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**The Impact of Regulatory Intervention in the UK Store
Card Industry**

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Abstract

The paper examines the impact of regulatory intervention on store card interest rates, for a panel of UK store cards. The analysis is timely given the public attention that high store card interest rates have attracted in the UK, and the enquiries by the Office of Fair Trading and the Competition Commission into the industry. Panel data Tobit estimation methods are used in conjunction with intervention analysis so that the impact of the investigations on store card interest rates can be examined. Results suggest that there is a significant negative impact on store card interest rates of approximately 4%. The impact of macroeconomic factors and credit card interest rates on store card interest rates are also taken into account, results indicating that store cards and credit cards should be considered as competing sources of credit.

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Non-technical Abstract

The paper examines statistically the impact of regulatory intervention on store card interest rates, for a panel of UK store cards. The analysis is timely given the public attention that high store card interest rates have attracted in the UK, and the enquiries by the Office of Fair Trading and the Competition Commission into the industry. Results suggest that these regulatory interventions had a significant negative impact on store card interest rates of approximately 4%. The impact of macroeconomic factors and credit card interest rates on store card interest rates are also taken into account, results indicating that store cards and credit cards should be considered as competing sources of credit.

1. Introduction

The store card industry has been an extremely topical issue in the UK media and in policy circles in the last few years because of the persistently high interest rates charged on many store cards. The average store-card rate in January 1994 was 27.72% APR, and although it fell somewhat, by January 2004 it still stood at 26.92% (Keynote 2005). In October 2003, the Office of Fair Trading (OFT) began its investigation into the store card industry. In March 2004, it referred the industry to the Competition Commission (CC) for further investigation in two vertically related areas; namely the provision of credit services to retailers, and the provision of credit via store cards to consumers in the UK. In March 2005 the investigation was also broadened to encompass the insurance provisions in the market[2].

Nevertheless, few studies have been written on the store card industry. This short paper contributes to the literature by addressing the issue of the impact of the OFT and CC

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[2] This will not be the focus of the current paper.

investigations on the store card market. Specifically, intervention analysis is used to examine the impact of this regulatory investigation on interest rates charged on store card accounts, as these represent the principal price of using a store card. In so doing, the analysis highlights the factors that determine store card interest rates.

2. Background and Previous Studies

Store cards are an important method of purchase in the UK. Many stores offer the opportunity of purchasing goods with a store card that can be used to purchase goods in just one or a small number of stores, typically with branches across the UK. Otherwise, the cards work like credit cards, as a monthly bill will be issued and consumers choose whether to settle each month's bill in total such that no interest is incurred, or pay at least a minimum amount each month, in which case interest must also be paid. At their most popular time, i.e. 2002, the number of store cards held in the UK was in excess of 24 million (Euromonitor, 2008). This is in comparison to only 11 million in 1994 (Keynote, 1999). In terms of the value of store card sales, a similar trend applies and the figures increased from £3.69bn in 1994 to £5.13bn in 2002. However, the importance of this payment method has declined somewhat in recent years, although it remains significant. Media attention given to store card interest rates and the CC final recommendation that store card interest rates be displayed more prominently are believed to have contributed to the number of store cards held falling to under 16 million in 2006, and the value of transactions made using store cards falling to £3.03bn in 2007 (Euromonitor 2008).

While there are a number of papers on the marketing of store cards, there is a notable lack of literature on the factors determining how store card interest rates are set by the store companies in association with the card issuing companies. Instead the economic literature has focused on consumers' use of store cards, namely Wright and Sparks (1999) and Lee and Kwon (2005). Consequently, it is suggested that this paper offers a valuable contribution to the very limited store card literature. Note that Bolt and Chakravorti (2008) provide a valuable survey of the existing literature on payment cards, but they focus attention on debit, credit and prepaid cards.

It is the purpose of the present paper to analyse the effects of the interventions by the OFT and CC on store card interest rates econometrically. This is done by using intervention analysis. There are numerous examples of intervention analysis being used in the Economics literature, for example Enders and Sandler (1996), Lloyd *et al.* (1998), Acutt *et al.* (2001), and Elliott *et al.* (2009). Further, as in Acutt *et al.* (2001) and Elliott *et al.* (2009), the current analysis contributes to the literature examining the impact on firms' strategies of the threat of regulation. Our empirical analysis allows us to explore any impact on store card interest rates when it was first announced that the industry would face an OFT investigation in October 2003, and then also a CC investigation in April 2004. There is then a period of uncertainty when firms do not know what will be the recommendations of the regulator, and we are able to model changes in store card interest rates during this period, as well as following the publication of the CC recommendations.

There is also a related literature that uses stock market event studies to estimate the impact of events such as regulatory investigations on firms' stock market valuations, see Beverley (2008) for a survey. Beverley (2008) highlights a number of papers that have been written exploring the impact of mergers and competition policy on firms' stock market prices. However, while there are similarities between this literature and the intervention analysis used in the analysis below, stock market event studies tend to focus on the impact on stock market prices of events in the days immediately prior and after an event. This partly reflects an assumption that capital markets process new information rapidly. Yet, in addition, firms' stock market valuations will be constantly changing for many reasons, and the longer the period over which stock market prices are monitored, the greater the likelihood that price changes will be reflecting changes other than those associated with particular events such as regulatory investigations and the associated decision announcements.

3. Data and Econometric Methodology

3.1 Data

We use a panel of monthly data on UK store card interest rates from October 1993 to February 2008. The store cards included in the data set are Creation; Debenhams; Fortnum

and Mason; House of Fraser; Ikea; Jaeger; John Lewis; Laura Ashley; Marks and Spencers; Monsoon and Selfridges. These were chosen as the longest data series were available of all store card interest rates published in MoneyFacts magazine since 1990. There are two different types of store card interest rates (Storerate): the rates when consumers pay their store card bills using direct debit (Storerate_DD) and the rates when consumers pay using other payment methods (Storerate_OR).

As the focus of the study was to find out the impact of investigations by regulatory authorities, we subject the store card interest rates to intervention analysis. In order to do so, a number of intervention dummy variables were considered. Table 1 provides summary information on these variables. Five intervention dummy variables are included in the analysis.

<Table 1 is about here>

Various other control variables are also expected to impact on the interest rates charged on store cards. The explanatory variables under consideration include the Bank of England base rate (Baserate), the 3 month UK interbank lending rate (Libor), total UK real consumer credit in £thousand millions, 1987=100 (Conscred) and the total UK unemployment claimant count in millions (Unemp). Credit cards can be argued to be a substitute form of credit for consumers. Store card interest rates may then be set, acknowledging the interest rates charged on competing credit cards. As such the regressions were run including one of four credit card interest rates. Visa and Mastercard interest rates[3] of both the Royal Bank of Scotland (RBS-v and RBS-m) and Barclays (Barc-v and Barc-m) were collected, i.e. the largest and second largest credit card issuers in the UK respectively, measured in terms of both the value of transactions and the number of cards issued (source: Euromonitor UK Credit Cards Industry Report 2008). The credit card interest rate adopted was always lagged one period as it is argued that there will be a short delay between the setting of credit card interest rates and competing store cards being able to respond. Descriptive statistics are reported in Table 2.

<Table 2 is about here>

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[3] Excluding special offer interest rates

While there have been a large number of store cards offered in the UK, most are operated by only a much smaller number of issuing companies. These include Creation; GECF; HSBC; Ikano; Lloyds TSB and Style. To control for the issuer's effects, we group the store cards in our data set into four; namely those provided by Creation; GECF; HSBC; and then other issuing companies. Dummy variables G1 – G3 are used in the analysis to control for the issuing company associated with each store card in the dataset.

Group 1 (Creation): Creation; Selfridges (G1)
Group 2 (GECF): Debenhams; House of Fraser; Laura Ashley; Monsoon (G2)
Group 3 (HSBC): Marks and Spencer; John Lewis (G3)
Group 4 (other): Ikea; Jaeger; Fortnum and Mason

In addition, monthly dummy variables were considered in the analysis.

3.2 Econometric Methodology

In order to examine the impact of these intervention dummies on store card interest rates, we specify a panel data econometric equation. The store card interest rates for an individual firm i at time t can be expressed as follows

$$y_{it} = D'_{it}\,\beta + x'_{it}\,\gamma + \mu_i + \varepsilon_{it} \qquad (1)$$

where β and γ are vectors of coefficients. D_{it} is a set of dummy variables to capture the impact of investigations. x is a vector of control variables affecting store card interest rates. The dependent variable, store card interest rates, is censored typically between the Bank of England base rate and 100%. Consequently, Ordinary Least Squares estimation methods are unsuitable, as the conditional mean places inappropriate restrictions on the residuals, resulting in biased and inconsistent coefficient estimates. Hence, we apply the two-limit Tobit model. The data collected are of a panel nature based on individual store cards. Hence, we employ a random effects model to explore the cross-sectional variation between store cards. μ is the individual specific unobserved heterogeneity that is assumed to be normally distributed with zero mean and variance σ^2_μ. Finally, ε is the error term which is assumed to follow a normal distribution with zero mean and variance σ^2_ε.

Before presenting the empirical results, it is in order to mention three technical notes regarding the estimation of the model and the use of variables. Firstly, as part of the data analysis the order of integration of variables is examined in order to avoid possible spurious regression problems. For the macro variables and credit card interest rates, because they are time-series data, the Phillips-Perron unit root test is used. Given the short data span and the limited data variability of the store card interest rates, the panel unit root tests advocated by Maddala and Wu (MW) (1999) are employed for these data. Panel unit root tests provide additional power by combining the cross-section and time series data allowing for the heterogeneity across cross-sections. MW panel data unit-root tests confirmed that the store card interest rate series were I(1) (see Table 2). Table 2 also reports the results of the time series Phillips-Perron unit root tests which indicate a mix of I(1) and I(0) variables. Given this, panel cointegration tests are then performed for each set of time-series and panel data variables in the regression. It is possible for the variables to be integrated of different orders and still to be cointegrated (Charemza and Deadman, 1997, pp. 126).

Pedroni (1999, 2004) employs two sets of tests for cointegration: one set is based on the within dimension approach (i.e. panel cointegration statistics) and the other is based on the between dimension approach (i.e. group mean panel cointegration statistics). The within-dimension-based statistics takes into account common time factors and heterogeneity across store cards. The between-dimension-based statistics are based on averages of the individual autoregressive coefficients associated with the unit root tests of the residuals for each store card in the panel. In other words, between-dimension-based statistics are just the group mean approach extensions of the within-dimension-based ones. In this study, we use both the panel ρ-statistic (a within-dimension-based statistic) which is an extension of the non-parametric Phillips-Perron ρ-statistic, and the group ρ-statistic (a between-dimension-based statistic). Gutierrez (2002) has found out that group ρ-statistic has the best power among the test statistics of Pedroni (1999), Larsson et al. (2001) and Kao (1999).

Finally, we use different variants of the model to examine the determinants of store card interest rates. For the main discussion we present a set of four models: the dependent variable is measured by the direct debt interest rates of store cards and the difference between models lies in the use of different measures of credit card interest rates. Then, the potential sensitivity

of the empirical results is investigated by using alternative measurements variables and the inclusion of monthly dummy variables.

4. Results

4.1 Results Discussion

<Table 3 is about here>

Table 3 reports the results of the panel data Tobit model when direct debit interest rates of store cards are used as dependent variables. Specifications (*I*)-(*IV*) use the different interest rates for Visa and Mastercards issued by RBS and Barclays banks to measure credit card rates. Before proceeding to the estimated results, we first examine the panel cointegration test results. As panel and group ρ-statistics are all statistically significant at the 1% level, the null hypothesis of no cointegration can be rejected. Having established that the variables of a time series nature are cointegrated, we can proceed to estimate all variables in levels using a panel data Tobit model.

The *pseudo-*R^2 in Table 3 is defined as the square of the correlation between the expected store card interest rates and observed store card interest rates. For all 4 models, they are around 46%. Sigma_u and Sigma_e give the estimates of the standard deviations of μ_i and ε_{it}, with the former representing the between variability and the latter representing the within variability. The parameter Rho measures the fraction of variance due to individual firms. In Table 3, the rho value of 0.59 suggests that 59% of the residual variance is between cross-section and 41% within cross-section.

Turning to the explanatory variables, results in Table 3 above indicate that, store card interest rates are partly determined by macroeconomic factors, with the coefficients on each of these explanatory variables having the expected signs. A very robust result is that the Bank of England base rate and the numbers of unemployed have significant impacts on store card interest rates, but that the amount of consumer credit in the economy does not. In addition,

lagged credit card interest rates impact significantly upon store card rates, regardless of the measure used. The CC final report into the UK store card industry concludes that

> "credit cards did not provide competitive constraints on store card APRs sufficient for us to consider them to be in the same market."

> (Competition Commission Store cards market investigation, Final Report 2006, p.81)

However, the statistical analysis above indicates that store card interest rates are positively and significantly related to credit card interest rates. This challenges the CC's conclusion that store cards and credit cards can be considered as distinct markets, instead supporting the evidence provided to the CC by both UK stores operating store cards, and the store card issuing companies.

Crucially, the coefficients associated with the intervention dummy variables D2, D3, D4 and D5 are all negative, and significantly different from zero. This implies that store card interest rates fell in response to key stages of the regulatory investigation and intervention by the OFT and the CC. Interestingly, the coefficient on D1 is not significantly different from zero, indicating that the start of the OFT investigation did not affect store card interest rates, although the decision to refer the investigation to the CC for more detailed analysis did have a significant, negative impact on store card interest rates. Further, the coefficients on D3, D4 and D5 indicate an increasing impact of the regulatory intervention. This indicates interest rates fell immediately after the CC issued the remedies consultation notice, then they fell again during each stage of the CC's provisional decisions being made and the CC's final report publication. Towards the end of the OFT and CC investigations into the store card industry, the impact of this regulatory intervention has been to reduce store card interest rates by approximately 4%.

The coefficients on the group dummy variables indicate that there are significant differences in the interest rates set on store cards issued by different issuing companies. GECF is identified in The CC 'Store cards market investigation' final report as controlling a "substantial part of the market", and as expected, the store cards issued by this company are significantly higher.

4.2 Robustness of Results

A number of changes to the methodology adopted were introduced to test further the robustness of the results discussed above.[4]

- The analysis was repeated including monthly dummy variables. However, the coefficients on these additional explanatory variables were never significantly different from zero, while their presence had little impact on the results reported above, so they were not included in the final regression analysis.

- The results reported use data on the interest rates that the store cards charge customers who settle their accounts by direct debit. Data was also collected on store card interest rates for customers who do not pay using direct debit. These 'Other' interest rates are little different, and the use of these data do not affect any of the results reported above.

- Given the state of flux in financial markets in many countries including the UK since the summer of 2007, it is suggested that the Bank of England base rate has not always since this time represented an accurate reflection of the cost to financial firms of obtaining credit themselves. As such, the analysis was repeated using the 3 month UK interbank lending rate (Libor) in place of the Bank of England base rate, but again there was little change to the results reported.

- Econometric estimation was repeated using the current, rather than lagged, credit card interest rates (each of the RBS and Barclaycard Visa and Mastercard rates) as the impact of changes in credit card interest rates on store card interest rates would be assumed to be very rapid under the efficient markets hypothesis. Again, there was little change to the results.

5. Conclusions

The late Professor Paul Geroski, former Chairman of the Competition Commission, in his address inaugurating the new Centre for Competition Policy (CCP) at the University of East

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[4] All of the results mentioned below are of course available upon request.

Anglia, asked "Is Competition Policy worth it?" and when discussing the store card industry he was only able to offer some anecdotal evidence to confirm the impact of the regulatory intervention in the UK store card industry in the early 2000s by the Office of Fair Trading, and then The Competition Commission. This paper uses panel data Tobit regression methods, coupled with intervention analysis to evaluate empirically the impact of intervention. Results indicate that regulatory intervention has had a significant effect on store card interest rates, with an increasing impact during the period of The CC's intervention. Other factors are also identified as having significant effects on store card interest rates. One such factor is credit card interest rates, but in so doing the CC's conclusion of the separability of the UK store card and credit card markets is called into question.

It is interesting to note the impact on the store card industry of the final CC industry recommendations. The final CC report included the recommendation that greater prominence is given both in stores and on monthly statements to the interest rates charged on store cards. This, coupled with increased media attention to store card interest rates has given rise to a considerable shrinking in the store card market. While in 2002 there were 139.8 million transactions undertaken in the UK using store cards, with a value of £5,113.0 million, these figures have fallen in every year since, and in 2007 there were only 61.1 million store card transactions undertaken with a value of £3,029.4 million (source: Euromonitor, 2008). The store card market can be compared with the credit card market which has enjoyed a growth in the number of credit card transaction in the UK from 1,647.2 million in 2002 to 1,837.9 million in 2007, with the value of transactions increasing during this time from £96,353.0 million to £114,856.5 million (source: Euromonitor UK Credit Card Industry Report 2008). This change in consumers' use of credit and store cards in the UK reflects not just a greater unwillingness on the part of consumers to use store cards, but in the final CC report on the store card market, substantial evidence is offered that indicates that numerous stores themselves have moved away from offering store cards in favour of offering credit card provision. Hence, the impact of the CC investigation and final recommendations extends beyond the significant negative impact on store card interest rates that the analysis in this paper has identified of approximately 4%.

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Table 1: Intervention Dummy Variables

Dummy Variable	Dates with dummy = 1	Related Events
D1	10/2003 - 3/2004	OFT begins investigation
D2	4/2004 – 9/2005	OFT refers case to CC
D3	10/2005 – 12/2005	CC Remedies Consultation Notice issued
D4	1/2006 – 3/2006	CC Provisional Decisions
D5	4/2006 – 2/2008	CC Report published

Table 2: Descriptive Statistics and Correlation Matrix

	Storerate_DD	Storerate_OR	Baserate	Libor	Conscred	Unemp	RBS-v	RBS-m	Barc-v	Barc-m
Mean	24.8	25.8	5.7	5.8	7.5	1.5	20.0	17.6	20.3	20.2
Median	26.8	28.9	5.5	5.8	8.0	1.2	17.9	16.9	19.9	19.9
Maximum	30.6	34.4	10.4	10.8	10.6	3.1	26.8	26.8	28.5	28.5
Minimum	12.9	12.9	3.5	3.4	3.6	0.8	12.9	12.9	11.9	11.9
Std. Dev.	4.96	5.92	1.50	1.56	1.89	0.74	3.46	3.28	3.40	3.34
Unit root tests	Panel unit root test PP-Fisher Chi-square test		Phillips-Perron test							
Level	11.27	19.04	-3.06	-2.83	-2.09	-0.81	-0.96	-2.43	-2.10	-2.25
	[0.94]	[0.64]	[0.03]	[0.06]	[0.25]	[0.81]	[0.77]	[0.14]	[0.25]	[0.19]
First-difference	297.27	385.74			-36.48	-9.95	-14.09	-14.04	-16.00	-15.70
	[0.00]	[0.00]			[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Integrated of Order	I(1)	I(1)	I(0)	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
	Correlation Matrix									
Storerate_OR	0.98	1								
Baserate	0.22	0.19	1							
Libor	0.20	0.18	0.99	1						
Conscred	-0.19	-0.11	-0.64	-0.62	1					
Unemp	0.22	0.17	0.58	0.58	-0.94	1				
RBS-v	0.28	0.23	0.77	0.75	-0.82	0.85	1			
RBS-m	0.09	0.16	0.49	0.48	0.00	0.46	0.42	1		
Barc-v	0.26	0.22	0.79	0.77	-0.76	0.77	0.90	0.46	1	
Barc-m	0.26	0.21	0.79	0.78	-0.74	0.74	0.88	0.42	1	1

Notes: The figures in squared brackets are p-values. Storerate_DD = the direct debit rates for store cards; Storerate_OR = the other rates than direct debit rates for store cards; Baserate = the base rate of Bank of England; Libor = the 3-month UK inter-bank lending rates; Conscred = consumer credit; Unemp = unemployment rate; RBS-v and RBS-m = visa credit card rate and master credit card rate used by the Royal Bank of Scotland respectively; Barc-v and Barc-m = visa credit card rate and master credit card rate used by Barclays respectively

Table 3: Intervention Analysis: Panel Data Tobit Model

Dependent variable = Direct Debit Interest Rates of Store Cards

Explanatory variables	(I)	(II)	(III)	(IV)
D1	-0.316	-0.412	-0.172	-0.401
	(0.337)	(0.338)	(0.339)	(0.338)
D2	-1.636***	-1.444***	-1.631***	-1.449***
	(0.223)	(0.226)	(0.224)	(0.227)
D3	-2.910***	-3.011***	-2.953***	-3.002***
	(0.447)	(0.447)	(0.449)	(0.447)
D4	-3.494***	-3.963***	-3.589***	-3.937***
	(0.460)	(0.465)	(0.462)	(0.465)
D5	-3.824***	-4.056***	-4.233***	-4.060***
	(0.225)	(0.203)	(0.200)	(0.203)
Baserate	0.236**	0.282***	0.530***	0.292***
	(0.111)	(0.104)	(0.097)	(0.104)
Conscred	0.039	0.064	0.035	0.067
	(0.140)	(0.140)	(0.140)	(0.140)
Unemp	-1.295***	-1.041***	-0.759**	-0.978***
	(0.373)	(0.355)	(0.352)	(0.354)
Lagged RBS-v	0.207***			
	(0.049)			
Lagged Barc-v		0.173***		
		(0.037)		
Lagged RBS-m			0.061*	
			(0.037)	
Lagged Barc-m				0.162***
				(0.037)
G1	4.883*	4.889*	4.872*	4.892*
	(2.696)	(2.700)	(2.704)	(2.699)
G2	5.129**	5.141**	5.142**	5.144**
	(2.256)	(2.259)	(2.263)	(2.258)
G3	-3.944	-3.932	-3.934	-3.928
	(2.697)	(2.701)	(2.705)	(2.700)
C	19.018***	18.850***	19.764***	18.910***
	(2.577)	(2.576)	(2.644)	(2.579)
Sigma_u	2.947***	2.952***	2.956***	2.950***
	(0.632)	(0.633)	(0.633)	(0.632)
Sigma_e	2.444***	2.441***	2.454***	2.443***
	(0.041)	(0.041)	(0.042)	(0.041)
Rho	0.593	0.594	0.592	0.593
	(0.104)	(0.104)	(0.104)	(0.104)
Pseudo- R^2	0.464	0.464	0.461	0.464
Model fitness test statistics	581.29***	584.96***	566.15***	582.80***
Panel Data Cointegration Tests				
Panel ρ-statistic	-8.28***	-4.82***	-6.80***	-6.91***
Group ρ-statistic	-9.86***	-6.99***	-9.29***	-9.32***

Notes: Standard errors in parentheses.* significant at 10%; ** significant at 5%; *** significant at 1%. Variable definitions as in Table 2.