ON FACTORS INFLUENCING THE UTILISATION RATE OF BANKCARD: A NOTE

Paul A. Volker

Discussion Paper No. 48

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ON FACTORS INFLUENCING THE UTILISATION RATE OF BANKCARD: A NOTE

BY

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ABSTRACT

This note is an empirical examination of the nature of factors influencing the utilisation of credit cards in Australia. Cross-section data from a 1980 survey is utilised in an attempt to determine what individual characteristics increase the probability of holding cards and using extended credit facilities. Aggregative time series analysis seeks to explain the trends in financing of various types of expenditure via Bankcard.
I. INTRODUCTION

The introduction of Bankcard in the mid 1970's is one of the more important innovations which have taken place in the Australian monetary system in recent decades. So far, however, there has been no formal analysis of the system. In large part this reflects data availability, since many of the interesting questions are of a cross section nature or require a knowledge of separate profit figures for Bankcard operations. The purpose of this note is to attempt to remedy this situation to some degree. In the first instance we try to explain aspects of Bankcard operations utilising demographic cross section data. In the second we seek to model the trends in various types of expenditure over time. We find that age and occupational status are the two major micro-economic factors influencing the nature of credit card utilisation. Aggregative time series analysis suggests that the limits to potential usage, previously incurred credit card debt, and the level of retail sales all exercise significant impact on the extent and direction of usage of Bankcard.

* I wish to thank Margaret Wood and Fiona Tully for their help with the empirical work, and Frank Small and Associates for supplying the data at cost.

1. The extreme dearth of useful cross section financial data of virtually any form for Australia is unfortunate as it has precluded the analysis of a large number of interesting issues.
II. (A) CROSS SECTION ANALYSIS

The cross section data base comprises part of the nation-wide survey of 1510 working-age adults carried out in August 1980 by Frank Small and Associates. A number of questions were asked which relate to the ownership of credit cards and their usage. Some of these questions are reproduced in the Appendix to this note. While they were not designed for the explicit purpose of carrying out economic analysis and have obvious limitations from this point of view they are nevertheless interesting and in conjunction with associated demographic data help to shed some light on current Australian attitudes to credit cards in particular and financial innovation in general.

Before attempting any formal analysis we note that several interesting points emerge from a casual examination of responses to the survey. First, approximately forty percent of adults surveyed held credit cards. Of these seventy-three percent held Bankcard. The majority (sixty-one percent) of those not holding cards stated a preference for paying cash as the major reason for eschewing cards. Second, Bankcard appeared to be used for purchases of a much broader nature than other cards such as American Express or Diner's Club cards. Finally, the majority of card holders used their cards on an occasional basis, i.e. approximately two or three times a month.

We attempt to answer three questions with the data. First, what are the characteristics of the people who hold Bankcards. Second, what determines whether people take advantage of credit facilities. Finally, what sort of people use credit cards on a

2. Some of the survey findings are discussed in a non-quantitative manner in Rydge's (1980).
regular basis. We employ a single equation approach to modelling these phenomena. The explanatory variables are primarily demographic, viz. sex, marital status, location, occupational status, family structure, and work status of female head of household. Our proxy for income is occupational status. This variable has education implications as well so that we should be wary of the way it is interpreted. Regularity of usage is a proxy for the average level of utilization of credit cards. Since the dependent variable is dichotomous the equations were estimated using a logit function. The independent variables were classified into various sub categories allowed by the questionnaire. A reasonably representative control group was specified for each of the various types of regressors. No interaction terms were incorporated into the equations.

The partial derivatives from the estimated equations are presented in Table 1. In equation (1) the dependent variable is whether or not the interviewee holds Bankcard. The regressors are self explanatory. Thirty to thirty-four year olds were chosen as the control group on an age basis. Other control variables were: Melbourne, males, white collar workers, married, families with two children and non-working female head of household. The 't' statistics in parentheses tell us that the likelihood of holding Bankcard is primarily a function of age and occupational status. One cannot differentiate between the likelihood of a thirty to thirty-four year old holding it and someone between thirty-five and forty-four. The probability of someone not in these cohorts holding it, however, is

3. The multiple response in Question 2, (in the Appendix) was recoded to a binary basis, as was the dependent variable in equation (1) relating to regularity of usage.
<table>
<thead>
<tr>
<th>Equation No.</th>
<th>Dep. Variable</th>
<th>(I) Hold Bankcard</th>
<th>(II) Use Credit</th>
<th>(III) Use Regularly</th>
<th>(IV) Use Moderately</th>
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<td>16-19 years</td>
<td>-.593*</td>
<td>-.108</td>
<td>-4.979</td>
<td>.010</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(5.19)</td>
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<td>(0.00)</td>
<td>(0.05)</td>
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<td>20-24</td>
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<td>-.163</td>
<td>.033</td>
<td>.012</td>
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<tr>
<td></td>
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<td>25-29</td>
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<td>(1.05)</td>
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<td>-.055</td>
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<td>.059</td>
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<td>(0.29)</td>
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<td>45-49</td>
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<td>(0.43)</td>
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<td>50-54</td>
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<td>.034</td>
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<td>(2.78)</td>
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<td>(1.23)</td>
<td>(0.36)</td>
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<td>55+</td>
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<td>-.047</td>
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<td>(1.36)</td>
<td>(0.52)</td>
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<td>-.179*</td>
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<td>(2.93)</td>
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<td>(2.56)</td>
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<td>SYDNEY</td>
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<td>.137*</td>
<td>.095*</td>
<td>.015</td>
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<td>(0.89)</td>
<td>(2.72)</td>
<td>(2.26)</td>
<td>(0.28)</td>
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<td>BRISBANE</td>
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<td>.005</td>
<td>.087</td>
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<tr>
<td></td>
<td>(1.87)</td>
<td>(0.67)</td>
<td>(0.07)</td>
<td>(1.06)</td>
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<td>(1.15)</td>
<td>(1.16)</td>
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<td>-.054</td>
<td>.079</td>
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<td>(1.53)</td>
<td>(2.79)</td>
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<tr>
<td>FEMALE</td>
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<td>-.022</td>
<td>-.103*</td>
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<td>(0.32)</td>
<td>(2.49)</td>
<td>(0.04)</td>
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<td>SINGLE</td>
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<td>.016</td>
<td>-.022</td>
<td>.027</td>
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<td>(1.65)</td>
<td>(0.23)</td>
<td>(0.34)</td>
<td>(0.34)</td>
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<tr>
<td>WIDDI/DIV.</td>
<td>-.125*</td>
<td>.062</td>
<td>.025</td>
<td>.017</td>
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<td></td>
<td>(2.30)</td>
<td>(0.80)</td>
<td>(0.38)</td>
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<td>RANDECARD</td>
<td>-.022</td>
<td>.049</td>
<td>.172*</td>
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<td></td>
<td>(0.46)</td>
<td>(1.10)</td>
<td>(3.30)</td>
<td></td>
<td></td>
</tr>
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</table>

* Likelihood ratio tests in each case clearly rejected the null hypothesis that there was no relationship between the dependent and exogenous variables. This table presents partial derivatives and 't' statistics. The constant term, family structure and wife work force status regressors have been omitted for space reasons, and because they were insignificant in all models.

* Significant at the 5% level.
significantly lower. Moreover, this probability decreases as one moves in either direction from those age-groups.

The other major determinant implies that professional people hold Bankcard to a significantly greater degree than do white collar workers, while skilled and unskilled workers hold it to a significantly lower degree. Elasticities (which we have not reported here) indicate that the divergence is most marked in the case of unskilled workers. It is not clear whether this is a demand or supply phenomenon. It is more likely to be the former, however, because any reservations in supply could be achieved by setting low limits on the extent of usage. Two other characteristics appear to exercise some influence on the propensity to hold Bankcard. The first is marital status. Widowed, divorced and single people have a lower probability of holding it than married persons. Location also appears to be marginally important. It is interesting that this latter finding should emerge the way it does since Melbourne, Sydney and Adelaide would normally be regarded as Australia's most sophisticated cities and they have a somewhat higher holding propensity.

The second question we sought to answer was what factors determined whether the card's extended credit facilities were used. In attempting to ascertain the answer to this we restricted our sample to all credit card holders and included a separate dummy variable for whether the interviewee was a holder of Bankcard. The partial derivatives are presented in Table 1 as equation (1). The major determinants of whether credit facilities are used also appear to be age and occupational status. The propensity to use such facilities decreases with
age. This may reflect a conservative attitude to credit among the older cohorts. Alternatively it may be due to the nature of goods purchased. It is likely that fewer consumer durables, for example, are purchased by people in these age groups.

The other group of people who use less credit are those whose occupation is classified as professional. Once again the precise reason for the divergence in behaviour is not clear but the result is consistent with both increased capacity to pay and greater awareness of interest charges. One other result worth noting is that the behaviour of people holding Bankcard does not differ in respect to usage of credit from that of people holding other credit cards. Finally our results suggest that it is apparently more common for people in Sydney and Perth to use credit than people living in other cities.

The third equation in Table 1 uses the same sample as the second equation and attempts to determine the nature of factors influencing regularity of credit card usage. As noted earlier frequency of usage is a (possibly not very good) proxy for the level of usage. Three factors appear to be important. These are occupational status, location and sex. While occupational status and possibly location might be expected to exercise differential influences it is surprising that women, who on average are likely to do more of the purchasing than men, appear to use credit cards less often. It is also surprising that the behaviour of Bankcard holders does not seem to differ from that of other card holders since Bankcard (as noted earlier) is a much more general purpose card.
In order to examine this issue further the dependent variable was redefined to encompass occasional usage. When the model was re-estimated, (as equation 4, Table 1) the higher usage by males and inhabitants of Sydney was no longer apparent. The ownership of Bankcard did, however, appear to increase frequency of usage.

(8) TIME SERIES ANALYSIS

Time series data are available from mid 1977 on a monthly basis showing the breakdown of Bankcard financing between cash, household and personal goods, and other goods. The movements of these series over time are depicted in Figure 1. In this section we present estimates from a simple model explaining these expenditures. In brief we hypothesise that each type of expenditure is a function of a trend variable, seasonal dummies, a scale variable, a limits variable and a variable reflecting the level of outstanding advances. The point of a trend variable is obvious: since the adoption of Bankcard has been progressive, the level of retail sales is used as a scale variable. This series is available on a monthly basis and seems appropriate.

1. The Bankcard data are primarily from the Reserve Bank Statistical Bulletin though some earlier figures were provided by Mr. Arthur Martin, executive officer of Bankcard. The various categories of expenditure flows are published for periods ending the second Wednesday of each month. This data was redefined to a calendar month basis by taking a weighted average of the figures for two consecutive periods, the various weights being determined by the date of the second Wednesday and the number of days in the month.
Utilisation cannot legitimately exceed the limits to use but may increase with increases in such limits. Since outstanding advances clearly represent a level of debt obligations, one might expect current utilisation to be negatively related to the advances outstanding at the end of the previous period. We would not expect these factors to be equally important in all categories of financing. Cash conversion, for example, is unlikely to be influenced by the limits on expenditure. Because interest rate charges accumulate immediately, this facility is relatively costly. As a consequence it is likely to be used only sparingly and in 'emergency' situations where it would achieve a higher priority than that accorded other types of expenditure.

5. This feature of the cash conversion facility might imply that the cost of Bankcard credit should enter the cash equation. This cost has remained constant at 18% per year, however, so that it is not empirically possible to include such a measure. The alternative to obtaining cash from Bankcard in most cases is cashing a cheque. Since demand deposits typically earn zero interest return the same point applies to measures of opportunity cost.
age. This may reflect a conservative attitude to credit among the older cohorts. Alternatively it may be due to the nature of goods purchased. It is likely that fewer consumer durables, for example, are purchased by people in these age groups.

The other group of people who use less credit are those whose occupation is classified as professional. Once again the precise reason for the divergence in behaviour is not clear but the result is consistent with both increased capacity to pay and greater awareness of interest charges. One other result worth noting is that the behaviour of people holding Bankcard does not differ in respect to usage of credit from that of people holding other credit cards. Finally our results suggest that it is apparently more common for people in Sydney and Perth to use credit than people living in other cities.

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because monthly data on small personal overdrafts are not available. Second, it might be thought that some measure of opportunity cost should enter the utilisation equations. (See Footnote 5.) This is not the case as the opportunity cost question really only relates to the speed of repayment of the debt obligations and not to the extent of the initial use. Third, we have assumed that retail sales are exogenous. While utilisation of Bankcard might in its turn influence retail sales the effect is not likely to be large enough to be important. Finally, we note that limits are elastic quantities determined by the banks on an individual basis in response to individual utilisation of Bankcard. This does not imply a simultaneous relation, however, as the current period's limits are not influenced by the current period's utilisation, but by utilisation rates in previous periods.

The estimated relationships between the three subcategories of Bankcard expenditure (as well as the aggregated amount), and the above explanatory variables are given in Table 2. The level of explanation in each case is very high. A first order autoregressive error correction was required in the cash equation, but none of the others exhibited any evidence of lower

9. The most reasonable measure of opportunity cost in this case ought to reflect the price of instalment credit. Because such a measure is unavailable we have not considered it worthwhile to study what determines the speed of repayment of Bankcard debt.

9. The 't' statistics presented in Table 2 are those from White's (1980) heteroscedasticity-consistent covariance matrix estimator. The sample period is September 1977 to August 1981.
TABLE 2: MONTHLY TIME SERIES ANALYSIS OF VARIOUS CATEGORIES OF BANKCARD EXPENDITURE 1977(9) - 1981(8).†

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Cash</th>
<th>Household and Personal Goods</th>
<th>Other Goods</th>
<th>Total</th>
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<tr>
<td>Constant</td>
<td>37.552*</td>
<td>(2.43)</td>
<td>-15.180</td>
<td>13.910</td>
</tr>
<tr>
<td></td>
<td>(1.63)</td>
<td>(1.13)</td>
<td>(0.38)</td>
<td></td>
</tr>
<tr>
<td>Trend</td>
<td>1.536*</td>
<td>(2.13)</td>
<td>.452</td>
<td>3.268*</td>
</tr>
<tr>
<td></td>
<td>(4.85)</td>
<td>(2.36)</td>
<td>(0.96)</td>
<td></td>
</tr>
<tr>
<td>Limits_t</td>
<td>-.017</td>
<td>(1.27)</td>
<td>.017*</td>
<td>.027</td>
</tr>
<tr>
<td></td>
<td>(0.76)</td>
<td>(3.26)</td>
<td>(1.42)</td>
<td></td>
</tr>
<tr>
<td>Debt Outstanding_t-1</td>
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<td>(0.36)</td>
<td>-.013</td>
<td>-.113</td>
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<td></td>
<td>(0.24)</td>
<td>(1.60)</td>
<td>(1.60)</td>
<td></td>
</tr>
<tr>
<td>Retail Sales_t</td>
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<td>(1.69)</td>
<td>.010*</td>
<td>.037*</td>
</tr>
<tr>
<td></td>
<td>(1.74)</td>
<td>(1.94)</td>
<td>(2.36)</td>
<td></td>
</tr>
<tr>
<td>( \hat{\beta} )</td>
<td>.942*</td>
<td>(11.74)</td>
<td></td>
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<tr>
<td>( R^2 )</td>
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<td>.981</td>
<td>.987</td>
<td>.986</td>
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<tr>
<td>S.E.E.</td>
<td>1.80</td>
<td>4.93</td>
<td>1.87</td>
<td>7.48</td>
</tr>
</tbody>
</table>

† Seasonals omitted. White's (1980) heteroscedasticity-consistent covariance-matrix estimator 't' statistics in parentheses. These differ slightly from OLS 't' statistics. \( \hat{\beta} \) is an AR(1) error correction parameter estimate.

* Significant at the 10% level.
or higher order serial correlation. We have not reported the coefficients on the seasonal dummies for space reasons, but much of the explanation of the variation in the dependent variable, as one might expect, comes from these. While the major seasonal variation in December and May is captured by similar variation in retail sales three of the dummy variables, January, February and September, are consistently important.

The signs of the coefficients of the behavioural variables where significant, are as we hypothesised. The constraint imposed by the limits on usage only appears to be influential in determining financing of 'other goods'. This might imply that this sort of expenditure is the more discretionary. Indeed the elasticity calculated at the mean of 1.11 suggests that the response is quite sensitive. The level of outstanding Bankcard debt is an important determinant only of 'household and personal goods' financing. The point elasticity of -.83 indicates a reasonably conservative attitude towards incurring new debt obligations. The level of retail sales exercises a significant impact at the 10% level on all three types of expenditure. The elasticities in equations (1), (2) and (3) are respectively .22, .53 and .69. If retail sales in some degree reflect economic activity, and if 'other goods' constitute more discretionary types of purchases, there is every reason to expect the elasticity to be higher than those of the other two categories. It is also predictable that the 'cash' category of expenditure should be least sensitive.
III. CONCLUSION

This note attempts to provide some insight into the nature of factors influencing the way in which Bankcard is used. On a micro-economic level the major conclusion is that age and occupational status are prime determinants of whether individuals hold Bankcard, how often they use it and whether they take advantage of extended credit facilities. Time series aggregative analysis of the determinants of various types of Bankcard financing indicated that the limits to potential financing, and the level of outstanding Bankcard debt exercise differing degrees of influence on the various categories. The volume of retail sales, utilised as a scale variable, appears to be a significant determinant of all types of expenditure.
APPENDIX

Credit Card Section of the Frank Small and Associates August 1988, Omnibus Survey - selected questions only.

1. All credit card holders.

   How frequently do you use your credit card(s):
   - Regularly (about once a week or more often)
   - Occasionally (say 2-3 times per month)
   - Rarely (less than once a month)
   - Whenever short of ready cash
   - Only in emergencies.

2. Which credit cards do you hold:
   - Bankcard
   - American Express
   - Diners Club
   - Carte Blanche
   - Visa
   - Master charge
   - Department store
   - Other.

3. Do you usually pay your monthly credit charge in full or use extended credit facilities:
   - Mostly pay in full
   - Mostly use extended credit facilities

The survey covered 1,516 working-age adults - Sydney (500), Melbourne (500), Brisbane (179), Adelaide (178), Perth (178).

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