AUTOMATED CLEARING SYSTEM AND THE BANKING SECTOR PERFORMANCE: THE NIGERIAN EXPERIENCE

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Abstract

This study investigated the impact of automated clearing system on the Nigerian banking system. Secondary data were mostly sourced through The Central Bank of Nigeria publications and analyzed using t test statistics, which tested the significant difference between pre, and post automated clearing system. The result revealed that automated clearing system has a significant positive impact on the general payment system. The paper concludes that the post NACS era is more efficient and hence we recommend the application of the automated clearing system that may further reduce the delivery settlement period from current T_3 to T_o

Key Words: Nigeria Automated Clearing System, Delivery period, Magnetic Inks Character Recognition, Payment system, Nigeria Inter Bank Settlement System.

Introduction

Some form of cheque clearing started in the Nigerian banking system in 1961. The clearing system then was based on multilateral instruments, directly operated and managed by Central Bank of Nigeria. The clearing banks were relatively few, directly participated at clearing houses and maintained accounts with the branch of the Central Bank in their areas. The process of clearing cheques was manual and could take as much as very long hours after commencement of the clearing house before banks could know their net settlement position, even as long as twenty seven days before they could take value for their clearing activities. The increase in number of commercial banks led to the establishment of magnetic ink character recognition technology (MICR) to enhance efficiency in the payment system in 1994.

Alade (2005) found that this technology did little to improve the clearing system and settlement activities, as the initial verification of cheques at the clearing house was still done through manual clearing and physical exchange of clearing instruments. Following this, the Central Bank of Nigeria established the Nigeria Inter Bank Settlement System (NIBSS) in 1999. It was reported that the NIBSS was embraced by the banks as the system provided real time services to the banks and easy movement of financial instrument transfers. It would be recalled that it was around this period that the licenses of twenty six banks were revoked due to inadequate financial base and lack of banking culture. Amedu (2005) and Ovia (2004)

investigated NIBSS and found that the system showed that delivery had not been positively affected.

To improve the system, Central Bank of Nigeria in 2002 introduced the Nigeria Automatic Clearing System (NACS) for the clearing and settlement of cheques (Nnannah, 2005). This framework classified clearing banks into settlement and non-settlement banks. This system has not been investigated and this study does this by investigating the impact of NACS by looking at how the framework has affected the value, volume and number of cheque transactions. Based on this, this study is based on the null hypotheses that the value, volume and number of transactions of cheques before the introduction of NACS do not significantly differ with those after the introduction of the system. The period 1997-2001 is taken as pre-NACS period while 2002 to 2006 is taken as post-NACS era.

Review of Related Literature

As seen in the background, it is long the Nigerian banking system started looking for more efficient ways of clearing cheques, from the manual to the present and more efficient automated system. Automated clearing system is beginning to evolve all over the world. The European Parliamentary Financial Services Forum (2004) pointed out that in June 2002, the banking sector created the European Payment Council (E PC) as a platform mandated by the European banking industry represented by the three European Credit Sector Associations (ECSAS) to create the architecture, instruments and processes necessary for the Single Euro Payment Area (S E P A).

In the United Kingdom, the banks automated clearing system (B A CS) has drastically reduced time and cost of administering bank payments, as cheques can be cleared within two business days to any account. (Trade Online Project, 2007). In Singapore, Monetary Authority of Singapore (2008) observed that the Singapore Clearing House Association (S C H A) formed in December 1980 is an association to establish, manage and administer clearing services and facilities for cheques as well as debit and credit items of its members using Banking Computer Services Pte Ltd (BC S).

Bruno-Britz (2008) wrote of how SWIFT (Brussels) announced a pilot programme around automated payments that would bring better and more efficient services to the people. Furthermore, United States of America while operating the automated clearing system was not unmindful of the problems associated with it, hence the issuance of the Bank Secrecy Act Anti-Money Laundering Examination Manual capable of taking care of associated risks (Federal Financial Institutions Examinations Council, 2008).

The African countries are not left out of the move for automation in the clearing system. For instance, Bank of Mauritius (2000) wrote of the Mauritius Automated clearing and settlement system, the operations, benefits derivable, security and resilience. Namibia on the other hand, appears to be very much ahead of other African countries as the country through Namclear has achieved a full, same-day cheque processing solution. The solution which places Namclear and the Namibian banking industry ahead of their competitors in Africa has substantially reduced the cost of holding uncleared funds overnight in the Namibian banking industry. It has also lowered the risk of failed settlements for customers, who are now gaining access to funds much faster than with the previous, largely manual cheque-clearing system (Microsoft, 2006).

In Nigeria, according to Aminu (2008), the Central Bank of Nigeria on July 2, 2007 in collaboration with the Bankers committee, further reduced up-country payment instruments

clearing cycle to four working days, while that of the local (payment instruments emanating from Lagos) remained unchanged at three working days. How this automated clearing system has affected the performance of the banking system in Nigeria has not been investigated and this is what this paper hopes to achieve.

Table 1: Volume and Value of Cheques Transacted 2001-2006

	2001		2002		2003		2004		2005		2006	
	Volume	**Value**	**Volume**	**Value**	**Volume**	**Value**	**Volume**	**Value**	**Volume**	**Value**	**Volume**	**Value**
		(₦)Bn		**(₦)Bn**		**(₦)Bn**		**(₦)Bn**		**(₦)Bn**		**(₦)Bn**
Clear system	10,508,977	3,885.0	11,169.380	5,262.7	12,526.643	8,928.4	13,997.898	10,996.0	14,658.511	13,915.1	14.3	16.5
Lagos clearing system	6,590,077	1,488,4	6,169.380	1,382.7	6,679.654	5,132.8	7,122.056	5,744.2	7,122.056	5,744.2	7,802.046	7215
Abuja clearing house	-	-	-	-	-	-	-	-	1,006.194	1,1354	1,145,095	2.814.2
Others	3,918.970	2,396	4.557.043	3,880.0	5,004.901	2,639.2	2,869.648	4,116.4	5,869.648	4,116.4	6,018.521	6,423.221

Source: CBN Annual Report and Statement of Accounts – 31st December 2006

Table 2: Consolidated Banks Clearing House Statistics

S/N	Year	Daily No of Working Days	Volume of Cheques Cleared	Daily No of Cheques Cleared	Value of Naira Transaction
1	1997	250	3665107	14660.4	1567.1bn
2	1998	249	7754672	31143.0	1915.0bn
3	1999	250	8620745	34683.0	2263.9bn
4	2000	249	10297889	41356.7	34009bn
5	2001	251	10508977	41868.0	3885.0bn
6	2002	252	11169380	44322.5	5262.7bn
7	2003	248	12526643	50511.0	8928.4bn
8	2004	256	13997898	54689.0	10,996.0bn
9	2005	250	1458511	58654.0	13,915.1bn
10	2006	252	14358688	56976.4	16,500.0bn

Source: Extracted from CBN Annual Report Statement of Accounts for the Year Ended December 1999-2006.

Table 3: Volume of Cheques Cleared During the Pre-and Post- NACS Periods, 1997-2006

YEAR	PRE-NACS	YEAR	POST-NACS
1997	3665107	2002	11169380
1998	7754672	2003	12526643
1999	8620745	2004	13997898
2000	10297889	2005	14658511
2001	10508977	2006	1435688

Table 4: The Daily Number of Cheques Cleared During the Pre-and Post- NACS Periods, 1997-2006

YEAR	PRE-NACS	YEAR	POST-NACS
1997	14660.4	2002	44322.5
1998	31143.0	2003	50511.0
1999	34683.0	2004	54689.0
2000	41356.7	2005	58654.0
2001	41868.0	2006	56976.4

Table 5: Values of naira transactions during the pre-and post- NACS periods, 1997-2006

YEAR	PRE-NACS	YEAR	POST-NACS
1997	1567.1BN	2002	5272.7BN
1998	1915.0BN	2003	8928.4BN
1999	2263.9BN	2004	109960.BN
2000	3400.9BN	2005	13915.1
2001	3885.0BN	2006	16500.0BN

Methodology

Data Collection

The study utilized secondary data derived from statistical bulletin and Annual statement of Account of CBN representing the performance of automated clearing and settlement system from period of 1997-2006.

Method: A t-test statistics which is a statistical tool for comparison was used to determine the progress made before and after introduction of NACS to the clearing and settlement banks.

$$\frac{X1 - X2}{\sqrt{(n_1 - 1)^2 s_2 + (n_2 - 1)^2 s_2} \frac{1}{n_1 - n_2} \frac{1}{n_1 + n_2 - 2}}$$

x_1, x_2 = Sample Means
n_1, x_2 = Population Sample
s_2, s^2_2 = Sample Valences From Samples
$n_1 + n_2 - 2$ = Degree of Freedom

Data Analysis and Result Discussion

We empirically tested hypotheses as formulated in the study. The difference between two means is the appropriate tool of analysis employed in the three hypotheses.

Hypothesis 1

Comparison of the volumes of cheques cleared between the pre and post NACS periods:

Ho_1: There is no significant difference in the volume of cheques cleared during the pre and post NACS era.

Data in Table 3 was utilized to estimate the degree of deference in volumes of cheques cleared between the pre-NACS and post NACS:

Periods	Number	Std. Deviation	Mean	Std. Error of Difference
Pre-NACS	5	2,768,955.263	8,169,478.000	
Post-NACS	5	1454,784.287	13,330,486.400	1,398,821.688

Source: SPSS 13.0 Result/Output.

The result of the test of difference between means for independent periods performed on the data on volume of cheques cleared as detailed in Table 2.

Ho_1: $U_A = U_B = O$: There is no significant difference in the volume of cheques cleared under the two periods.

H_{a1}: $U_A = U_B =$ There is a significant difference in the volume of cheques cleared under the two periods.

Test Statistics

t-ratio (calculated)

$$= \frac{X(A) - X(B)}{\text{Standard Error of the difference between means (A) and (B)}}$$

$$= \frac{8169478.000 - 13330486.400139}{821.688}$$

$\therefore$ t-ratio (cal) = 3.69

But, t-ratio (tabulated) df ($n_A + n_B - 2 = 8$)

1% = 2.896

5% = 1.860

Hypothesis Test: Table 3

Pre-NACS	Post-NACS	
8,169,478.00	1.330,489.00	Mean
2,768,955.263	1.454,784.287	Std. Dev
5	5	N

8 df

-5,161,008,400 difference (PRE-NACS-POST-NACS)

4,891.755,283.861,150 pooled variance

1,398,688 standard error of difference

0.000 hypothesized difference

-369 t

0031 P-value (one-tailed)

Decision Rule

Since t-cal (3.69)> t-tab (2.896, 1.860) at both the 1% and 5% levels probability respectively, reject Ho and accept Ha to conclude that a significant difference exists between the volume of cheques cleared during the pre-and post-NACS periods.

Hypothesis 2

Comparison of the Daily Number of cheques Cleared between the pre-and post –NACS period

The hypothesis tested here states thus:

Ho_2: There is no significant difference in the daily number of cheques cleared between the pre-and post-NACS periods

Result

Periods	Number	Std. Deviation	Mean	Std. Error of Difference
Pre-NACS	5	11,076,4775	32,742,0800	
Post-NACS	5	5,746,9961	53,030,1000	5,580,6150

Data in Table 4 were utilized to test the difference between the daily numbers of cheques cleared during the pre-and post-NACS periods. Data in Table 3 were utilized for the test of hypothesis.

Ho_1: $U_A = U_B = O$: There is no significant difference in the daily number of cheques cleared under the periods

Ha_1: $U_A \neq U_B \neq O$: There is a significant difference in the daily number of cheques cleared under the periods.

Test statistics

t-ratio (calculated)

$$= \frac{X(A) - (X(B)}{\text{Standard Error of the difference between means (A) and (B)}}$$

$$= \frac{32,742.0800 - 53,030,100}{5,580.6150}$$

=

∴ T-ratio (cal) = 3.64

While t-ratio (tab) df (nA+nB-2 = 8)

1% = 2.896

5% = 1.860

Hypothesis Test

Pre-NACS	Post-NACS	
32.742.0800	53,030,1000	Mean
11,076,4775	5746.9961	Std. Dev
5	5	n

8	df
-20,288,0800	difference (PRE-NACS-POST-NACS)
77,858,158,8410	pooled variance
5,580.6150	standard error of difference
0.000	hypothesized difference
-3.64	t
0033	P-value (one-tailed)

Decision Rule

Since t-cal (3.64)> t-tab at both 1% and 5% levels of probability we reject Ho and accept Ha and conclude that a significant difference exists between the daily number of cheques cleared during the pre-and post-NACS periods.

Hypothesis 3

Comparison of the value of transactions between the pre-and post-NACS periods

The hypothesis states as follows:

Ho_3: There is no significant difference in the value of transaction between the pre-and post-NACS periods.

Test of difference between mean of value of transactions during the pre-and post-NACS periods

Result

Periods	Number	Std. Deviation	Mean	Std. Error of Difference
Pre-NACS	5	992.6816	2,606,2800	
Post-NACS	5	4,352,1936	11,122,4400	1,996.3470

We have the result of the test of difference between means for the value of transactions in bank clearing and settlements for both pre-and post-NACS periods. While the data set on Table 4 was employed, this test of hypothesis 3 was as well utilized to do the analysis.

Ho_1: $U_A = U_B = O$: There is no significant difference in the value of transaction under the two periods

Ha_1: $U_A \neq U_B \neq O$: There is a significant difference in the value of transaction under the two periods.

Test Statistics

$$= \frac{X(A) - (X(B)}{\text{Standard Error of the difference between means (A) and (B)}}$$

$$= \frac{2,606.2800 - 11,122,4400}{1,996.3470}$$

$\therefore$ T-ratio (cal) = 4.27

Hypothesis Test

Pre-NACS	Post-NACS	
32.742.0800	53,030,1000	Mean
11,076,4775	5746.9961	Std. Dev
5	5	n

8 df

-8,516.1600 difference (PRE-NACS-POST-NACS)

9,963,503.1200 pooled variance

1,996.3470 standard error of difference

0.000	hypothesized difference
-4.27	t
0014	P-value (one-tailed)

Decision rule

Since t-cal > t-tab (2.896) at both 1% and 5A% levels significance respectively, we therefore, reject Ho and accept Ha to conclude that a significant difference exists between the value of transaction on bank clearing settlement for the two periods.

Discussion of Results

The results of the three hypotheses above have been quite revealing. All the three hypotheses tested significant even at 1% alpha level. It then follows that a high significant difference exists in the performance of the bank clearing and settlement system between the two periods.

For instance, both in terms of volume of cheques cleared, number of daily cheques cleared and the value of transactions encountered between the period before the introduction of the automated clearing system and the period after its introduction, there has been a consistent result. This leads to the conclusion that the introduction of the automated clearing and settlement system has in fact brought with it an enhanced performance in the general settlement system.

Summary and Conclusion

This study has been able to study the impact of central clearing and settlement system on the performance of the Nigerian financial payment system. It will be recalled that the policy makers/ monetary authorities have been at the forefront of implementing policies to promote the advancement of the payment and settlement system. At the hallmark of such policies is the introduction of the Nigerian automated clearing system, expected to reduce the number of days taken for instruments to be cleared and payments made. The need to therefore, investigate whether such introduction has actually improved payment delivery, formed our central problem in this study. Sequel to this, the following hypotheses were formulated and tested.

There is no significant difference in the volume of cheques cleared and settled during the periods before and after the introduction of the automated clearing system. There is no significant difference in the daily number of cheques cleared between the per-NACS and post-NACS periods.

Secondary data were mainly employed and sourced through the Central Bank of Nigeria (CBN) publications. The data analysis conducted with both the descriptive and inferential statistics revealed some interesting results. These include the following:

That a significant difference exists in the volume of cheques cleared between the pre-and post-NACS periods.

That significant differnce exists in the daily number of cheques cleared between the pre-and post-NACS periods. That a significant difference exists in the value of transactions between the pre-and post-NACS periods. The obvious implication of the results above is that the introduction of the automated clearing system has had a salutary effect on the general clearing and payment system. Following our findings, major conclusions are that:

There is a high and significant relationship between the automated cleared system and the general performance of the settlement and payment system. The introduction of the automated clearing system has brought positive impact on the general bank clearing and payment system.

Recommendation

On the strength of the above findings and conclusion, the study offers the following recommendations:

The use of automated clearing system should aim at further reduction of the current T-three to T-zero. With this in place, cheques once presented can be settled immediately to enhance the general performance in the system.

References

Adeniran M.O. (1999) Legal and Institutional Arrangements for Payment System ,*CBN, Bullion.*23; No. 2, '

Agene, C.E. (2000)a The Nigerian Payments System Evolution, Problems and Prospects, *Bullion, . CBN*,Vol. 23, No 2

Agene, C.H. (2000)b Electronic Banking in Nigeria. Concept, Policy Issues and Supervisory Framework, *Bullion CBN*,\/ol 24. No. 4.

Akpakpan, E.B. (I 998) Evolution, Problems and Prospects of Nigeria Payment System. *Bullion, CBN* Vol 23, No. 2

Akujuobi, L.E. (2006) *Corporate Finance,* Owerri: Springfield Publishers Ltd.

Alade, S.O. (2005) The New Settlement Framework The Journey so far *Bullion CBN*, Vol. 29, No. 1. Jan-March

Aminu, A, (2008) ``CBN Harmonizes Cheque Clearing Cycles http:allafrica.com/stories/printable/200804240217.html

Anyanwu, J.C. (2001) Concepts and Theoretical Framework of Nigeria Payment System *Bullion CBN* Vol 23, No. 2.

Ashinze, J.O. (2004) Payments System Development in the West African Monetary Z'one (WAMZ) Nature Challenges and Prospects *Bullion CBN* Vol. 28, No. 4,Oct-Dec. 2004.

Bank for International Settlement (2003) "The Role of Central Bank Money in Payment and Settlement Systems

Bank of Mauritius (2000)``A Real Time Gross Settlement Payment System for Mauritius'',*Mauritius Automated Clearing and Settlement System*

Baridam, D. M. (2003), Research Methods in Administrative Sciences Paragraphs.

Bruno-Britz M. (2008) Swift's Exceptions and Investigations Automation Push Lacks Widesspread Adoption'', *Bank Systems and Technology, http://www.banktech.com/showArticle.jhtml?articleID=210102155*

CBN (1990) Economic and Financial Review vol. 29, No 3

CBN Briefs (1998) The Nigerian Payment System Research Development.

CBN (1999) Annual Report and Statement of Accounts 3 I sy Dec, I 999

CBN (2001) CBN Briefs Series No 2001/2004. Annual Report and Accounts, Various Issues

CBN (2002) Annual report and Settlement of Accounts, 3 Ist Dec. 2002.

CBN (2002) economic Reports of Regional Research Units.

CBN Briefs (2002-2003) The Nigeria Payment System Research Development. CBN

CBN Briefs (2003) "The Nigeria Payment System'[1], CBN Briefs, Series No 2002/2003

CBN Briefs (2004) Annual report and Statement of Accounts, 31[s'] Dec. 2004.

Dozie, P. G. (1998) The Nigeria Payment System, The Role of the Banking Industry, Paper Presented at the Financial and Economic Correspondent and Editors Conference, Lagos.

Federal Financial Institutions Examination Council (2008) ``Automated Clearing House TransactionsOverview''.http://www.ffiec.gov/bsa_aml_infobase/pages_manual/OLM_059.htm.

Heifer, O. and Stum, A. (2003) "The Role of the Swiss National Bank in the Electronic Payment System" SNB 44 Quarterly *Bullion* I/. 2003.

MICR Technology in the Nigerian Industry (1999) "Legend: A Publication of the MICR Technical Implementation Committee. CBN, Lagos.

Microsoft (2006)``Namibian Banking Industry Cuts Cost of Holding Uncleared Funds with New System'' http://download.micrsoft.com/download/d/b/8/db841a11-5c68

Monetary Authority of Singapore (2008)``Payment & Settlement Systems in Singapore'',http://www.mas.gov.sg/fin_development/fin_sec/payment_system.

Nnannah O.J (1999) Policy Option for Improving the Efficiency of the Nigeria Payments System *CBN Bullion*, vol. April/June

Nnannah, O.J. and M. Ajayi (2005) An Overview of the Payments System in Nigeria Bullion Publication of CBN, vol. 29, No I, January/March

Nnannah, O.J. and M. Ajayi (2005) The Role of Payment System in Liquidity Management: CBN Perspective. Bullion CBN Vol 29, No. 1 , Jan-March.

Nwezeaku$_{y}$N.Q (2007) *Theories and Practice of Financial Management* Springfield Publishers Ltd

Nworuh,G.E.. (2001) *Fundamentals of Applied Quantitative Techniques for Management Decisions* Bon Associates-HRDC, Owerri.

Nzotta S.M. (2004) *Money Banking and Finance: Theory and Practice* Bon Publishers Owerri.

Odiaka C.O.(2004) The Role of Payment System in Liquidity Management A Paper Presented at the Banking Operations Department, December

Oduyemi, O.S. (1996) Prospects of the Payments settlement System in Nigeria, *Journal of the Chartered Institute of Bankers of Nigeria* Lagos

Ogwuma, P.A. (1995) "problems and Challenges of Developing and Efficient Payments System in Nigeria", *CBN Bullion*, vol. 19, No 3, July Sept

Ogwuma, P.A (1996) Problems and Challenges of Developing an Efficient Payment System *Bullion CBN* Vol. 21, No. 4.

Oluyemi, S.L (2001) Development of Electronic Banking in Nigeria: The Associated Risks and Implications, *NDIC Quarterly* Vol. I I, No.3/4.pp16-24

Osiegbu P.I. (2005*) Money, Banking* and Economy in Nigeria,PH, Harey Publication .

Ovia J (2001) The Nigeria Authorities Clearing System Imperative for cost Effective Implementation on the Financial System.

Ovia, J. (2005) Enhancing the Efficiency of the Nigeria Payments System *Bullion CBN*, VO!,. 26, No. I, Jan-March pp17-25

Sadq, M.A. (1999) Determination, Issuance, and Distribution of Currency in Nigeria, Bullion, vol .1 No 4.pp 8-16

Trade Online Project (2007) http://www.electronic-payments.co.uk/bacs.jsp

The European Parliamentary Financial Forum (2004) Payment Systems, efficiency and Fairness http://www.epfsf.org/meetings/2004/briefings/briefings

Singapore Monetary Authority of Singapore(2008) ``Payment & Settlement Systems in Singapore'' http://www.mas.gov.sg/fin_development/fin_sec/pament_system

Uduebo, M.N. (1995) The Central Bank and the Payments System, *Economic and financial Review*, vol. 3*, No. 4

Weiner, S 1 E (I999) Electronic Payment in the US Economy An Overview in Oluycmi, S A(2001), Development of Electronic Banking in Nigeria' the Associated Risks and Implications. *NDIC Quarterly*, vol I I, No 3/4 . ^

Zarma, A.B. (2001) Electronic and banking Practice lorm other Countries Associated Risks and Implications, NDIC Quarterly, vol I I, No V4, Sept-Dec