

## **Estimating Moral Hazard in Indian Banks a Study of 6 Large Banks from India**

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**Abstract:** *Moral Hazard is a problem facing lenders across the world. The problem originated in economic literature a few decades ago and there is ample geographical evidence of instances of Moral Hazard however, there appears to be no method of measuring the same at the level of lenders or economies.*

*This paper attempts to provide a metric for estimating Moral Hazard in Indian banks using analytical techniques. It presents a small step as an attempt at 'quantifying' Moral Hazard in Indian banks and taking a look at the problem at the macro / system level. It is open for discussion and debate as also for further inputs by contemporary researchers.*

*This paper performs computation on advances and Gross NPA as published by selected banks for the 14 year period 2002-2015 and also tracks evidence from the field about moral hazard. It goes on to compute the Index of Moral Hazard based on existing actual ex-post data.*

*There is an urgent need to take steps to curtail the problem of NPA with a view to enhancing the health of Indian banks.*

**Keywords:** *Economics of Information, Indian PSU Banks, Moral Hazard, Willful Default*

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### **I. Introduction:**

Non-Performing Assets or NPAs affect almost all banks in the world. Moral Hazard falls in the broad category of issues classified in the field of Economics of Information and is the subject matter of this paper.

Reserve Bank of India, the regulator of Indian banks has guidelines and Master Circulars to enable banks to manage various aspects of bank lending and NPA management during the course of their operations. One such Master Circular (MC) relates to Willful Defaults which aims to put in place a mechanism to identify and declare such accounts, deny further banking facilities to such defaulters and recently, even deny opportunity to access capital markets (to be implemented by SEBI). In terms of the MC, Willful default covers : a) Deliberate non-payment of the dues despite adequate cash flow and good networth; b) Siphoning off of funds to the detriment of the defaulting unit; c) Assets financed either not been purchased or been sold and proceeds have been misutilised; d) Misrepresentation / falsification of records; e) Disposal / removal of securities without bank's knowledge; f) Fraudulent transactions by the borrower. All aforementioned actions fall in the domain of MH hence WD is a good indicator of MH while we may see further refinement in the area in the days to come. On the advice of RBI, banks and FIs started reporting all cases of WD, which occurred or were detected after 31st March 1999 on a quarterly basis. It covered all NPA accounts with outstanding aggregating Rs.25 lakhs and above identified as WD by a Committee of higher functionaries headed by the Executive Director and consisting of two GMs/DGMs. Banks/FIs were advised that they should examine all cases of WD of Rs 1.00 crore and above for filing of suits and also consider criminal action wherever instances of cheating/fraud by the defaulting borrowers were detected. In case of consortium/multiple lending, banks and FIs were advised that they report WD to other participating/financing banks also. Cases of WD at overseas branches are required to be reported if such disclosure is permitted under the laws of the host country.

### **II. Literature Review**

A brief review of the extensive literature on the subject is presented below.

Diamond (1984) argued that diversification within the financial intermediary is the main reason financial intermediaries exist. When outcome from firms investment project is hidden from external agents, it leads to a MH problem as it incentivises borrowers to default on a loan even when the project is successful.

Williamson (1986) developed a model of credit rationing where borrowers are subject to a moral hazard problem. In case of information asymmetry, the borrower will have an incentive to falsely default on the loan.

Jappelli and Pagano (2000), reported that information asymmetry can prevent efficient allocation of credit arising out of lenders inability to observe borrowers characteristics, including riskiness of projects. Lenders may also be unable to control borrowers actions after they receive a loan. Even a solvent borrower may try to avoid repayment. Statistical risk management processes may be used to grant and price loans.

In his address to industry, Muniappan (2002), stated that recovery of dues by banks is directly related to the performance of the borrowal unit/industrial segments. A departmental study showed various internal and external factors which contribute to NPAs. It was also found that lack of effective co-ordination between banks and financial institutions in respect of large value projects contributes to NPAs even at the implementation stage.

Claus and Grimes (2003), reported that financial intermediaries can handle market failure and information asymmetry problem. MH arises when a borrower engages in activities that reduce the likelihood of a loan being repaid, eg when firms, owners siphon off funds (legally or illegally) to themselves or to associates. It lowers the probability of loan repayment.

Duffie & Singleton (2007), stated that MH inherent in markets for credit present challenges that are not present (at least to the same degree) with many other forms of market risks. Economics of risk management for financial firms is far from an exact science. Market imperfections provide banks and financial institutions opportunities to bear and control financial risks. An appropriate appetite for risk is ultimately a matter of judgment based on multiple factors. Banks classify, measure and limit credit risk in multiple classifications and develop policies and systems for managing them.

Crockett (2003), stated that prompt corrective action is clearly appropriate in the event of poor risk management. This spurs prudent behavior and avoids compounding of mistakes.

Mishkin (2003), stated that lenders try to screen out good from bad credit risks. However, this process is inevitably imperfect. Legal problems exist in many countries. Collateral can help reduce MH problems by reducing lender's losses in event of default. Government intervention in credit markets is an issue. Private institutions are more incentivized than governments to tackle MH and lend for productive investment opportunities because they are driven by profit motive. Such government intervention in credit markets often results in less efficient investment and slower growth.

Mehrteab (2005), outlined issues in the discipline of "economics of information" viz in many markets information is asymmetrically distributed and is costly to acquire. According to Stiglitz (1989) financial contracts include elements that lead to the basic problems of MH. Analysis of credit markets is contrary to the classical teachings of the market mechanism.

Tirole (2006), has provided a lucid description on the subject. In the last thirty years, economists, following the impetus of earlier researchers have worked on MH. Information asymmetries may prevent outsiders from hindering insider behavior, leading to market breakdown and cross-subsidization of bad borrowers by good ones.

Thakor et al (2008), stated that banking is fragile and institutions face an important probability of failure and a potentially severe MH problem, and failure has associated with it a large systemic social cost.

Rodrik and Rosenzweig (2010) analysed borrowers efforts in credit markets, which also may lead to voluntary default, where the borrower has the ability to repay but chooses not to do so. MH may be addressed through dynamic incentives, for example, threat of termination of credit, introduction of credit bureaus etc.

Dionne (2012), reported that MH was introduced in the literature in 1963 by Kenneth Arrow after which it was defined and was later formalized. Several forms of contracts were observed including those relating to debt with collateral. However, numerous complications arise when an attempt is made to measure the phenomena.

According to Wikipedia (2014), MH can be divided into two types when it involves asymmetric information (or lack of verifiability) of the outcome of a random event. An ex-ante Moral Hazard is a change in behavior prior to the outcome of the random event, whereas ex-post involves behavior after the outcome.

Levent Koçkesen has stated that Moral Hazard arises due to agent's action not being observable. MH originated in insurance literature where it is defined as ability of insured individuals to affect the probabilities of events. There is MH when agent takes an action that affects his payoff as well as the principal's.

Rawlin et al (2012), modeled NPA of a mid-sized NB as a function of Advances for 2001-10. Linear and non linear models were developed. Model accuracy can be improved by combining different non-linear models.

### III. Methodology

#### Research Questions

This paper looks at some important outstanding questions. As there appears to be no uniformity on a suitable measure of the problem relating to MH, this paper attempts to measure the extent of MH and also attempts to arrive at an ex-post indicator for ranking banks and their processes.

The following objectives have been outlined in this paper.

1. Definition of MH.
2. Explanation of key terms related to MH.
3. Estimation of Index of Moral Hazard (IMH) for chosen banks.

**Definitional Issues** – expressed in very simple terms, MH may be taken to refer to a situation where - a bank discovers that it has been ‘cheated’ by a borrower who has resorted to incorrect and improper utilization of disbursed loans for unapproved actions. We can conceive of an IMH, which may be defined to reflect the percentage of amount of Willful Default loans over the advances and / or to existing NPA. It may be worthwhile to consider an ex-post IMH, which may be considered as a measure of MH based on past actions of the borrower. With passage of time, and with availability of new information there may be a refinement in the metric, which may lead to a healthy situation for the bank, however, if it not addressed, it may indicate that the bank fails to learn from its past decisions.

#### Modeling

In this paper, we use simple mathematical techniques for definition of the index. The computation rests on three key variables – cases reported as WD, Gross NPA (GNPA) at end of the year AND advances. Being stock measures of the variable at the end of the accounting period, they are suitable for comparative assessment.

#### Data

The study is based on secondary data. Data for the study has been obtained from reliable commercial sources such as CMIE, Capitaline and Ace Equity, in addition to the RBI and CIBIL websites, pertaining to the period 2002-2015

Top six banks for which maximum data was available, have been chosen from the profile of banks by RBI. The banks are – Bank of Baroda, Bank of India, Canara Bank, HDFC Bank, ICICI Bank and State Bank of India. The selected banks have furnished information pertaining to WD to CIBIL as required by RBI. Cases of WD have been limited to those disclosed by banks.

### IV. Results and Discussion

#### Description of the Index of Moral Hazard

The IMH has been computed using reported cases of WD where suits have been filed (amount > Rs 25 lakh) and gross NPA as also over advances, employing geometric mean over the relevant period. The computed index denotes, proportion of GNPA, declared as WD. Description and variable-wise descriptive statistics is as under :

**Advances** : Total advances at end of the year, reported by banks in Rs crore. A snapshot of data from the data frame, relating to State Bank of India is placed in Table 1.

**Cases Reported as WD**: Total amount of loans reported as WD as at end of the year by the bank. Banks have been advised to report such cases on a quarterly basis. Table 2 shows the amount of Suit Filed Willful Defaulters (> Rs 25 lakh) declared and reported by each bank in Rs crore as at end of each year in the period. Fig.1a through Fig. 1g represents the above information in a graphic summary form. In the above Fig. 1g, except for data of State Bank of India (which is very large, and is hence plotted on the secondary axis), all other bank WD information can be read from the primary y axis.

**Gross NPA** : Total amount of loans classified as GNPA by each bank as at end of the year. Fig 2a to 2f represent both Gross NPA and WD cases for each bank in the study. The line plot shows the WD cases while the bars show the GNPA in each year.

### **Ratio of WD cases to Advances and to Gross NPA**

Ratio of WD amount to advances and GNPA has been computed for each bank, for each year. The ratios for each year have been averaged using geometric mean and the findings are as presented in Table 3. The ratios have been presented after sorting them in increasing order. The ratio of WD/GNPA may be named as IMH as it reflects the true extent of contamination of portfolio arising out of Moral Hazard type of issues.

## **V. Results**

1. The incidences of WD have increased in recent years almost for all banks. This could be due to the fact that banks have become more aware of the problem, OR that they feel that there are more legal and other empowerment available to lenders for such action.
2. Ratio of WD / Advances shows the proportion of loans disbursed which end up being classified as WD. In the sample study above, the best ranked bank is ICICI Bank which has less than 0.1% loans eventually classified as WD, while the last ranked bank is Canara Bank is almost 1% (ten times that of ICICI Bank). This implies that almost 1% of all borrowers at Canara Bank end up being classified as WD over a period of time.
3. Ratio of WD / GNPA shows the proportion of loans reported as Gross NPA over a period of time and which end up being classified as WD. On this dimension too, ICICI Bank is ranked highest with just about 2% of its GNPA ending up as WD, while the figure is alarming for Canara Bank where the figure is 48% (i.e. 24 times that of ICICI Bank). This indicates that almost half of all accounts classified as GNPA at Canara Bank are likely to end up as WD in due course. Such a situation is not healthy at all and possibly indicates structural weaknesses in selection of borrowers for lending and their eventual classification as WD.
4. A bubble chart for the above information is presented in Fig 3. The parameter on the x-axis denotes a ranking / ordinal location of the data point (bank under consideration). The y-axis denotes the ratio of WD/Adv and the size of the bubble denotes WD/GNPA (thus, showing the level of contamination of the GNPA).

Table 3 enables us to infer that that of all the money lent by any bank, the proportion of WD is stuck up in court cases, where the borrower has been identified and declared as WD and hence it is not likely to follow the expected cash flow profile for the bank in the time to come.

It may not be a one-level simple situation to suggest that the rule for rating banks would be the lower IMH the better OR the higher the IMH the better. However, it appears that the lower the IMH the better it is, may be a good enough rule to rank banks. The table highlights that the problem of identification and reporting of cases is important, and that both the corporate finance and the legal teams of the bank needs to constantly be alert and take steps to quickly identify occurrence of events / conditions stipulated by RBI and take steps to approach courts. There may be a strong case to strengthen the legal departments in the banks to ensure that filing of suits and pursuing them in the courts is facilitated while maintaining good coordination among the team members of the corporate finance / loans / NPA department.

From an operational point of view, this raises one question - would sticky borrowers approach say, Bank X for financing, on the premise that they have a low IMH (i.e. is it unable to prove WD?). The answer could be that if indeed Bank X is a good bank, and if it has robust credit checks, sticky borrowers may not be able to get loans from Bank X, which is good for the economy. If they do get loans, the monitoring mechanism may be good enough to detect such cases on time and enable Bank X to minimize gross NPAs (and WD). In such a case, Bank X's IMH will keep on declining. If it does nothing substantial, and does not learn from its past actions, and does not take steps to tackle the problem, its IMH will increase. Similarly, in case of another lower ranked Bank Y, if the bank does nothing to improve its situation, in future it will keep attracting the sticky borrower which will lead to an increase in the IMH. However, if this bank chooses to tidy up its systems, then there is a possibility of the IMH declining. Therefore, it can be safely stated that all banks should aspire to reduce their IMH. This is easier said than done. As a first step, banks should undertake case by case analysis and review cases for NPA resolution.

## **VI. Summary of Findings**

Researchers in this area in India seldom have access to borrower level information, however, following may be generally derived from the above findings. The IMH has demonstrated a wide range which may send incorrect signals to the market. The IMH may prompt certain types of borrowers to approach certain banks. The borrowers may think that they can get away with asymmetric information at such banks which have high IMH,

particularly, if they may feel that credit and legal officers of such banks do not have access to better skills or coordination with other players. This could be a risky scenario for banks.

## VII. Conclusions and Policy Recommendations

For long there has been discussion on the phenomenon of Moral Hazard in credit institutions, however, no concrete measure has been considered so far particularly for economies like India where a lot of information about borrowers (or their intentions) is not readily available. As the economy grows, with passage of time, and with establishment of credit information agencies, there is a likelihood of availability of more relevant information in the years to come. In the interim, it may be useful to consider an ex-post measure of Moral Hazard. This becomes useful and may help in enabling regulator and banks to take steps to try to minimize this. However, there may be a need to allow this index to increase, as a one time measure to clean up the accounts. There is a case for further research by incorporating more variables and conducting more analysis. The study is presented subject to the following qualifications.

1. This is a preliminary study and needs more rigorous analysis for improving health of banks.
2. Regulator / bank managements may study the findings outlined above and arrive at metrics to minimize incidence of NPAs / WDs. Banks are in a better position to monitor this metric. They may also have component IMHs for different segments / components of their loan portfolios, in addition to having one IMH for the bank as a whole. They may have different strategies for each component.
3. There are various factors which could impact WD cases including societal, temporal and legal factors, which would have an impact on the index and these have not been captured in this exercise.
4. Annual Credit Policy documents of banks may be revised / focused to improve this metric, possibly with industry wise / sector wise loans and incidence of NPAs/WDs, and toning up credit and monitoring system to have a better view of the likely scenario of the business environment. To begin with, banks may establish 5 year and 1 year benchmarks for tracking.
5. Periodic borrower wise reviews are likely to reveal more trends and signals of borrower accounts becoming non performing.
6. The study is based on secondary data.
7. Though RBI has instructed banks to disclose such information through the Credit Information Companies Act, 2005, the credit information companies need to have better information handling systems. The quality of information available across the companies varies, despite the format being provided by RBI. Further, banks are insulated from researcher's efforts to getting the information, and the information companies taking no responsibility for the accuracy of the data, some inaccuracies may have crept into the information.

### Figures And Tables:

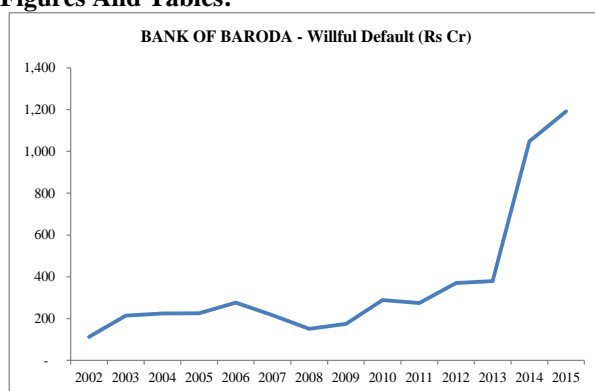


Figure 1a : Bank of Baroda WD

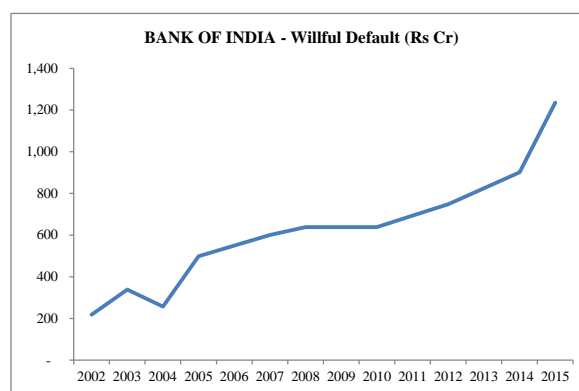


Figure 1b : Bank of India WD

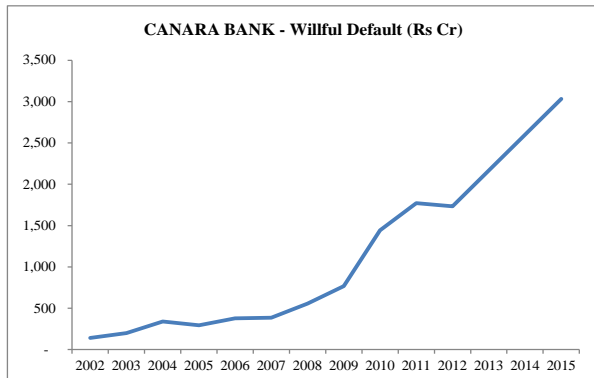


Figure 1c : Canara Bank WD

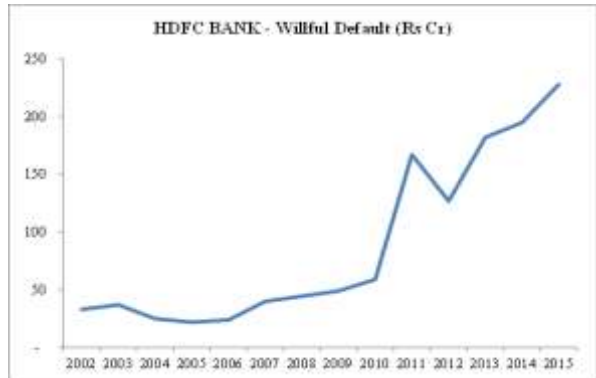


Figure 1d : HDFC Bank WD

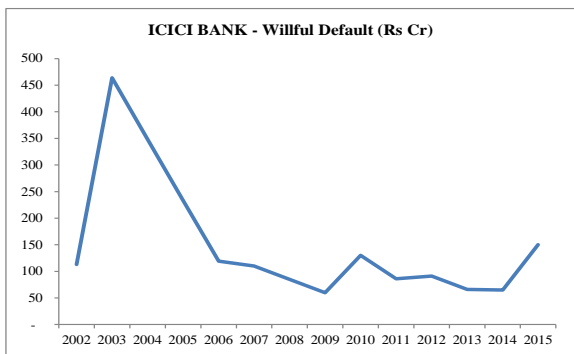


Figure 1e : ICICI Bank WD

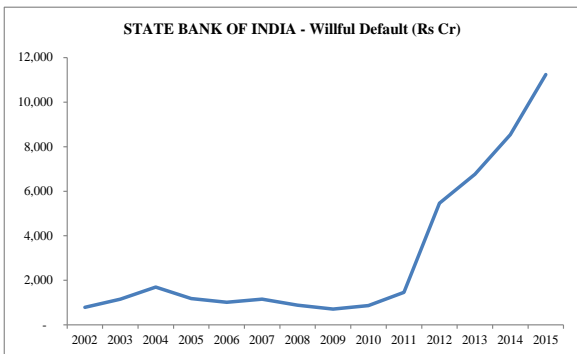


Figure 1f : State Bank of India WD

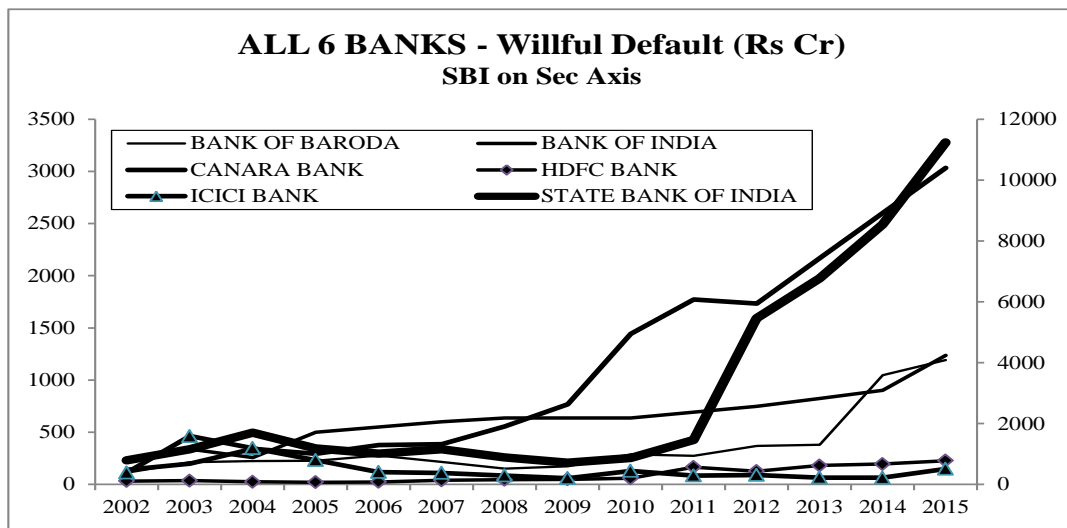
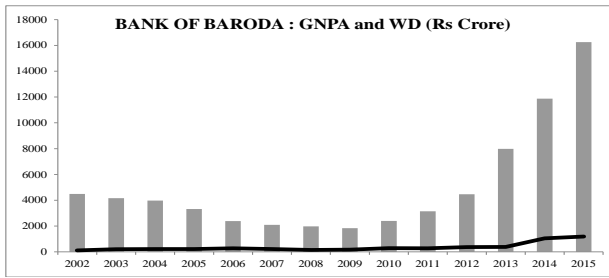
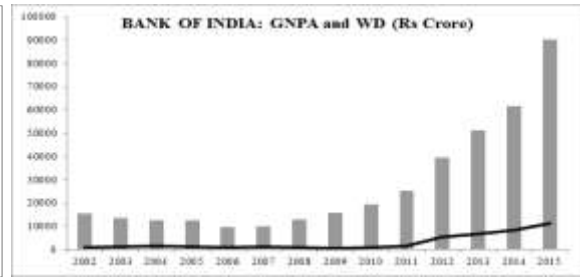


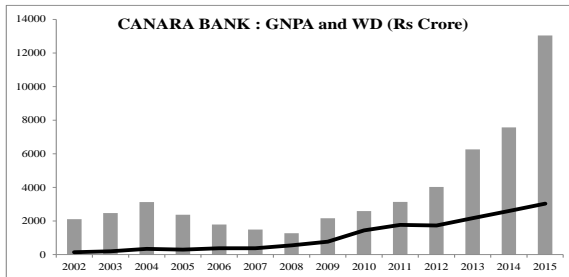
Figure 1g : All six banks, WD



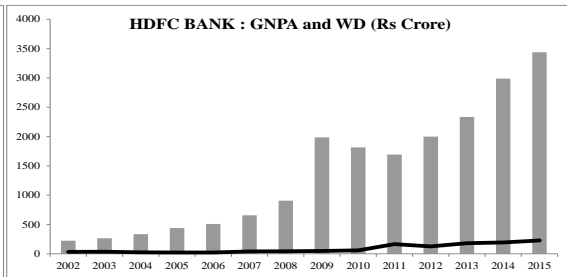
**Figure 2a : Bank of Baroda GNPA & WD**



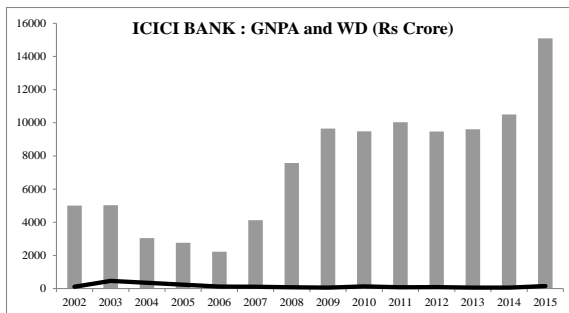
**Figure 2b : Bank of India GNPA & WD**



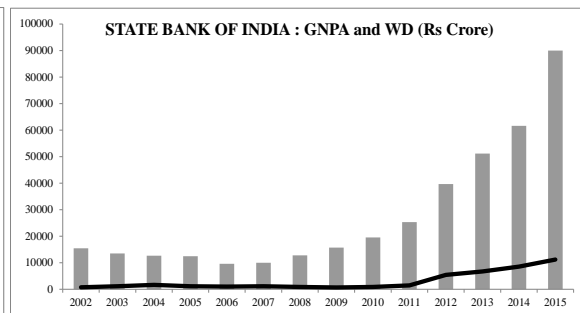
**Figure 2c : Canara Bank GNPA & WD**



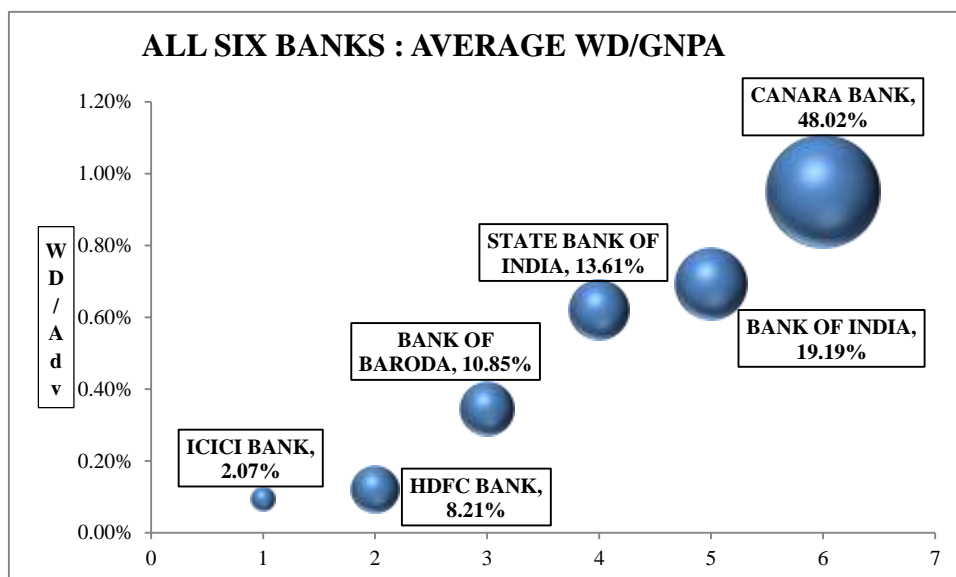
**Figure 2d : HDFC Bank GNPA & WD**



**Figure 2e : ICICI Bank GNPA & WD**



**Figure 2f : State Bank of India GNPA & WD**



**Figure 3 : Computation of WD to Advances and WD to GNPA**

**Table 1: Snapshot of Data pertaining to State Bank of India**

BANK	SECTOR	YEAR	WD No	WD size	WD Cr	ADV	GNPA
STATE BANK OF INDIA	PSU	2015	1,100	10.21	11,234	1,300,000	90,000
STATE BANK OF INDIA	PSU	2014	1,071	7.97	8,537	1,200,000	61,605
STATE BANK OF INDIA	PSU	2013	1,000	6.77	6,767	1,000,000	51,189
STATE BANK OF INDIA	PSU	2012	884	6.18	5,460	867,579	39,676
STATE BANK OF INDIA	PSU	2011	624	2.34	1,461	756,719	25,326

**Table 2: Amount of WD reported by each bank as at end of each period of the study**

Row Labels	BANK OF BARODA	BANK OF INDIA	CANARA BANK	HDFC BANK	ICICI BANK	STATE BANK OF INDIA
2002	113	218	141	33	113	788
2003	214	339	200	37	464	1,153
2004	225	257	341	25	348	1,701
2005	226	499	295	22	233	1,187
2006	277	550	378	24	119	1,015
2007	216	601	385	40	110	1,156
2008	151	638	556	45	85	890
2009	175	638	768	49	60	715
2010	289	638	1,443	59	130	870
2011	275	693	1,773	167	86	1,461
2012	370	748	1,734	127	91	5,460
2013	380	825	2,167	182	66	6,767
2014	1,048	901	2,601	195	65	8,537
2015	1,192	1,236	3,034	228	150	11,234

**Table 3: Computation of WD to Advances and WD to GNPA**

Bank	WD/Adv	WD/GNPA
ICICI BANK	0.09%	2.07%
HDFC BANK	0.12%	8.21%
BANK OF BARODA	0.34%	10.85%
STATE BANK OF INDIA	0.62%	13.61%
BANK OF INDIA	0.69%	19.19%
CANARA BANK	0.95%	48.02%

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