

Role of Credit Cards in the Payment and Settlement System in India

Rinku Elizabeth Chandy,

Research Scholar,
Department of Commerce,
CMS College, Kottayam, India.

Dr. Roy Sam Daniel,

Associate Professor,
Department of Commerce,
CMS College, Kottayam, India.

ABSTRACT

Payment and settlement system is the most vital part of the economic system of a country. The payment system includes RTGS, CCIL Operated Systems, Paper Clearing, Retail Electronic Clearing, Credit Cards, Debit Cards, PPI's etc. In India the payment system today is technologically superior and vibrant with multiple payment instruments. In cognizance with this background, the paper discusses with the credit card contribution towards total payments in the country. This study is based on secondary source of information. Data for the years commencing from the financial year 2011-2018 have been used in this study. The tools used for analysis are OLS Regression. The fit of the model suggests that there is very high r square, and have overall significance.

Keywords: Payment and Settlement System, RBI, Credit Cards , CCIL, RTGS, Mobile Banking, Paper Clearing, PPI's.

INTRODUCTION:

Technological developments, financial innovations and globalization contributes to reshape the payment and settlement infrastructure of our country. In India there are multiple payment and settlement systems. The payment and settlement systems are regulated by the Payment and Settlement Systems Act, 2007. Section 2(1) (i) of the PSS Act 2007¹, defines “a payment system to mean a system that enables payment to be effected between a payer and a beneficiary, involving clearing, payment or settlement service or all of them, but does not include a stock exchange (Section 34 of the PSS Act 2007 states that its provisions will not apply to stock exchanges or clearing corporations set up under stock exchanges)”. RBI, the regulatory authority driving the National Payment System empowered the Board for Regulation and supervision of Payment and Settlement System (BPSS) in prescribing policies, setting standards, supervising and authorizing payment and settlement system in the country. In the Indian financial system the Payment and Settlement system consists of

- Real Time Gross Settlement (RTGS)
- The Clearing Corporation of India LTD. (CCIL) Operated systems
- Paper clearing
- Retail electronic clearing
- Debit cards
- Credit cards
- Pre paid Instruments System etc.

Over the past years the system has witnessed many challenges and the technological advancements have changed the customers. In 1999 BIS established firm principles on payment system, these had improved the efficiency in payment system and enhanced adeptness in handling the increased volume and value of payments within the country and internationally. However the payment system of a country though advanced and sophisticated faces risks like frauds, bank failures, counter party failures etc. Thus the contribution of all the elements in the Payment system should be identified prudently.

¹Payment and settlement system act 2007- <http://rbi.org.in>

The Demonetization effort on Nov 6th 2016 pushed the Indian economy to a less cash society. During the fiscal year 2015-16 the total payment and settlement system in India showed a robust growth, the volume of transaction has grown to 55.7% and the value of transactions to 24.8%.² The greater use of electronic payments contributes to a less cash society³. In cognizance with this background the present study attempts to examine and analyse the credit card payment contribution towards the payment system in India.

REVIEW OF LITERATURE:

Iftekhar Hasan et al. (2012) in their study found the relationship between Retail payments and overall economic growth and observe that migration to the efficient retail electronic payments stimulates the overall economic growth, trade and consumption. Card payments, credit transfers and direct debits had the highest macroeconomic impact.

Oginni Simon Oyewole (2013) in the study "Electronic Payment System and Economic Growth: A Review of Transition to Cashless Economy in Nigeria," finds that there is a positive relationship between e-payment system and economic growth in terms of real GDP Per capita and Trade Per capita. Comparing the various e-payment modes, only ATMs payment shows positive contribution to economic growth and the rest are negative. Deepankar Roy and Amarendra Sahoo (2016) "Payment system in India: Opportunities and challenges", discusses the efficiency and operation of payment system in India and other countries, and found out that compliance to some core principles such as management, operational risk, liquidity risk through participation, system operator's obligation for liquidity support, motivations for managing liquidity risk, access criterion, transparency regarding Intra Day Liquidity (IDL) support etc. was not evident from the perceived trends and public documents. And suggested that there should be a migration from paper based transaction to electronic mode of payment system. The trend in Indian payment system, is therefore not in conformity with the trend detected in other international payment systems and needs improvement.

Razeen Sappideen and Ling-Ling He (2008) The Payment System in China discusses the development in the payment and settlement system of the Chinese banking sector. The payment system in China consists of three sub systems (i.e) National Electronic Interbank system (NEIS), Local clearing Houses (LCHS), Commercial Bank and Inter Bank Payment System (CBIPS). The key issues in the payment system of China includes firstly the evolving trends in the International Payment System which pose the payment system in China to a steady growth. Secondly, increase in the cross border financial activities established high demands for competent functioning and supervision of the payment system. And thirdly the co-ordination issues in securities settlement system and large value settlement system ensure the safety and efficiency of the financial system.

Dilip Soman (2001) in the study "Effects of Payment Mechanism on spending Behaviour: The role of Rehearsal and Immediacy of Payments" studied the past expenses displayed to influence the spending behavior in future by reducing the actual budgets. The criterion for finding those relation is the exact recall in past payments and the experiencing of the full aversive impact related with them. Thus the use of diverse payment influences both these factors and moderates the outcome of past payments on future spending.

OBJECTIVES:

- To understand the Payment and Settlement system in India
- To analyze the contribution of credit cards in the payment and settlement system of India during the period May 2011- June 2018.

RESEARCH METHODOLOGY:

Sources of Data:

The dependent variable that is total payment and settlement services in India and data on Independent variables as RTGS, CCIL, paper clearing, retail electronic clearing, debit cards, credit cards, pre paid instruments etc. are obtained from the statistics published by RBI Reports.

Data Description and Methodology:

Data from May 2011-June 2018 was used in the study. The analysis on the rate of change in the volume of total payment and settlement services was done with the Linear Regression models. Ordinary least square method was used in the study. The study provides with dependent and independent variable as:

² Trend and progress in payment system-RBI Annual reports 2017 <https://www.rbi.org.in/scripts/AnnualReportPublications.aspx?Id=1209>

³ Payment and Settlement Systems in India: Vision-2018-<https://www.rbi.org.in/Scripts/PublicationVisionDocuments.aspx?Id=842>

Dependent Variable: The Volume of total payment and settlement business in India.

Independent Variable: Volume of business from RTGS, CCIL Operated System, Paper Clearing, Retail Electronic Clearing, Debit Card, Credit Card, Prepaid Instruments etc and the set of specific variables comprises of ROC (RTGS Vol.) ROC (CCIL Vol.) ROC (Prepay Vol.) ROC (Dr.Cards), ROC (Cr.Cards), ROC (Paper Vol), ROC(Ele Vol) ROC (Mobile Vol) i.e rate of change in the variables.

Empirical Results:

The rate of change in the dependent variables and independent variable is found out as volume at current time period (Volt) divided by volume at previous time period (Volt-1) minus 1. Rate of change in Volume (ROC_Vol) = (Volt/ Volt-1)

The model is constructed as follows:

$$\text{ROC(TPS)} = + \beta_1 * \text{ROC(RTGS)} + \beta_2 * \text{ROC(PPI)} + \beta_3 * \text{ROC(Paper)} + \beta_4 * \text{ROC(Elec)} + \beta_5 * \text{ROC(CCIL)} + \beta_6 * \text{ROC(DrCard)} + \beta_7 * \text{ROC(CrCard)}$$

Test of Normality:

In this study a normality test was first performed using the Jarque Bera Test and found that the lesser than 0.05 probability values of Jarque-Bera statistics rejects the null hypothesis that the distribution is normal, at 5 per cent significance level, except in the cases of ROC(CCIL_Vol) and ROC(CrCard_Vol). It is hence inferred that only data series of rate of changes in CCIL volume and Cr. Card volume are normally distributed.

Test of stationarity:

The data series relating to predictors and predictand are checked for their stationery nature using unit root tests, the results of which are the probability of Levin, Liu & Chu t statistics being less than 0.05 rejects the null hypothesis that common unit is present while that of ADF- Fisher Chi-square too rejects the null hypothesis that individual unit is present. With the presence of unit root in both common unit root process and individual unit root process being rejected, at 5 per cent significance level, the data series of all the predictors and predictand are stationery in nature

Test of correlations:

The linear relationship between predictand and predictors as well as between predictors is tested through the correlations that exist between them. Table 3 depicts the correlation between explained variable and explanatory variables as well as between explanatory variables. A very high correlation was found to exist between regressand ROC_TRP_Vol and all the other regressors except ROC_Cr Card_Vol. Between the regressors a desired low correlation was found to exist except in certain cases.

OLS Regression:

The lesser than 0.05 probabilities of t statistics rejects the null hypothesis that the coefficient is zero in all the cases except ROC_RTGS_Volume ROC_CCIL_Volume and the intercept term C. The coefficients of all the independent variables except these two representing RTGS and CCIL as well as constant C are thus significant and not equal to zero.

The fit of the regression model is significant as indicated by a very high R² and adjusted R² with a low stand error of regression. A near to '2' value of Durbin Watson statistic rules out the concern of first order serial correlation.

The less than 0.05 probability of F statistics rejects the null hypothesis that the fit of the intercept only model is as good as the specified model, at 5 per cent significance level. This indicates that the specified model is having overall significance.

The regression is represented as follows.

$$\text{ROC_TRP_Vol} = 0.0016 - 0.0066 * \text{ROC_RTGS_Vol} + 0.0055 * \text{ROC_Prepay_Vol} + 0.1495 * \text{ROC_Paper_Vol} + 0.1317 * \text{ROC_Elec_Vol} + 0.6232 * \text{ROC_DrCard_Vol} + 0.0838 * \text{ROC_CrCard_Vol} - 0.0091 * \text{ROC_CCIL_Vol}$$

As in the case of RTGS and CCIL the coefficients of which were not significant the prepaid payment instruments too accounts for only less than 1 per cent of monthly variations in total retail payments. While variations in debit cards explains 62 percent of variations in total retail payments credit cards explain only 8 per cent of monthly variations in total retail payments.

Test of Multicollinearity:

The multicollinearity between regressors indicated by variance inflation factors is tested and the results are shown in table 5. The centered VIF of all the regressors being less than “5” rules out the concern of auto correlation among them.

Test of Correlogram:

The autocorrelation and partial autocorrelation between residuals was tested using Correlogram Q statistics. The greater than 0.05 p values of Q statistics in all the lags from 1 to 12 fails to reject the null hypothesis that there is no auto correlation up to lag 12.

Test of Heteroskedasticity:

The residuals were tested for heteroskedasticity White’s test, the results of which are summarised in Table 7. The greater than 0.05 p values of F-statistic and Observation times R-squared fails to reject the null hypothesis that there is no heteroskedasticity in residuals.

CONCLUSION:

The study has analysed the rate of change in the volume of performance of all components in Total Payment and Settlement System. Ninety six percent of the dependent variables are explained by the independent variables in the model. Among the different payment instruments the relationship is highest for debit cards followed by paper based clearing, electronic clearing and credit cards. Our paper supports that the change in the countries potentiality of performing the credit cards transactions in 1 unit will lead to an increase in the TPS by 8.3 %. Comparing with the other components of TPS there is a dismally low contribution of credit cards in India. Consequently banks should promote the usage of credit cards, and this will directly increase the Total Payments and settlement services in India.

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TABLES:

Table 1: Test of Normality -Descriptive Statistics

	ROC_ TRP_Vol	ROC_ RTGS_Vol	ROC_ PPI_Vol	ROC_ Paper_Vol	ROC_ Elec_Vol	ROC_ CCIL_Vol	ROC_ DrCard_Vol	ROC_ CrCard_Vol
Mean	0.016844	0.020413	0.12854	0.003408	0.036584	0.024851	0.012147	0.023646
Median	0.00299	0.008914	0.057906	-0.005138	0.028064	0.030484	0.006403	0.024874
Maximum	0.343421	0.377153	4.310345	0.484716	0.419249	0.447388	0.310979	0.200146
Minimum	-0.09102	-0.238867	-0.77181	-0.218882	-0.208506	-0.251682	-0.15364	-0.157999
Std. Dev.	0.063593	0.111456	0.566929	0.101777	0.100834	0.157419	0.05935	0.077282

	ROC_ TRP_Vol	ROC_ RTGS_Vol	ROC_ PPI_Vol	ROC_ Paper_Vol	ROC_ Elec_Vol	ROC_ CCIL_Vol	ROC_ DrCard_Vol	ROC_ CrCard_Vol
Skewness	1.733733	0.636868	5.525443	1.281658	0.823539	0.27606	1.399247	-0.053384
Kurtosis	9.451856	4.232908	39.0654	7.64125	5.062508	2.592738	9.501291	2.541866
Jarque-Bera	192.245	11.2605	5098.494	100.7339	24.96438	1.686675	179.5191	0.792944
Probability	0.0000	0.0036	0.0000	0.0000	0.0000	0.4303	0.0000	0.6727
Sum	1.448563	1.755545	11.05446	0.293067	3.146183	2.137172	1.044614	2.033555
Sum Sq. Dev.	0.343745	1.055911	27.31975	0.880483	0.864242	2.106376	0.299406	0.507659
Observations	86	86	86	86	86	86	86	86

Table 2: Group Unit Root Test

Series:	ROC_TRP_Vol, ROC_RTGS_Vol, ROC_Prepay_Vol, ROC_Paper_Vol, ROC_Elec_Vol, ROC_CCIL_Vol, ROC_DrCard_Vol, ROC_CrCard_Vol			
Sample:	2011May 2018 June			
Exogenous variables:	Individual effects, individual linear trends			
Automatic selection of maximum lags				
Automatic lag length selection based on SIC: 0 to 11				
Newey-West automatic bandwidth selection and Bartlett kernel				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-17.8663	0.0000	8	654
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	350.678	0.0000	8	654
** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution, while LLC test assumes asymptotic normality.				

Table 3: Correlation between ROC in Volumes

	ROC_ TRP_Vol	ROC_ RTGS_Vol	ROC_ Prepay_Vol	ROC_ Paper_Vol	ROC_ Elec_Vol	ROC_ CCIL_Vol	ROC_ DrCard_Vol	ROC_ CrCard_Vol
ROC_TRP_Vol	1.0000							
ROC_RTGS_Vol	0.6182	1.0000						
ROC_Prepay_Vol	0.2124	0.1417	1.0000					
ROC_Paper_Vol	0.8235	0.6959	0.1076	1.0000				
ROC_Elec_Vol	0.7152	0.4845	0.0571	0.5661	1.0000			
ROC_CCIL_Vol	0.9414	0.5426	0.2022	0.7060	0.5756	1.0000		
ROC_DrCard_Vol	0.7189	0.4713	0.1111	0.6150	0.4181	0.6696	1.0000	
ROC_CrCard_Vol	0.1215	0.3793	0.0815	0.1995	0.1654	0.0530	0.3068	1.0000

Table 4: OLS Regression - ROC in Volumes

Method: Least Squares	Dependent Variable: ROC_TRP_Vol			
Sample: 2011May 2018June	Included observations: 86			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROC_RTGS_Vol	-0.0066	0.0176	-0.3761	0.7079
ROC_Prepay_Vol	0.0055	0.0024	2.3480	0.0214
ROC_Paper_Vol	0.1495	0.0220	6.7853	0.0000
ROC_Elec_Vol	0.1317	0.0166	7.9541	0.0000
ROC_DrCard_Vol	0.6232	0.0380	16.4112	0.0000
ROC_CrCard_Vol	0.0838	0.0249	3.3652	0.0012
ROC_CCIL_Vol	-0.0091	0.0097	-0.9372	0.3515
C	0.0016	0.0015	1.0843	0.2816
R-squared	0.96777	Durbin-Watson stat		1.78242
Adjusted R-squared	0.96488	F-statistic		334.588

Method: Least Squares	Dependent Variable: ROC_TRP_Vol			
Sample: 2011May 2018June	Included observations: 86			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
S.E. of regression	0.01192	Prob(F-statistic)		0.0000
Figures in bold indicate significance at 5% level.				

Table 5: Variance Inflation Factors – Rate of Change in Volume

Sample: 2011May 2018 June	Included observations: 86		
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
CRTGSVOL	0.000308	2.370926	2.2931
CPRE_VOL	0.000006	1.120457	1.0651
CPAPERVOL	0.000485	3.012202	3.0088
CELE_VOL	0.000274	1.891603	1.6693
CDRC_VOL	0.001442	3.168598	3.0398
CCR_CA_VOL	0.000620	2.425264	2.2154
CCCILVOL	0.000093	1.420074	1.3851
C	0.000002	1.340473	NA

Table 6: Correlogram Q Statistics – Residuals of OLS - Rate of Changes in Volume

Lag	AC	PAC	Q-Stat	Prob
1	0.108	0.108	1.0473	0.3060
2	-0.052	-0.065	1.2918	0.5240
3	-0.01	0.003	1.3014	0.7290
4	0.152	0.152	3.4278	0.4890
5	0.016	-0.02	3.452	0.6310
6	0.02	0.038	3.4901	0.7450
7	-0.226	-0.239	8.4027	0.2980
8	-0.015	0.023	8.4251	0.3930
9	0.182	0.174	11.676	0.2320
10	0.252	0.225	17.977	0.0550
11	-0.114	-0.096	19.284	0.0560
12	0.083	0.126	19.99	0.0670

Table 7: Heteroskedasticity Test – White – Rate of Changes in Volume

Heteroskedasticity Test: White			
F-statistic	0.898333	Prob. F(35,50)	0.6264
Obs*R-squared	33.20147	Prob. Chi-Square(35)	0.5551
