

# Inward and outward rtgs payment system finance essay



The inter-bank transactions form the major lump of the total value of transactions transacted throughout the globe. G-10 countries alone have turnover of transactions worth over US \$5 trillion each day, according to estimates. Globalization of the financial sector realized that it is necessary to have a new system which would reduce the systemic risks. There may be serious repercussions over the banking system even on the other side of the globe because of default by one entity in one part of the world. Many countries over the globe have started realizing the necessity for introduction of new systems to avoid such failures. With that vision the payment systems are becoming more robust by introducing RTGS in many countries around the world.

A country's payment infrastructure will typically include at least two building blocks, a bulk settlement system for high volume low-value retail-type payments and a expert system for high-value or critical interbank payments. Both systems are normally administered by the country's central bank, even though the actual operation of the bulk system is often delegated. The bulk settlement retail-type systems often work on a ' netting' basis where participants settle only the net differences in the total value of clearings between them. The high-value systems process each transaction in turn on an entity basis with the settlement of each transaction being for its full amount i. e. gross and not netted with other transactions. For preventing domino effects of individual defaults RTGS is critical to an effective risk control strategy.

In the context of internationalization of the finance sector, to manage risk better RTGS provides both the technology and process controls .

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## **2. Statement of problem**

The Net settlement system facilitates the participating banks to pay only the net difference of inward and Outward whereas RTGS facilitates the transactions solely. RTGS system settled 0. 72 million transactions in march 2008 where as 1. 94 million transaction in the month of march 2009. Customer transactions settled in RTGS presently are 89 percent of total RTGS transactions and are growing.

The study aimed to find the difference between inward and outward payments which is essential to find out the essential foreign exchange gained or lost for the Indian Economy. The research was done to identify the Co-integration between inward and outward payments. Thus it enables to enhance the quality level of predicting the Inward and Outward RTGS remittance of 120 banks for sustainable foreign exchange equilibrium development.

## **3. Objectives**

To study the inward and outward payment systems in the banks throughout India.

To find out the equilibrium the RTGS service charges by neutralizing input and output

payment system of different banks.

To predict the trend of inward and outward payments with the help of GARCH

Modeling.

To study the optimum level of Inward and Outward RTGS payments.

#### **4. Methodology**

The research was conducted by identifying the RTGS inward and outward payment values from the RBI database. The data was collected for 120 Banks. Unit Root test was employed for determining whether there is a linear trend in case of inward RTGS payment values. Based upon the result of Unit Root test 19 banks were selected for further analysis. To test the reliability of data of 19 banks, continuous assessments have been performed. Only 9 banks passed the test; their values only taken for the further analysis. To determine the behavioral pattern of Inward and Outward RTGS payments, Auto regressive Conditional Heteroskedasticity test was formulated. Two-way estimation is used to determine the relationship between inward and outward RTGS payments. SPSS and E-Views Software package is used for making statistical analysis.

#### **5. Period of study**

The Period of research extends from June 2008 to November 2009.

#### **6. Real Time Gross Settlement- Meaning**

RTGS is a centralized payment system in which, inter-bank payment transactions are done one by one and continuously (online) throughout the day, as and when the instructions are received and finally accepted by the system. The fast way of money transferring mechanism between the banks

is RTGS. The transactions are processed and settled in Real time and on Gross bases in RTGS. It is irreversible once if the transaction is settled.

The principle of an RTGS system is that the central bank processes and settles each payment on an order-by-order basis continuously throughout the period and in the sequence in which they are received. The settlement is final, and once the funds arrive in the receiving bank's

central bank account they can be made available to that bank's client. This security of payment and the speed of settlement are two of the reasons that encourage central banks to undertake costly implementations of computerized RTGS systems. One response to the growing awareness of the need for sound risk management is the development of the RTGS. It offers a powerful mechanism in the inter-bank settlement process for limiting settlement and systemic risks.

## **7. India's Initiatives on Payment System**

Reserve Bank of India (RBI) – in order to make the financial system more efficient, effective and secure, has undertaken a number of initiatives in the field of payment systems. The thought behind the initiatives is that payment systems will widen the participant base, improve the information base for all participants, generate greater transparency and encourage good market practices, introduce efficient settlement mechanisms build better infrastructure to facilitate faster transactions and lower their costs. To facilitate above objectives Real Time Gross Settlement System (RTGS), as a part of inter-bank fund transfer system, was introduced with a view to lower transaction costs by speedier settlement, among other considerations. The

inter-bank funds transfer system in India can be sorted into the Batch Mode (Net) and Real Time (Gross) System. In a Batch Mode, the transmission, processing and settlement is equipped for a set of transactions at a specific point of time and the disbursement on a pre-fixed interval of time i. e. at the end of the day. In the Real Time Gross System on the other side, the transmission, processing and settlement of instructions is done on an incessant basis. From March 26, 2004 the system of RTGS has been implemented in India. Now to be a part of the real time gross settlement system there are 120 scheduled commercial banks and primary dealers. For outward and inward RTGS payments, the participants are required to have a dedicated RTGS settlement account with RBI. This account will be an intra day account. At the beginning of day the account will be required to be funded from a current account held with RBI. Zeroing the RTGS settlement account is done by sweeping back the balance of this account in the end of the day.

## **8. Present Status of RTGS System**

The country in constructing an efficient and durable payment system infrastructure, RTGS covers 15000 branches. These branches altogether make about 7000 transactions, worth Rs 50, 000 crores spreading over 500 centres throughout the country. Even small towns in most of the states are sheltered under RTGS making it a National Payment System though the concentration is on top 25 major centres. The volume of RTGS transactions are swiftly increasing. RTGS settled 0.72 million transactions in the month of March 2008 where as 1.94 million transactions in March 2009. Customer

transactions settled in RTGS presently are 89 percent of total RTGS transactions and are growing.

## **9. Target of RTGS**

1. Reducing settlement risk due to settlement lag
2. Reducing credit risk
3. Speeding up the process of high value payments and
4. To provide accurate position of the participating bank.

## **10. Requirements of RTGS**

The simple conditions for availing this facility is as follows: —

1. The IFSC Code (4 Alpha+7numeric code) for the branch where the account is maintained.
2. Funds availability at clients account.
3. Name of the receiver and account number.
4. Name of the Bank of the receiving branch and branch code.

### **Exhibit 10. 1**

#### **Sample format of RTGS settlement within India**

In electronic payment systems it is mandatory that the account holder name must match exactly the name in bank records. In case of default the payment may refused.

## **11. Slap Limit and service availability for RTGS**

The RTGS system is for large value transactions. 1 lakh is the minimum amount to be paid through RTGS . As soon as funds are transferred by the bank the beneficiary branches are probable to obtain the funds under regular state of affairs. Within two hours of being paid the funds transfer message the beneficiary bank must credit the beneficiary's account. The RTGS service for customer's on weekdays is from 9. 00 to 16. 30 hours and from 9. 00 hours to 12. 30 hours on Saturdays for settlement at the reserve bank of india end.

### **Service Charges for RTGS transactions**

A broad framework has been mandated by RBI are as under

- a) Free, no charge to be levied on inward transactions
- b) For Rs. 1 lakh to Rs. 5 lakhs – not exceeding Rs. 25 per transaction on outward transactions.

For Rs. 5 lakhs and above not more than Rs. 50 per transaction for larger and outward transactions.

### **Types of Message Flow**

A payment message is dispatched by the sending bank, which is sent to the central bank and to the receiving bank as the system processes and settles the transfer to commence a funds transfer.



**a) V-shaped message flow**

**b) Y-shaped message flow**

**c) L-shaped message flow**

**d) T-Shaped message flow**

## **17. Case References**

### **17 . 1 RTGS Systems – Progress to Date and Future Growth**

The settlement of critical payments in the financial system in RTGS is ensured with specialized central bank application. Proliferation of such system is universal , given relatively small countries in our planet. The report examines the speed and the rate of the introduction of RTGS systems and technology to central banks. At the time of publication there were 174 central banks around the world. Starting in 1985 when only 3 central banks operated RTGS systems, the end of 2005 saw 90 central banks operating such systems. The remaining 84 banks are expected to have all introduced RTGS systems by about 2020. The article summarizes what RTGS is as well as the role of the G10 and the BIS in setting the standards and being the driving force in the move to RTGS adoption. Interlinked systems, such as TARGET (and also CLS to a lesser extent) have helped force the pace of change. The introduction period is exceptionally long, having taken 20 years to move from 3 central banks to 90 central banks and the anticipated additional 15 years to cover the remaining 84. The report finds that the spread of RTGS systems is consistent with the standard S-curve prediction (initially take-on is low led by “ innovators” after which the rate increases as “ early adapters” introduce the system after which the rate of increase levels out). The chance that a country introduces RTGS in a given year increases

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significantly in the level of real GDP per capita. Moreover, countries with a lower relative price of capital and countries whose major trading partners adopted RTGS are also more likely adopters. This suggests that, beyond market forces reflected by real GDP and capital costs, spillovers seem to play a significant role in the adoption of this financial innovation. These spillovers seem to be transferred mainly through trade relationships. To what extent the pattern of RTGS adoption reflects central banks' technology decisions is uncertain and is suggested as a source of further research. Other factors that are seen as determining when a central bank will switch to RTGS are:

Price of information & communications technology - The lower the relative cost the more likely the central bank is to switch to RTGS.

Relative size of the central bank - the more central bank staff in relation to the overall population, the slower the rate of switching to RTGS.

Financial market development - the more sophisticated/ developed the faster the pace of RTGS implementation.

Membership of international organizations - Membership if bodies such as BIS, EU force the rate of RTGS adoption.

Bilateral trade - the level of international trade also appears to be a positive factor especially if trading partners have RTGS systems.

From systems developer's point of view there is still a lot of life left in the central bank RTGS market. Added to this is the fact that many of the existing systems are going through a process of being upgraded. The original " 1st

Generation" RTGS system are being replaced with " 2nd Generation"  
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versions that include many new features with various degrees of hybridization as is illustrated in the Bundesbank's RTGSplus.[1]

## **17. 2 Crashing of servers affects RTGS across banks**

### **December 9, 2009**

The growing incidence of real time gross settlement (RTGS) servers hanging or crashing across banks has resulted in a delay in transactions, so much so that lenders have to complete these transactions on the next day. According to banking sources, RTGS systems have been hanging or crashing frequently, causing a delay for customers as well as bank employees. The reasons behind the servers hanging are the lack of connectivity between the Reserve Bank of India (RBI) and other banks, and bad networking between the servers of banks as well as the central bank. There are also problems related with leased lines, routers and modems while transmitting messages. Since RTGS requires all the concerned parties to work simultaneously, any minute error can cause problems with the systems. Further the RBI insists that deals are settled on the very same day, but at times these deals are being delayed due to server problems, and there is no assurance over the proper functioning of the system. The recent problems with the servers have been happening because the apex bank has installed a new software patch in the RTGS system. However, many bankers said that the problems have been around since the past few months. RTGS is a centralised payment system set up in 2004 by the RBI where , payment instructions settled continuously throughout the day, as and when the instructions are received and finally accepted by the system. As a funds transfer mechanism, it is the fastest possible transfer of money by the banking channel. The number of

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bank branches offering the RTGS service has increased from 43, 512 to 55, 000 during 2008-2009. The daily average volume of transactions is 90, 000 for about Rs1, 200 billion, of which 82, 000 transactions worth Rs980 billion pertained to customer transactions as of end-August 2009.[2]

### **13. ANALYSIS 1 – CORRELATION CO-EFFICIENT**

To find out the relationship between Inward and Outward RTGS Payment Systems Karl-Pearson Co-efficient of Correlation is used. Table 13. 1

**S. No.**

**Name of the Bank**

**Inward Volume Vs Inward Value**

**Inward Value Vs Outward Volume**

**Outward Volume Vs Outward Value**

1.

Bank of Maharashtra

0. 983680

-0. 598050

0. 999156

2.

Bank of Tokya Mitsubishi Ufj Limited

0. 960618

-0. 467649

0. 998306

3.

BNP Paribas

0. 887991

-0. 705531

0. 998241

4.

City Union Bank

0. 994491

-0. 654543

0. 998356

5.

Deutsche Bank Limited

0. 942486

-0. 540047

0. 999406

6.

Karnataka Bank

0. 992323

-0. 730649

0. 995049

7.

**Societe Generale Bank**

**0. 468171**

**0. 304441**

**0. 991549**

8.

South Indian Bank

0. 9995976

-0. 645639

0. 993140

9.

Yes Bank

0. 974884

-0. 616225

0. 999850

There is a significant relationship between Inward volume total and Inward Value

Total in all the 9 banks.

There is no significant relationship between Inward value total and Outward Volume total

in all the banks except Societe Generale Bank.

There is a significant relationship between Outward volume total and Outward value total in all the 9 banks.

## **14. ANALYSIS 2 – CO-INTEGRATION**

### **14. 1 Bank of Maharashtra**

The maximum log likelihood ratio by rank is -268. 8003 and the minimum log likelihood ratio by rank is -291. 8330. The maximum AIC ratio by rank is 36. 97913 and the minimum AIC ratio by rank is 35. 40030. The maximum Schwarz criteria ratio by rank is 37. 17288 and the minimum Schwarz criteria ratio by rank is 35. 97328

Interpretation: There is a Quadratic intercept trend for Inward and Outward RTGS payments in Bank of Maharashtra.

## **14. 2 Bank of Tokyo Mituubishi Ufj Limited**

The maximum log likelihood ratio by rank is -222. 9291 and the minimum log likelihood ratio by rank is -239. 7287. The maximum AIC ratio by rank is 30. 941494 and the minimum AIC ratio by rank is 29. 73303. The maximum Schwarz criteria ratio by rank is 31. 61795 and the minimum Schwarz criteria ratio by rank is 30. 26425

Interpretation: There is a Quadratic intercept trend for Inward and Outward RTGS payments in Bank of Tokyo Mituubishi Ufj.

## **14. 3 BNP Paribas**

The maximum log likelihood ratio by rank is -279. 5358 and the minimum log likelihood ratio by rank is -289. 3383. The maximum AIC ratio by rank is 37. 31116 and the minimum AIC ratio by rank is 36. 60491. The maximum Schwarz criteria ratio by rank is 37. 71456 and the minimum Schwarz criteria ratio by rank is 36. 86044

Interpretation: There is no Quadratic intercept trend for Inward and Outward RTGS payments in BNP Paribas.

## **14. 4 City Union bank**

The maximum log likelihood ratio by rank is -210. 9826 and the minimum log likelihood ratio by rank is -248. 9908. The maximum AIC ratio by rank is 31. 62385 and the minimum AIC ratio by rank is 28. 37282. The maximum Schwarz criteria ratio by rank is 31. 81699 and the minimum Schwarz criteria ratio by rank is 29. 1451



Interpretation: There is a Quadratic and Linear intercept trend for Inward and Outward RTGS payments in City Union Bank.

### **14. 5 Deutsche Bank Ltd**

The maximum log likelihood ratio by rank is -319. 2296 and the minimum log likelihood ratio by rank is -330. 7783. The maximum AIC ratio by rank is 42. 38984 and the minimum AIC ratio by rank is 41. 84728. The maximum Schwarz criteria ratio by rank is 43. 30707 and the minimum Schwarz criteria ratio by rank is 42. 04043

Interpretation: There is no Quadratic intercept trend for Inward and Outward RTGS payments in Deutsche Bank Limited.

### **14. 6 Karnataka Bank**

The maximum log likelihood ratio by rank is -249. 5544 and the minimum log likelihood ratio by rank is -264. 0993. The maximum AIC ratio by rank is 33. 67887 and the minimum AIC ratio by rank is 33. 01944. The maximum Schwarz criteria ratio by rank is 33. 78787 and the minimum Schwarz criteria ratio by rank is 33. 30916

Interpretation: There is no Quadratic intercept trend for Inward and Outward RTGS payments in Karnataka Bank.

### **14. 7 Societe Generale Bank**

The maximum log likelihood ratio by rank is -207. 6956 and the minimum log likelihood ratio by rank is -218. 2243. The maximum AIC ratio by rank is 28. 32672 and the minimum AIC ratio by rank is 27. 77803. The maximum

Schwarz criteria ratio by rank is 28. 90616 and the minimum Schwarz criteria ratio by rank is 27. 97118

Interpretation: There is no Quadratic intercept trend for Inward and Outward RTGS payments in Societe Generale..

## **14. 8 South Indian Bank**

The maximum log likelihood ratio by rank is -250. 3941 and the minimum log likelihood ratio by rank is -272. 8849. The maximum AIC ratio by rank is 34. 61061 and the minimum AIC ratio by rank is 32. 7905. The maximum Schwarz criteria ratio by rank is 34. 89165 and the minimum Schwarz criteria ratio by rank is 33. 55849.

Interpretation: There is no Quadratic intercept trend for Inward and Outward RTGS payments in South Indian Bank.

## **14. 9 Yes Bank**

The maximum log likelihood ratio by rank is -288. 3734 and the minimum log likelihood ratio by rank is -303. 6541. The maximum AIC ratio by rank is 38. 92720 and the minimum AIC ratio by rank is 37. 78175. The maximum Schwarz criteria ratio by rank is 39. 60321 and the minimum Schwarz criteria ratio by rank is 38. 31290.

Interpretation: There is no Quadratic intercept trend for Inward and Outward RTGS payments in Yes Bank.

Inward and Outward RTGS having Quadratic trend has been selected for further analysis. Based upon the Co-integration test the following banks are

selected. Yes Bank, City Union bank, Bank of Maharashtra, Bank of Tokoyo  
Mituubishi Ufj Limited

## **15. ANALYSIS 3 – Multiple Regression**

### **15. 1 Bank of Maharashtra**

The heteroskedasticity co-efficient among inward and Outward RTGS payments in Bank of Maharashtra is 10229. 38. The probability of estimation of Outward and Inward RTGS Payments using Garch modeling is 0. 195276.

### **15. 2 Bank of Tokyo Mitsubishi Ufj Limited**

The heteroskedasticity co-efficient among inward and Outward RTGS payments in Bank of Tokyo Mitsubishi Ufj Limited is 732. 0018.

### **15. 3 City Union Bank**

The heteroskedasticity co-efficient among inward and Outward RTGS payments in City Union Bank is 7570. 181. The probability of estimation of Outward and Inward RTGS Payments using Garch modeling is 0. 138434.

### **15. 4 Yes Bank**

The heteroskedasticity co-efficient among inward and Outward RTGS payments in Yes Bank is 12897. 34. The probability of estimation of Outward and Inward RTGS Payments using Garch modeling is 0. 602851.

## **16. ANALYSIS 4 – Two way Linear Estimation**

To find out the linearity among the inward and outward RTGS payment system two-way linear regression estimation was carried out with respect to City Union Bank data.

Since the heteroskedasticity between Inward and Outward RTGS payment is co-integrated in City Union Bank's payment network, it is selected to identify the linear trend.

## **Table 16. 1**

### **Two- way linear trend**

## **Table 16. 2**

### **ANOVA**

#### **16. 1 Null Hypothesis:**

There is no significant prediction of values among inward and outward RTGS payment values.

#### **16. 2 Alternative Hypothesis:**

There is significant prediction of values among inward and outward RTGS payment values.

The calculated F is 4094. 377 at degrees of Freedom 1, 16. Since the calculated value is higher than that of the table value, null hypothesis rejected. Hence it may conclude that the RTGS inward payment having more effect in Outward payments also.

## **18. Findings**

All the banks have a significant relationship between Inward volume total and Inward Value total and outward volume total and outward value total.

Only Societe Generale Bank has a significant relationship between Inward value total and Outward Volume total and Inward Value total and outward Value total.

No banks have a significant relationship between Inward Volume Total and Outward Volume total and Inward Volume total and Outward Value total.

There is a Quadratic Trend between Inward Value total and outward value total in case of banks like Bank of Maharashtra, Bank of Tokoyo Mituubishi Ufj Ltd, City Union bank and Yes Bank.

There is no Co- integration between inward and outward values in case of BNP Paribas, Deutsche Bank Ltd, Karnataka Bank, Societe Generale and South Indian Bank.

Inward Values are independent of Outward values.

Indians use foreign banks in India for making remittances in abroad.

City Union Bank is able to manage the inward and outward values in Equilibrium manner.

## **18. Conclusion**

The RTGS when it is introduced has been adapted by few banks and as a result those banks had more customers towards it. Later as many banks implemented the RTGS system the volumes of RTGS transactions spread across the banks. Due to competition among the banks , the trend of RTGS remittance per bank shows a decline trend. The heteroskedasticity of inward and outward remittances have to be neutralized. This can be achieved

because of improvement in telecom sector, online banking, EFT and mobile banking. If this continues, by 2015 the RTGS transactions can bring the inward and outward remittances in equilibrium level, which facilitates the growth of Indian economy. The RTGS system will pave the way for more inflow of foreign exchange to Indian economy. Based upon this the monetary policy can be estimated.