

Digital Payments in Indian Banking Sector – A Study

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Abstract

The Indian banking sector has undergone several changes and recorded a remarkable growth since liberalization. With the development of technological innovations in the banking sector, new regulations along with increasing needs of customers, the banking sector is facing challenges. Indian banking sector has been introducing new technology enabled operations to satisfy its customers. The present paper is aimed to study the technological innovations introduced in the banking sector for digital payments which made easy for payments and settlements of banks as well as customers. Demonetization of rupee was expected to increase in digitalization of payments and settlement systems in India. This study uses monthly data to study degree of digitalization of banking system in both pre and post demonetization periods. The paper considers four forms of digital transactions over the period 44 months (22 months for pre-demonetization (Jan.2015 to Oct.2016) and 22 months for post-demonetization (Nov.2016 to Aug.2018) from the RBI website. Kolmogorov-Smirnov (K-S) and Shapiro-Wilk normality tests and equality of variance in selected modes of payment systems between the two periods have been conducted. Then t tests have been conducted for each form of digital transaction to test hypotheses of equality of variance.

Keywords: *Indian Banking Sector, Technological innovations, Challenges in Banking Sector, Digital Payments, Product and Services.*

Introduction

The banking sector in India has undergone tremendous changes after 1991 industrial liberalization to meet increasing needs of customers. Advance in the technology has changed the perceptions of customers towards banking services. To meet changing needs and perceptions of customers, banking sector began to introduce innovative methods in their operations to provide immediate, fast, fair, prompt and transparent services to their customers with an objective of creating more value for customers. Now a day, banking sector has two types operational system e.g. i. electronic system and ii. Currency notes system. Financial sector in India has been moving from

currency notes system to electronic system. The main objective of the introduction of technology in banking services e.g. electronic system is to reduce and make 'zero' the currency note system for fair and prompt operations. At present, all the banks have started multi-channels like ATM (Automatic Teller Machine) debit cards, credit cards, internet banking, mobile banking, telephonic banking etc. Now, the role of banking has been redefining and becoming financial super markets that are providing not only financial intermediary but also various financial services under single roof. Banking institutions are facing high competition and are looking for innovative ways of services to attract and retain customers and trying to gain competitive advantages against their competitors.

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Evolution of Innovations in Banking Payment Systems in India:

Advancement in information technology has

given boost to financial institutions to introduce innovations in their operations and deliver more sophisticated financial services to their customers. With the help of technology, banks are constructing new systems that address variety of customers' needs. Technology has redefined the banking philosophy and created more innovations in the banking sector. The followings are the evolution of technological innovations in the banking sector.

1. Starting of ATM services in India 1987.
2. Arrival of card- based payments- debit card, credit card-late 1980's and early 1990.
3. Introduction of Electronic Clearing Service (ECS) in late 1990.
4. Introduction of Electronic Funds Transfer/ Special EFT in the early 2000.
5. Real Time Gross Settlement (RTGS) was introduced in March 2004
6. Introduction of NEFT (National Electronic Funds Transfer) 2005-06
7. Introduction of CTS (Cheque Truncation System) in the year 2008
8. Mobile banking 2002

Review of Literature

The concept of digitalization of banking system in India has been gaining its importance day by day. Many scholars, academicians, practitioners have conducted research in this area in India and abroad. In this context, it is relevant to refer briefly to the previous studies and research conducted in the related areas of the subject to find out and to fill up the research gaps. The following are some studies conducted by the eminent authors and practitioners on the area of payments and settlements systems of banking sector in India.

Gupta, (2013) has examined the developments of payment and settle systems in Indian banks by using the secondary data taken from the RBI. As per this study, while many innovations

are introduced in the Indian banking payment systems through adaptation of information and communication technology (ICT) and varieties of electronic clearing service options are available, these are not satisfying the demands of customers. Also, these electronic payment service options are not available to bank customers in rural areas due to lack of sufficient infrastructural facilities. Badruddin (2015) examines the various facilities provided by the RBI to gear up the payment and settlement issues in the Indian banking sector. Due to information technology payment systems in India have received new directions and numerous innovations are introduced. Payment and settlement of transactions through electronic mode create trust among the users and boosts speed, efficiency and safety of banking operations. Adaptation of e-payment system leads to cash less economy in the country. At present, variety of clearing options available in Indian banking system. But these options are still limited and not meeting the requirements of users. Shet, (2016) analyzes merits and demerits of technological innovations in Indian banking sector. Indian banks have introduced technological innovations in their operations to meet the challenges of changing needs and perceptions of customers, new regulations over years and advances in technology and create more value for their customers. India's financial sector has witnessed electronic payments systems along with paper currency (notes and cheques) and are moving towards a scenario where it can have new instruments along with liquidity and safety. Abid (2016) has made an attempt to study the change in the traditional payment systems because of introduction of electronic payment systems during 2010-11 to 2014-15. The study comparatively analyzes the various electronic payment modes in terms of volume and value for the five years period. Findings of the study are that the paper-based transactions recorded declining trend and

e-payments recorded a significant growth over the study period. It is recognized that development of information and communication technology (ICT) has been playing an important role in the growth of e-payments. Though there is significant increase in e-payments still its reach is limited in rural areas primarily due to lack of Internet connectivity and other infrastructural facilities. Anbalagan (2017) studies the new technological changes taken place in Indian banking sector like debit and credit cards, introduction of Electronic Clearing Service (ECS), National Electronic Fund Transfer (NEFT), Real Time Gross Settlement (RTGS) and mobile banking, online banking etc. These technological developments led to introduction of more and more sophisticated services to customers and increased the accessibility of common person to bank. In coming days Indian banking sector will recognize the financial needs of customers and provide better services and will compete the foreign banks.

Senthil and Vasan, (2018) have illustrated the scope of innovation and changes taking place in Real Time Gross Settlement (RTGS), Mobile banking, National Electronic Fund Transfer (NEFT), Electronic Clearing Service (ECS) have made significant move in payment systems through electronic mode. Through e-banking, users began to make banking operations (receipts and payments) electronically. E-banking is playing a vital role in banking operations and providing qualitative services to the customers. E-banking accelerates the customers' satisfaction by reducing the cost of transaction, providing fast and safe services and innovative banking operations.

Need for the Study

Banking sector is playing a vital role in the Indian economy by attracting the major part of the savings from the public and providing credit facilities. Banking system is the back-bone of the nation's economy and barometer for the economic health

of the country. Banking sector has been undergoing tremendous innovative changes due to advancement in the information and communication technology (ICT). Advancement in technology has changed the expectations and level of customers for services from banks. Banking sector has tracked the ICT and introduced the e-banking easing the payments and settlement transactions to meet the changing demands from bank customer and satisfy their needs. In this juncture, it is needed to study progress of payment and settlement systems in the banking sector to understand the performance of payments and settlement systems in the Indian banking sector.

Research Gap/Statement of the Problem

Numerous studies have been conducted by academicians, researchers, business and management practitioners, banking experts and research agencies, previously, on payments and settlement systems in banking sector by considering year wise and bank wise volume and value of various modes of payment and settlement systems in Indian banking sector. No concrete study has been taken place by considering the monthwise volume and value of modes of payment and settlement system by comparing the pre and post demonetization period. Hence, the present paper is aimed to study the monthwise volume and value of payment and settlement system in Indian banking sector by comparing pre and post demonetization period. It is also expected that this paper helps not only to researchers, academicians and students but also to policy makers in reviewing the present on going payment and settlement system in Indian banking sector and to take appropriate measures for improvement.

Objectives of the Study

The reasons for demonetization of currency notes have multiple objectives. One of the most important objectives is to promote digital transactions (cashless

transactions) into the economy to transform the financial behavior of the people relating to monetary transactions. This behavioral change in monetary transactions is expected to control corruption and black money in the economy. Though the decision of demonetization was with several targets, the aim and scope of the present study is to examine whether the decision of demonetization resulted a significant change in the volume and value of digital transactions in the Indian banking sector by comparing the volume and value of selected modes of digital payments and settlements during pre-demonetization and post demonetization period. Comparison of pre and post demonetization is based on the quantitative data released by the RBI for selected modes of digital payments. The following are the main objectives of the study.

1. To study the trend of payments and settlement systems in Indian banking sector.
2. To compare and analyze the payment and settlement systems in Indian banking sector during the pre and post demonetization period.

Hypotheses

1. **H0:** There is significant difference in respect of volume and value of ECS between pre and post demonetization period.
2. **H1:** There is significant difference in respect of volume and value of NEFT between pre and post demonetization period.
3. **H2:** There is significant difference in respect of volume and value of RTGS between pre and post demonetization period.
4. **H3:** There is significant difference in respect of volume and value of mobile banking between pre and post demonetization period.

Methodology

a. Data Collection

Data have been collected mainly from RBI website

and other economic and banking related websites, newspaper. Tables and graphs are used to present the information, wherever necessary.

b. Sample Units

Out of various electronic payment and settlements modes in Indian banking sector, only four electronic payment and settlement methods namely Electronic Clearing Service (ECS), National Electronic Fund Transfer (NEFT), Real Time Gross Settlement (RTGS) and Mobile Banking (MB) are selected for the present study. These four modes are popular and have been availing by most of the customers in the Indian banking sector for payment and settlement of their financial transactions.

c. Sample Design

The main aim of the present study is to compare and analyze the payment and settlement system in Indian banking sector during the pre and post demonetization period. That is the reason why volumes and values of selected four modes of payments and settlements i.e. ECS, NEFT, RTGS and MB are collected for a period of total 44 months (22 months for pre-demonetization (Jan.2015 to Oct.2016) and 22 months for post-demonetization (Nov.2016 to Aug.2018) from the RBI website. As volumes and values of Mobile Banking transactions are available for 18 months, so data relating to mobile banking transactions reflects for 18 months only.

Data Analysis: Data so collected are presented with the help of tables in a meaningful manner. Statistical tools like mean, median, standard-deviation; variance, skewness, kurtosis and F-test were applied to test the significant relationship between the pre and post demonetization period in respect of selected modes of the payments and settlements of financial transactions of bank customers. Prior to test the t-test, normality test is applied to examine homogeneity of variances and

to ensure the compliance of necessary conditions.

Results: Table-1 (in Appendix) depicts data relating to, selected modes of volume and value of digital payments in Indian banking sector during the pre and the post demonetization period taken from Jan.2015 to Aug.2018. From the table, it is observed that the average of all modes of digital payments is increased in post demonetization period compared to pre demonetization period except electronic clearing system (ECS) both credit side and debit side. This clearly exhibits that users shifted from ECS to other modes of payments like NEFT, RTGS and mobile banking after demonetization. Table – 2 examines the variance levels among variables. It is inferred, from the table-2 (in Appendix), that there were heavy fluctuations, specified by the standard deviation and coefficient of variations, during post demonetization period as compared to pre demonetization period.

Before testing hypothesis with the help of F-test, to ensure the interpretation, Kolmogorov-Smirnov (K-S) and Shapiro-Wilk normality tests and equality of variance in selected modes of payment systems between the two periods have been conducted. Results of Kolmogorov-Smirnov (K-S) and Shapiro-Wilk normality test were presented in the table 3 (in Appendix). Data in the table-3 furnish that all modes of digital payments during the post demonetization period satisfy the condition of normality. The hypothesis for normality test is framed as below.

H₀: Data are normally distributed.

H₁: Data are not normally distributed.

If $p\text{-value} > \alpha$ ($p > 0.05$), H_0 is accepted. It is assumed that data is normally distributed. In other words, the difference between the data sample and the normal distribution is not big enough to be statistically significant. The $p\text{-value} > \alpha$, hence, if we reject the H_0 , the chances of type-1 error (rejecting a correct

H_0) would be too high.

According to Kolmogorov-Smirnov (K-S) and Shapiro-Wilk normality test, the p-value is greater than α ($p > 0.05$), indicate that the data on variables selected for the study satisfy the condition of normality. In the case of Volume and value of ECS (Debit) the p-value less than α ($p < 0.05$), shows that the normality condition is not satisfied. Hence, data relating to ECS debit are not considered further statistical test.

Table 1 : Digital Payments in Indian Banking Sector in Appendix

Table 2: Descriptive Statistics in Appendix

Table 3: Tests of Normality in Appendix

Data in the table-4 reveal that the equality of variance in selected modes of payment system between the pre and post demonetization periods. To test the equality of variance the following hypotheses are framed.

H₀: There is no significant difference between variances of selected modes of payments in pre and post demonetization periods.

H₁: There is significant difference between variances of selected modes of payments in pre and post demonetization periods.

Table 4 : Equality of Variance in Appendix

Table-4 (in Appendix) exhibits the results of equality variance. It indicates that calculated p-value is less than the significance level $\alpha = 0.05$. Therefore, the null hypothesis is rejected and concluded that there is significant difference between variances of selected modes of payment (digital transactions) in pre and post demonetization periods.

To find the difference between variances of selected variables 'F-test Two Sample for Variances' is conducted. For this, the following hypotheses has been formulated for all four modes digital payment system.

H0: There is no significant difference between variances with respect to selected modes of payments in pre and post demonetization periods ($\sigma_{12} = \sigma_{22}$).

H1: There is significant difference between variances with respect to selected modes of payments in pre and post demonetization periods ($\sigma_{12} \neq \sigma_{22}$).

The results of 'F-test Two Sample for Variances' are presented in the table – 5. In the case ECS Cr. Volume and value the F-static value is greater than the F-critical value. Therefore the null hypothesis is rejected and proved that there significant difference of variance between two periods. In the case of other mode payments i.e. NEFT, RTGS and Mobile Banking the F-static value is lower than the F-critical value. Hence, the null hypothesis is accepted and concluded that there is no significant difference of variance between two periods. This is because public concentration on mobile banking, electronic fund transfer and RTGS has been rising and tremendous increase is recorded for these transactions in post demonetization period.

Table – 5 :F-Test Two Sample Variances in Appendix

Conclusion

The present study clearly finds that the volume and value of bank transactions held by customers in the post demonetization of currency notes are significantly different than those held in the prior to demonetization. It is inferred that Indians have tailored themselves to the digital financial transactions in the new financial system and have been proving that in increasing accessibility of digital system by common man for his financial requirements. Overall, the e-payment system recorded high volumes and values in the post demonetization. To continue the same trend and to bring permanent change towards the digital

transactions, continuous education, awareness and technological innovations accompanied by sustainable digital payment ecosystem are a significant. The concerned authorities and Reserve Bank India jointly should go for the in-depth analysis of needs of customers and introduce innovative products by using sophisticated technology at affordable cost.

References

- Aastha Gupta, M. G. (2013). Electronic Mode of Payment – A Study of Indian Banking System. *International Journal of Enterprise Computing and Business Systems*, 2 (2), 1-13.
- Abid, S. (2016). Electronic Payment System: An Evolution in Indian Banking System. *IOSR Journal of Economics and Finance (IOSR-JEF)*, 7 (2), 25-30.
- Anbalagan. (2017). New Technological Changes in Indian Banking Sector. *International Journal of Scientific Research and Management (IJSRM)*, 5 (9), 7015-7021.
- Badruddin, A. (2015). Financial Market Infrastructures: A Study on Payment and Settlement System in Indian Banking Sector. *International Journal of Engineering Technology, Management and Applied Sciences*, 3 (2), 180-191.
- Senthil and Vasan. (2018). A Study of Payment and Settlement in Indian Banking Sector. *Research maGma (An International Multidisciplinary Journal)*, 1 (11), 1-8.
- Shet, A. R. (2016). Technological Innovations in Indian Banking Sector. *International Journal of Scientific Engineering and Research (IJSER)*, 4 (5), 11-14.

APPENDIX

Table 1: Digital Payments in Indian Banking Sector

S.No.	ECS (Credit)						ECS (Debit)						NEFT						RTGS						Mobile Banking					
	Volume (in Mn)		Value (Rs.in Bn)		Volume (in Mn)		Value (Rs.in Bn)		Volume (in Mn)		Value (Rs.in Bn)		Volume (in Mn)		Value (Rs.in Bn)		Volume (in Mn)		Value (Rs.in Bn)		Volume (in Mn)		Value (Rs.in Bn)		Volume (in Mn)		Value (Rs.in Bn)			
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post		
1	0.96	0.76	16.55	7.89	0.82	0.28	2.04	1.38	133.21	123.05	9504.50	8807.88	9.01	7.87	76473.29	78479.19	78.12	87.47	1139.41	1365.70										
2	0.85	0.91	8.35	12.84	0.82	0.25	2.06	1.55	120.15	166.31	9880.17	11537.63	8.47	8.84	86687.35	84096.48	72.63	110.64	1042.60	1498.18										
3	0.95	0.76	9.65	10.51	0.85	0.20	2.55	1.43	118.56	164.19	8764.14	11355.08	8.56	9.33	77588.32	74886.07	71.76	106.13	1038.97	1383.05										
4	0.60	0.68	7.49	8.04	0.89	0.19	2.66	1.31	113.48	148.21	8145.39	10877.91	8.25	9.10	74919.55	74218.81	67.47	95.41	809.59	1279.93										
5	0.80	0.92	9.64	9.69	1.00	0.23	3.23	1.55	118.29	186.70	8815.31	16294.50	8.83	12.54	83834.94	123375.83	63.17	113.65	673.48	1730.88										
6	0.54	0.49	9.11	9.68	1.21	0.19	5.05	1.21	117.50	143.17	7732.54	12156.17	8.70	9.54	76332.58	88512.19	61.73	106.27	618.13	1612.65										
7	1.38	0.62	34.30	10.36	2.03	0.17	14.38	1.06	111.84	155.82	8324.52	12410.81	8.33	10.43	68411.27	90770.52	48.67	114.26	524.83	2134.20										
8	3.51	0.64	87.70	10.49	9.17	0.13	68.31	0.89	129.24	152.34	10226.36	12694.20	9.86	9.83	100045.36	92812.58	49.48	115.73	572.80	1807.65										
9	1.61	0.43	71.30	10.90	11.04	0.14	82.13	0.93	110.17	148.14	7278.60	12011.60	8.22	9.38	70341.90	87149.26	44.65	103.54	540.00	811.61										
10	2.94	0.63	71.54	10.96	13.36	0.12	99.01	0.83	118.97	151.61	7086.75	12500.38	8.22	9.46	66517.70	89163.39	42.80	98.25	465.21	805.06										
11	2.09	0.48	89.69	9.60	31.57	0.14	153.06	0.84	119.61	157.67	8197.21	14182.14	8.02	9.61	68924.04	102348.13	39.49	113.89	490.29	862.20										
12	2.09	0.50	56.31	10.72	20.05	0.12	157.77	0.83	99.82	158.78	6370.16	13851.28	7.60	10.00	53896.03	92056.10	40.45	150.68	334.71	917.02										
13	4.00	0.54	95.94	10.38	20.27	0.13	160.21	0.83	114.60	161.97	6906.88	13884.00	8.34	10.83	63365.56	98410.49	32.48	184.97	305.68	1065.42										
14	3.76	0.51	85.58	7.24	20.09	0.13	157.76	0.84	98.54	169.05	6860.21	15779.20	7.77	10.89	68791.35	100907.79	27.11	206.52	269.60	1057.00										
15	3.46	0.50	83.79	8.68	19.70	0.12	156.43	0.79	95.94	170.21	6153.38	15374.07	7.82	11.16	64376.22	107488.40	25.16	215.01	217.98	1124.22										
16	3.70	0.49	104.44	9.34	20.14	0.09	157.46	0.40	103.11	165.59	6289.37	14843.90	8.26	10.62	68891.04	91765.63	25.02	223.25	214.56	1136.60										
17	3.03	0.31	86.53	9.05	20.04	0.07	156.69	0.27	91.22	212.01	6324.58	22540.77	8.26	12.68	74181.48	126340.30	21.87	239.90	202.91	1415.03										
18	3.95	0.65	98.51	12.34	19.65	0.05	150.55	0.24	88.13	177.15	5536.03	16326.64	8.06	10.66	60051.45	94045.75	21.36	250.62	199.18	1348.60										
19	4.83	0.50	127.10	10.29	18.84	0.08	145.63	0.27	83.53	172.90	6043.75	17152.00	7.90	11.50	65199.83	105720.93	19.78	NA	188.69	NA										
20	8.57	0.40	151.26	12.35	20.27	0.13	155.17	0.77	106.00	19017.08	9.67	11.43	87421.48	111991.00	19.76	NA	169.14	NA												
21	8.29	0.57	159.01	13.9	19.11	0.04	1449.77	0.28	81.19	180.60	5046.41	17321.40	7.69	10.97	57414.11	112012.91	17.91	NA	140.66	NA										
22	9.65	0.41	165.5	9.73	19.49	0.05	183.83	0.29	80.22	167.35	5084.73	16326.64	7.89	11.00	61648.02	109214.10	18.07	NA	129.17	NA										
Total	71.55	12.69	1620.32	224.99	290.39	3.05	3465.75	18.78	2353.33	3608.16	161744.07	317245.68	183.72	221.67	1575312.90	2037533.84	908.94	2636.18	10387.61	23555.02										
Mean	3.25	0.58	74.06	10.33	13.20	0.14	157.53	0.85	106.97	163.64	7352.00	14120.24	8.35	10.35	71605.13	92416.99	41.32	119.83	467.62	1061.59										
SD	2.56	0.15	49.38	1.59	9.21	0.06	290.12	0.42	15.02	17.16	1453.14	3026.54	0.57	1.15	10609.56	22216.81	19.75	54.86	305.28	357.22										
V	6.556	0.0237	2438.45	2.53003	8.811	0.004	84717.6	0.176	225.55	2945265	211610	9123693.8	0.2523	1.3288	11389500	49386703	389.895	3093961	9319741	127604.3										

Source: Reports of RBI from Jan.2015 to Aug2018

Table 2: Descriptive Statistics

Particulars	ECS (Credit)						ECS (Debit)						NEFT						RTGS						Mobile Banking					
	Volume (Mn.)		Value (Rs.in Bn)		Volume (Mn.)		Value (Rs.in Bn)		Volume (Mn.)		Value (Rs.in Bn)		Volume (Mn.)		Value (Rs.in Bn)		Volume (Mn.)		Value (Rs.in Bn)		Volume (Mn.)		Value (Rs.in Bn)		Volume (Mn.)		Value (Rs.in Bn)			
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post		
Mean	3.25	0.580	74.060	10.23	13.20	0.140	96.850	0.850	106.97	163.64	7352.000	14420.240	8.350	10.35	71605.130	92617.000	41.320	119.83	467.62	1061.60										
Median	2.98	0.520	84.680	10.32	18.97	0.130	147.23	0.830	111.00	163.89	7129.920	14033.070	8.250	10.52	68907.540	92434.340	39.970	112.14	399.96	1130.41										
SD	2.62	0.160	50.540	1.63	9.42	0.065	69.12	0.430	15.37	17.56	1487.330	3091.600	0.580	1.18	10920.640	22739.650	20.210	76.96	312.47	609.70										
V	6.88	0.025	2534.63	2.65	88.82	0.004	4777.8	0.185	236.30	308.53	2212164.52	9558121.43	0.341	1.39	119260437.41	517090830.63	408.47	5922.70	97635.72	371740.18										
Skewness	1.275	0.734	0.164	0.373	-0.198	0.480	-0.519	0.044	-0.316	0.425	0.328	0.676	0.818	-2.078	0.468	-0.007	0.906	-0.007	-0.375	-0.575										
Kurtosis	1.043	248.00	-0.848	0.221	-1.175	-0.20	-1.683	-0.995	-853.0	2.470	-0.697	0.940	0.843	7.380	-1.185	-0.591	-0.190	-0.225	-0.225											

Source: Computed with the help of SPSS

Table 3: Tests of Normality

	Pre-Demonetization							Post Demonetization						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk			Normality	Kolmogorov-Smirnov ^a			Shapiro-Wilk			Normality
	Statistic	df	P-Value	Statistic	df	P-Value		Statistic	df	P-Value	Statistic	df	P-Value	
ECS Cr. Volume	.206	22	.056	.843	22	.053	Yes	.165	22	.121	.938	22	.182	Yes
ECS Cr. Value	.145	22	.200 [*]	.916	22	.063	Yes	.144	22	.200 [*]	.969	22	.691	Yes
ECS Dr. Volume	.271	22	.000	.822	22	.001	No	.173	22	.084	.954	22	.374	Yes
ECS Dr. Value	.305	22	.000	.743	22	.000	No	.150	22	.200 [*]	.913	22	.053	Yes
NEFT Volume	.128	22	.200 [*]	.948	22	.288	Yes	.127	22	.200 [*]	.952	22	.342	Yes
NEFT Value	.111	22	.200 [*]	.965	22	.593	Yes	.121	22	.200 [*]	.964	22	.564	Yes
RTGS Volume	.190	22	.059	.888	22	.107	Yes	.098	22	.200 [*]	.976	22	.848	Yes
RTGS Value	.142	22	.200 [*]	.955	22	.402	Yes	.178	22	.069	.811	22	.001	Yes
MB Volume	.168	22	.107	.899	22	.028	Yes	.203	22	.019	.906	22	.059	Yes
MB Value	.165	22	.124	.877	22	.011	Yes	.155	22	.182	.915	22	.060	Yes

Source: Computed with SPSS

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 4 : Equality of Variance

	ECS Credit Volume (Pre Vs Post)	NEFT Volume (Pre Vs Post)	NEFT Value (Pre Vs Post)	RTGS Volume (Pre Vs Post)	RTGS Value (Pre Vs Post)	MB Volume (Pre Vs Post)	MB Value (Pre Vs Post)
Difference of Variance	6.856	-72.2612	-7345956.454	-1.05	-39783	-2827.39	-42393.183
F-Value	276.82	0.7658	0.231443356	0.245	0.2306	0.1128	0.6862
F-Critic	2.084	0.4798	0.479803022	0.4798	0.4798	0.4401	0.44016
P-Value	0.000	0.02731	0.000729436	0.001	0.000712	0.000219	0.02228
Are the variances different (p<0.05)	Yes	No	Yes	Yes	Yes	Yes	No
One or Two Tailed	Two	Two	Two	Two	Two	Two	Two
H ₀	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected	Rejected

Significance Level = 95%

Computed with the help of SPSS

Table 5: F-Test Two Sample Variances

	ECS (Cr.) Volume (Pre&Post)	ECS (Cr.) Value (Pre&Post)	NEFT Volume (Pre&Post)	NEFT Value (Pre&Post)	RTGS Volume (Pre&Post)	RTGS Value (Pre&Post)	MB Volume (Pre&Post)	MB Value (Pre&Post)
Mean	3.25	74.06	106.97	7352	8.35	71605.13	46.3	536.66
Variance	6.88	2554.57	236.29	2212163.30	0.34	119260429	359.63	92717.21
N	22	22	22	22	22	22	18	18
df	21	21	21	21	21	21	17	17
F-Statistic	276.8214	963.8046	0.7658	0.2314	0.245	0.2306	0.1128	0.6862
F-Critic (Two tailed)	2.0968	2.0968	2.0968	2.0968	2.0968	2.0968	2.297	2.297
Significance	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
H ₀	Reject	Reject	Accept	Accept	Accept	Accept	Accept	Accept