

## Asia's Enron: Satyam (Sanskrit Word for Truth)

Elisabetta Basilico  
Hugh Grove  
Lorenzo Patelli\*

Major financial reporting frauds need to be studied for lessons learned and strategies to avoid or reduce the incidence of such frauds in the future. Howard Schilit, the founder and Chief Executive Officer (CEO) of Financial Shenanigans Detection Group, observed (2010): "I read recently that the one lesson we have learned from history is that we have learned nothing from history. Yet my mantra remains that in order to find fraud, we must study the history of fraud. A common element is all the fraud I have described is that their warning signs were not hard to find; in fact, they were hard to miss."

Examples of fraudulent financial reporting which had tremendous economic impact on different national and international environments include Enron, Parmalat, Satyam, Qwest Communications International, WorldCom, AOL, Freddie Mac, Tyco, Xerox, and Lehman Brothers. All these cases showed that in order to successfully investigate and detect fraudulent financial reporting the analysis of financial statement red flags needs to be supplemented with the analysis of non-financial red flags concerning corporate governance mechanisms. As Sir David Tweedy, Chair of the International Accounting Standards Boards stated (2007), "The scandals that we have seen in recent years are often attributed to accounting although in fact, I think the U.S. cases are corporate governance scandals involving fraud."

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\* The authors are, respectively, Doctoral Candidate at University of St. Gallen, Professor, and Assistant Professor at the Daniels College of Business at University of Denver

In this paper, we analyze the 2009 scandal of Satyam, one of India's largest information technology companies and provider of computer software and business process outsourcing to large companies around the world including General Motors, Nestlé, and General Electric. We discuss financial and non-financial red flags. Specifically, we apply five financial fraud prediction measures and examine corporate governance elements. The results of our analyses suggest the importance of integrating financial and non-financial indicators. Supplementing financial indicators with non-financial red flags enables us to present the reverse KISS principle by Hilb (2005). The principle offers a consistent framework to design and assess corporate governance structures which could limit monitoring failures. The paper contributes to the literature and practice by providing an analysis of one of the most economically significant cases of fraudulent financial reporting. The analysis is not limited to descriptive anecdotal evidence. Yet, it is based on the application of five fraud detection financial measures. Moreover, it examines corporate governance factors in light of prior research. Finally, we offer a framework to help organizations and investors to assess the strength of corporate governance in reducing fraudulent financial reporting.

The paper has four main sections: Section I presents the main facts of the Satyam case; Section II and Section III analyze financial and non-financial red flags, respectively; Section IV proposes the reverse KISS model by Hilb (2005) to reduce fraudulent financial reporting; and Section V describes the epilogue of the Satyam scandal and concludes.

### **Section I: The Facts**

Ramalinga Raju, 54, former Chairman of the Board (COB) of Satyam Computer Services Ltd, originally known as a successful software entrepreneur, will be remembered in Indian

business history as the perpetrator of the country's biggest corporate fraud, also referred to as the "Enron of India." He was born into a farmers' family and educated both in India and the USA. He returned to India in 1977 and after venturing into the textile and real estate industry, he started Satyam in 1987.

Satyam was a global information technology services provider, offering a range of services, including systems design, software development, system integration and application maintenance. In 2008, Satyam reported \$2.1 billion dollar in revenues and employed over 53,000 IT Professionals in over 67 countries. The company went public in 1991 and the initial public offering (IPO) was 17 times oversubscribed. In the following decade, Satyam continued its growth and obtained the ISO9001 certification and several other awards. In 2001, Satyam started listing its American Depository Receipts (ADRs) on the New York Stock Exchange (NYSE) under the ticker symbol SAY. The size and prestige of the company have been constantly increasing. In 2003, The World Bank became a client of Satyam whose revenues reached \$1 billion in 2006 and \$2 billion in 2008. Satyam was often recognized as a center of excellence on risk management and in 2008 it was awarded the Golden Peacock for Excellence in Corporate Governance.<sup>†</sup>

All the facts and awards seemed to point to an exemplary corporation and to reflect the respect and confidence from the corporate world, financial analysts, and institutional investors. The board of directors did not nominally lack non-executive members and committees such as the Audit, Compensation, and Investors' Grievance committee.

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<sup>†</sup> The "Golden Peacock" award was instituted in 1991 by the Institute of Directors and was considered the holy grail of corporate excellence in areas of quality, innovation, training, governance, environment management and corporate social responsibility. Based on Satyam's most recent annual reports (2006-2007-2008), corporate governance was given high importance and driven by Satyam's core values: "Associate Delight, Investor Delight, Customer Delight and the Pursuit of Excellence."

The loss of respect and confidence started at the end of 2008. On December 16, 2008, Ramalinga Raju, COB of Satyam, announced the purchasing of Maytas Infrastructure and Maytas Properties for \$1.6 billion. The two Maytas companies were owned by the two sons of Raju and their businesses were unrelated to the core competencies of Satyam. Raju justified the decision by emphasizing the need of diversification at times of uncertainty and economic turbulence. On the following day, Satyam shares plunged as domestic and international investors were angry with the company which on December 18, 2008 announced to rescind the decision to purchase the two Maytas companies. Few days later, another fact raised deep concerns for investors. On December 23, 2008 World Bank announced to ban Satyam for at least 8 years from its list of possible suppliers of services citing alleged bribing of the bank staff and data theft. Following this incident, Satyam's ADRs fell by 50% overnight. From December 26 to December 29, 2008 four directors resigned including an independent director resigned.

On January 7, 2009 Ramalinga Raju wrote a letter to the Board of Directors and the Exchange Board of India (SEBI) to admit fraudulent financial reporting and resign as the COB of Satyam. In his letter, Raju stated that the company's balance sheet for the quarter ending on 30 September 2007 included inflated cash and bank balances of up to \$1.44 billion, understated liabilities worth about \$300 million and non-existent accrued income of \$86 million. Furthermore, Raju stated that none of the board members or immediate and extended family members was aware of the accounting scam. Raju was arrested two days after the letter and charged with several offences, including criminal conspiracy, breach of trust, and forgery. The Board of Directors was dismantled and replaced with six board members appointed by the Indian Government.

## Section II: Financial Red Flags

Although Satyam's auditor had been PricewaterhouseCoopers since 2001, Ramalinga Raju admitted that Satyam profits were inflated over several years to "unmanageable proportions" and that the company was forced to carry more assets and resources than its real operations justified. In a subsequent interview, he said that "it was like riding a tiger, not knowing how to get off without being eaten." In particular, Raju acknowledged that Satyam operating margins were less than 10% of what was reported.

Financial red flags associated with Satyam and its financial statements were not lacking. Table 1 reports the last financial statements reported by Satyam. Investors, financial analysts, and regulators had available several financial indicators to detect fraudulent financial reporting, including the following:

1. There was the existence of large "accrued interests", which raised the question of banks not paying interest on Satyam's fixed deposits versus just accruing interest (in hindsight these cash deposits had been stolen by the Raju family).
2. Satyam was showing continuous and aggressive sales growth at double digits as well as a 35% EPS growth over a period of 5 years. Jitendra Singh, a Wharton management professor, argued, "when you have companies that are ostensibly growing their top lines at 30%, 40% and 50%, it is possible to paper over things. Satyam was doing it by boosting sales and profit. (Bernie Madoff was doing it by boosting rates of returns.) Then, when growth rates slow down, you are unable to hide the financial reality of how much cash you have." Notably, when the whole industry is growing at a fast pace, it is

easier for companies within the industry to claim that they are doing well. The IT outsourcing industry has been going exponentially in the last twenty years and Satyam took advantage of this favorable scenario to inflate its own growth.

3. Unpublicized, under-the-radar, share sales by insiders lowered their ownership from 17.4% in March 2004 to 8.7% in March 2008.
4. The proposed deal to purchase stakes into Maytas Properties and Maytas Infrastructure, which were businesses connected with Raju's family, was announced right before the scandal started to unfold and caused bold opposition from the investor community. These businesses were suffering severe financial problems due to the credit crunch. Investors and financial analysts could not find any type of acquisition synergies and they alleged that this proposed acquisition was an attempt by Raju to bridge the liquidity crunches of both Maytas Properties and Maytas Infrastructure. At a time when companies worldwide were building cash reserves to face the global financial turmoil, this proposed acquisition did not seem to make financial sense for Satyam.

In order to propose a more sophisticated framework to assess financial red flags, we applied five recent financial fraud prediction models and ratios, as compiled by Grove et al. (2010), namely:

1. Z-Score Fraud Prediction Model (Beneish 1999; updated by Basilico and Grove 2008)
2. F-Score Fraud Prediction Model (Dechow et al. 2007)
3. Sloan Accrual Measure (Sloan 1996; updated by Robinson 2007)
4. Quality of Earnings Ratio (Schilit 2003)
5. Quality of Revenues Ratio (Schilit 2003)

These five financial red flag ratios and models were applied to the three most recent Satyam financial statements, prior to the fraud being exposed (i.e., 2008, 2007, and 2006). The Appendix contains a detailed description of the specifications of these five models and ratios.

As shown in Table 2 and Table 3, both fraud prediction models (i.e., the Z-Score and the F-Score), did predict fraudulent financial reporting at Satyam based on financials reported by Satyam in 2008 and 2007. Neither the Z-Score model nor the F-Score model predict fraudulent financial reporting based on financials reported by Satyam in 2006. Results based on the fraud detection models offer consistent evidence to predict fraud in Satyam in 2008 and 2009. Table 4 shows the values of the three fraud ratios (i.e., Sloan Accrual Measure, Quality of Earnings Ratio, and Quality of Revenues Ratio) for 2008, 2007, and 2006. The Sloan Accrual Measure indicates fraud only based on financial reported by Satyam in 2006. The Quality of Earnings Ratio indicates fraud consistently throughout the three year period. The Quality of Revenues Ratio indicates fraud based on financials reported by Satyam in both 2008 and 2007, yet does not indicate fraud in 2006. Overall, by using financials reported by Satyam in 2008 and in 2007, both fraud detection models and two out of three fraud ratios predict fraud; by using financials reported by Satyam in 2006, none of two fraud detection models and only one out of three fraud ratios predict fraud. These results show how the fraud in Satyam was significantly associated with financial fraud indicators. The ability of these financial fraud indicators to predict fraud increased as the unveiling of the fraud got closer in time, i.e., from 2006 to 2008.

### **Section III: Non-Financial Red Flags**

Satyam had listed its ADRs on the NYSE, where foreign companies typically get listed in order to raise capital at a lower cost partially because they accept NYSE's higher standards of

corporate governance than many other stock exchanges. Table 5 reports the composition of the Board of Directors. However, there were numerous non-financial red flags associated with a failure of corporate governance, including the following:

1. All-Powerful CEO

According to recent studies (e.g., Cullinan and Sutton, 2002; Grove and Cook, 2007), CEOs and senior managers were involved in 90% of the 276 companies cited by the Securities Exchange Commission (SEC) in its Accounting and Auditing Enforcement Releases (AAERs) from 1987-2001. This was true in the recent big fraudulent cases such as Enron, WorldCom, HealthSouth, and Parmalat. Typically, research on corporate governance detects the presence of an All-Powerful CEO whenever he/she is also the COB, meaning whenever CEO duality exists. Satyam was not a case of pure CEO duality since Ramalinga Raju, COB, was not the CEO. Yet, his brother Rama Raju was the CEO. Therefore, even though CEO duality could not be determined, it was simple to recognize a lack of independence between the CEO and the COB, and, thus, the presence of an All-Powerful CEO.

2. Independent Directors

In their company listing requirements concerning corporate governance, major international stock exchanges mandate the presence of independent members on the Board of Directors to improve the monitoring power over the management (Grove et al. 2009). Table 5 shows the education, experience, and background of the five independent directors. More than one member was linked to the Harvard University circle and more than one member was involved with the Indian Government. These



two non-financial indicators suggest a substantial lack of independence. Moreover, Nandini Raju, the wife of Ramalinga Raju, was a member of the Board of Directors of more than ten Indian firms. Finally, Ramalinga Raju was constantly involved with the Indian Government. Since 1995, Raju had befriended a Chief Minister, Naidu. This move was aimed at obtaining competitive advantages by leveraging strong governmental support. For example, this strategy gave Raju and Satyam the opportunity to buy prime real estate at very low prices. Naidu's aim was to make the city of Hyderabad, Satyam's headquarters, an information technology hub and his administration allotted large chunks of land to develop a software technology park with obvious benefits for Satyam.

### 3. Weak System of Internal Controls

Senior management often encourages weak control systems so that they can be easily overridden to opportunistically meet desired financial targets. An examination of the board's background information reveals that the composition of the Audit Committee and the education and experience of its members were inadequate to perform effective financial auditing. Table 5 shows the lack of expertise in accounting and finance of the board members, especially of those sitting on the Audit Committee. Regarding this delicate corporate governance factor, investors were explicitly warned by Satyam in its August 2008 Form 20-F. Satyam reported, "We do not have an individual serving on our Audit Committee as an 'Audit Committee Financial Expert' as defined in applicable rules of the Securities Exchange Commission. This is because our Board of Directors has determined that no individual audit committee

member possesses all the attributes required by the definition 'Audit Committee Financial Expert.'

4. Focus on Short Term Performance Goals

Aggressive strategies focused on maximization of short-term earnings deviate managerial attention from long-term value creation and can lead to shareholders' wealth expropriation. Satyam was incorporated as a private limited company with 20 employees in 1987. By 1991, it had a 17 times oversubscribed IPO. By 1999, it had a presence in 30 countries and had 10,000 employees. Between 1997 and 2004, it experienced a constant annual growth revenue rate of a staggering 61.35%, showing revenues of almost \$1 Billion, and by 2005 it had 16,872 employees. By 2008, revenues were shown of \$2 Billion with a headcount of 45,969. This unbelievable growth, coupled with evidence from several articles describing the history of Satyam, point to the management style of the Raju brothers, focused on constant double digit revenue growth, as well as fast head count growth.

5. Questionable Business Strategies with Opaque Disclosures

As Warren Buffet, worldwide well-known investment guru, effectively stated, "If you don't understand what a company does, don't invest in it. If management refuses to fill in holes and keeps investors in the dark, run!" A culture of financial opacity covering questionable business practices supports fraudulent intentions and create a favorable environment for financial misreporting. The Raju brothers appeared to be very insensitive to the issue of transparency and accountability. In many occasions, investors had to raise their voice to prevent the Raju brothers from using their dominant position to benefit their family businesses instead of Satyam's shareholders.

When Satyam was still a private limited company, Raju family members were the only ones managing the company's finances. They used to take care of their other family businesses, sometime diverting funds from one firm to another one without any consistent financial plan and rigor. When it went public in 1991, Satyam lost its private independence and had to start adhering to regulations of public firms, especially concerning the use of cash reserves and accountability mechanisms to preserve the interests of the new non-family shareholders. In 1992, the issue of using cash reserves as investments in other sister companies was not properly disclosed. An agreement had to be signed whereby the Satyam family members would stop using Satyam's cash reserves for their other, privately held family companies. Despite the agreement, the issue of investing in a sister company surfaced again in 1998. Investors reacted negatively and forced the Satyam brothers not to invest such funds in their sister companies. In 2008, right before the confession of fraudulent reporting, the issue of investing in sister companies (i.e., the Maytas companies) arose again. Investors again questioned the reasons behind this investment strategy and stopped the investment.

#### **Section IV: Strategies to reduce fraudulent financial reporting**

The case of Satyam teaches that in addition to applying the financial red flag ratios and models for fraud risk management, an overall strategy to reduce fraudulent financial reporting is to have strong corporate governance (Grove and Basilico 2010). Hilb (2005) proposes a comprehensive and multidimensional framework to help develop strong corporate governance and reduce fraudulent financial reporting. This framework considers both financial and non-financial elements and is based on the reverse KISS principle for corporate governance. The

acronym stands for **S**ituational, **S**trategic, **I**ntegrated and **K**eep it controlled and it builds on the shortcomings of more traditional corporate governance approaches and guidelines which tend to propose a dangerous universal approach and often lack (i) strategic direction within board practices; (ii) integration and professionalism in board selection, appraisal, remuneration and development; and (iii) in depth know-how in auditing, risk management, communication and evaluation.

### Situational

Corporate governance practices need to be appropriate to the specific context (nation, industry, size, etc.) of the firm. At one extreme, there are national jurisdictions (i.e., US and UK) based on diffused shareholding and stock options and equity based compensation of managers, where commonly there are strong incentives to inflate short-term earnings. At the other extreme, in countries like India, shareholding is concentrated and the critical actor is the controlling shareholder or “promoter” (not senior management). In such situations, frauds are typically not a result of inflation of earnings but related party transactions, like siphoning of assets to other sister companies owned by the controlling shareholder. Satyam has been named the “Enron of India” but it was really more similar to Parmalat (the “Enron of Europe”) which also involved affiliated transactions and misstatement of financials from stealing company cash. As argued by Dossi et al. (2010), the form of the relationship between ownership and management shape the structure of corporate governance. Investors, financial analysts, and regulators should claim the adoption of different corporate governance structures in different situational contexts and future research should consider national differences in studying the effectiveness of corporate governance elements (Dossi et al. 2010).

### **Strategic**

Hilb (2009) recommends that members of the Board of Directors should “possess the same market/product and functional know-how as top management, as well as complimentary team roles, such as a critical thinker or a financial controller. In addition, each member should play the role of one stakeholder (customer, shareholder, employee and the society).” Moreover, according to Hilb (2005), “an effective Board structure is comprised of a small, legally, well diversified board, comprising a maximum of seven members, including an Independent COB, independent members and the CEO. In addition, the board should conduct its activities through only two committees: an integrated audit and risk management committee and an integrated board management committee”. Table 5 clearly and succinctly shows how the composition of Satyam’s Board of Directors does not meet any of the recommendations concerning the **Strategic** dimension of Hilb’s (2005) framework.

### **Integrated**

The components within this **Integrated** dimension relate to Board Selection, Board Feedback, Board Remuneration, and Board Development. The visibility and market perception or relationships with the promoters should not be the only criteria while choosing independent directors. In India, where social power heavily depends on belonging to a given class, it is hard to nominate independent directors based on competence, integrity, and objectivity. Moreover, the Indian Government does not require a Nomination Committee, which is another mechanism that could enhance the Board Selection dimension of corporate governance. By exclusively involving Indian politicians or individuals with pre-existing ties with other directors, Satyam’s

Board Selection was severely limited and inherently ineffective. Regular Board Feedback should be linked to the performance of the supervisory Board, the managing Board and the company (Hilb 2008). Finally, to overcome a short-term focus, the Board of Directors should design consistent compensation packages for top management to consider the interests of all stakeholders. Such compensation packages should be divided into a mix of fixed and variable components (Hilb 2008). Further, in family businesses, it is key that the Board of Directors develops a succession plan to manage transitionary period according to a transparent and formalized approach.

### **Kkeep it controlled**

The components within this **Kkeep it Controlled** dimension relate to the auditing, risk management, communication, and evaluation functions of the Board. According to Hilb (2005), the “external auditor is the only external institution that can give an objective view of the financial condition of the company. In order to ensure the independence of the external auditors, both the auditors and the auditing firm should be changed periodically. The task of the internal auditors is to establish a financial supervision that is as independent and objective as possible for the audit committee and the Board.” Satyam had used the international auditing firm of PricewaterhouseCoopers since Satyam went public in 2001. External auditors should be changed periodically to assure true independence. In the **Kkeep it Controlled** dimension, other recommendations include:

1. the need to shift the appointment of the external auditors from the controlling shareholders to the independent audit committee. In Satyam, that shift never took place;

2. the need for periodic meetings between the audit committee members and auditors without the presence of management. The 2008 Form 20F filed by Satyam clearly stated that “non-management directors do not meet periodically without management directors”;
3. the establishment of an oversight board (present in the U.S. and absent in India) which would review the intensity and the integrity of audits on an annual basis.

### **Section V: Epilogue and Conclusions**

After Ramalingam Raju admitted fraud and resigned as the COB of Satyam with his letter of January 7, 2009, the Indian Company Law Board notified Satyam that it intended to appoint nominees to form the new Board at Satyam. By January 16, 2009, the Ministry of Corporate Affairs appointed the following six independent Board members:

<b>Name</b>	<b>Background</b>
Deepak Parekh	Chairman of the Housing Development Finance Corporation
Kiran Karnik	Former President of NASSCOM
C. Achutan	Director of the National Stock Exchange
TN Manoharan	Former President of Institute of Chartered Accountants of India
Tarun Das	Confederation of Indian Industry
Balkrishna Mainak	Life Insurance Corporation of India

While awaiting the appointment of a COB by the Company Law Board, there was a rotating COB at the meetings of the Satyam’s Board of Directors. On January 24, the new Board of Directors appointed Deloitte and KPMG to restate the accounts of Satyam and decided to focus on “business continuity” by arranging funds for expenses and vendor payments. On

February 5, the Board announced the appointment of a new CEO, A.S. Murthy, who was promoted from his previous role as Head of Satyam's Leadership Development Group and had been with Satyam since 1994. On April 13, 2009, via a formal public auction process, 46% stake in Satyam was purchased by Tech Mahindra. Satyam rebranded its services under the new Mahindra management as Mahindra Satyam, effective July 2009. In February 2009, SEBI announced corporate governance changes to be implemented in India including the rule that all listed companies need to obtain a peer audit and cases of pledging of promoter shareholdings must be made available to all other shareholders.

The Satyam scandal clearly presented financial and non-financial (i.e., corporate governance) red flags. In particular, we showed the results of the application of two financial fraud detection models, three fraud ratios, and the analysis of five corporate governance factors. Four out of the five red flag models and ratios predicted fraud in both 2007 and 2008, but there were only two such red flags in 2006. These results based on this longer time period suggest a strong validity of the financial red flags examined and strengthen the robustness of our results. They reflect the typical fraud scenario where more red flags emerge the closer to the year of fraud implosion or discovery, i.e., from 2006 to 2008 here. Thus, they effectively highlight the importance of examining financial red flags to detect fraudulent financial reporting.

The reverse KISS framework proposed by Hilb (2005) is beneficial for both the company and the investors. On the one hand, it is fair to assume that corporate governance mechanisms can be highly influenced by managers and Hilb's framework offers a broad set of guidelines to guide the design of the different corporate governance mechanisms in an integrated way. On the other hand, investors do have significant power in shaping the corporate governance through



voting rights and other representation mechanisms. Therefore, Hilb's framework offers a set of principles that investors should expect from companies. In addition to its usefulness for designing effective corporate governance, Hilb provides a framework of non-financial red flags to predict frauds. This additional benefit of Hilb's framework is particularly in line with the purpose of our study which is aimed at presenting the Satyam case and the predictive power of financial and non-financial (i.e., corporate governance) factors for fraud detection. Also, a key preventive strategy is to develop a strong corporate governance system that needs to be holistic, by focusing not only on shareholders but also on all the other stakeholders such as employees, customers, and society (i.e., the public and the environment). We propose the reverse KISS principle of strong corporate governance to offer a guideline to design a corporate governance framework which could support the regulatory function of the legislators and the evaluation function of investors and analysts.

**Table 1: Satyam's Financial Statements**

	2008	2007	2006
<b>Income Statement</b>			
<i>(amounts in \$ million)</i>			
Revenue	\$2,138	\$1,461	\$1,096
Revenue Growth	46%	33%	
Cost of sales	1359	937	689
Gross Profit	\$779	\$524	\$407
Operating Expenses	\$370	\$232	\$187
EBITDA	409	292	220
Depreciation & Amortization	41	34	31
Change: Depreciation & Amortiz.	7	3	
Operating Income	409	292	220
Net Income Before Taxes	470	328	288
Income Tax Expense	53	31	38
Taxes Paid See Notes	79	51	38
Change: Current Taxes Payable	0	0	0
Net Income Core Earnings	399	229	221
Net Income GAAP	417	298	249
Preferred stock dividends	0.17	0.15	0.11
Earnings available to common	417	298	249
<b>Balance Sheet</b>			
<i>(amounts in \$ million)</i>			
Cash	1,117	152	292

Change: Cash	965	-140	
AR net	680	435	261
Inventory			
Current Assets	1,862	604	1,018
Change: Current Assets	1,258	-414	
Net Fixed Assets	236	163	106
Total Assets	2,205	1,624	1,181
Current Liabilities	353	211	139
Change: Current liabilities	142	72	
Deferred Income Taxes			
Change: Working Capital	1,116	-486	
Short Term Debt	29	12	6
Long Term Debt	26	22	18
Total Stockholder's Equity	1,862	1,371	994
<b>Additional Data</b>			
Common Stock Share Price	\$23.56	\$23.35	\$21.88
Common Shares Outstanding	336	336	336
Diluted Common Shares outstanding	336	336	336
Diluted Earnings Per Share	\$1.22	\$0.90	\$0.75
Sales Per Basic Common Share	\$6.31	\$5.58	\$6.72
Operating Cash Flow	339	262	163
Operating CF per Basic Common Share	1.01	0.78	0.49
Capital Expenditures	70	60	65

**Table 2: Z-Score Fraud Prediction Model, (Beneish (1999))**

Fraud Z-score (OLD)					
	NMMI good	MMI bad	2008	2007	2006

<b>Days' Sales in Receivables</b>	1.031	1.465	<b>1.068</b>	<b>1.250</b>	<b>0.724</b>
<b>Gross Margin Index</b>	1.014	1.193	<b>0.984</b>	<b>1.035</b>	<b>0.973</b>
<b>Asset Quality Index</b>	1.039	1.254	<b>0.092</b>	<b>10.934</b>	<b>1.000</b>
<b>Sales Growth Index</b>	1.134	1.607	<b>1.463</b>	<b>1.333</b>	<b>1.380</b>
Change in WC			\$ 1,116	\$ (486)	NA
Change in Cash			\$ 965	\$ (140)	NA
Current Taxes Payable			\$ 28	\$ 13	NA
<b>Total Accruals to Total Assets Index</b>	0.018	0.031	<b>0.037</b>	<b>(0.242)</b>	<b>(0.026)</b>
	Green < -1.99 No	Red > -1.99			
<b>Z-score</b>	Fraud Warning	Fraud Warning	<b>(1.821)</b>	<b>1.331</b>	<b>(2.147)</b>

*Green = good; Yellow = uncertain; Red = bad.*

**Table 3: F-Score Fraud Prediction Model, Dechow, Ge, Larson and Sloan (2007)**

Fraud F-Score			
	2008	2007	2006
Δ WC	\$ 151	\$ (346)	NA
Δ NCO	\$ (621)	\$ 867	NA
Δ FIN	\$ 13	\$ 2	NA
Avg. TA	\$ 1,915	\$ 1,403	\$ 1,181
Accrual	-0.23870	0.37291	NA
Δ AR	0.1280	0.1241	NA

Δ Inv.	0.0000	0.0000	NA
% Δ Cash Sales	0.4709	0.1743	0.3804
Δ Earnings	0.0053	0.0016	0.0804
Actual Issuance	1	1	1
Predicted Value	-5.54434	-5.11242	-5.85396
Probability	0.003894	0.005985	0.00286
Constant	0.003432	0.003432	0.003432
<b>F-Score</b>	<b>1.134756</b>	<b>1.744085</b>	<b>0.833463</b>

*Green = no fraud warning; Red = fraud warning.*

**Table 4: Additional Fraud Ratios**

	2008	2007	2006
Free Cash Flow	\$ 269	232	103
<b>Sloan Accrual Measure</b>	<b>0.0773</b>	<b>0.0471</b>	<b>0.1236</b>
<b>Quality of Earnings</b>	<b>0.8129</b>	<b>0.8792</b>	<b>0.6546</b>
Cash Collected	\$ 1,893	1287	1096
<b>Quality of Revenue</b>	<b>0.8854</b>	<b>0.8809</b>	<b>1.0000</b>

*Green = good; Red = bad.*

**Table 5: The composition of Satyam's Board of Directors**

Name	Designation	Background
Ramalinga Raju	Chairman, Promoter and Executive Director Member of Investors' Grievance Committee	MBA from Ohio State University and Advanced Management Program from Harvard University
Rama Raju	Managing Director, promoter and Executive Director Member of Investors' Grievance Committee	Advanced Management Program from Harvard University
Ram Mynampati	President and Whole Time Director	Currently Chairman at Satyam Technologies and director at Satyam Venture Engineering
Dr. Mangalam Srinivasan	Independent and Non Executive Director Member of Audit and Compensation Committee	Advisor to Harvard University
Prof. Krishna Palepu	Non Executive Director	Professor of Business Administration and Senior Associate Dean of Research at Harvard University

Vinod	Independent and Non Executive Director	Director at IndoUS Ventures LLC
Dham	Member of Compensation Committee	
Prof.Rammohan	Independent and Non Executive Director	
Rao	Member of Audit and Compensation Committee	
T.R	Independent and Non Executive Director	Various Government posts (Cabinet Secretary, member of the Finance Commission, Defense Secretary...)
Prasad	Member of Audit and Investors' Grievance Committee	
Prof. V.S.	Independent and Non Executive Director	Chairman of the Naval Research Board, Defense Research and Development Organization at the Government of India
Raju	Member of Audit and Compensation Committee	

## **Appendix**

### **Red Flag Models and Ratios**

Five fraudulent financial reporting models and ratios were used to try to predict fraud at Satyam as a comprehensive financial red flag approach in screening for and identifying financial reporting problems in publicly held companies rather than just using traditional ratios.

#### **1. Z-Score Fraud Prediction Model**

Beneish (1999) developed a statistical model used to detect financial statement fraud and earnings management through a variety of metrics. There are five key ratios used in the model, which are the Sales Growth Index (SGI), Gross Margin Index (GMI), Asset Quality Index (AQI), Days Sales in Receivables Index (DSRI), and Total Assets to Total Accruals (TATA). Each of these measures with its model coefficient, based upon Beneish's research, is outlined below.

There is also a constant value in the model of -4.840. The red flag benchmark is a Z-Score greater than a negative 1.99, i.e., a smaller negative number or a positive number indicates possible financial reporting problems (Beneish 1999). For example, Enron had a Z-Score of a positive 0.045 in its last year.

**SGI – Sales Growth Index x 0.892**

This measure is current year sales divided by prior year sales. It is meant to detect abnormal increases in sales which may be the result of fraudulent revenue recognition. If a company experiences a very large increase in sales from one period to the next, it may be because they are shifting revenue to a later period or booking phony revenue.

**GMI – Gross Margin Index x 0.528**

This measure is last year's gross margin divided by this year's gross margin. While not necessarily a direct measure for potential manipulation, companies that are experiencing declining gross margins may have increased pressure to improve financial performance. Such pressure may cause them to turn to fraud or questionable financial reporting to maintain net income margins.

**AQI – Asset Quality Index x 0.404**

This measure is the percentage of total assets that are intangible assets this year divided by the same percentage calculation for last year. An increase in this index may represent additional expenses that are being capitalized to preserve profitability. Rather than expensing various costs, such as research and development or advertising, these costs are being capitalized as intangible assets. Capitalization increases assets while helping to maintain profitability.

**DSRI – Days Sales in Receivables Index x 0.920**

This measure is DSRI this year divided by DSRI last year. Companies that are trying to



boost revenue and profit will often allow customers to have greatly extended credit terms so that they will buy earlier. This practice increases revenue in the current quarter but will hurt the company in the future. This metric is meant to detect companies which make significant changes in their collection policies or which recognize phony or early revenues. It could reflect a general economic slowdown which could impact most companies and, thus, not be an effective signal.

#### **TATA – Total Accruals to Total Assets x 4.679**

This measure represents total expense accruals to total assets. Such accruals represent non-cash earnings. Similar to Sloan's accrual measure and the upcoming accrual measure in the New Fraud Model, an increase in expense accruals represents an increased probability of earnings manipulation and possible operating and free cash flow problems.

## **2. F-Score Fraud Prediction Model**

The new F-Score fraud model (Dechow, Ge, Larson, and Sloan 2007) can be used as another initial test in determining the likelihood of financial reporting manipulation. Similar to the other models and ratios, a fraudulent score for this model does not necessarily imply such manipulation but it serves as a red flag for further analysis. The model contains measures to identify problems in accruals, receivables, inventory, cash sales, earnings and stock issuances as discussed below with their coefficients, based upon their research. There is also a constant value of -6.753 in the model. The red flag benchmark is an F-Score greater than 1.0 and is calculated using an exponential model. For example, the F-Score for Enron in its last year of operation was 1.85. Their research is the most extensive of the two fraud models (designated as the old and the new models) since it was based upon an examination of all AAERs issued between 1982 and 2005 while the older Beneish study was based only on AAERs issued between 1982 and 1992.

**Accruals x 0.773**

Firms that engage in earnings manipulation typically have abnormally high accruals. A significant amount of non-cash earnings results in inflated earnings and is a warning sign for earnings manipulation. This measure is a complex calculation based upon numerous accrual measures and is scaled by average total assets. Essentially any business transactions other than common stock are reflected in accrual measures (Dechow et.al. 2007).

**Change in receivables x 3.201**

The change in receivables from last year to this year is scaled by average total assets. Large changes in accounts receivables may indicate revenue and earnings manipulation. Such manipulation can occur through the early or phony recognition of revenue and large swings in accounts receivable will distort cash flows from operating activities.

**Change in inventory x 2.465**

The change in inventories from last year to this year is scaled by average total assets. Large changes in inventory may indicate inventory surpluses, shortages, obsolescence, or liquidation. For example, if the company uses the last-in first-out (LIFO) method of accounting for inventory in a period of rising prices, selling older inventory will result in lower cost of goods sold, i.e., LIFO liquidation of inventory units or layers. This practice leads to inflated earnings.

**Change in cash sales x 0.108**

This measure is the percentage change in cash sales from last year to this year. For a firm not engaged in earnings manipulation, the growth rate in cash sales could be compared to the growth rate in revenues but these researchers did not include such an analysis. They argued and modeled that just the change in cash sales is a key metric to monitor when evaluating the potential for earning manipulation.

### **Change in earnings x -0.995**

This measure is a percentage calculated as earnings divided by total assets this year less the same measure last year. Volatile earnings may be indicative of earnings manipulation. According to Dechow, Ge, Larson, and Sloan (2007), a consistent theme among manipulating firms is that they have shown strong performance prior to manipulations. The cause for such manipulations may be a current decline in performance which the management team attempts to cover up by manipulating financial reporting.

### **Actual issuance of stock x 0.938**

This measure is a dummy variable that is ON if additional securities are issued during the manipulation year and is OFF if no such securities are issued. Such issuances may indicate operating cash flow problems that need to be offset by additional financing. Also, issuance of stock may indicate management is exercising stock options. The exercise of stock options may signify that managers are attempting to sell at the top because they foresee future underperformance of the company. Such insider sales resulted in the criminal conviction of Qwest's Chief Executive Officer and have been a significant non-financial red flag in many fraud cases, like Enron, Global Crossing, and WorldCom. For example, Qwest and Enron insiders made \$2.1 billion and \$1.1 billion, respectively, by exercising and selling their stock options before their firms' financial reporting problems became public.

### **3. Sloan Accrual Ratio or Measure**

The Sloan accrual measure (1996 and updated as discussed by Robinson 2007) is based on the analysis of accrual components of earnings. It is calculated as follows: net income less free cash flows (operating cash flow minus capital expenditures) divided by average total assets.

The red flag benchmark is a ratio of more than 0.10. For example, Sloan calculated that JetBlue had a ratio of 0.50 and his employer, Barclays Global Investors, shorted the stock and made over 12% in less than one year.

This ratio is used to help determine the quality of a company's earnings based on the amount of accruals included in income. If a large portion of a company's earnings are based more on accruals, rather than operating and free cash flows, then, it is likely to have a negative impact on future stock price since the income is not coming from the company's actual operations (Sloan 1996). Since many of the accrual components of net income are subjective, managers are able to manipulate earnings to make the company appear more profitable. In essence, the Sloan accrual measure is used to help determine the sustainability of a company's earnings.

#### **4. Quality of Earnings Ratio**

The quality of earnings ratio is a quick and simple way to judge the quality of a company's reported net income. The ratio is operating cash flow for the period divided by net income for the period. The red flag benchmark is a ratio of less than 1.0 (Schilit 2003). Also, large fluctuations in this ratio over time may be indicative of financial reporting problems, i.e., Enron's quality of earnings ratios were 4.9, 1.4, and 2.3 over its last three years of operation. In its last year of operation, Enron forced its electricity customers to prepay in order to receive any electricity which dramatically increased its operating cash flows and quality of earnings ratio.

Quality of earnings is also meant to measure whether a company is artificially inflating earnings, possibly to cover up operating problems. This ratio may indicate that a company has earnings which are not actually being converted into operating cash. Methods for inflating

earnings (but not operating cash flows) include early booking of revenue, recognizing phony revenues, or booking one-time gains on sales of assets.

### **5. Quality of Revenues Ratio**

The quality of revenues ratio is similar to the quality of earnings, except that the emphasis is on cash relative to sales rather than cash relative to net income. It is the ratio of cash collected from customers (revenues plus or minus the change in accounts receivable) to the company's revenue. Similar to the quality of earnings ratio, the red flag benchmark is a ratio of less than 1.0 (Schilit 2003). For example, Enron's quality of revenues went down from 0.98 to 0.92 in its last year of operation. Since manipulation of revenue recognition is a common method for covering up poor results, this simple metric can help uncover schemes used to inflate revenues without the corresponding cash collection. Common methods include extending increased credit terms to spur revenues but with slow collections, shifting future revenues into the current period, or booking asset sales or swaps as revenue.

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