process. In addition to the baseline model, Equation (1) is estimated for each activity variable (GDP in this example):

$$\Delta GDP_t = \alpha_0 + \alpha_1 \Delta GDP_{t-1} + \alpha_2 \Delta SWIFT_t + \varepsilon_t \quad (1)$$

where *SWIFT* is the number of payments settled per quarter, ε is an error term and Δ denotes quarterly per cent growth. For comparison, Equation (2) is also estimated for each activity variable:

$$\Delta GDP_t = \beta_0 + \beta_1 \Delta GDP_{t-1} + \beta_2 survey_t + \varepsilon_t \quad (2)$$

where *survey* is the NAB survey measure of business conditions.

The results suggest that SWIFT payments data do indeed contain additional information, as the fit of the models improves noticeably, with the models explaining an additional 10–30 per cent of the quarterly movement in broad measures of economic activity, relative to the baseline model (Table 2). This improvement is comparable to that achieved with the inclusion of the business conditions survey measure in the baseline model.[6] The inclusion of the payments variable also slightly improves the models' out-of-sample predictive ability (to a greater extent than the inclusion of the survey variable), as shown by the fall in the mean absolute error (MAE), which is the average absolute difference between predicted and actual quarterly growth in the economic variable for the quarter ahead.

A more challenging test is whether SWIFT payments data can improve models of economic activity that already include a range of timely economic indicators. Principal component analysis can be used to summarise the information provided by such other indicators (Gillitzer, Kearns and Richards 2005). This technique identifies the movements of common factors (the principal components) and their importance in driving movements in a set of variables. Two first principal components are estimated, one based on various surveys of economic conditions ('survey variables'), and one on a broader collection of variables including surveys, financial market indicators and official ABS statistics ('all variables').[7] Two corresponding baseline models

6 The results for *nominal* measures of economic activity are similar to those shown in Table 2.

7 The survey indicators include the NAB business conditions and business confidence indices, the Westpac-Melbourne Institute consumer sentiment index, a composite AIG business conditions index, and changes in the NAB survey measure of capacity utilisation. In addition to these measures, the broader collection of indicators includes growth in the ANZ job advertisements series; imports; exports; retail sales; dwelling approvals; total credit; real equity, commodity and dwelling prices; and changes in the unemployment rate.

Table 2: Information Content of SWIFT Payments Data – Autoregressive Models[(a)]
March 2001 to March 2012, quarterly

Economic variable	Baseline	SWIFT payments	Survey
Real GDP			
Adjusted R^2	0.05	0.31	0.19
MAE (ppt)	0.30	0.29	0.54
Real GNE			
Adjusted R^2	0.00	0.29	0.27
MAE (ppt)	0.54	0.29	0.85
Real domestic demand			
Adjusted R^2	0.03	0.16	0.31
MAE (ppt)	0.91	0.75	0.82

(a) MAE is calculated using one quarter ahead out-of-sample predictions for the four quarters to March 2012
Source: RBA

are estimated, with growth in the economic variable explained by a principal component. In addition to the baseline models, Equation (3) is estimated for each principal component and each activity variable (GDP in this example):

$$\Delta GDP_t = \gamma_0 + \gamma_1 PC_t + \gamma_2 \Delta SWIFT_t + \varepsilon_t \quad (3)$$

where *PC* is the estimated first principal component of other timely indicators (either 'survey variables' or 'all variables').

The inclusion of a SWIFT payments variable into the baseline models improves their explanatory power, as shown by the increase in the adjusted R^2 figures (Table 3). The inclusion of the payments variable also improves the models' out-of-sample predictive ability, as shown by falls in the MAEs. However, the MAE results appear somewhat sensitive to the length of the period chosen for the out-of-sample

Table 3: Information Content of SWIFT Payments Data – Principal Component Models[(a)]
March 2001 to March 2012, quarterly

	Survey variables		All variables	
Economic variable	Baseline	SWIFT payments	Baseline	SWIFT payments
Real GDP				
Adjusted R^2	0.06	0.23	0.05	0.22
MAE (ppt)	0.47	0.39	0.51	0.41
Real GNE				
Adjusted R^2	0.34	0.50	0.33	0.48
MAE (ppt)	0.67	0.57	0.78	0.67
Real domestic demand				
Adjusted R^2	0.35	0.40	0.38	0.41
MAE (ppt)	0.75	0.68	0.79	0.70

(a) MAE is calculated using one quarter ahead out-of-sample predictions for the four quarters to March 2012
Source: RBA

forecasts.[8] Nonetheless, the results from the various tests suggest that wholesale SWIFT electronic transactions data have some relationship with key economy-wide measures of activity and, moreover, contain useful information in addition to that already reflected in other timely indicators.

Retail Payments

Electronic data are also generated when consumers and businesses use credit and debit cards to purchase goods and services. With the growing adoption of electronic means of payment, such electronic transactions data are a potentially rich and timely source of information on economic activity. In Australia, such data are collected from financial institutions by the Reserve Bank and published as part of the monthly Retail Payments Statistics (RPS).[9]

These data have several advantages as indicators of household consumption and broader measures of spending. First, the data are close to a census of transactions in the economy (for the non-cash payment methods covered); data are drawn from most financial institutions that have retail payment operations and some other payment system participants and are therefore subject to only minor sampling error, which can be a significant problem for traditional statistical survey collection. For this reason, and similar to wholesale payments, the retail transaction data could reasonably be considered as an alternative indicator of activity in their own right. Furthermore, the data cover a wider variety of sales than other indicators – such as the ABS Retail Trade Survey (which tends to capture the sale of goods rather than services). Indeed, the monthly value of electronic card transactions is more than twice the monthly value of retail sales (but still less than total household consumption spending).[10] It is also possible to obtain an indication of trends in some economic activities that cannot be gleaned from official statistics, such as online purchases or purchases overseas.

On the other hand, the RPS data do have some limitations. Importantly, they do not capture all transactions in the economy: for example, purchases made using cash, among other payment methods, are not directly included. The data also capture a mix of consumer and business transactions, which could weaken their ability to track consumer spending. The data also include spending on both final *and intermediate* goods and services, whereas the latter is excluded from economy-wide measures of spending; this raises the possibility of multiple transactions being recorded even though they relate to just one final good or service. Finally, since data are collected from a large number of financial institutions for the construction of these statistics, they are less timely than some other indicators of spending, being published around six weeks after the end of the reference month.[11]

Overseas research suggests that electronic card transactions are a potentially useful complement to more traditional monthly indicators of spending. In New Zealand, Minish (2007) shows that monthly electronic transactions data by industry type are useful as an early indicator of retail sales and broader consumer spending. Similarly, Galbraith and Tkacz (2007) find that high-frequency Canadian debit card transactions data can reduce consensus forecast errors for GDP and consumption growth, and help to predict future revisions to official data.

8 For example, there was no improvement in MAEs from the baseline model when the out-of-sample forecasting was conducted over eight quarters, rather than four.

9 The published RPS data include ATM cash withdrawals, EFTPOS transactions, credit and charge card transactions, as well as direct debits and credits, and cheques. For more information, see <http://www.rba.gov.au/payments-system/resources/statistics/retail-paymts-stat-collect/index.html>.

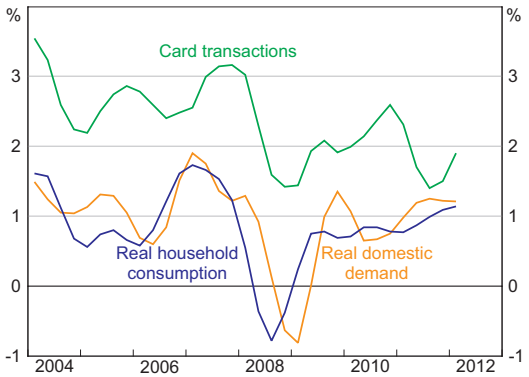
10 The activity captured by the Retail Trade Survey accounts for roughly one-third of household consumption spending (and over 40 per cent of consumption spending excluding housing). For the purpose of this comparison, 'electronic transactions' is broadly defined to include ATM and over-the-counter cash withdrawals, EFTPOS purchases and cash outs, purchases on scheme debit cards, and purchases and cash advances on charge and credit cards. It includes both domestic and overseas transactions on cards issued in Australia, but not domestic transactions on foreign cards.

11 Data on the settlement of low-value payments are, however, available to the Reserve Bank on a daily basis from RITS.

To assess whether retail payments data can serve as a useful indicator of spending in Australia, a similar analysis to the previous section is employed. Both the value and number of electronic card transactions are considered, as well as 'purchases only' transactions, which exclude cash withdrawals and cash advances.[12] The sample period is relatively short, as the complete set of credit and debit card statistics is only available from late 2002, and the data are affected by various payments system reforms, which changed the relative cost and usage of different payment methods. Nonetheless, it is possible to draw some tentative conclusions.

Correlation analysis suggests that there is a potentially useful relationship between the *value* of 'purchases only' retail transactions and official spending measures (Graph 2, Table 4).[13] Although the correlations are low for GDP, they are noticeably higher for measures of domestic spending. This is consistent with retail payments data measuring spending on cards issued in Australia, which includes spending on imports – for example, when the cards are used overseas – but not exports. However, growth in the *number* of retail card transactions is not closely related to growth in economic activity. This result perhaps reflects the ongoing structural shift from cash to electronic means of payment, which appears to be having a larger impact on the total number of transactions than the total value (that is, the average size of electronic transactions has declined); once this transition has run its course, however, the electronic transactions data will cover a larger, and arguably more representative, share of aggregate spending, which is expected to improve their usefulness as an indicator. Finally, the correlations are broadly similar for nominal and real measures of activity. Given this, and in line with the previous section, the following analysis focuses on 'purchases only' electronic transactions as an indicator of *real* measures of economic activity.

Graph 2
Card Transactions, Consumption and Domestic Demand Growth*
Trend, quarterly



* Card transactions refers to the value of purchases on electronic cards issued to individuals and businesses in Australia; household consumption excludes housing; 7-period Henderson trend
Sources: ABS; RBA

Following the same approach employed in the previous section, the inclusion of electronic purchases modestly improves the fit of autoregressive models of spending, although the adjusted R^2 statistics remain low (Table 5). For household consumption and retail sales, the improvement also slightly exceeds that achieved by alternatively including a survey measure of consumer sentiment in the models. The inclusion of electronic purchases also slightly improves the models' out-of-sample predictive ability for domestic demand, albeit little more than the improvement achieved with the inclusion of a survey variable. These findings suggest that retail payments data may be better indicators of household demand than broader measures of spending (such as GDP or GNE), which is consistent with the majority of card transactions being conducted by individuals rather than businesses.[14]

12 Cheque and direct entry transactions are excluded from the dataset as direct entry payments are likely to partly reflect movements of money between accounts and wage and dividend payments, while cheques are often used for transactions not directly related to real economic activity, such as property settlements.

13 The correlations between *total* card transactions and official spending measures are in general a little lower than for 'purchases only' transactions. Also, the correlations between the value of 'purchases only' transactions and the real economic variables shown in Table 4 are little changed when the transactions data are deflated by the price deflator corresponding to each real economic variable.

14 The results shown in Table 5 are similar for nominal measures of economic activity, although in the latter case the improvement in the adjusted R^2 for household consumption was larger for the survey variable.

Table 4: Correlations between Retail Payments and Economic Activity[a]
December 2003 to March 2012, quarterly

	Retail payments	
Economic variable	Value	Number
Real retail sales	0.34	0.05
Real consumption (excl rent)	0.40	0.23
Real domestic demand	0.31	0.25
Real GDP	0.09	0.06
Nominal retail sales	0.28	–0.04
Nominal consumption (excl rent)	0.36	0.09
Nominal domestic demand	0.29	0.05
Nominal GDP	0.09	–0.07

(a) Contemporaneous correlations based on seasonally adjusted data
Source: RBA

Table 5: Information Content of Retail Payments Data – Autoregressive Models[a]
December 2003 to March 2012, quarterly

Economic variable	Baseline	Retail payments	Survey[b]
Real retail sales			
Adjusted R^2	0.02	0.08	–0.01
MAE (ppt)	0.49	0.52	0.48
Real household consumption (excl rent)			
Adjusted R^2	0.08	0.16	0.15
MAE (ppt)	0.49	0.52	0.62
Real domestic demand			
Adjusted R^2	0.03	0.08	0.35
MAE (ppt)	0.94	0.86	0.88
Real GDP			
Adjusted R^2	0.01	0.00	0.16
MAE (ppt)	0.36	0.46	0.61

(a) MAE is calculated using one quarter ahead out-of-sample predictions for the four quarters to March 2012
(b) For household consumption and retail sales, the survey variable is the Westpac-Melbourne Institute Consumer Sentiment Index
Source: RBA

In models where growth in spending is explained by the first principal component of various timely data (including retail sales), the inclusion of the electronic purchases variable resulted in little change to the explanatory power (Table 6). Similarly, the inclusion of retail transactions data did not reduce the forecast errors for any of the economic variables.[15]

15 While the MAEs are slightly lower than those shown in Table 6 when the out-of-sample prediction is conducted over eight quarters, rather than four, the results are nonetheless similar.

Table 6: Information Content of Retail Payments Data – Principal Component Models[(a)]
December 2003 to March 2012, quarterly

	Survey variables		All variables	
Economic variable	Baseline	Retail payments	Baseline	Retail payments
Real household consumption (excl rent)				
Adjusted R^2	0.25	0.27	0.44	0.42
MAE (ppt)	0.56	0.65	0.74	0.77
Real domestic demand				
Adjusted R^2	0.35	0.33	0.38	0.36
MAE (ppt)	0.81	0.81	0.83	0.83
Real GDP				
Adjusted R^2	0.05	0.03	0.04	0.02
MAE (ppt)	0.51	0.51	0.53	0.54

(a) MAE is calculated using one quarter ahead out-of-sample predictions for the four quarters to March 2012
Source: RBA

Retail payments data are also available on a daily basis from RITS. While the collection method is different, conceptually these data represent a sub-sample of the RPS electronic transactions data; the narrower scope of these data reflects the fact that payments between customers holding accounts at the *same* bank will not normally be sent to RITS for settlement and are therefore not captured. The RITS data are also less detailed than the monthly RPS; for example, 'purchases only' transactions cannot be identified separately as in the above analysis. However, the RITS data are extremely timely, as a day's payments are available at the close of business the same day. Moreover, when aggregated to a monthly or quarterly frequency, the daily RITS data are highly correlated with the RPS data. Given this, it is not surprising that the above analysis yields very similar results when conducted with the RITS data.

In summary, the retail electronic transactions data appear to be of some use in providing a timely read on official measures of domestic demand. In particular, the transactions data performed somewhat better than consumer sentiment in raising the explanatory power of simple models of household consumption and retail sales. However, official statistics themselves are not free of measurement error. For example, the ABS has identified the real-time measurement of households' spending on services as an area for improvement in their Forward Work Program. Given that retail electronic transactions data are an independent measure of spending in the economy, and include spending on some services, these kinds of data are likely to be used more extensively in official measures of spending in the future. Together with the fact that the structural shift towards electronic payment methods will eventually run its course, this suggests that both the very timely and high-frequency RITS payments data and the RPS data will become increasingly useful for monitoring current economic conditions in the years ahead.

Commercial Banks' Electronic Payments Indicators

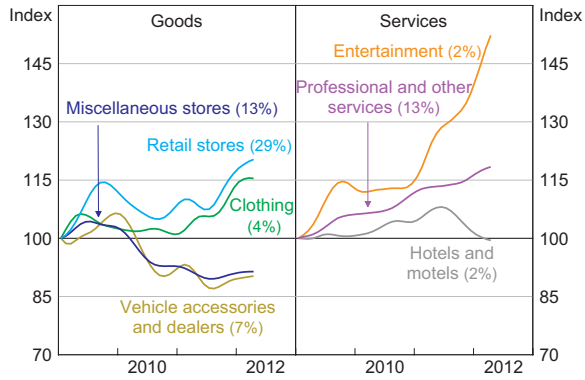
In addition to the electronic transactions data collected by the Bank, some financial institutions publish monthly indices of activity based on electronic transactions, such as those made through their merchant facilities or on the credit and debit cards issued by them. These include the Commonwealth Bank 'Business Sales Indicator'

(CBA BSI), the ANZ 'Small Business Sales Trends' index and the NAB 'Online Retail Sales Index'.[16]

As with electronic payments data more generally, the scope of these data suggests that they could be useful indicators of various types of spending in the economy. Moreover, the indices have a timely release of three to four weeks after the reference month, and therefore precede the publication of monthly ABS retail sales data and quarterly household consumption data in the national accounts. Each index also provides an independent measure of some types of spending that are less well measured in official data and not separately identified in the RPS data, such as spending at service providers and at overseas online retailers. However, the transactions underlying each of these indices are only a sample of all electronic transactions, and payments more generally, and the extent to which they are representative of broader spending patterns may change over time.

A particular advantage of the CBA BSI, compared with the RPS data considered in the previous section, is that the data are broken down by 20 merchant types. This enables spending to be tracked at a much more detailed level. For example, it is possible to construct separate measures of spending on goods and services – the measure of services spending could be particularly useful given the paucity of indicators for this type of expenditure (Graph 3).[17] It is also possible to create a 'household BSI' by excluding certain business-related categories, which should enhance its usefulness as an indicator of household spending.

Graph 3
Household Card Spending by Category*
Trend, January 2009 = 100



* Data are adjusted for seasonality and breaks by the RBA before calculating a 13-period Henderson trend; numbers in brackets refer to each category's share of the aggregate BSI in 2011
Sources: CBA; RBA

When the CBA BSI data are analysed as in the previous section, the pattern of results are generally similar to those obtained using the RPS data. Nevertheless, a few differences emerge. Although the RPS data are somewhat more correlated with most official measures of activity, the CBA BSI is more correlated with real retail sales. This may partly reflect the fact that the CBA BSI measures spending in Australia (at CBA merchant facilities), similar to the Retail Trade Survey, while the published RPS data measure spending on Australian-issued cards and so include overseas spending. The ability to identify spending by different types of retailer separately also means that the CBA BSI is more useful than the broader electronic transactions data for analysing more detailed official statistics on monthly retail sales.

Internet Search Data

Access to the internet has become pervasive in Australia and internet use continues to grow strongly, with households increasingly using the internet to compare and buy goods and services, access government services and engage in online banking. Accordingly, data on internet usage can provide useful information about economic activity.

One such measure of internet activity is the volume of internet searches – how often particular terms are

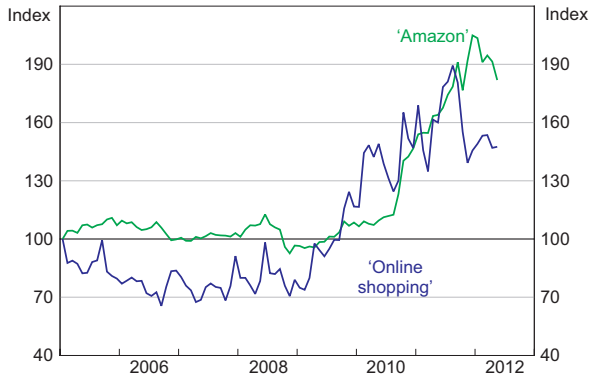
16 The CBA BSI measures the value of credit and debit card transactions processed through the Commonwealth Bank's Australian merchant facilities. The ANZ 'Small Business Sales Trends' index measures the value of credit and debit card transactions processed through ANZ merchant facilities as well as ANZ card transactions processed through other facilities, for businesses with annual turnover less than $5 million (and at least two years old). The 'Online Retail Sales Index', produced by NAB and Quantium, estimates online retail spending, based on an analysis of credit and debit card transactions, as well as BPAY, direct debit and PayPal transactions, made by NAB customers.

17 However, such a measure is limited by the fact that merchants within a specific category may sell a variety of products, including both goods and services.

entered into search engines. As noted in McLaren and Shanbhogue (2011), internet search data have a number of benefits when compared with other economic indicators: the data are available weekly and are therefore very timely, cover a large sample of households and businesses, and avoid the rigidity of survey questionnaires. In particular, internet search data can provide insight into issues not well covered by existing consumer or business surveys, or official data, such as novel or unexpected developments. For example, the rise of online shopping, especially at overseas retailers, has been difficult to track owing to a lack of official data, but Google search data for various relevant search terms such as 'Amazon' and 'online shopping' are useful indicators of the recent increase in this activity (Graph 4). Nonetheless, there are a range of drawbacks with internet search data, including their relatively short history, the possibly unrepresentative nature of the sample given the variation in internet use across different groups by age and income, and the likelihood of considerable noise in the data (owing to factors such as changes in the market share of firms like Amazon, and changes in search terms and behaviour).

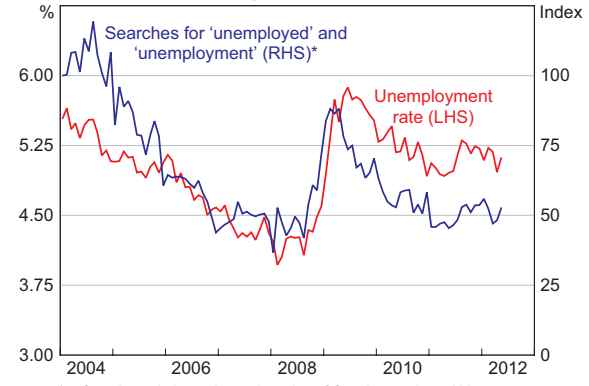
A growing literature has found that online search data – typically sourced from Google – can yield valuable insights into current economic trends.[18] Following early work by Ettredge, Gerdes and Karuga (2005), which found that web search data were useful in forecasting official unemployment data, Choi and Varian (2009a, 2009b, 2011) show that search engine data can help forecast near-term motor vehicle sales, initial jobless claims and home sales in the United States, as well as visitors to Hong Kong. Indeed, there are now a wide range of research papers analysing data from various countries, which find relationships between search data and housing market indicators, particularly dwelling sales and prices, unemployment, and household consumption and confidence. Accordingly, replicating and extending these analyses with Australian data may yield useful results; for example, internet search data in Australia appear promising as a timely leading indicator of the unemployment rate (Graph 5). Furthermore, the usefulness of internet search data is likely to increase with time, as the history of data increases, as internet use becomes more pervasive across the population, as more economic activities become linked in with the internet, and as the availability and flexibility of internet search data continue to improve.

Graph 4
Google Searches for Online Retailers*
January 2005 = 100



* Searches relative to the total number of Google searches within Australia; seasonally adjusted by the RBA
Sources: Google; RBA

Graph 5
Unemployment Indicators



* Searches relative to the total number of Google searches within Australia; January 2004 = 100; seasonally adjusted by the RBA
Sources: ABS; Google; RBA

18 Previous studies generally source online search data from the Google Insights for Search application, owing to its flexibility and free availability, as well as the representativeness of the data given Google's large share of the search engine market.

Conclusion

Electronic indicators provide timely information about spending in the economy. Wholesale and retail payments data from RITS are available daily, search data from Google are currently available at a weekly frequency with minimal lag, and detailed transactions data from commercial banks are available less than four weeks after the end of each month. Electronic data can also provide information on activity that is not available from official statistics or surveys of businesses and households. Wholesale and retail payments data appear to contain useful information about aggregate economic indicators. These payments data capture a very large sample of actual economic activity and, along with other electronic data, are likely to be used increasingly by official statisticians and others to improve the real-time measurement of economic aggregates. Both payments and internet search data are likely to become more useful as economic indicators over time as payments behaviour and internet usage become more stable. Accordingly, electronic indicators of economic activity will continue to be monitored in assessing current conditions. ✠

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