

ISSN No: 2278-8670

September 2012

Volume 1

Number 1

JOURNAL OF INTEGRATED RESEARCH & DEVELOPMENT

State Govt. College Teachers' Organization (West Bengal),
DL 70, Salt Lake,
Kolkata - 700 091.

Journal of Integrated Research & Development

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Editorial

It is our immense pleasure to inform that we have succeeded to publish the first issue of our academic journal "Journal of Integrated Research & Development" on 18th September, 2012. Our motto was to present an academic journal before the teachers and the scholars. The journal would be a referred journal bearing ISSN for the academic benefit of the teachers and the scholars. While discussing with many of my colleagues I came to know that there are some subjects which have a few or no referred journals for publication. Some of the subjects are such as Sanskrit, Linguistic, Urdu etc. The teacher and scholars cannot publish their papers or they are forced to publish in the journals bearing no ISSN. Our organization has consequently undertaken the responsibility (with the help of our esteem members) to publish this journal. The journal will not be confined to a particular discipline or subject. It will be a multilingual journal covering all the disciplines i.e. Science, Commerce, Humanities & Social Sciences, Engineering & Technology, Art & Culture, Management, Literature, Languages etc. Through a long struggle we have managed to bring out the first issue.

The first issue focuses on Business, Management and Economics related subjects due to availability of papers confined on those subjects in a very short period of time. The latter issues will cover all the subjects stated above. In the month of November 2012 we are going to organize a seminar on "Vivekananda's Thoughts on Education". We will also publish a special issue including the papers that are to be presented in that seminar.

Dr. Ram Pratap Sinha

Editor-in-Chief

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Sub Prime Crisis in US: Emergence, Impact and Lessons

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Abstract

The sub prime crisis in US is the result of excessive amounts of loans made to people who could not afford them and excessive amounts of money thrown into the mortgage arena by investors who were very eager for high return. The crisis represents the other side of a phase when a low rate of interest, rising home prices and mortgage securitization brought huge gains. A number of factors like legislations like Community Reinvestment Act, low rate of interest, mortgage brokers and lenders, rating agencies played their role in generating crisis. Three important dimensions of the sub prime saga relate to poor regulation of investment banks, relaxation in lending standards led by greed in a regime of unbridled competition and failure of the asset market to realize the dues from the defaulter. It once again brings home the fact that financial sector is distinctive in nature and can be exposed to unbridled and unregulated competition only at the cost of a complete peril.

JEL Code: E22, E32, E44, L58, G11, G12.

Keywords: Mortgage, Housing bubble, Sub-prime Crisis.

Introduction

Sub-prime crisis in U.S. is currently the hottest topic of discussion around the globe. It started as a financial crisis and quickly assumed the form of general economic crisis. Some termed it as the beginning of "the second great depression" because of the enormous dislocation it has created across continents. Such portents now appear to become a reality. As put aptly by Rakesh Mohan, "Even as every passing day unravels a little more of the underlying forces at work – the complex nature of the derivatives used; the high degree of leveraging on poor, light or even absent collateral; the underestimation of risk pervading financial markets; the surprisingly sizeable exposures of large financial institutions to some of the debt instruments and derivatives in question; and the speed of contagion." It is the resultant of a multiplicity of factors. It has serious implications for the global economy.

Plan of the study

The first section deals with the mortgage lending process in the US. Mortgage securitization and the Housing bubble are dealt with the second and third sections respectively. In the fourth section, we

discuss emergence of "unknown-unknown". Cost of securitization and responsibility of crisis are discussed in the next two sections. The following sections reveal how various entities indulged in 'Passing the buck'. The impact is studied in specific terms, as the overall impact and the effect on the global economy in the next three sections. Section XI and XII respectively explain the role of central banks all over the globe and the lessons drawn from the crisis. The final section contains the summary and conclusion.

I. The mortgage lending process in the US

In the residential mortgage business in the US, a homeowner, with the help of a real estate broker, selects a mortgage lender who gives the loan after checking the borrower's creditworthiness and the property that serves as collateral for the loan. After the loan is disbursed, most mortgage lenders resell these loans to investors or Wall Street firms, often through multiple intermediaries. Wall Street firms in turn bundle thousands of mortgage loans from different lenders into mortgage-backed securities (MBS). These institutions then slice these mortgages into residential mortgages backed securities (RMBS) or in other words, securities that are backed by collateral; the collateral here being the mortgages held by sub-prime borrowers. These mortgage-backed securities are, in turn, often sliced and diced into different structures, for example, a Collateralized Debt Obligation (CDO). Thus CDOs are pools of bond securities that are grouped together to help diversify risk. The different tranches of these structures are assigned a risk rating by the rating agencies such as Moody's, Standard & Poor's, and Fitch based on various parameters. They are subsequently sold by Wall Street firms to institutional investors worldwide – mutual funds, banks, hedge funds, central banks and pension funds.

The above discussion helps us to list the agents involved in the US housing mortgage market. This will help to identify those hit by the crisis.

- Homeowners • Real estate agents • Mortgage lenders • Wall Street firms
- Rating agencies • Investors

II. Mortgage securitisation creates multiple principal agent problems.

Securitization is viewed as bank "disintermediation". But actually it replaces one middleman by several. In the traditional model, there is only one middleman between the lender and the borrower, the bank. This however leads to emergence of a principal-agent problem at two levels: between the depositor and the bank on the one hand and between the bank and borrower on the other. In a mortgage securitization, the lender is supplanted by

- The mortgage broker • The loan originator • The servicer who collects payments
- The investor • The arranger • Rating agencies • Mortgage bond issuers.

Concept of sub prime lending

Subprime lending, also called B-paper, near-prime, or second chance lending, is the practice of making loans to borrowers who do not qualify for the best market interest rates because of their deficient credit history.

III. Housing bubble and sub-prime crisis.

A housing bubble is characterized by rapid increases in the valuations of real property such as housing until unsustainable levels are reached relative to incomes, price-to-rent ratios, and other economic indicators of affordability. The housing bubble (See Figure 1) was largely fed by the lowering of interest rates to record low levels to diminish the blow of the massive collapse of the bubble. Encouraged by the low interest regime and high liquidity, thanks to inflows from Asia and other economies, US banks started lending liberally for housing. Their credit to sub prime mortgages bloomed because of the low interest regime and hefty promotional campaigns. The sub prime crisis is the result of excessive amounts of loans made to people who could not afford them and excessive amounts of money thrown into the mortgage arena by investors who were very eager for high-yielding investments. It fed the real estate mania, the real estate bubble in many parts of the country. The bubble prices in the US housing market were caused by:

- Lax lending standards.
- Low treasury rates on adjustable rate mortgages.
- Speculative behavior by consumers.

Interest paid on residential mortgages in the US is linked to US Federal Reserve Fed Funds Rates. Between 2004 and 2006, because of incipient inflation in the US economy, the Fed increased its Fed fund rate¹ from 1% all that way to 5.25% and the discount rate² from 2% to 6.25%. Because of this, holders of residential mortgages saw their payments on their house loans rise. This rise in rates was a disaster in the making for banks that gave loans to sub prime borrowers. Defaults on sub-prime mortgages turned out more than expected, with approximately 17 per cent of loans defaulting so far. When faced with higher mortgage payments, they fell behind their payments and in cases, some become delinquent and banks started repossessing their houses. However, problems cropped up for the same reasons leading to mortgage closure when banks attempted to sell these houses. Because of higher interest rates, people became more cautious in borrowing to buy houses and there occurred a general slowdown in demand in the housing market. This led to banks holding assets that people were not just willing to buy. Rise in supply of mortgaged houses couple with no demand for them led to plummeting of price in real estate sector. This trend was visible in the period May 2006 to April 2007 (See Figure 2 and Table 1 below). The most dramatic fall in price was just in one month, from March 2007 to April 2007 when the prices declined by over \$ 25000 in just one month. Prior to this in the preceding 87 months the growth in prices was an alarming 0.56 percent per month! (See Table 2). It is about 13 percent annually. In the last month the fall equals the rise in one year!

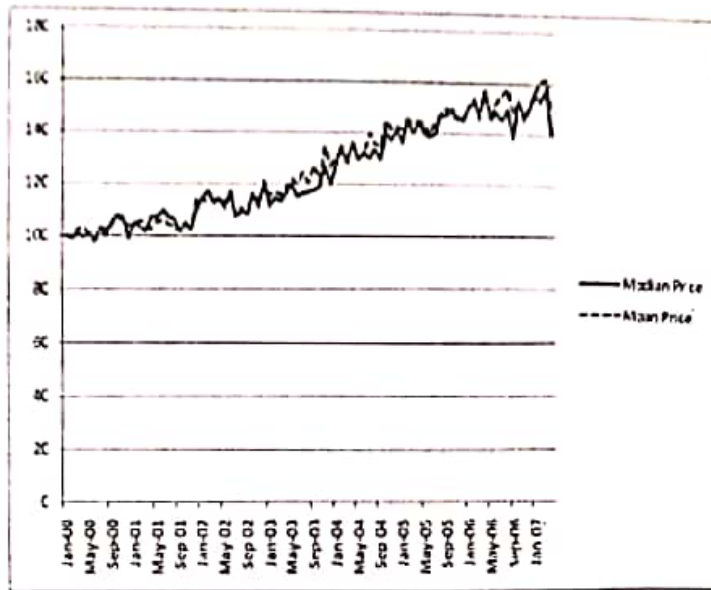


Figure 1: Housing Prices in USA

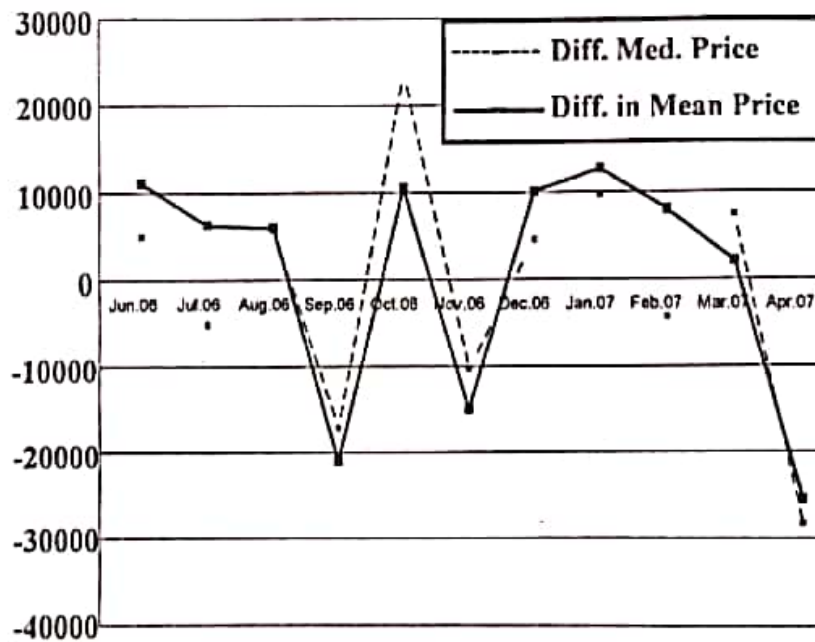


Figure 2: Change in Housing Prices in USA

Table 1: Housing Prices in USA

Housing Prices in USA				
	Median Price	Mean Price	Diff. Med. Price	Diff. in Mean Price
May.06	238200	293900		
Jun.06	243200	305000	5000	11100
Jul.06	238100	311300	-5100	6300
Aug.06	243900	317300	5800	6000
Sep.06	226700	296200	-17200	-21100
Oct.06	250400	306800	23700	10600
Nov.06	240100	291800	-10300	-15000
Dec.06	244700	301900	4600	10100
Jan.07	254400	314600	9700	12700
Feb.07	250100	322600	-4300	8000
Mar.07	257600	324700	7500	2100
Apr.07	229100	299100	-28500	-25600

Table 2: Growth rate of Housing Prices in USA

SUMMARY OUTPUT					
Regression Statistics					
Multiple R	0.968351352				
R Square	0.937704341				
Adj.R Square	0.936971451				
Std.Error	0.036795352				
Observations	87				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1.732259658	1.73226	1279.461	5.17661E-53
Residual	85	0.115081325	0.001354		
Total	86	1.847340983			
	Coefficients	Standard Error	t-stat	P-value	
Intercept	11.96471601	0.00795826	1503.434	7.6E-190	
Time	0.005618843	0.000157085	35.76955	5.18E-53	

This created a vicious circle when subprime loan payers defaulted on their obligation, leaving foreclosure of their mortgages as the only perceived recourse for investors in the loan. When other homeowners with mortgages also attempt to meet their financial obligations, some of them put their homes up for sale, which drags down the price of other houses in their neighborhood, not merely those houses with subprime mortgages. People who held riskiest debt got paid the highest when the going was good and they got hit first times were bad.

IV. Emergence of "unknown unknown"

Any CDO manager, primarily new CDO managers with light staffing, very little technology and unbalanced capability, was able to get a CDO done. Actively managed CDOs are blind pools, in which a manager buys various debt instruments, which can be tranches of other asset backed securities, including pieces of other CDOs. Once the money committed has been invested, the manager trades it actively. And like regular CDOs, it is tranced into risk pools. The net result is two fold.

- one does not have an idea what he owns.
- no one knows which firms have exposure to sub-prime or the amounts involved

This is a situation that may be called the "unknown unknown". The wall Street Journal expressed its apprehensions about CDOs because it's not entirely clear how much is in bonds backed by risky subprime mortgages versus bonds backed by safer corporate debt. But the prospectus notes holdings of bonds backed by subprime debt as a "risk factor" that would need to be weighed by investors.

V. Costs of securitization became apparent.

It is argued that the transaction costs of CDOs are high and the benefits are questionable. CDOs are being used to transform existing debt instruments that are accurately priced into new ones that are overvalued. The more eclectic CDOs bind together the fate of assets which have few real economic links. For example, a lowly rated energy bond and top notch bank paper may be in the same structure. Separately, they would not move in tandem. If they are put in CDO, they fall together in a credit squeeze, by virtue of being in the same structure, as investors rush to exit or seek to hedge their risk.

Investors seeking to redress have encountered unforeseen problem. Securitizations are generally structured as true sales: the seller wipes its hands off the risk. In practice buyers have some protection. Many contracts allow them to hand back loan pools that sour surprisingly quickly. Some have done just this with the most rancid sup prime mortgages, requesting an injection of better-quality loans into the pool. But there were so many bad loans that originators could not oblige. The effective secondary market punishment mechanism turned out to be faulty when the problems grow beyond a certain size.

VI. Who were responsible for the crisis?

The crisis is the result of excessive amounts of loans made to people who could not afford them and excessive amounts of money thrown into the mortgage arena by investors who were very eager for high-yielding investments. However, apart from mere borrowers, lenders and investors, a number of agents have played their role in generating the crisis.

Government policy: Some observers claim that government policy actually encouraged the development of the subprime debacle through legislation like the Community Reinvestment Act.

Fed's policy of reducing the rate of interest: This was done to contain the adverse impact of dot com boom.

The borrowers: Many borrowers bought a home they could not afford but hoped that prices would

continue to rise and that they could re-sell their homes for a profit, sometime in the future. Unfortunately, prices went in the wrong direction.

Mortgage brokers: They have been blamed with steering borrowers to unaffordable loans, appraisers with inflating housing values. They were more interested in their commission.

The mortgage lenders/ the loan originator: High fixed costs of the loan originator platform motivated the mortgage lenders to generate as many loans as they could and then sell them quick³. In order to compete with other mortgage lenders, they relaxed lending standards. The most notorious example of this laxity -- the so-called NINJA loans i.e., loans to borrowers with No Income, No Job or Assets.

Poor regulation and Investment banks: In the last few years, SEC in US (counterpart of SEBI) removes the ceiling of 12 times capital placed on the borrowing limits of investment banks. This resulted in a borrowing spree by investment banks⁴. With money

easily available from banks, they bought individual home loan mortgages from banks, consolidated them into big packages and chop these into smaller pieces that serve as collateral for the issuance of tradable mortgage-backed securities. Investment banks backed subprime mortgage securities without verifying the strength of the underlying loans. Many of these structured securities are too complex and opaque. After being highly rated by credit rating agencies these instruments were sold to various institutional investors like hedge funds, pension funds, mutual funds and banks in all parts of the globe including Europe and Asia. When the loans turned sour, commercial banks that sold them realized that they were also affected, as many of the holders of sub-prime loans had in turn raised money from banks. The cycle was completed.

The rating agencies: The rating agencies, which were supposedly evaluating the risk of the securities structured by Wall Street, were making millions of dollars in fees from Wall Street's mortgage desks. The rating agencies appear to have been too free in giving out prized AAA badges for structured products, especially CDOs. This is partly because their models were faulty and partly because the appraiser is paid by the seller instead by the buyer. The rating agencies were beguiled by the low default rate of sub-prime loans which was partly due to rising house prices making refinance of loans possible.

VII. Passing the buck

For all its flaws, the old bank model resolved the incentive in a simple way. Loans were kept in-house, banks had to underwrite cautiously and also to keep a tab on the borrower after the money is disbursed to the borrower. Lax rating by the rating agencies made it easier for the banks securitizing and further repackaging debt to create the greatest number of securities with lowest regulatory cost (that is highest rating). Securitization has allowed banks which are regulated holders of credit risk to unregulated traders of credit risk with smaller balance sheet. As a result, although the risk of bank runs as faced by the holder of such securities was shifted to the banking system at large because other banks have bought the security. It could also have been bought by other hedge funds. So a bank can push risk out of the front door, only to find it sneaking through the back.

While financial innovations spread risk from lenders to the investor and the markets, it distanced the borrower from the ultimate provider of funds-the Wall Street firms and the hedge funds. Hence, while the ultimate holder of the risk, the investor, has more reason to be careful but owns a complex product too far

down the chain for monitoring to work. The risk was great but so was the return. The expansion of US housing loans would not have been so disastrous if it were not fed mostly investors from Wall Street firms buying securitization bonds-made up of sub prime loan assets. Attracted by the higher returns on sub-prime loans, they relied in the rating of these by rating agencies. Given the rating agencies' laxity and investors' complacency, Wall Street kept pushing the envelope while structuring the mortgage- backed derivatives.

VIII. Devastating impact of the crisis

Since 2000, the market for MBS has overtaken even those for US treasury notes and bonds. This led to a broad-based and devastating impact of the crisis. It is hard to overstate the extent of this reversal in fortunes, if only because it is hard to overstate the effect that securitization has on financial markets.

Homeowners: A vicious circle was created when subprime loan payers defaulted on their obligation, leaving foreclosure of their mortgages as the only perceived recourse for investors in the loan. When other homeowners with mortgages also attempt to meet their financial obligations, some of them put their homes up for sale, which drags down the price of other houses in their neighborhood, not merely those houses with subprime mortgages. Thus the entire real sector was involved. Sales of previously owned homes fell in September to annual rate of 5.04 million, the lowest since the records began in

1999, the National Association of Realtors said. Housing starts fell to a 14 year low. **Investors:** These defaults will lead to huge losses for investors, with predictions in the range of \$200 billion or more just from sub-prime mortgage investments. The losses from so-called "contagion" effects are likely to be much larger.

Mortgage lenders: Mortgage lenders are seeing their lines of credit dry up and Wall Street is unwilling to buy any mortgage loans because of the liquidity crunch. Hundreds of mortgage lenders have shut down and more than 50,000 people have lost their jobs in

2007 alone. The situation is likely to worsen with smaller and mid-size lenders closing shop or forced to sell out.

Homebuilders & real estate brokers: Both these groups are also trying to deal with the perfect storm. Many homebuilders will shut down and thousands of real estate brokers will go out of business.

Wall Street firms: Wall Street firms, who issued and underwrote many of the mortgage- backed securities and structured vehicles (such as CDOs) that were sold to investors worldwide, have suffered huge losses on their holdings and business has come to a standstill. In addition, all banks have suffered losses in other markets from the "contagion", which will likely continue.

IX. Overall impact

We can see how complex and interrelated the US economy was and how various undercurrents worked towards the final debacle. The impact of the crisis transcended the US economy and sent ripples across the globe.

Liquidity Crisis: The credit markets, along with most other markets, have experienced a liquidity crisis as an aftermath of sub-prime crisis. It induced a period in which most securities have simply ceased to trade. High grade securities traded like junk bonds as panicked investors dump them. This liquidity crisis has caused bids to disappear from the market and makes it virtually impossible to properly price securities or to trade them because it became harder to determine whom it is safe to do business with. In the atmosphere of acute uncertainty, where no one knows which firms have exposure to sub- prime or the

amounts involved, banks decided to stop lending -- not just housing debt but other forms of debt as well. This led to the liquidity crunch in August, 2007 which in turn hit the markets worldwide.

Solvency crisis: Thus the gravest and most immediate threat to the banking system arose. For the time being banks no longer trusted potential debtors enough so as to lend them money except on onerous terms. They also lacked the confidence that other banks would will trust them if they wanted to borrow from them. This led to a hoarding of money. At best, it tightens monetary policy. At its worst, it creates a shortage of cash which would cripple the payment system causing a run on otherwise solvent banks and businesses that can not rapidly raise funds. The outcome is similar to a bank run, which engulfed the entire wholesale money market. The status of liquidity in various money and credit markets in US can be gauged from the fact that three-month Eurodollar loans carried an interest tag about 247 basis points more than the yield on three month Treasury Bill (safe yield) in later part of September, 2007. The spread between these short term securities reflects the risk in lending to banks, which in months before August, 2007 was 50 basis points.

Crash in stock price and dollar turmoil: The US housing bubble, resulted in a severe credit crunch, threatening the solvency of a number of marginal private banks and other institutions. The sharp rise in foreclosures after the housing bubble caused several major subprime mortgage lenders, to shut down or file for bankruptcy leading to shortage of investible funds for the US stock markets and consequent collapse of stock prices for many in the subprime mortgage industry, and of some large lenders. The funds crunch, in turn, led to a vicious cycle. Redemption pressures led to further suction of funds and stock market fall. Overall, sub prime crisis has a disastrous effect on global stock markets. On July 19, 2007 the Dow-Jones closed above 14,000 for the first time. By August 15, the Dow had dropped below 13,000 and the S&P 500 had crossed into negative territory year-to-date. Similar drops occurred in virtually every market in the world, with Brazil and Korea being hard-hit. The dollar dropped to its lowest level since 1996 according to a Fed index after the second rate cut by Fed.

Impact on labor market:

On September 7, 2007, a report by the US Labor Department announced that non-farm payrolls fell by 4,000 in August 2007, the first month of negative job growth since August 2003. The number fell well short of expectations, as analysts were expecting payrolls to grow by 110,000. The Dow Jones Industrials fell by as much as 180 points on the news. The problems in the housing and credit markets are cited as a reason for the unexpected weakness in the job market.

X. Global fall out of the US crisis

The controversy surrounding subprime lending has expanded as the result of an ongoing lending and credit crisis both in the subprime industry, and in the greater financial markets which began in the United States. This phenomenon has been described as a financial contagion which has led to a restriction on the availability of credit in world financial markets. Hundreds of thousands of borrowers have been forced to default and several major American subprime lenders have filed for bankruptcy. So far, in 2007 itself losses have been reported from France, Germany, China, Australia, Japan and England in addition to the US. In September 2007 Northern Rock, the UK's fifth largest mortgage provider, had to seek emergency funding from the Bank of England, the UK's central bank as a result of problems in international credit markets attributed to the sub-prime lending crisis.

XI. Role of world central banks in stabilization

Other central banks around the world had to launch coordinated efforts of their own to increase liquidity in their own currencies to stabilize foreign exchange rates (thus stemming a further fall in the American dollar and diminishing any incentive to sell them off) and prevent the probable significant global consequences a run on the American dollar would cause. It marks the first time the American, European, and Japanese central banks have taken such actions together since the aftermath of the September 11, 2001 terrorist attacks.

XII. Lessons from the crisis.

1) Asset market failure: Asset market may fail to recover the dues in case of failed lending. This is true even when the asset is a real estate. Poor lending constitutes the core of sub prime crisis. In the literature, the issue of lending is commonly viewed as a principal-agent problem. There are three aspects of principal agent problem: adverse selection, moral hazard and monitoring. The first and the third aspects are related to the lender and second to the borrower. As for the role of the bank, it should try its best to select its customers judiciously after appropriate screening and this should be followed by a rigorous monitoring because bank will hold this asset on its balance sheet, till it returns duly with interest. One may be tempted to think that adverse selection is not a very big problem, when the bankruptcy procedure is efficient, so that the collateral may enforced with any problem. The need to monitor was considered redundant in a securitized regime, as there was an implicit faith in the ability of the collateral to recover the money lent. There was an implicit assumption that if the borrower in the credit market can not pay back, it may not be of any significance, when asset markets are functioning. However, it is already pointed out in the literature that the collateral may be a risky asset whose value may fluctuate⁵. The sub prime crisis demonstrated that relying on the asset market for realization of dues was counter productive, even when the asset was as solid as a real estate.

If the price of the collateral prevailing in the market happens to be low when the asset is sold, then the seller will not be able to recover his dues through selling. However, a very peculiar scenario was observed during the sub prime crisis where the same factor which leads to defaults is also forcing the prices of real estate to drop. This variable is rate of interest fixed by Fed, which is a policy variable. Such a variable is found to influence both aspects: demand and supply of real estate. Let us go through the chain of events. A rise in the interest rate caused defaults in sub-prime category. Faced with this, the investors who bought the securitized instruments attempted to sell them in the market. However, every rise in the rate of interest is also simultaneously leading to drying of demand through a rise in mortgage payments. Thus rise in the rate of interest led leading to widening of the gap between supply and demand and pushed below the price of collateral creating a vicious cycle from which no escape is apparently in sight. This has demolished the myth that real estate is considered a solid security. A bitter lesson emerging out of the crisis is that market of asset does not provide any respite in case of failed lending.

2) New model of bank with modern principles of finance is not sustainable: Unwillingness of the mortgage banks to asses the risk profiles of the borrowers and lend on the basis of risk in a regime of low interest rate made financial system very fragile. Many lenders had to relax their credit norms due to competition. In addition, given that most mortgage lenders in the US sell their loans within a month or two, their

primary motivation was to generate as many loans as they could and then sell them quick. This was yet another reason they lacked strong incentives for credit checks. It vindicates the old model of banks which provides loan and keeps it on its books till it matures.

3) There should be more transparency about the structured products: One reason behind market failure relates to information asymmetry. It is argued that sellers have more information than buyers about what they are selling. In the sub prime episode, investors increasingly did not know what they were buying and what the security is worth. The problem with the complex securities is that they do not trade at all and so market prices are rarely available. The following steps are necessary to ensure more transparency about the structured products.

- Consistent valuation of such assets across firms to be ensured by the regulator
- Dissemination of information on the vehicles that issue asset-backed commercial paper and price and performance of privately traded asset-backed instruments.
- Greater standardization of structured products

4) Disciplining the rating agencies: Investment bank pays the rating agencies to rate CDO securities. Investment banks and rating agencies work closely in structuring the transactions. Rating agency staff crosses over to "dark side" to work for investment banks. One option is for the government itself to regulate rating agencies.

5) Addressing the problem of fragmented responsibility:

Fixing the problem of fragmented responsibility will be a balancing act. It may be argued that subprime default rates would not have spiked if loan originators had been forced to set aside capital to cover, say, 10% of each securitized pool. But framing the terms of this sort of co-insurance would be tricky.

XIII. Summary and Conclusion

The remodeled financial system has made credit available to more people. This led to higher asset prices, increased value of collateral and loans that appeared to be safer. However, this benign cycle was dramatically reversed. The roots of crisis were sown during the fall in the rate of interest, engineered to contain the adverse impact of the dot com crisis. However, the housing boom went beyond what can be justified by its fundamentals and was driven by speculation. With the rise in the interest rate, the mortgage payments rose and defaults among the sub-prime category of borrowers increased accordingly. When attempts were made to recover dues, it was realized that there were very few buyers of the mortgaged property due to increased mortgage costs. A recession developed in the housing sector and consequently it was transmitted to the entire US economy through securitization of mortgage payments. The collapse of the U.S. Housing Bubble had a direct impact not only on home valuations, but also on the nation's mortgage markets, home builders, home supply retail outlets, and Wall Street hedge funds held by large institutional investors. This led to the emergence of a nationwide recession. This created an unprecedented situation characterized by credit crunch, insolvency, crash in stock price and fall in price of dollar. While some observers are comparing it with Great Depression in its impact, it is clear that the fundamental nature of the crisis is different because the recession in the real sector has been created by instability in financial sector. It is the failure of the response of the financial sector in the form of

financial innovation in the garb of derivatives, which failed to contain risks of lending. Fed had been attempting to counteract the recessionary tendency through a rate cut. However, in a situation in which one does not know, who is affected and by how much, the efficacy of the monetary policy pursued by Fed becomes questionable. Securitization was a revolution that brought huge gains. The transformation of sticky debt into something more tradable, for all its imperfections, has forged hugely beneficial links between individual borrowers and vast capital markets that were previously out of reach. However, the costs of securitizations became apparent later. As it comes under scrutiny, the debate should be about how this system can be improved, not dismantled. The challenge before the Fed and other central bankers is to control and regulate securitization without hurting the beneficial outcomes of increased flexibility, which securitization reportedly provides. Lastly, a debate is on whether central bankers may have themselves been responsible for the problems that led to sub-prime mess in the first instance and whether their subsequent actions are over compensating. The debacle has been a testing ground for central bankers of the world and will have a profound impact on the conduct of macroeconomic policy.

Notes:

- ¹ The overnight rate at which banks lend to each other in the US.
- ² The rate at which Fed lends to banks.
- ³ Most mortgage lenders in the US sell their loans within a month or two.
- ⁴ Bear Stern and Lehman Brothers had a leverage of over 30.
- ⁵ Biswas, P. K. and Deb, A.T. (2004)

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Taxation of Inter-State Transactions of Goods and Services: From CST to IGST

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Abstract

Kelkar's Task Force Report (2004) had recommended introduction of Goods and Services Tax (GST) replacing domestic indirect taxes in India. It is a challenge to implement GST in a federal country like India. Currently, Central Sales Tax (CST) is levied by states on inter-State sales of goods. The Empowered Committee has recommended implementation of Integrated-GST (IGST) for taxation of inter-State transactions of goods and services. It has been decided to phase-out the CST in stages. So, the CST rate was reduced from 4% to 3% with effect from 1st April, 2007 and again it was reduced to 2% in the year 2008. This paper has analysed the relative importance of CST in different states and it has also examined the impact of cut in the tax rates on CST revenue. The paper has also discussed issues relating to implementation of IGST in a country like India.

Key words: Central Sales Tax, Goods and Services Tax, Value Added Tax

Introduction

It is a challenge to harmonise implementation of Goods and Services Tax (GST) in a country like India due to its federal structure. GST is essentially a Value Added Tax (VAT) on goods and services with 'continuous chain of set-off benefits from producer's point and service provider's point upto the retailer's level'¹. It is proposed that GST would consist of two components, CGST (levied by the Centre) and SGST (levied by the States). Both CGST and SGST will be levied on the same tax base. Most of the Central and State indirect taxes will be subsumed under CGST and SGST respectively. There will be two-rate structure- a lower rate for necessary items and goods of basic importance and a standard rate for goods in general². Input taxes paid against CGST will be allowed to be taken as input tax credit (ITC) against the output tax on CGST. The same principle will be applicable for SGST. Cross-utilization of ITC will not be allowed except in the case of inter-state transactions of goods and services.

The Empowered Committee of State Finance Ministers has recommended implementation of Integrated-GST (IGST) for taxation of inter-State transactions of taxable goods and services. Currently, Central Sales Tax (CST) is levied by States on inter-State sales of goods at the rate decided by the Central Government. CST is an origin-based tax since it is payable in the State from which movement of goods commences (i.e. producing or exporting States). CST cannot be given as set-off by the destination States since tax revenue accrues to the origin States. So it causes tax cascading which results in escalation of prices. CST is therefore, incompatible with the system of VAT where a seller can claim set-off not only for input tax paid but also for tax paid on previous purchases while selling his output. It has therefore, been decided that CST will be replaced by IGST with the implementation of GST in India. Centre would levy IGST on all inter-State transactions of taxable goods and services with appropriate provision for consignment or stock transfer of goods and services. The rate of the IGST would be equal to the aggregate of the CGST and the SGST rates. The inter-State seller will pay IGST on value addition after adjusting available credit of IGST, CGST and SGST on his purchases. The exporting State will transfer to the Centre the credit of SGST used in payment of IGST. The importing dealer

will claim credit of IGST while discharging his output tax liability in his own State. The Centre will transfer to the importing or consuming State the credit of IGST used in payment of SGST. It was proposed to set up a Clearing Agency to verify the claims and inform the respective governments to transfer the funds. So IGST, a consumption or destination-based tax would replace CST, which is an origin-based tax. IGST will be free from any cascading effect as it would ensure seamless trade where producers as well as service providers will be entitled to a continuous chain of set-off benefits.

It was agreed by the Central Government and Empowered Committee of States to phase out the CST in stages. Accordingly, the CST rate was reduced from 4% to 3% with effect from 1st, April 2007. The CST rate was again reduced to 2% in the year 2008. It was also decided to compensate the States for the resultant revenue losses. The amount of revenue generated from levy of CST was about Rs.23,000 crores for the year 2009-10, so some States are not in favour of removal of CST. In this context, it would be interesting to analyse the relative importance of CST in different States and also to examine the impact of successive cuts in the tax rates on CST revenue.

Relative Importance of CST

This analysis is carried out on the basis of State-wise data collected from www.indiastat.com and *State Finances* published by the Reserve Bank of India.

The correlation coefficient between per capita Gross State Domestic Product (GSDP) and per capita CST for general category States is found to be 0.64 and rank correlation is 0.76 for the year 2006-07. It can be observed from Table 1 in Appendix that five States namely, Maharashtra, Tamil Nadu, Gujarat, Haryana and Karnataka account for about 55% of CST revenue of all States. Five high-income States with a population share of 19% and GSDP share of 31% generate 36% of total CST revenue. On the other side, seven low income States with a population share of 44% and GSDP share of 27% account for 22% of CST revenue. The movement of goods largely takes place from richer States to poorer States. Richer producing States collect CST revenues from the people of poorer consuming States. The system of origin-based taxation has created the problem of tax exportation from richer States to poorer States³.

Impact of cut in the CST rate

The process of phasing out of CST was initiated with a cut in the tax rate by 1% in 2007-08 and again in 2008-09. The impact of cut in tax rates on the change in CST revenue of general category States is shown in Table 2. It can be observed that CST revenue declined in most of the States during this period. Only one State i.e. Uttar Pradesh experienced an increase in CST revenue in both the years. It may be recalled that Uttar Pradesh implemented VAT on 1st January, 2008 whereas most of the States launched VAT on 1st April, 2005. The tax rates in the States which had implemented VAT were 4% on items of basic necessities and a standard rate of 12.5% on the remaining goods⁴. This might have prompted the dealers in VAT – States to import goods from Uttar Pradesh for which Sales taxes rates were lower than the VAT – rates.

Tables 3 shows that the contribution of CST in sales tax revenue was quite substantial for States like Jharkhand, Haryana and Chhattisgarh during 2006-09. Low income States like Jharkhand and Chhattisgarh generated CST revenue primarily from inter-State sales of coal, iron and other minerals which are used as intermediate goods in the industrial sector. Haryana collected CST revenue primarily from inter-state sales of

agricultural products. The share of CST in the Sales tax revenue is the lowest in Bihar. All States barring Uttar Pradesh experienced a decline in the share of CST in the Sales tax revenue between 2006-07 and 2008-09.

Implementation of IGST replacing CST may not be beneficial for low income States like Jharkhand and Chhattisgarh. However, another poor State Bihar is likely to benefit as revenue will accrue to consuming or destination States once IGST is implemented.

Conclusion

IGST is a destination-based consumption-type tax on inter-State transactions of taxable goods and services, so it is free from the drawbacks of CST such as tax cascading and tax exporting. It would maintain an uninterrupted input tax credit chain on inter-State transactions across the country. Importing or consuming States would benefit from transfer of funds from the Centre as importing dealer would use his IGST credit for the payment of SGST. However, IGST may not be beneficial for low income States such as Jharkhand and Chhattisgarh although it is a destination-based tax. All states except Uttar Pradesh suffered revenue losses due to cut in the tax rate by 1% in two consecutive years. States are therefore, demanding more compensation from the central Government because of revenue losses. They are also clamouring for a hike in the CST rate to the original level of 4% till GST is implemented⁵.

It seems that implementation of IGST is fraught with a number of challenges. There may be laxity on the part of exporting States to transfer SGST credit utilized for payment of IGST to the Centre⁶. Consequently, transfer of IGST credit funds used in payment of SGST in destination States may also get delayed. IGST model presupposes a very high level of information exchange between all States and the Centre. The Clearing Agency should be well-equipped to match enormous data regarding IGST paid by sellers and IGST claimed by purchasers on monthly basis. All States, the Centre and the Clearing Agency should be able to monitor inter-State transactions of taxable goods and services with the help of Information and Communication Technology (ICT). But, the process of computerization of tax administration is at rudimentary level in some States. It has been decided to set up a special purpose vehicle (SPV) to erect the information technology platform for GST⁷. Unless a proper ICT network connecting all stakeholders is created it would not be wise to implement IGST.

Notes

1. *First Discussion Paper on Goods and Services Tax in India*, The Empowered Committee of State Finance Ministers, New Delhi, November 10, 2009.
2. The proposal is to implement a lower rate for goods at 6% and a standard rate at 10% in the first year of its implementation. Services will be taxed at 8%. Both lower rate and the standard rate on goods will be adjusted over a period of two years in order to achieve a single CGST rate of 8% for goods and services in the third year of implementation of dual.GST. Source: 'Centre Agrees to Dual Rate under Goods and Services Tax', *Business Line*, Mumbai July 23, 2010.
3. See Rao, M.G. (2003) 'Reform of Central Sales Tax in the Context of VAT', *Economic and Political Weekly*, February 15-21, Vol.38, No.7.
4. Many States increased the tax rate on basic necessities to 5% from 4% later. The standard VAT rate varies from 13.5% to 15% in different States.
5. 'States Seek Fair Compensation for Central Sales Tax Phase-Out', *Business Line*, July 12, 2012.
6. See Rao, M.G. (2009) 'Goods and Services Tax : Some Progress Towards Clarity', *Economic and Political Weekly*, December 19, Vol.44, No.51.

7. 'Centre, States agree on new Platform for GST', *Business Standard*, July 22, 2010.

Appendix:

Table 1 : Statewise Distribution of Population, GSDP and CST Revenue (2006-07)

States	Population Share (%)	GSDP Share (%)	CST Share (%)
GCS			
HIS	18.99	30.63	35.91
Goa	0.13	0.43	0.34
Haryana	2.1	3.77	8.61
Maharashtra	9.45	15.17	14.24
Punjab	2.35	3.68	1.83
Gujarat	4.96	7.58	10.8
MIS	28.9	33.04	34.35
Kerala	3	3.95	1.9
Tamil Nadu	5.87	7.34	12.64
Karnataka	5.07	5.61	8.38
Andhra Pradesh	7.28	8.02	6.96
West Bengal	7.68	8.12	4.47
LIS	44.51	27.14	21.52
Chhattisgarh	2.04	1.91	3.93
Jharkhand	2.64	2.19	3.64
Orissa	3.51	2.72	4.04
Rajasthan	5.62	4.23	2.51
Madhya Pradesh	5.99	3.82	3.16
Uttar Pradesh	16.53	9.32	3.85
Bihar	8.18	2.95	0.39
SCS	6.16	5.48	8.32
Arunachal Pradesh	0.11	0.1	N.A.
Assam	2.58	1.94	N.A.
Himachal Pradesh	0.58	0.84	0.52
Jammu & Kashmir	0.99	0.86	N.A.
Manipur	0.21	0.19	N.A.
Meghalaya	0.22	0.21	0.16
Mizoram	0.09	0.09	N.A.
Nagaland	0.19	N.A.	N.A.
Sikkim	0.05	0.06	0.03
Tripura	0.31	0.31	N.A.
Uttaranchal	0.83	0.88	7.61

Notes : GCS : General Category States, HIS : High Income States, MIS : Middle Income States, LIS : Low Income States, SGS : Special Category States, N.A. : Not Available

Sources: www.indiastat.com, State Finances 2008-09, Reserve Bank of India

Table 2: Rate of Change in CST Revenue due to a Cut In Tax Rates
(Per Cent)

General Category States	Between 2006-07 & 2007-08	Between 2007-08 and 2008-09
High Income States		
Goa	N.A.	N.A.
Haryana	(-) 11.96	(-) 17.47
Maharashtra	(-) 6.4	13.82
Punjab	0.51	(-) 18.04
Gujarat	(-) 1.33	(-) 12.53
Middle Income States		
Kerala	199.18	(-) 58.14
Tamil Nadu	(-) 23.86	(-) 4.45
Karnataka	(-) 15.8	(-) 16.9
Andhra Pradesh	15.16	(-) 12.41
West Bengal	(-) 0.21	2.94
Low Income States		
Chhattisgarh	(-) 25.82	27.48
Jharkhand	13.5	(-) 11.98
Orissa	(-) 23.7	(-) 58.86
Rajasthan	(-) 9.73	14.22
Madhya Pradesh	(-) 1.57	(-) 6.67
Uttar Pradesh	101.01	3.83
Bihar	(-) 36.79	(-) 16.33

N.A. : Not Available

Source : Computed from States Finances 2008-09, 2009-10, RBI

Table 3: Ranking of States in terms of Share of CST in Sales Tax Revenue

Rank	2006-07	2007-08	2008-09
1	Jharkhand [26.48]	Jharkhand [26.48]	Chhattisgarh [18.39]
2	Chhattisgarh [24.7]	Haryana [17.57]	Jharkhand [17.5]
3	Haryana [22.48]	Chhattisgarh [17.23]	Haryana [13.73]
4	Orissa [19.19]	Orissa [13.38]	Gujarat [9.92]
5	Gujarat [15.07]	Gujarat [12.62]	West Bengal [9.17]
6	Tamil Nadu [12.76]	Kerala [10.84]	Maharashtra [8.85]
7	Karnataka [12.74]	West Bengal [9.89]	Uttar Pradesh [8.22]
8	West Bengal [11.29]	Tamil Nadu [9.48]	Tamil Nadu [7.96]
9	Madhya Pradesh [10.75]	Uttar Pradesh [9.22]	Madhya Pradesh [7.6]
10	Maharashtra [10.56]	Madhya Pradesh [9.21]	Karnataka [7.17]
11	Andhra Pradesh [8.04]	Karnataka [9.08]	Andhra Pradesh [5.74]
12	Goa [7.28]	Maharashtra [8.91]	Goa [5.26]
13	Punjab [6.77]	Andhra Pradesh [7.53]	Rajasthan [5.19]
14	Rajasthan [6.67]	Punjab [6.15]	Orissa [4.43]
15	Uttar Pradesh [5.19]	Rajasthan [5.22]	Punjab [4.18]
16	Kerala [3.97]	Bihar [1.75]	Kerala [3.74]
17	Bihar [3.36]		Bihar [1.23]

Note : Percentage shares are shown in brackets.

Source : Computed from State Finances 2008-09 .

Impact of Thermal Power Plant's Emission: Health Hazards and Loss of Income - Case of Titagarh Generating Station

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Abstract

Indian coals are characterized by very high ash content. Coal combustion in power plants in India creates large quantity of coal related waste like fly ash and bottom ash, mainly disposed off in ash ponds located near the thermal power plants and in the vicinity of the surrounding area. The ash of TGS leads to morbidity of the local people, loss of vegetation and affects adversely the income of the local people in form of man days loss. In the present study attempt has been made to calculate the cost of illness of fly ash affected people and how much income they sacrifice for their ill health caused by fly ash emission. Attempt has also been made to estimate their willingness to pay for a pollution free healthy environment.

Key words: Fly ash, Emission, Thermal Power Plants, Environmental Hazards

I. Introduction

India's ongoing population explosion has placed great strain on the country's environment. This rapidly growing population, along with a move toward urbanization and industrialization, has placed significant pressure on India's infrastructure and its natural resources. Deforestation, soil erosion, water pollution and land degradation continue to worsen and are hindering economic development in rural India, while the rapid industrialization and urbanization in India's booming metropolises are straining the limits of municipal services and causing serious air pollution problems.

According to the Central Electricity Authority of India, as of March 31, 1998, 83 steam plants were in operation in India. These plants generated almost 80% of total generated power for the nation. Coal consumption by various plants in the country during the year 1997-98 was almost 203 million metric tons. The consumption of fuels such as furnace oil decreased by more than 32.5%, while the consumption of lignite coal, a low-sulfur heavy stock (LSHS), a high sulfur heavy stock (HHS), and diesel oil increased by 7.54%, 31.91% and 33.9%, respectively. Decreased use of furnace oil has decreased the emissions to some extent.

The main emissions from coal combustion at thermal power plants are carbon dioxide (CO₂), nitrogen oxides (NO_x), sulfur oxides (SO_x), chlorofluorocarbons (CFCs), and air-borne inorganic particles such as fly ash, soot, and other trace gas species. Carbon dioxide, methane, and chlorofluorocarbons are greenhouse gases. These emissions are considered to be responsible for heating up the atmosphere, producing a harmful global environment. Oxides of nitrogen and sulfur play an important role in atmospheric chemistry and are largely

responsible for atmospheric acidity. Particulates and black carbon (soot) are of concern, in addition to possible lung tissue irritation resulting from inhalation of soot particles and various organic chemicals that are known carcinogens. The share of power sector in total emission increased from 28.04% in the year 1980-81 to 38.61% in 1997-98.¹

Evidence accumulated by the Inter-governmental Panel on Climate Change (IPCC) suggests that emission of these greenhouse gases might be responsible for climate change, a global concern. Possible consequences projected by IPCC include: (i) a rise in sea levels (ii) a more vigorous hydrological cycle that may increase the severity of floods and droughts and may cause more extreme climatic events; and (iii) ecological change that could threaten agricultural productivity. Oxides of nitrogen and sulfur also play an important role in atmospheric chemistry and are largely responsible for atmospheric acidity. Particulates and black carbon (soot) are of concern in the radiative forcing of the earth. They also have a significant negative impact on human health causing lung tissue irritation and are linked to cancer and other serious diseases.

In order to correct the phenomena of market and policy failures on the one hand and halt the process of degradation and depletion of natural resources and their functions on the other, economic valuation of ecological functions and benefits have been sought as necessary so that the public policy can be holistic and sustainable. The attempt for valuation has been made at different levels varying from population to ecosystem function to biosphere in the descending order of success. Agricultural land belongs to ecosystem also. The ash contents in the coal consumed in the thermal power stations is responsible for the emission of 2.3 thousand tons of SPM in the form of fly ash per day and about 0.8 million tons SPM per year. This fly ash and SPM may cause serious damage to the agricultural productivity of the area where the thermal power plant is located and also may lead to serious health hazards - respiratory as well as enteric disease - of the local people. It may even adversely affect the income of the local people due to work day loss caused by illness.

This is generally believed that fly ash leads to environmental hazards and adversely affects the local habitats, vegetation and cropping pattern, general health of the local people with respiratory and cardio vascular disease and thus raise their cost of illness and finally income of the local people declines caused by work day loss.

The study is aimed to come out with overall impact assessment of air pollution caused by the thermal power plants of the coverage area of the study. It is expected that this research will bring forth some policy implications, crucial for the well being of the local people of the study area and for the rest of the thermal power plants of India as well.

In this study, attempt will be made to find the relation between air pollution caused by emission and adverse impact on health consequences of the local people, and whether there is any detrimental effect on income of the local people due to work day loss caused by illness which, in turn, is the effect of emission from the thermal power plants.

Prasad et al (1990) shows India depends largely on coal reserves for energy needs, which alone contribute 72% of the total power generated in India. One of the major environmental problems associated with the use of coal as fuel in thermal power plants is the production of ash. This problem is particularly important for Indian power stations because most of the power stations use a poor quality bituminous type coal, with 55-

¹ Manish Gupta March 2005

60% ash and an average production of 100 million tonnes of ash per annum.² Combustion of coal thus generates huge amount of ash which are disposed-off either in dry or slurry form. In India, most of the power plants operate in the vicinity of coal fields. Major coal fields of India are situated in the eastern region, in Bihar and West Bengal, which are densely populated. There is potential chance for contamination of soil and groundwater of the surrounding areas from the toxic trace elements in the ash. Natural radioactivity content of coal from these coal fields is also slightly higher than that from other coal fields of India. Hence combustion of coal results in higher collective doses to the population in this part of the country. Thus coal-fired power stations have recently come under scrutiny as potential sources of mercury and other heavy metal pollutants. When large quantities of ash accumulate for long periods of time in the disposal site, hazardous substances are likely to be released by leaching, percolate through the soil layers and eventually reach the groundwater.

The solid wastes produced from the coal-fired thermal power plants are mainly of two types, i.e. fly ash and bottom ash. Bottom ash is the coarse-grained fraction that is collected from the bottom of the boiler and is disposed of by the wet disposal method in a slurry form to nearby waste disposal sites (ash ponds). Fly ash consists of finer sized particles, ranging from 0.5–200 μm .³

Most of the toxic elements (As, Cd, Cr, Ni, Co, Cu and Sb) become enriched in the soil and groundwater through leaching from the bottom ash, causing soil and water pollution. Coal, like other materials found in nature, contains radio-elements like uranium, thorium and ^{40}K . Combustion of coal thus enhances the natural radiation in the vicinity of the thermal power plants by release of these radio-nuclides and their daughters into the surrounding ecosystem. Apart from inhalation, as argued by Bem and others (2002), an additional radiation hazard can be solid fallout resulting in elevated concentrations of natural radio-nuclides in the surface soils around the power plants. The release of some of these residues to the environment, either directly through stack releases or indirectly from waste-storage areas, results in redistribution of natural radioactivity from deep under the earth to locations where it can modify ambient radiation fields and population exposure. Whether or not this redistribution constitutes a potential health problem has become a matter of public and scientific concern.

Gulec et al (2001) have argued that ash generated from coal combustion has a greater tendency to absorb trace elements that are transferred from coal to waste products during combustion due to its small size and hence, large surface area. Disposal of the ash is a major source of environmental pollution in the areas surrounding the disposal site. Migration of the trace elements from waste disposal sites to surrounding ecosystems is a complex process. Trace elements present on the surface of ash particles are readily leached⁴ and tend to contaminate the groundwater. Soil is the ultimate and most important sink of trace elements in the terrestrial environment. Heavy metals are mainly introduced to the environment through anthropogenic activities such as those related to metal mining, metallurgical processing and waste disposal.

The results show that the concentration of uranium and thorium in fly ash is produced by the combustion of coal, with the concentration of thorium being higher than that of uranium. The thorium concentrations in the fly ash of Titagarh are five times higher compared to their crustal abundance.

² Vijayan and Behera 1999

³ Baba 2002

⁴ Shi and Sengupta (1995) and Fytianos et al (1998)

The Titagarh Thermal Power ash contains a significant amount of radio-nuclides. The health risks are especially high in the area down-wind of the power plant. Air pollution as a result of coal combustion is the most obvious type of environmental pollution. According to UNSCEAR, the main pathways of radiation exposure to the plant's staff and the population living around the plants from the radio-nuclides emitted from the stack result from: (i) inhalation during passage of the plume; (ii) external exposure; (iii) inhalation and ingestion.⁵

The paper is organized in the following manner. Section II deals with environmental implication of the study. Location of the study area and the data base are explained in the section III. Section IV considers the analytical framework behind this study. The results of the study and the data analysis are considered in the section V. Finally concluding remarks are made in the section VI.

II. Environmental Implication of the Study

Titagarh Thermal Power Station uses Gondwana coals of low sulphur and high ash content. Hence combustion of coal in this power plant results in generation of huge amounts of ash, which is disposed-off in large ponds located close to the thermal power plants. The ash, after being dumped, is kept exposed to the sun and in the course of time gets dried and becomes hard and compact. Ash ponds are situated close to domestic areas. Hence the radiation emitted from them can affect the surrounding locality, on prolonged exposure. The disposal of ash near the local neighborhood around the thermal power plant causes significant amount of soil and ground water contamination. The groundwater collected from the tube wells shows high concentrations of As, Mn, Al, Mo, and Pb as compared to the W.H.O. (1993) for drinking water. Therefore these elements are the major contaminants of the aquatic sources in the study area. People living in the villages surrounding the power station may suffer from serious disease like keratosis, skin pigmentation etc. The trace elements in the soil may enter the food chain through uptake by plants.

Metal contamination of surface soils, agricultural soils, from industries and waste disposal sites is well known. Soil contamination around coal ash disposal sites takes place in two different ways: through atmospheric fallout and due to leaching. The topsoil (0– 15 cm from the surface) is mainly affected by the ash fallout. Atmospheric deposition from industrial activities can induce long-term changes in soil quality⁶. Bertine and Goldberg (1971) have shown that fossil fuel combustion can be a potentially significant source of atmospheric discharge of many metals. Heavy metals from fossil fuel combustion are a common source of pollution for surface soils. Contamination of surrounding soil due to the deposition of air-borne ash plume from the disposal pond, as argued by Satyanarayana Raju (1993) has been a matter of great concern. Most trace elements act as micro-nutrients to certain plants but become toxic at enhanced levels in the soil, thereby contaminating the land. Coal ash contains high concentration of trace elements, which affect the soil properties and vegetation grown around the ash disposal site.

Combustion of coal in the Titagarh thermal power plant is reported to have generated large quantities of ash that is disposed off in vast areas of land adjoining the power plant. Geochemical, mineralogical and radiometric analysis of the pond by Mandal and Sengupta (2006) has been done to assess the quantity of toxic elements that are likely to contaminate the soil and the ground water system. Mineralogically, the ash is

⁵ see Rouni and others 2001 for details

⁶ Jones 1991

composed of quartz, mullite, haemite, zircon etc. Trace element analysis reveals that toxic elements (Pb, Cu, Ni, Fe, As) are sufficiently enriched in the ash and in the lighter size fractions. Chemical analysis of the water samples collected from tube wells near the ash ponds reveals high concentration of trace elements (Al, Li, Ni, Fe, As, Zn, B, Ag, Sb, Co, Si, Mo, Ba, Rb, Se, Pb, V, Cr, Cu, Cd, Mn, Sr), whose distribution is mainly controlled by the ash deposited in the area. Radio-nuclides (U, Th) also show enrichment of 3-5 times in the coal ash compared to their crustal average.

All substances emitting radiation have been considered as carcinogenic and at higher doses, radiation may cause developmental defects leading to impaired brain functions, for example severe mental retardation. The target organ of the radio-nuclides U and Th are bones and lungs. Increased incidence of leukemia, bone sarcomas and chromosomal aberrations are due to the radio toxicity of thorium. Exposure to high dose rates has shown cases of lung and bone cancer in the population within an 88-km radius of the power plants of Indraprastha, Bandel and Badarpur⁷. It can be said that there are sufficient chances of a danger of lung and bone cancer to the population of the neighboring villages of the power plants.

The analyses by Mandal and Sengupta (2005) show that combustion of coal in thermal power plants causes significant amount of environmental pollution, with the generation of ashes that are high in radioactive and other toxic trace elements compared to other thermal power stations in India. The natural radiation dose to population from thermal power plants is slightly higher than that from nuclear power plants of the same capacity, due to high ash content and higher population density around such plants. The target organs of the radio nuclides ²³⁸U and ²³²Th are bones and lungs. Increased incidence of leukemia, bone sarcomas and chromosomal aberrations are due to the radio-toxicity of thorium. Concentrations of radio nuclides in the ashes from thermal power plants are much higher than those of radio nuclides in the ashes of other thermal power stations. The bricks made of ash from thermal power plants showed high activity concentrations of ²³²Th and ²³⁸U compared to those of ordinary bricks.

Geochemical study⁸ of the water samples shows that the tube-well waters near the ash pond and in the surrounding villages are contaminated by toxins released from the ash pile. The enhancement in concentration of toxins (Al, Ni, Fe, As, Zn, Mo, Mn, Ba, Pb) in the tube-well waters near the ash pond denotes significant input from the ash pond. Mn and Pb shows significant enrichment in the waters, exceeding the WHO guideline values for drinking water. Al and As show enrichment above the WHO guideline value in some places, mainly in the tube wells located near the ash ponds. Excess amount of arsenic and manganese affects the cardiovascular system, gastrointestinal tract, kidney, liver, skin and blood and prostrate. Excess amount of lead could lead to dysfunction of the kidney, gastrointestinal tract and respiratory systems due to inhalation of fine ash particles rich in lead.

III. Location of the Study Area and Data Base

Titagarh Generating Station ($22^{\circ}43'56''N$ $88^{\circ}22'11''E$) is situated on B.T. road, Titagarh in North 24 parganas district. It is one of the oldest generating station and is the pulverized fuel thermal station of CESC.

Titagarh Power Generating Station (TGS) and their adjacent area is the catchment zone of the study. The sample size is 300. Since it is clear that not all morbidity, or other health hazards and loss of income etc. are not caused by only the air pollution, for each zone there are two areas – Catchment area, who resides in the

⁷ see Lalit and others (1986) for details

⁸ Mandal and Sengupta (2005)

vicinity of the thermal plant and are directly victimized for the emission and the Control area, situated outside of the catchments area, which will explain how much of the observed phenomenon are on account of air pollution.

Table 1: Details of Villages Surveyed

SI No	Village / Town ⁹	District	Sub Division	Block	GP / Police Station	Total Household	Total Population	Sample Size
1	KARANA MADHABPUR	North 24 Parganas	Barrackpur	Barrackpur II	Bilkanda - I	437	2540	18 (9+9)
2	MAHISH POTA					573	2700	24 (15+9)
3	MURA - GACHHA					129	570	5
4	BERA - BERIA	Hughly	Barasat	Amdanga	Beraberi	1442	7655	79
5	TARA - BARIA				Taraberia	376	1817	21
6	BEGAMPUR	Hughly	Srirampore	Chanditala II	Begumpur	2160	9545	91
7	PANCH - GHARA				PanchGhara	1467	7273	62 (20+20+22)

Source: Census 2001 and www.wbprd.nic.in

The data for the present study was obtained through a field survey, based on Contingent Valuation Method (CVM) questionnaire, within a 10 km radius for catchment area and between 15 and 20 km radius for control area. At the first stage only those blocks were chosen where the power plants are situated for catchment area. At the second stage of sampling gram panchayats were selected under those blocks considering the distance from power plants. At the third stage villages were selected randomly. Finally from the voters' list available in the official website names of respondents were chosen. The gram panchayats chosen from both catchment and control area are homogeneous in other aspect. The details of villages those are surveyed for catchment and control area are summarized in table 1

Data on respiratory illness and other disease have collected directly from field survey. Data have also collected to get an estimate about the medical expenses for illness.

To monetize the work day loss on account of illness caused by air pollution and the victim's willingness to pay for a cleaner environment data have collected from the field survey based on framed questionnaire.

IV. Analytical Framework

This paper is based on the work of Atreya (December 2007) who has estimated the health costs of pesticide use in Nepal from short term exposure and the work of Dasgupta (2004) who has valued health damages from water pollution in Delhi.

In this study, individuals who are exposed to air pollution caused by the emission from thermal power plants have a probability Y_1 of falling sick. The probability of an individual falling sick is a function of exposure

⁹ Villages with serial number 1 – 3 and 6, 7 are surveyed for catchment area and rests are for control area.

and some other characteristics.¹⁰ The predicted probability of success in the outcome, which in this case is defined as the probability of observing acute respiratory illness and/ or any other chronic illness in a household is estimated for the sample. The model specification used in this paper for Y_1 is:

$$Y_1: f[\text{age, education score, health score, infrastructure score, indoor pollution exposure (lpe), physical environment (pe), occupational exposure to pollution (oep), years of education (years of edun)}] \dots\dots\dots (I)$$

The binary dependent variable Y_1 is the probability of falling sick. It indicates whether or not an individual experiences any of the acute symptoms due to air pollution caused by emission from thermal power plant during last one year. In equation (i), the probability of a representative household falling sick was regressed on some explanatory variable mentioned in the parenthesis.

All three scores (education score, health score, infrastructure score) have been calculated from the questionnaire asking their response regarding distance of some basic amenities from their residence, level of satisfaction of these amenities and whether these facilities have been improved or not over last five years. These amenities include educational facilities like school, health center, bus stop, railway station etc.

It was important to differentiate whether the disease is being caused by only emission or not. Individual, who is already exposed to some other source of pollution, might be prone to respiratory or other enteric disease compared to other person who live in healthy environment. Indoor pollution exposure, physical environment and occupational exposure have been included in the model to capture these characteristics.

Older people and children are generally very sensitive to cardiovascular disease. Educated individual generally take precautionary measures to minimize the health risk because of their knowledge of environmental pollution. Thus age and years of education have incorporated in this model.

Individuals who are being suffered by the emission also have a demand price for better environment. Willingness to pay (WTP) captures their demand price for a pollution free environment. In this study probability of willingness to pay (Y_2) has been estimated using a probit model which is also a function of some individual characteristics. The model specification¹¹ used in this paper for Y_2 is:

$$Y_2: f[\text{age, years of education, environmental awareness (envawr), general awareness (genawr), cooperation (coop), women empowerment (wemp), social security(ssec)}] \dots\dots\dots (II)$$

The binary dependent variable Y_2 is the probability of an individual's willingness to pay for a cleaner environment. It indicates that whether the individual is willing or not to pay for a better environment. In equation (ii), probability of a representative household is willing to pay is regressed on a set of explanatory variables mentioned in the parenthesis.

In both regressions, the dependent variables are binary (if outcome occurs = 1, 0 otherwise).

It is assumed in this model that, environmental and general awareness influence an individual to demand for and healthy environment. That's why they have been included in the second model.

It does of general believe that older people generally are reluctant for paying pollution free environment. Age has thus considered in this second model.

¹⁰ Based on Dasgupta's (2004) work probability of an adult falling sick has defined as observing illness in each household surveyed in the study.
¹¹ The two model specifications used in this paper is a little variant of Atreya (2007).

If an individual feels socially secured and feel free from social disturbance, he or she may not be interested to contribute. Attitude of co operation also plays very crucial role towards social contribution. Social security and co operation are thus being considered as explanatory variables for the second model.

When the survey was conducted a significant sample of respondents was women and they were asked to reveal their WTP for better environment. Since financially dependent women can not reveal her WTP independently and can not be unbiased, questions were asked to know their feelings about their empowerment. Effort has been made to capture the influence of women empowerment on WTP. Needless to say income is a very important variable for WTP. Thus in the second model women empowerment and income have been incorporated.

In this paper *Cost of illness* is the aggregate cost of medical expenditure as well as the conveyance cost of an individual for going to the health clinic. Diseases are broadly grouped into three categories: Upper Acute Respiratory Illness (UARI), Lower Acute Respiratory Illness (LARI), Chronic and Short term illness.¹²

In order to estimate a representative household's cost of illness, only the data of adult individual were considered. Because at later stage, to calculate the wage loss of income, only the adults were considered. Individuals below the age 15 were ruled out based on ILO mandate on defining child labor. The average value obtained for this predicted probability using equation (i) is 0.36 for catchment and 0.21 for control area. In this section, this probability value is used along with some measures to determine the monetized cost of illness.

If the probability of a household being affected is λ ¹³, the probability of being an adult from an affected household is α and the probability of being ill if the individual concerned is an adult from an affected household is β , then the probability of observing illness in an adult in a representative household is defined as $\lambda\alpha\beta$. The average cost of illness is also calculated for adult and can be denoted by χ . Given the average size of the family (σ), the total cost of illness for a representative household is derived¹⁴ as :

$$C = \sigma \times \lambda \times \alpha \times \beta \times \chi \quad \dots\dots\dots(III)$$

It is worth mentioning that C is the total cost of illness for a representative household for a period of one year, since one year was the recall period. And as argued by Atreya (2007), this cost of illness can also be interpreted as minimum willingness to accept or offer price for a representative household to avoid illness.

From an economics perspective the opportunity cost of an illness comprises the cost of illness as well as the loss of income arising from man days loss caused by illness. The loss of income is calculated for only adult individual in the present study since child labor has not taken into consideration.

The probability of an adult being ill is derived in the above section as $\lambda\alpha\beta$. The loss of income for a period of one year is the product of probability of illness, average man days lost, the average wage over all working adults, the rate of employment for the sample, and finally the average size of the household.

¹² This classification of illness is based on SANDEE questionnaire on health

¹³ λ is obtained from equation (i)

¹⁴ Dasgupta (2004).

V. Results and Data Analysis

Monetization of Health Damages

In the study sample, in all there are 780 individual in the catchment area and 409 individual in the control area. Total numbers of adult individual in catchment and in control area are 626 and 285 respectively. And total numbers of affected individual who are adult are 184 and 61 respectively. Thus following Dasgupta (2004), the probability of being an adult from an affected household is 0.29 and 0.21 for catchment and control area respectively, and the probability of being ill if the individual concerned is an adult from an affected household is 0.36 for catchment and 0.18 for control area. The probability obtained (λ), using equation (I), of a household being affected is 0.8 for catchment and 0.7 for control area. Thus the probability of an adult being ill ($\lambda\alpha\beta$) is 0.08 for catchment and 0.03 for control area. The findings are summarized in the following table:

Table 2: Cost of illness for a representative household

Titagarh Power Generating Station	Catchment	Control
Total no. of individual	780	409
Total no. of adult individual	626	285
Total no. of affected adult individual	184	61
λ	0.8	0.7
α	0.29	0.21
β	0.36	0.18
χ (in Rupee)	1167.67	1655.25
σ	380.34	179.13
Cost of Illness (in rupee)	780	409

Source: Field Survey and author's calculation

From the table 2, it is quite evident that catchment area has a larger cost of illness compared to control area for a representative household, which lies outside the area where fly ash can be deposited.

Willingness to Pay

As mentioned earlier Willingness to Pay (WTP) can be interpreted as the demand price for a better environment. It is estimated by a probit model described in equation (II). The following table summarizes the result:

Table 3: Predicted WTP for Pollution Free Environment

Titagarh Power Generating Station	Catchment	Control
Predicted Willingness to Pay	0.55	0.5

Source: Field survey and author's estimation

Needless to say people resides in the affected area of thermal power plant are more eager for a pollution free environment and the probability that whether an individual is willing to pay is more than double in catchment area compared to control area.

As explained earlier not all morbidity, or other health hazards and loss of income etc. are not caused by only the air pollution, to explain how much of the observed phenomenon are on account of air pollution, the average health costs are estimated¹⁵ as:

¹⁵ This is a little variant of Atreya's (2007) estimation.

$$C_{ca} = P_{ca} \times COI_{ca} + PWTP_{ca} \times mn WTP_{ca} \dots\dots\dots (IV)$$

$$C_{cn} = P_{cn} \times COI_{cn} + PWTP_{cn} \times mn WTP_{cn} \dots\dots\dots (V)$$

Where,

C_{ca} and C_{cn} are the total predicted health cost for catchment and control area respectively; P_{ca} and P_{cn} are the predicted probability of falling sick of a representative household, estimated from equation (I), for catchment and control area respectively; COI_{ca} and COI_{cn} are the average cost of illness for catchment and control area respectively as obtained from table 4; $PWTP_{ca}$ and $PWTP_{cn}$ are the predicted probability that a representative household is willing to pay for a better environment, estimated from equation (II), for catchment and control area¹⁶ respectively; $mn WTP_{ca}$ and $mn WTP_{cn}$ are the mean willingness to pay of a representative household of catchment and control area respectively for a pollution free environment.

Finally, actual health cost (C) attributable to only air pollution caused by emission from thermal power plants for a representative household is calculated as:

$$C = C_{ca} - C_{cn} \dots\dots\dots (VI)$$

It is worth repeating that mean WTP is interpreted as average cost that a representative household is willing to incur for reducing health risk. Mean of max WTP is calculated as Rs.13.64 and Rs.11.83 for catchment and control area respectively, predicted probability that a representative household is willing to pay for a better environment for catchment and control area is calculated using equation(II) as 0.55 and 0.5 respectively (obtained from table 3), average cost of illness for catchment and control area, as obtained from table 2, using equation (III) is respectively Rs.780 and Rs.409 and predicted probability of falling sick of a representative household for catchment and control area is calculated using equation (I) as 0.36 and 0.18 respectively. Total predicted health cost is calculated with the help of equation (iv) and (v) for catchment (C_{ca}) and control area (C_{cn}) is respectively Rs.144.36 and 38.66. Finally, actual health cost (C) attributable to only air pollution caused by emission from thermal power plants of a representative household is calculated using equation (vi) as Rs.105.7.

Total health cost of TGS for 200 sampled household surveyed in catchment area is $Rs.105.7 \times 200 = Rs.21140$; total annual health cost¹⁷ for population (780)of sample household of villages surveyed in catchment area is $Rs. 105.7 \times 780 = Rs.82446$ and total annual health cost for population (22628) of villages surveyed in catchment area is $Rs. 105.7 \times 22628 = Rs.2391779. 61$

Loss of Income due to illness¹⁸

The probability of an adult being ill ($\lambda\alpha\beta$) has calculated from table 2, as 0.36 and 0.18 for catchment and control area respectively. Average man days lost (ϵ) has calculated by calculating the number of days an affected adult individual was absent from his work due to illness in the last one year. There were 780 individual in 200 household for catchment and 409 individual in 100 household for control area. Average size of household has calculated separately for catchment and control area. Rate of employment has calculated as the ratio of potential employee (individual belongs to the age group between 18 and 60) and number of employees. Finally

¹⁶ Even the respondents residing in control area were asked to reveal their WTP, though they are not directly affected by emission from power plants, to differentiate between catchment and control area.

¹⁷ Dasgupta (2004)

¹⁸ calculation of this section has done following Dasgupta (2004)

average daily wage has calculated from individual's monthly or yearly income. The following table summarizes the findings:

Table 5: Loss of Income due to illness

Titagarh Power Generating Station	Catchment	Control
Probability of adult being ill	0.08	0.03
Average size of household	3.9	4.09
Average man days lost	11.17	18.5
Rate of employment	0.5	0.55
Average daily wage rate (in rupee)	142.05	150.16
Loss of Income (in rupee)	247.52	187.47

Source: Field survey and author's calculation

Thus fly ash causes a detrimental effect on income of individual who resides in the vicinity of thermal power plant. Loss of income for a representative house hold is Rs.247.52 for catchment area while for control area it is Rs.187.47. Annual loss of income of a representative household only for power plant emission in case of TGS is Rs.720.65. For sampled household (200) in catchment area in TGS, the annual loss of income is Rs.144130.40. Total annual loss of income for population (780) in sample households of villages surveyed in catchment area of TGS is Rs.562108.58. And finally annual loss of income for total population (22628) of sample villages surveyed in catchment areas of TGS is 16306914.02. The figure is mind boggling indeed!!

VI. Concluding Remarks

The results obtained in the present study indicate that environmental hazards are looming large on the individual, residing in the surrounding area of Titagarh Power Generating Station (TGS). Fly ash emitting from TGS is causing morbidity of the local people. They are getting sick from various cardio vascular diseases as well as from some chronic disease. Consequently they are being absent from their work and their income is declining. The severity of emission is so acute that they are even agreed to pay for a better environment.

The cost of illness and loss of income estimated in this study area are two indicators of the hazards emission of thermal power plants pose to individuals. The health cost is indeed small if an individual is concerned. This is the reason why people are not so concerned about this pollution. But the social cost at macro level is alarming. Again improved air quality implies better health status which leads to fewer workdays lost due to ill health and less resource spent on health care. Economic productivity, as a result will increase.

This empirical investigation provides some policy inputs for planners at local, district and national levels. Proper measures should be taken to check the release of toxins from the ash pond and subsequent mixing with the ground water. The hazards from thermal power plants can be reduced by reducing the ash content of coal and establishing thermal power plants far away from populated area.

Nuclear power plants emit radioactive and negligible amounts of gaseous or particulate pollutants. The risk associated with nuclear radiation is probabilistic. Thermal power plants using fossil fuels produce particulates, oxides of sulphur, nitrogen, carbon and toxic metals like arsenic, mercury, etc. in trace concentrations. The health risk of all these is deterministic. Organ dose commitments are greater in the case of thermal power stations compared to nuclear power plants. If all the gaseous and particulate emissions are

considered, coal-based plants have a higher health risk to the population. Carbon dioxide emission from coal giving rise to global warming is almost absent in nuclear power plants.

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Accessibility of Bank Credit by the Muslim Minorities in West Bengal – A Case Study

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Abstract

The study on credit facilities to Muslim minority community in West Bengal initially deals with some aspects of credit facilities that the Muslim minority community of West Bengal, may avail of. Issues related to availability, accessibility and utilization of such facilities from the different sources are taken up. The two main sources of credit namely the formal and the informal, the constituent components of which include the banks, financial institutions, govt. organizations, money lenders, friends, relatives etc. are touched upon in this study. The study derives its theoretical background from the rich body of the literature that has developed over the years on credit transactions formal as well as informal in the agrarian economy. The primary focus of this research is on interlinked transactions. It has been examined whether interlinked transactions may exist in the non-agrarian sphere of the activity profile of the Muslim minority community, so far as their relations are concerned. The main aspects of the study are formal credit sector versus informal credit sector dichotomy, comparative strength of the informal sector, sources of formal and informal credit, accessibility and functioning of formal and informal credit & market interlinkages.

Key words: Credit Accessibility, Muslim Minorities, Districts of West Bengal.

Introduction:

The study initially deals with some aspects of credit facilities that the Muslim minority community of West Bengal, may avail of. So, issues related to availability, accessibility and utilization of such facilities from the different sources are taken up. The two main sources of credit namely the formal and the informal, the constituent components of which include the banks, financial institutions, govt. organizations, money lenders, friends, relatives etc. are touched upon in this study. The primary focus of this study is on interlinked transactions. It has been examined whether interlinked transactions may exist in the non-agrarian sphere of the activity profile of the Muslim minority community, so far as their credit relations are concerned.

Why Muslims:

A few points regarding the minority communities of India may be relevant for recall. In general, the population of this country has been categorized in terms of the following social groups namely: the general and the minority groups which include the S.C, S.T and O.B.C's. More specifically, in terms of the religious composition, while the Hindus constitute the majority religion group, it is the others of non-Hindu denomination i.e. the Muslims, Christians, Sikhs, Buddhists, Jains etc. who are considered as belonging to the minority religion group.

Among the minority religion groups in India, the Muslims are predominant, as compared to the Christians, Sikhs, Buddhists, Jains etc. It is one of the reasons why we have chosen the Muslim religious group, among the minority religious community for systematic analysis & in depth research is largely on account of the fact that, it is the most vulnerable group among all other religious groups. The vulnerability among the Muslims has been explained in terms of the following indicators namely, literacy rate, poverty ratios, unemployment,

dependence on informal household based activities etc. The N.S.S.O 55th round (1999-2000) estimates show that a large proportion of Muslims than Hindus suffer from low level of consumption. A few figures may be quoted from the report for the rural Hindus, while the average consumption expenditure by each member of the family was less than Rs.300/- per month among 26% of the households, the corresponding percentage for Muslims was much higher (at 29%). Such differences were more pronounced in towns & cities. From this it may be said that the incidence of poverty is much higher among the Muslims.

Unemployment among Muslims is also higher in rural areas & marginally more in the towns. In rural India unemployment rates (both sexes) in the work force, measured according to 'usual status' was 2.1% of the Muslims, while that for the Hindus were 1.4%. The same picture emerges for urban India also (5% for Muslims & 4.7% for Hindus).

Illiteracy rates are also higher among the Muslims. In rural areas, it has been reported that for the Muslims above the age of 7 years, as high, as 48% could not read or write, though the figures were slightly lower (44%) for the Hindus. The difference in literacy attainment gets more pronounced for urban areas. Muslim illiteracy rate in urban areas was 30% while for Hindus it was only 19%.

The Muslims seemed to be further marginalized in access to land holding. By 1999-2000, 51% of rural Muslim households cultivated little or no land. For the Hindus above 40% of rural households belonged to this category.

The overall profile of vulnerability is true for both men and women in rural and urban India and in all states. The disparity between this minority religious group & the majority Hindus has been observed to have increased over the years.

Having established the point that the level of vulnerability is highest among the Muslims among all religious groups in India, one may refer to the thrust areas that have been identified by the Minority Commission in India that may ensure the welfare of the minorities. It not only emphasized their integration into the national mainstream, but also called for specific measures so as to enable them to become partners in the development process of the nation. The commission called for the attention to the following thrust areas:

- (a) attending to individual representations,
- (b) making direct interaction with minorities' groups & taking up the minority related issues with the respective state/govt. departments,
- (c) ensuring easy availability of bank credit/loans to minority beneficiaries by interacting with the RBI and nationalized banks and
- (d) creating adequate employment opportunities for minorities.

A review of the thrust areas thus shows the credit needs do require attention from policy makers, if the welfare of the minority communities is to be enhanced. As to why the Muslim minority group's credit should be the specific area of enquiry, the latest Census figures may be referred. Since the Muslim population constitute the largest among all the minority groups in West Bengal (25.24% in total of 80,176,197 persons, 2001 Census) and also because they remain backwards in terms of their participation in education, formal sector unemployment, social development and so on which the N.S.S.O 55th round study reveals, we have selected this sub-group among the minorities. More specifically, we have tried to focus upon their productive relations, confining the analysis to only two Muslim predominant districts of the state

of West Bengal (i.e. Howrah and Murshidabad). We have examined their participation in both the formal and informal credit market, trying to find out whether interlinked transactions might exist in the non-agrarian activity spheres of this group.

Specific Objectives of the Study:

- (a) To assess the participation of Muslims in the credit market.
- (b) To attempt to find out their accessibility of credit and also the problems they may encounter in this context.
- (c) To study the socio-economic characteristics of the Muslim minority community and to investigate the extent of utilization of credit.
- (d) To study the levels and forms of their dependence on the informal credit market.
- (e) To investigate whether interlinked transactions may be observed to exist in the non-agrarian sphere of their activity.

Sources of Data and Methodology:

Both primary as well as secondary data sources have been used for the study. For the secondary data we have consulted census reports, Economic Review (India), Economic Review (Govt. of West Bengal), District Statistical Handbook, Annual Credit Plan, R.B.I Bulletin, Human Development Report, Different Periodicals etc.

For primary data we follow the household survey by sample survey method of data collection. We have followed purposive, stratified random sampling method of sampling. Since our purpose is to deal with the Muslim minority community of West Bengal, initially we have tried to identify the Muslim predominant districts of this state. Nine such districts have been found in West Bengal. Among them Howrah and Murshidabad districts have been chosen for our study. These districts form the first stage sample. From each district two Muslim predominant blocks have been selected. From each such block two villages have been taken up from where the households have been randomly selected. In the four blocks spread across the two districts a total of 990 households have been surveyed.

Population Distribution:

Considering the overall economic status of Muslims in West Bengal, we first of all look into the demographic picture of Muslims in West Bengal. The 1991 & 2001 Census figures may be referred to. From 1991 Census it has been found that among the total population 23.61% belong to the Muslim community whereas 74.72% belong to Hindu and the remaining 2% belong to other minority communities. From 2001 Census the figures are 25.24% for Muslims, 72.47% for Hindus and the remaining 2% belong to the other categories. Here also, among the minority communities, Muslims are significantly large in number. Over the decade the Muslim population has increased by almost 2% where as the Hindu population has decreased by 2.25%.

As we have noted for the West Bengal state the proportion of different religious communities to total population (from Census 2001) of 72.5% Hindus and 25.2% Muslims may be compared to the all India figures. At the all India level the figures are 80.05% belonging to Hindu community and 13.4% belonging to Muslims. From the above data it is apparent that the percentage of Muslims in West Bengal is higher compared to all India figures.

Literacy:

The advantages of the Muslim Community with respect to sex ratios, does not persist when literacy figures are examined. The Jains of West Bengal have 92.8% literacy rate, for Hindus it is 72.4% and for Muslims it is 57.5%. For all the communities male literacy rate is higher than the female literacy rates. For Hindus male literacy rate is 81.1% and for female it is 61.1%. For Muslims it is 64.6% for male and 49.8% for female. Therefore Muslim women are more illiterate. In all India figures also Jains are most literate i.e. 94.1%, for Hindus it is 65.1% & for Muslims it is 59.1%. Here also for all the communities male literacy rate is higher than females. For Hindus male literacy rate is 76.2% and for female it is 53.2%. For Muslims the figures are 67.6% and 50.1% respectively (Census of India 2001, the first report on religion data).

Work Participation:

Work participation rate among the Muslims is lower than that of Hindus in India as well as West Bengal level. Muslim females' work participation rate is lower than males in India and West Bengal level. Comparing among the minority groups, Jains are in the same position as that of Muslims. Among the Jains the females' work participation is also lower than males in India and West Bengal level (Census of India 2001, the first report on religion data).

Distribution of Workers:

Considering the distribution of workers among the religious community groups we prefer to discuss about the household industry workers because our study deals with this category. In West Bengal we see that 12.6% is from Muslim Community which is the highest participation. From Hindu community the participation is 5.9%. Indian data shows the same picture i.e. 8.1% from Muslim community where as only 3.8% for Hindu community (Census of India 2001, the first report on religion data).

Howrah:

Households have been found to belong to the following activity groups namely zari related work, embroidery and tailoring, shop and grocery, professions & others (which include building material suppliers, civil contractors & so on).

From table 1(col.3), we see that about 92.84 percent of the surveyed households were found to be borrowers. Only 7.15 percent reported as non-borrowers (col.4). Such percentages are found to vary across the different activity wise category of households. Among the borrowing households only 34.19% borrowed from the formal credit market, who may or may not have depended on informal sources of credit also. As against this, more than 92% were found to have taken credit from the informal credit market, who may or may not have borrowed from formal sources also (column 5 & 6 of table – 1). Simultaneous recourse to both these (formal & informal) sources were reported by 27.89% of the households (col.7). With respect to column 5, 6 & 7 a few points of observation may be stated:-

- (i) Col.5, 6 & 7 refer to col.3 and not col.2.
- (ii) Aggregate of col.5 & col. 6 net of col.7 will not add up to 100% because the figures are household (borrower) provided figures & not from institutional (lender) sources.

It is evident that the reach of the formal sector credit does not appear to penetrate deep into the lives of the Muslims in Howrah district, since reliance on informal sources both on the part of those who have and have not availed of bank credit, is quite high. It will be observed later that the availability of bank credit to meet the

productive needs of the Muslims has not been found to match even to a reasonable proportion of their own credit needs.

Table-1:Participation of Households in Credit Markets in Surveyed Villages (Howrah District):

Activity wise category of households (1)	No. of households (2)	Percentage of households		Percentage of distribution of borrowing households under		
		Borrowing (3)	Not Borrowing(4)	Formal (5)	Informal (6)	Both (7)
Zari	382	94.76	5.23	29.83	92.54	22.37
Embroidery & Tailoring	246	95.12	4.88	39.74	97.86	33.76
Shop & Grocery	29	89.65	10.34	34.64	65.38	34.61
Profession	28	85.71	14.28	33.33	95.83	29.16
Others	153	90.19	9.8	36.36	90.15	31.06
All	838	92.84	7.15	34.19	92.93	27.89

Source: Field Survey.

Distribution of Informal Loan Cases by Borrower – Lender Types:

As we have categorized the borrowers in to five categories, in the similar way we have categorized the informal lenders in to four categories such as, Ostagers, Money Lender, Friends & Relatives and Others. It is evident that the borrowers belonging to the different activity groups distribute the percentage of loan cases among the different categories of lenders, in varying proportions as is given in table-2. In the case of borrowers involved in 'Zari' related activity, the distribution of the loan portfolio among the different informal sources is as follows:-

- (i) 5.88% of their loans are provided by the Ostagers (col.2),
- (ii) 53.9% of their loans are provided by the Money Lenders (col.3),
- (iii) 37.45% of their loans are provided by the Friends & Relatives (col.3,4,5),
- (iv) 2.75% of their loans are provided by the Other sources (col.5),

It is obvious that dependence on Money Lenders is highest for the Zari related workers. Next in importance, comes Friends & Relatives, to meet their informal credit needs.

In case of Embroidery & Tailoring activity too, the households depend mostly on the Money Lenders and on their Friends & Relatives for the informal credit requirements where two sources account for more than 90% of their borrowings. Like Zari workers their dependence on Ostagers and Others are not substantial, i.e. not exceeding 9%.

Similar is the case for Shop and Grocery related households' activity. It becomes apparent that in the borrower's loan portfolio especially for Shop and Grocery activities Money Lenders and Friends & Relatives emerged as important credit suppliers (supply not less than 90% of their credit needs). Even for Other activities, in no category does the proportion fall below 3/4ths. In other words, at least 85%, if not more, of lenders to the different activity groups belong to the category of Money Lenders and Friends & Relatives.

Table-2: Distribution of Informal Loan Cases by Borrower-Lender Type in Surveyed Villages (Percentages); (Howrah District):

Type of Borrowers (1)	Type of Lenders				
	Ostager (2)	Money Lender(3)	Friends & Relatives(4)	Others (5)	Total (6)
Zari	5.88	53.92	37.45	2.75	100(510)
Embroidery & Tailoring	2.71	44.75	46.10	6.44	100(295)
Shop & Grocery	0.00	47.18	45.99	6.82	100(44)
Profession	0.00	42.63	44.38	12.90	100(32)
Others	3.23	43.01	44.09	9.06	100(93)
All	5.13	49.18	40.76	4.93	100(974)

Note: Figures in the parenthesis indicate total loan cases.

Source: Field Survey.

Purpose – Wise Distribution of Informal Loan by Borrower – Lender Type:

When figures for the purpose – wise distribution on informal loan among the borrowers of different activity groups, across the diverse lending sources are considered [table- 3], then following emerge:-

(A) For all activity groups pooled together, among production, consumption and other purposes, for which loans are resorted to,

- (i) friends and relatives, as a source of informal lender, provide for highest percentage of consumption need – based loans,
- (ii) money lenders and ostagers emerge as the most important source of production purpose loans &
- (iii) other sources of lending, are also availed of primarily for productive or other purposes, followed by loans for consumption related needs too.

(B) Across the activities in which the households are involved, in most of these cases, the Money Lenders and the category Friends & Relatives, emerge as the most important sources for informal credit. More than 80% of the cases borrowed from these sources are utilized for productive and consumption purposes. In this sense, reliance for the two most important purposes (production & consumption) for which the Muslim households are seen to borrow is unambiguously on the informal credit sector. Ostagers also are apparently playing a supportive role in this respect.

**Table-3:Lender Types and Purpose for Informal Loans in Surveyed Villages (Percentage of Loan Cases)
(Howrah District):**

Category of household (1)	Purpose of loan (2)	Type of lender				Total (7)
		Ostager (3)	Money Lender(4)	Friends & Relatives(5)	Others (6)	
						100(162)
Zari	Production	9.26	54.32	33.95	2.47	100(219)
	Consumption	5.48	53.88	37.44	3.20	100(190)
	Others	8.95	47.37	41.58	2.10	100(91)
Embroidery & Tailoring	Production	4.39	49.45	34.07	12.09	100(199)
	Consumption	5.53	43.22	44.72	6.53	100(93)
	Others	11.83	39.78	31.18	17.20	100(80)
Shop	Production	0	55.56	38.89	5.56	100(21)
	Consumption	0	61.90	38.10	0	100(12)
	Others	0	41.67	41.67	16.67	100(9)
Profession	Production	0	44.44	44.44	11.11	100(24)
	Consumption	0	50.00	45.83	4.17	100(12)
	Others	0	41.67	41.67	16.67	100(48)
Others	Production	2.08	39.58	47.92	10.40	100(77)
	Consumption	1.30	44.16	46.75	7.79	100(63)
	Others	1.59	42.86	50.79	4.76	100(328)
All	Production	6.10	50.61	36.59	6.71	100(540)
	Consumption	4.44	48.70	31.85	4.98	100(370)
	Others	7.84	44.32	40.54	7.30	

Note: Figures in the parenthesis indicate total loan cases.

Source: Field Survey.

Productive Purpose-Wise Distribution of Formal Loan:

The productive purpose-wise distribution of formal loan is shown in table – 4. Of the productive utilization of the total formal credit 39.31% of the households utilizing the formal credit in productive purpose belong to the category of Zari related activities. 34.73% of the households utilizing in the productive purpose belong to Embroidery & Tailoring related activities. 4.58% of the households belong to Shop & Groceries activities. Whereas for the categories of Professions and Others the percentage of households utilizing formal credit in productive uses are 2.67% and 18.70% respectively.

Now, among the different productive utilizations we have categorized the uses into three broad heads. First is the utilization of formal credit in opening new units. Second is the utilization in the existing units and third is the utilization in other productive purposes.

Among all the households those who utilize the formal credit in opening new units 37.88% of the households belong to Zari category, 40.91% belong to Tailoring, 3.03% belong to shop, 2.27% belong to Profession and 15.91% belong to Other categories. So the categories of Zari and Tailoring are the greater number utilizing for opening new units.

Again among the households those who utilizes the formal credit in their existing units 40.78% belong to Zari category, 32.04% belong to Tailoring, 4.85% belong to Shop, 1.49% belong to Profession and 20.39% belong to Other categories. Here also Zari and Tailoring are greater in number those who are utilizing the formal credit in their existing units.

For utilizing in the other productive purposes the category of Zari and Other are greater in number, they are 40.74% and 25.93% respectively. For Tailoring it is 14.81%, for Shop it is 11.11% and for Profession it is 7.41%.

Table-4: Purpose Wise Distribution of Formal Loan in Surveyed Villages (Percentages)
(Howrah District):

Purpose of Loan	Category of Households					
	Zari	Tailoring	Shop	Profession	Others	All
New	37.88	40.91	3.03	2.27	15.91	100(132)
Existing	40.78	32.04	4.85	1.49	20.39	100(103)
Other	40.74	14.81	11.11	7.41	25.93	100(27)
Total	39.31	34.73	4.58	2.67	18.70	100(262)

Note: Figures in the parenthesis indicate total loan cases.

Source: Field Survey.

Observed Credit Gap for Different Categories of Households in Surveyed Villages:

Credit requirements as reported by the households and credit actually available were compared to work out the existence of CREDIT GAP if any.

To estimate the credit gap we first estimated the amount of formal credit required as specified by the households in Rupees and then calculated the actual amount of formal credit available in Rupees for the different category of households separately. Then the difference between these two gave the credit gap. Then we have calculated the percentage of the credit gap, which is shown in column-4, 5 & 6 in table-5.

For the category Zari the credit gap is 52.44%. That is more than 52% of the credit requirement remain unfulfilled. For the category Tailoring the gap is 80.22%, for Shop & Grocery it is 81.58%, for Profession it is 92.25% and for Others it is 94.17%. So we see that for the categories Profession and Others more than 90% of the credit requirements remained unfulfilled. Whereas for the category Tailoring and Shop & Grocery more than 80% of the credit requirement remained unfulfilled. Finally considering all the categories of households together we have the credit gap 86.77% i.e. more than 86% of the credit requirements remained yet to be fulfilled.

Table-5: Estimates of Credit Gap for Different Categories of Households in Surveyed Villages; (Howrah District)

Category of Households (1)	Total Income (in Rupees)		Formal Credit Available (in Rupees) (4)	Formal Credit Required (in Rupees) (5)	Credit Gap in Percentage (6)
	Per Household (2)	Per Worker (3)			
Zari	53,697.28	19,629.89	9,70,687.00	20,40,779.00	52.44
Embroidery & Tailoring	46,914.75	18,331.94	8,95,100.00	45,25,960.00	80.22
Shop & Grocery	18,260.07	13,930.13	83,800.00	4,55,000.00	81.58
Profession	40,592.50	14,282.00	1,58,200.00	20,41,586.00	92.25
Others	41,314.86	16,462.15	7,15,300.00	122,75,400.00	94.17
All	2,00,779.46	82,636.11	28,23,087.00	21,338,725.00	86.77

Source: Field Survey.

Murshidabad:

Participation of households in the informal credit is as large as 81%. For Weaving households 10 have reported having borrowed from the informal market and for Silk Spinning, more than 90% said that they had depended on the informal sources to meet their credit needs. For other category of households, it may be pointed out; more than 70% of such households' dependence was primarily on informal credit.

Table-6: Participation of Households in Credit Markets in Surveyed Villages (Murshidabad District)

Activity wise category of households (1)	No. of households (2)	Percentage of households		Percentage of distribution of borrowing households under		
		Borrowing (3)	Not Borrowing (4)	Formal (5)	Informal (6)	Both (7)
Weaving	85	100	0.00	13.33	100	13.33
Matka Spinning	27	69.66	30.25	18.92	72.72	12.54
Reeling	15	71.42	28.57	14.28	71.44	14.56
Silk Spinning	20	93.75	6.25	25.00	93.75	26.92
Silk Trading	13	86.66	13.42	26.55	86.23	20.00
All	160	84.28	15.71	17.14	81.42	14.28

Source: Field Survey.

Distribution of Informal Loan Cases by Borrower – Lender Types:

As we have categorized the borrowers in to five categories, in the similar way we have categorized the informal lenders in to four categories such as, Ostagars, Money Lender, Friends & Relatives and Others. The borrowers belonging to the different activity groups distribute the percentage of loan cases among the different categories of lenders, in varying proportions as is given in table-7. In the case of borrowers belonging to the Weaving activities, the distributions of the loan portfolio among the different informal sources are as follows:-

- (i) 48.36% of their loans are provided by the Money Lenders (col.2),
- (ii) 30.32% of their loans are provided by the Friends & Relatives (col.3),
- (iii) 21.32% of their loans are provided by the Other sources (col.4),

It is evident that the Weavers depend mostly on Money Lenders for their credit needs then the next in importance, comes Friends & Relatives, who meet their informal credit needs.

In case of Matka Spinning activity too, the households depend mostly on the Money Lenders and on their Friends & Relatives for the informal credit requirements where two sources account for more than 90% of their borrowings.

Similarly for the case of household belonging to Silk Spinning activities depend mostly on the Money Lenders and their Friends & Relatives for their credit needs. Only in the case of the activity group Reeling 52.33% depend on their Friends & Relatives where as 47.32% depend on Money Lenders. So we find that Money Lenders and Friends & Relatives are the important credit suppliers (supplying not less than 90% of their credit needs).

Table-7: Distribution of Informal Loan Cases by Borrower-Lender Type in Surveyed Villages (Percentages); (Murshidabad District):

Type of Borrowers (1)	Type of Lenders		
	Money Lender(2)	Friends & Relatives(3)	Others (4)
Weaving	48.36	30.32	21.32
Matka Spinning	59.65	30.25	10.10
Reeling	47.32	52.33	0.35
Silk Spinning	40.25	36.52	23.23
Silk Trading	55.39	32.54	12.07
All	54.62	40.83	4.55

Source: Field Survey.

Purpose – Wise Distribution of Informal Loan by Borrower – Lender Type:

Now looking onto the figures for the purpose wise distribution of informal loan among the borrowers of different activities, across the diverse lending sources, the following findings emerge [table – 8]:-

(A) Taking all the activities together pooled, among production and consumption purposes, for which loans are resorted to, Friends & Relatives are found to be the highest provider of production as well as consumption need based loans, where as Money Lenders emerge as the loan provider mostly for production purposes. Other sources of lending are also availed primarily for consumption.

(B) Across the activities in which the households are involved:-

- (i) For the category of Weaving, Money Lenders provide 42.54% of loan cases for productive purposes. Whereas in this purpose Friends & Relatives provide 30.42% and 27.04% of the loan cases are provided by Other sources. While for consumption purposes 60% of the loan cases are provided by Friends & Relatives, 29.55% of the loan cases are provided by the Money Lenders and the rest amount of loan cases i.e. 9.65% are provided by the Other sources.
- (ii) Now for the category of Matka Spinning 52.29% of the loan cases are provided by the Money Lenders for production purposes. Friends & Relatives and Other sources provide 45.72% and 1.99% of the loan cases respectively for the production purpose. In the case of consumption 61.33% are provided by Friends & Relatives, 38.62% are provided by the Money Lenders and very negligible amount by Others.
- (iii) For the category of Reeling, 50.23%, 46.29% and 3.48% of the loan cases are provided by Friends & Relatives, Money Lenders and Other sources respectively for production purposes. For consumption purposes 65.66%, 22.35% & 11.99% of the loan cases are provided by Friends & Relatives, Money Lenders and Other sources respectively.
- (iv) For the category of Silk Spinning for production purposes 62.38%, 28.54% & 9.08% of the loan cases are provided by Friends & Relatives, Money Lenders and Other source respectively. For consumption purposes 75.24%, 18.63% & 6.13% of the loan cases are provided by Friends & Relatives, Money Lenders and Other sources respectively.

Among the category of Silk Trading for production purposes 55.25%, 42.66% and 2.09% of the loan cases are provided by Money Lenders, Friends & Relatives and Other sources respectively. For consumption purposes 60.05%, 12.54% and 27.41% of the loan cases are provided by Friends & Relatives, Money Lenders and Other sources respectively.

**Table-8: Lender Types and Purpose for Informal Loans in Surveyed Villages
(Percentage of Loan Cases); (Murshidabad District):**

Category of household	Purpose of loan	Type of lender		
		Money Lender	Friends & Relatives	Others
Weaving	Production	42.54	30.42	27.04
	Consumption	29.55	60.80	9.65
Matka Spinning	Production	52.29	45.72	1.99
	Consumption	38.62	61.33	0.05
Reeling	Production	46.29	50.23	3.48
	Consumption	22.35	65.66	11.99
Silk Spinning	Production	28.54	62.38	9.08
	Consumption	18.63	75.24	6.13
Silk Trading	Production	55.25	42.66	2.09
	Consumption	12.54	60.05	27.41
All	Production	45.54	52.95	1.51
	Consumption	25.25	56.33	18.42

Source: Field Survey.

Productive Purpose-Wise Distribution of Formal Loan:

The productive purpose-wise distribution of formal loan is shown in table – 9. Of the productive utilization of the total formal credit 32.54% of the households utilizing the formal credit in productive purpose belong to the category of Weaving category, 24.27% of the households utilizing in the productive purposes belong to Matka Spinning activities, 9.05% of the households belong to Reeling activity groups. Whereas for the categories of Silk Spinning and Silk Trading the percentage of households utilizing the formal credit in productive uses are 8.23% and 25.91% respectively.

The productive utilization has been categorized into three heads.

(a) First is the utilization of formal credit in opening new units. (b) Second is the utilization in the existing units and (c) third is the utilization in other productive purposes.

Among all the households those who utilized the formal credit in opening new units 18.32% of the households belong to Weaving category, 8.25% belong to Matka Spinning, 40.25% belong to Reeling, 6.99% belong to Silk Spinning and 26.19% belong to Silk Trading categories. So the categories of Reeling are the greater in number utilizing for opening new units.

Now among the households those who utilizes the formal credit in their existing units, 30.54% belong to Weaving category, 26.05% belong to Matka Spinning, 8.33% belong to Reeling, 9.54% belong to Silk Spinning and 25.54% belong to Silk Trading categories. Here Weaving, Matka Spinning and Silk Trading are the categories those who are greater in number utilizing the formal credit in their existing units.

For utilization in the other productive purposes the categories Weaving, Matka Spinning and Silk Trading are greater in number, they are 25.53%, 18.65% and 38.57% respectively. For Reeling it is 9.42%, and for Profession it is 7.83%.

**Table-9 :Purpose Wise Distribution of Formal Loan in Surveyed Villages (Percentages);
(Murshidabad District):**

Purpose of Loan	Category of Households				
	Weaving	Matka Spinning	Reeling	Silk Spinning	Silk Trading
New	18.32	8.25	40.25	6.99	26.19
Existing	30.54	26.05	8.33	9.54	25.54
Other	25.53	18.65	9.42	7.83	38.57
Total	32.54	24.27	9.05	8.23	25.91

Source: Field Survey.

Observed Credit Gap for Different Categories of Households in Surveyed Villages:

Credit requirements as reported by the households and credit actually available were compared to work out the existence of CREDIT GAP if any.

To estimate the credit gap, as have done in Howrah district, here in Murshidabad district also we first estimated the amount of formal credit required as specified by the households in Rupees and then calculated the actual amount of formal credit available in Rupees for the different category of households separately. Then the difference between these two gave the credit gap. Then we have calculated the percentage of the credit gap, which is shown in column-4, 5 & 6 in table-10.

For the category Weaving the credit gap is 65.66%, that is more than 65% of the credit requirement remain unfulfilled. For the category Matka Spinning the gap is 83.30%, for Reeling it is 72.97%, for Silk Spinning it is 92.26% and for Silk Trading it is 94.27%. So we see that for the categories Silk Spinning and Silk Trading more than 90% of the credit requirements remained unfulfilled. Finally considering all the categories of households together we have the credit gap 87.64% i.e. more than 87% of the credit requirements remained to be fulfilled.

Table-10: Estimates of Credit Gap for Different Categories of Households in Surveyed Villages; (Murshidabad District):

Category of Households (1)	Total Income (In Rupees) Per Household(2)	Formal Credit Available(In Rupees) (3)	Formal Credit Required (in Rupees) (4)	Credit Gap in Percentage (5)
Weaving	18660.00	1,25,346.00	3,65,098.00	65.66
Matka Spinning	11604.00	1,12,997.00	6,76,656.00	83.30
Reeling	15750.00	10,475.00	38,765.00	72.97
Silk Spinning	30342.00	19,675.00	2,54,298.00	92.26
Silk Trading	36000.00	89,412.00	15,62,525.00	94.27
All	112356.00	3,57,905.00	28,97,342.00	87.64

Source: Field Survey.

In order to explain the access to formal credit by the Muslim households we have run the logit regression model, the dependent variable is actually the log of all ratios. The odd ratio is defined as $P_i/(1 - P_i)$ where P_i is the probability of getting a formal/informal loan by the i th household (Maddala 1992). We have applied the method of maximum likelihood to estimate the logit regression model. Computing the asymptotic ratios we have tested the significance of various explanatory variables seven in numbers ($X_1 - X_7$) in determining the access to formal credit (Y_1). We have also computed the value of F - Statistic in order to test the overall significance of the regression. Furthermore, we had run the logit regression to explain the access to informal credit and computed the results.

To look at the accessibility of credit we have run the logit model. The relevant variables we have used for the regression analysis are as follows:

Dependent Variable:

1. Y_1 = Access to formal credit (Formal Credit Taken=1, Otherwise=0).
2. Y_2 = Access to informal credit (Informal Credit Taken=1, Otherwise=0).

Explanatory Variables:

1. X_1 = Annual Income (in thousands).
2. X_2' = Utilization of Previous Formal Credit (Fully or Partly = 1, Otherwise = 0).
- 2'. X_2'' = Utilization of Previous Informal Credit (Fully or Partly = 1, Otherwise = 0).

3. X_3 = Education (Number of Years of Schooling).
4. X_4 = Worker-Dependent Ratio.
5. X_5 = Default (Fully or Partly = 1, Otherwise = 0).
6. X_6 = Family Size.
7. X_7 = Familiarities with Political Leaders (Yes = 1, No = 0).

We have regressed the dependent variable on the explanatory variables separately for both the formal and informal credit cases.

From the logit regression results of the pooled data both the districts (Howrah and Murshidabad) taken together, we have found that in the formal credit market the

$$Y_1 = -2.540 + 0.230X_1 + 3.435^*X_2 + 0.578X_3 - 0.191X_4 + 3.365^*X_5 + 0.794^{**}X_6 \\ + 3.173^*X_7$$

(0.968) (3.991) (2.872) (-1.234) (12.369) (2.713)

(3.419)

$$R^2 = 0.507$$

Note: * indicate significant at 1% level.

** indicate significant at 5% level.

variable 'utilization of previous formal credit' has significant impact on the accessibility of present formal credit. Here the null hypothesis that there is no relationship between the accessibility and the utilization of the formal credit has been rejected at 1% level of significance. Default rate has no negative impact rather it has positive impact on the accessibility of formal credit. That is the defaulters face no difficulty in getting formal loan. The other reason may be such that for some loans supplied by the Govt. such as IRDP loans are sometimes misrepresented by the political leaders as grants and interpreted as repayment is not required. The picture is same for the districts of Howrah and Murshidabad separately.

$$Y_2 = -2.239 - 0.373^*X_1 + 0.342^{**}X_2 - 3.829^*X_3 + 3.250^{**}X_4 + 0.171X_5 + 0.261^*X_6 \\ + 0.157X_7$$

(-1.272) (1.572) (-3.406) (2.108) (0.483) (0.930)

(0.363)

$$R^2 = 0.832$$

Note: * indicate significant at 1% level.

** indicate significant at 5% level.

Taking the case of the accessibility of credit in the informal credit market into consideration, it has been observed that utilization of previous informal credit has a significant positive impact on the accessibility of present informal credit. Default rate and familiarities with the political leaders have no significant influence on the accessibility of informal credit. This may be explained as, since the collateral amount is very high compared to the amount of borrowing so the default may cause harm to the borrowers not to the lenders. This is because

the lenders may appropriate the collateral amount as penalty. In case of accessibility of informal credit annual income and education have significant negative impact. This may be explained as the households having higher annual income require less informal credit but the poor people with low annual income sometimes in distress due to festivals, or in cash shortage situation, require informal credit. Hence the requirements of informal credit are high for the poor and vice-versa. The households those who have higher education is quite aware of the exploitative nature of the informal credit and are also well equipped with the knowledge about the procedure of getting bank loan. So the higher the education level the less is the dependence on the informal credit sector and vice-versa. Worker-Dependence ratio and family size have significant positive impact on the accessibility of the informal credit. This may be explained as when the family size is large the working members of the family may also be large and the two variables here may explain each other and have the reason to access higher informal credit and vice-versa.

Conclusion and Policy Considerations

In the light of the above findings, the following policy suggestions may be put forward:

- (1) In our survey findings we have found that there is a wide credit gap among the households engaged in cottage based industrial activities. This implies that there is every scope for the banking sector to enter into this sphere of the activity groups to meet their credit needs, which may be otherwise taken care of by the informal lending sector.
- (2) A few bank branches that are present are far beyond the reach of the households because of the complicated procedure they maintain to give the loans. Since most of the households in the community are illiterate therefore the banks should make the procedure simple and flexible for the community to accept it.
- (3) Lack of education is one of the reasons among the community households for not accessing the formal credit. Therefore spread of education in these areas should be given emphasis. The social sector has to be strengthened. That is schools, colleges have to be build up and of course special attention should be on primary education.
- (4) The areas are backward in infrastructural development. Roads that connect these areas with the nearby towns or cities are very poorly maintained. So getting formal credit or marketing their products is hampered and a huge amount of cost is incurred for these purposes. Therefore infrastructural development should be focused upon i.e. construction and repairing of roads etc.
- (5) People must be healthy to make productive use of bank credit. So health situation has to be improved which the community lacks. This can be done by constructing health centres/hospitals, supplying safe drinking water, improve sanitary and drainage system etc.
- (6) To improve the qualities of the product technical know how, artisan training, entrepreneurial development programs should be provided along with credit.
- (7) Govt. should take care of the marketing of the products produced by the community by implementing market promotion in the form of making arrangements for the producers to take part in the national and international handicrafts fairs.
- (8) Strong Govt. intervention may be required to break the vicious circle of interlinkage. The availability of inputs, remunerative prices, market facilities need to be improved. The setting

up of special economic zones for the textile – based activities, the formation of some form of co-operation & self-help groups may be considered for this minority group.

(9) Globalization may be thought as one of the aspects of strengthening the interlinkage and exploitative relations which should be taken care of. Some form of social control, may be evolved that may help to transform these people into active growth agents.

(10) So far as financial services are concerned, it is reported that the producers would like the loan amount to cover at least 75%, if not the full, of the project cost. Insufficient funds do not translate into concrete productive returns, from their point of view.

(11) The newly emerging microfinancing institutions as also the strengthening of productive – activity based co-operatives that may combine the advantages & flexibility of informal credit with social banking of the formal credit sector, may augment the flow of credit & its reach to those vulnerable sections.

(12) The tendency of political parties to interpret credit as grants, with a view to increasing their own popularity, among the vote-bank, has negative implications on the development of the credit markets in general. This weakness need to be overcome.

It may be quite possible that efficient rural credit markets are a consequence rather than a cause of development. It is our opinion that further research is needed to test the strength of this hypothesis using the plight of the Muslims of Howrah and Murshidabad districts as a point of reference. Such a study detailed with the socio – economic and historical details of this community may help to throw light on an important question relating to the development process itself as is observed in the Third World economies. Such findings may obviously be in contrast to the existing development theories.

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