An Introduction to Financial Forensics Analysis

Forensic indices are high-level tools that properly trained forensic operators[1] can use to assess the financial health of a company or to hone the road map for his investigation, thus identifying normalizations. However, as with many tools and techniques, forensic indices only provide indirect evidence and are often not a substitute for subsequent "pick-and-shovel" work.

Historically, earnings manipulation matters have been characterized by two types of pick-and-shovel work by accountants. First, the financial statements were "analyzed" by using rudimentary techniques such as common sizing, horizontal analysis, vertical analysis, trending analysis, ratio analysis, and similar methods. These techniques reflect the dictum, "*Not knowing what to do, one does what one knows.*"

Those techniques have their place in certain circumstances. However, they were historically developed by lenders seeking to measure a borrowing company's capability to repay its incurred or intended debt. Also, techniques were compared against presumptively "similar" entities hopefully (and occasionally) identifying potential discrepancies. Consequently, significant emphasis focused on assessments of collateral capacity and comparisons of coverage. Such traditional and debt-focused analysis seldom yields forensic results without additional tools.

The need for tools to assess the veracity of earnings has been long recognized in the financial discipline, at least since 1909, and likely much longer.[2]

A foundational text, the classic 1934 edition of *Security Analysis*[3] by emphasized the need to transcend simple ratio analysis. Since Graham and Dodd published this book, thousands of academicians, analysts, researchers, and others have published hundreds of powerful methods to forensically analyze reported earnings. Curiously, few of the methods have made their way into the appraisal, accounting, or forensic investigation realms.

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[1] Forensic operator. The term that describes those select individuals possessing the uncommon skills, education, experience, knowledge, and training to comprehensively deploy the hundreds of tools, techniques, methods, and methodologies necessary to investigate people and money. Dorrell and Gadawski, *Financial Forensics Body of Knowledge* (Hoboken, NJ: John Wiley & Sons, Inc., 2012).

[2] See American School of Correspondence, Cyclopedia of Commerce, Accountancy, Business Administration, Vol. 10 (American Technical Society 1909).

[3] Benjamin Graham and David Dodd, *Security Analysis* (New York: McGraw-Hill, 1934)

The following content highlights two of the more straightforward methods, i.e., CRO (cash realized from operations) and AQI (asset quality index). CRO is presented first because it is arguably more intuitive for a non-financial reader. AQI is presented next as a bridge between CRO's intuitiveness and AQI's elementary trending.

Many other quantitative and non-quantitative techniques exist but cannot be included due to space limitations. However, the following content includes selected key methods to introduce the reader to their breadth and depth. Their use provides a springboard for the forensic operator to intuitively progress to more quantitative methods.[4]

Because many of the forensic techniques measure period-to-period change (for example, year-to-year, month-to-month, quarter-to-quarter, etc.) they are individually referred to as an index and collectively referred to as indices. Indexing can be defined as the relative comparison of a measurement to itself at a different—typically preceding—period of time.

A common example is annual Gross Domestic Product (GDP) measurements that determine purchasing power increases or declines relative to a given year. Such measures are known as real and nominal GDP used to measure inflation. The terms index and indices are important because they differentiate results from the more common vernacular of "ratios."

Forensic operators use the indices in a manner similar to a physician diagnosing his patient's physical health. The physician orders a complete workup, ranging from simple measurements such as height and weight, to more complex measurements that require laboratory analysis, such as blood chemistry, EKGs, and related tests. The physician assesses the panoply of technical and emotional (such as patient disposition) results to arrive at a diagnosis and prognosis. Forensic investigation should be executed in a like manner, utilizing all available technology to gather quantitative and qualitative data to present evidence and reach a conclusion regarding financial statement veracity.

The following forensic techniques cannot be mechanically deployed—the aggregate results are indicative and not probative, certain exceptions notwithstanding. The indices are generally diagnostic, pointing forensic operators in directions promising results. Furthermore, few forensic assignments merit application of all the indices; thus, seldom are all indices required during an assignment. However, the indices provide pointers for investigative drill-downs into successive levels of details; for example, from financial statements to account groupings, to the general ledger, to the journal entries, to the supporting documents, to the authorization trail and related evidence.

All of the following content was developed during an actual forensic assignment executed by the authors. A $200 million (assets), $500 million (revenue), $2.7 million (net income), and $12 million (operating cash) private company was used to forensically analyze the audited financial statements. Regardless, the power of the indices is illustrated because virtually all of the results point to the same period of manipulation, that is, 2007–

4 A detailed discussion these and other techniques is contained in Darrell D. Dorrell and Gregory A. Gadawski, "Forensic Intelligence: People & Money Tools to Prosecute Fraud, Corruption and Earnings Management," United States Attorneys' Bulletin, Vol. 60 (2) (United States Department of Justice, Executive Office for United States Attorneys, Office of Legal Education, March 2012).

2008. The span results from the various techniques inherently identifying leading, coincident, and lagging indicators.

Prosecutors, investigators, and analysts are encouraged to consider financial statements[5] as "written confessions." That is, financial statements "confess" to telling the truth or lying. Thus, prosecutors, investigators, and analysts can use the contents of this issue to test for earnings manipulation.

Certain facts and circumstances apply to the ABC, Inc. financial statements and contents. First, the company was closely held, had been audited by the same auditors for many years, and had received only unqualified, that is, "clean" opinions. Next, the accounting staff was very skilled, but the CFO maintained certain calculations and journal entries as his sole responsibility commensurate with accounting period closings. Also, the company's financial statements were reported on a consolidated basis to reflect its various subsidiaries and affiliates that required recognition of minority interests.

Furthermore, ABC, Inc. had been acquiring many smaller operations for several years, typically absorbing them through various combinations of cash purchase, debt restructurings, and stock transactions that occasionally required recognition of intangible assets such as goodwill. Moreover, the earnings manipulation was discovered during 2010. Therefore, 2011 results include substantial financial statement adjustments and are disregarded for purposes of this analysis. Finally, ABC, Inc. was predominantly a retail operation, so inventory was the critical revenue generating asset.

Regarding the forensic indices, recall that the results of the indices are indicative and not probative. Occurrence of an unusual indicator does not necessarily reflect earnings manipulation.

However, unusual occurrences guide the way for forensic operator investigation and are often sufficient "reasonable cause" to persuade triers of fact regarding subsequent actions. Also, forensic operators require specific training in a wide range of financial forensics to enable them to skillfully derive and interpret results. Finally, forensic indices exhibit "leading, coincident, and lagging" measurements inherent to the nature of the underlying data. Specifically, ABC, Inc.'s CFO manipulated earnings for 2007 with most indices pointing to 2007, while others pointed to 2008, reflecting residual impacts.

This section describes and illustrates the three foundational financial statements necessary to execute forensic investigation: the balance sheet, the income statement, and the cash flow statement. Fortunately, these three statements are structured and formatted in virtually the same way for all entities: publicly held companies, privately held companies, government agencies, nongovernmental organizations, and nonprofits. This also holds true for non-domestic entities.

In many closely held and/or small entities, only a balance sheet and income statement may be available, thus the cash flow statement must be constructed by a forensic operator.

The three audited financial statements are depicted below to permit the reader to reproduce the depicted indices. Certain items are highlighted for the reader's benefit.

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[5] Annual financial statements will indeed divulge their manipulation but quarterly or monthly financial statements—depending on the extent of detail and other factors—are often more definitive.

Exhibit 49A–1

Audited Balance Sheets

Assets

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Assets:											
Current Assets											
Cash											
Checking	5,046,000	5,265,000	8,837,000	7,152,000	8,857,000	9,972,000	10,587,000	9,752,000	9,051,000	9,484,000	9,331,000
Marketable Securities	452,000	427,000	260,000	189,000	143,000	275,000	26,000	39,000	20,000	22,000	24,000
Total Cash	5,498,000	5,692,000	9,097,000	7,341,000	9,000,000	10,247,000	10,613,000	9,791,000	9,071,000	9,506,000	9,355,000
Accounts Receivable	1,879,000	2,790,000	2,113,000	3,038,000	3,532,000	3,451,000	4,066,000	5,355,000	4,681,000	4,573,000	7,773,000
Inventory	15,867,000	17,931,000	19,355,000	20,707,000	21,186,000	22,273,000	23,672,000	25,709,000	27,994,000	30,666,000	34,983,000
Other Current Assets	1,236,000	1,555,000	1,594,000	2,000,000	2,209,000	2,133,000	2,161,000	2,681,000	2,600,000	3,714,000	4,912,000
Total Current Assets	24,480,000	27,968,000	32,159,000	33,086,000	35,927,000	38,104,000	40,512,000	43,536,000	44,346,000	48,459,000	57,023,000
Fixed Assets - Net	64,416,000	65,471,000	71,456,000	78,479,000	82,986,000	79,502,000	69,919,000	70,554,000	79,567,000	83,029,000	83,160,000
Other Assets											
Intangible Assets - Net	2,057,000	4,144,000	5,629,000	8,641,000	8,274,000	8,008,000	13,193,000	19,238,000	24,625,000	30,806,000	40,535,000
Other Non-Current Assets											
Investments	1,914,000	3,796,000	3,927,000	4,003,000	3,671,000	4,648,000	7,381,000	10,151,000	10,802,000	11,886,000	6,796,000
Reorganization value in excess of amounts allocat	-	-	-	-	-	-	7,253,000	7,253,000	7,253,000	7,253,000	-
Deferred Taxes	-	974,000	1,055,000	925,000	663,000	650,000	333,000	311,000	-	-	-
Other Assets	6,762,000	3,810,000	2,850,000	4,677,000	4,115,000	3,623,000	4,994,000	4,646,000	4,930,000	4,167,000	3,027,000
Total Other Non-Current Assets	8,676,000	8,580,000	7,832,000	9,605,000	8,449,000	8,921,000	19,961,000	22,361,000	22,985,000	23,306,000	9,823,000
Total Other Assets	10,733,000	12,724,000	13,461,000	18,246,000	16,723,000	16,929,000	33,154,000	41,599,000	47,610,000	54,112,000	50,358,000
Total Assets:	99,629,000	106,163,000	117,076,000	129,811,000	135,636,000	134,535,000	143,585,000	155,689,000	171,523,000	185,600,000	190,541,000

Liabilities & Equity

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Liabilities and Equity:											
Liabilities											
Current Liabilities											
Accounts Payable	5,902,000	9,075,000	10,262,000	11,814,000	10,301,000	11,937,000	13,295,000	11,860,000	14,960,000	17,605,000	21,614,000
Outstanding Checks	2,362,000	1,659,000	2,332,000	3,172,000	6,851,000	7,058,000	4,399,000	7,590,000	4,560,000	5,591,000	4,553,000
Notes Payable	2,000,000	2,000,000	5,000,000	5,500,000	4,000,000	2,000,000	3,000,000	7,000,000	10,000,000	12,200,000	13,175,000
Securities Margin Account	-	-	-	-	-	-	-	-	-	-	-
Current Portion - LTD	5,863,000	8,641,000	11,350,000	6,722,000	9,504,000	11,767,000	6,038,000	6,220,000	8,049,000	7,792,000	5,272,000
Current Portion of Deferred Income Taxes	479,000	513,000	388,000	482,000	521,000	451,000	471,000	466,000	-	-	-
Income Taxes Payable	-	116,000	149,000	81,000	21,000	1,676,000	2,492,000	1,593,000	3,870,000	2,667,000	741,000
Accrued Liabilities	4,139,000	4,530,000	5,208,000	5,283,000	5,743,000	5,826,000	5,635,000	6,552,000	8,709,000	9,743,000	10,125,000
Total Current Liabilities	20,745,000	26,534,000	34,689,000	33,054,000	36,941,000	40,715,000	35,330,000	41,281,000	50,148,000	55,598,000	55,480,000
Long-Term Liabilities											
Total Long-Term Liabilities	55,434,000	53,538,000	53,579,000	67,002,000	66,935,000	55,527,000	70,863,000	72,529,000	75,293,000	91,310,000	95,183,000
Other Liabilities											
Deferred Income Taxes	5,825,000	5,379,000	6,365,000	6,716,000	7,268,000	7,920,000	8,295,000	8,770,000	8,546,000	8,776,000	8,874,000
Total Other Liabilities	5,825,000	5,379,000	6,365,000	6,716,000	7,268,000	7,920,000	8,295,000	8,770,000	8,546,000	8,776,000	8,874,000
Total Liabilities	82,004,000	85,451,000	94,633,000	106,772,000	111,144,000	104,162,000	114,488,000	122,580,000	133,987,000	155,684,000	159,537,000
Equity											
Preferred Stock Series A-2	-	-	-	-	-	-	9,500,000	9,500,000	9,500,000	-	-
Preferred Stock Series B	-	-	-	-	-	-	7,000,000	7,000,000	7,000,000	7,000,000	7,000,000
Common Stock Class C	-	-	-	-	-	-	905,000	813,000	813,000	813,000	813,000
Common Stock Class D	-	-	-	-	-	-	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000
Common Stock, no par value	100,000	100,000	100,000	100,000	100,000	100,000	-	-	-	-	-
Minority Interest in Other Entities	-	-	-	-	-	-	-	-	-	-	97,000
Add'l Paid-In Capital	4,302,000	4,415,000	4,573,000	4,634,000	4,879,000	4,814,000	-	-	-	79,000	368,000
Investment Valuation Allowance	(1,046,000)	904,000	1,037,000	317,000 (	170,000) (	399,000) (	308,000) (	81,000)	349,000	905,000	905,000
Retained Earnings	14,269,000	15,293,000	16,733,000	17,988,000	19,683,000	25,858,000	21,255,000	-	3,877,000	7,874,000	9,119,000
Common Dividend Paid	-	-	-	-	-	-	- (	540,000) (	720,000) (	360,000)	-
Preferred Dividend Paid	-	-	-	-	-	- (	2,582,000) (	990,000) (	1,320,000) (	552,000)	-
Stock Redemptions	-	-	-	-	-	- (	39,234,000) (	13,000) (	243,000) (	600,000)	-
Quasi Reorganization Adjustment	-	-	-	-	-	-	16,449,000	-	-	-	-
Net Income	-	-	-	-	-	-	4,112,000	5,420,000	6,280,000	2,757,000	702,000
Total Equity	17,625,000	20,712,000	22,443,000	23,039,000	24,492,000	30,373,000	29,097,000	33,109,000	37,536,000	29,916,000	31,004,000
Total Liabilities and Equity:	99,629,000	106,163,000	117,076,000	129,811,000	135,636,000	134,535,000	143,585,000	155,689,000	171,523,000	185,600,000	190,541,000

Exhibit 49A–2

Audited Income Statements

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Revenues	**204,035,000**	**231,630,000**	**261,983,000**	**282,684,000**	**316,135,000**	**323,807,000**	**341,198,000**	**361,435,000**	**375,711,000**	**423,455,000**	**477,275,000**
Cost of Goods Sold											
Merchandise Purchased	149,829,000	169,118,000	191,578,000	204,743,000	227,159,000	229,161,000	242,177,000	255,003,000	259,960,000	293,102,000	326,870,000
Freight	-	1,182,000	1,719,000	1,896,000	2,062,000	2,109,000	2,360,000	2,671,000	2,838,000	3,854,000	-
Trucking Expenses	444,000	59,000	-	-	-	-	-	-	-	-	-
-Less Trucking Revenue	(641,000)	(107,000)	-	-	-	-	-	-	-	-	-
Lottery Payouts	97,000	(4,000)	(33,000)	(20,000)	(54,000)	(32,000)	(35,000)	(41,000)	(38,000)	(40,000)	-
Discounts given	23,000	33,000	41,000	48,000	193,000	339,000	345,000	222,000	189,000	350,000	-
-Less Discount Earned	(1,635,000)	(3,229,000)	(4,148,000)	(3,845,000)	(4,046,000)	(4,410,000)	(4,283,000)	(5,526,000)	(5,201,000)	(5,888,000)	-
-Less Rebates Earned	(2,137,000)	(2,288,000)	(2,673,000)	(2,771,000)	(2,901,000)	(3,581,000)	(3,856,000)	(5,469,000)	(5,373,000)	(5,580,000)	-
COGS Depreciation (trucks)	43,000	16,000	-	-	-	-	-	-	-	-	-
Inventory Change											
Total Cost of Goods Sold	146,023,000	164,780,000	186,484,000	200,051,000	222,413,000	223,586,000	236,708,000	246,860,000	252,375,000	285,798,000	326,870,000
Gross Profit	58,012,000	66,850,000	75,499,000	82,633,000	93,722,000	100,221,000	104,490,000	114,575,000	123,336,000	137,657,000	150,405,000
Operating Expenses											
Selling Expenses	43,972,000	49,095,000	55,874,000	61,801,000	71,011,000	72,810,000	77,640,000	84,907,000	88,564,000	102,901,000	129,956,000
General and Administrative	2,722,000	3,458,000	3,902,000	4,558,000	4,995,000	5,594,000	6,747,000	7,378,000	8,388,000	9,692,000	-
Total Operating Expenses	46,694,000	52,553,000	59,776,000	66,359,000	76,006,000	78,404,000	84,387,000	92,285,000	96,952,000	112,593,000	129,956,000
Officers' Compensation											
Salaries	650,000	691,000	766,000	805,000	881,000	938,000	840,000	830,000	795,000	521,000	-
Bonuses	-	-	-	-	-	-	-	-	-	-	-
Total Officers' Compensation	650,000	691,000	766,000	805,000	881,000	938,000	840,000	830,000	795,000	521,000	-
Operating EBITDA	10,668,000	13,606,000	14,957,000	15,469,000	16,835,000	20,879,000	19,263,000	21,460,000	25,589,000	24,543,000	20,449,000
Depreciation and Amortization											
Depreciation	3,680,000	3,982,000	4,353,000	4,570,000	5,124,000	5,216,000	5,467,000	5,214,000	5,778,000	6,681,000	7,310,000
Amortization	375,000	455,000	576,000	658,000	799,000	276,000	284,000	302,000	274,000	329,000	-
Total Depreciation and Amortization	4,055,000	4,437,000	4,929,000	5,228,000	5,923,000	5,492,000	5,751,000	5,516,000	6,052,000	7,010,000	7,310,000
Operating - EBIT	6,613,000	9,169,000	10,028,000	10,241,000	10,912,000	15,387,000	13,512,000	15,944,000	19,537,000	17,533,000	13,139,000
Interest Expense	5,202,000	6,255,000	6,181,000	7,275,000	7,283,000	6,117,000	5,445,000	8,451,000	9,097,000	12,158,000	13,115,000
Operating Income/(Loss)	1,411,000	2,914,000	3,847,000	2,966,000	3,629,000	9,270,000	8,067,000	7,493,000	10,440,000	5,375,000	24,000
Miscellaneous Income\(Expense)											
Patronage dividends	-	-	-	205,000	265,000	404,000	474,000	839,000	744,000	901,000	916,000
Dividend and interest income	96,000	36,000	56,000	89,000	109,000	98,000	34,000	28,000	23,000	144,000	10,000
Income (loss) from investment in other entities	(1,000)	(85,000)	(65,000)	(17,000)	(16,000)	(292,000)	(456,000)	(562,000)	(208,000)	(2,047,000)	-
Gain (loss) on sale of investments	22,000	7,000	11,000	14,000	-	-	(219,000)	-	14,000	-	-
Gain (loss) on disposition of property, plant & Equipmen	(15,000)	(144,000)	37,000	133,000	(100,000)	425,000	871,000	14,000	576,000	(22,000)	666,000
Gain (loss) on sale of intangibles	-	-	-	-	-	-	-	75,000	-	-	-
Debt restructuring expense	(854,000)	(1,173,000)	(1,173,000)	(1,534,000)	(580,000)	(580,000)	(580,000)	(228,000)	-	(228,000)	(228,000)
Plant closure\opening expense	-	-	-	-	(554,000)	-	-	-	(288,000)	(247,000)	(356,000)
Net unrealized gain (loss) on marketable securities	40,000	(27,000)	(156,000)	(37,000)	(38,000)	132,000	312,000	13,000	(308,000)	2,000	2,000
Other Expense	-	-	-	-	-	-	-	-	(10,000)	-	25,000
Total Miscellaneous Income\(Expense)	(712,000)	(1,386,000)	(1,290,000)	(1,147,000)	(914,000)	187,000	436,000	179,000	(27,000)	(1,497,000)	1,040,000
Pre-Tax Income	699,000	1,528,000	2,557,000	1,819,000	2,715,000	9,457,000	8,503,000	7,672,000	10,413,000	3,878,000	1,064,000
Less: Income Taxes	231,000	504,000	1,117,000	564,000	1,020,000	3,282,000	4,391,000	2,252,000	4,133,000	1,121,000	362,000
Net Income\(Loss)	**468,000**	**1,024,000**	**1,440,000**	**1,255,000**	**1,695,000**	**6,175,000**	**4,112,000**	**5,420,000**	**6,280,000**	**2,757,000**	**702,000**
Per Income Statements	**468,000**	**1,024,000**	**1,440,000**	**1,255,000**	**1,695,000**	**6,175,000**	**4,112,000**	**5,420,000**	**6,280,000**	**2,757,000**	**702,000**

Exhibit 49A–3

Audited Cash Flow Statements

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Cash Provided by (Used for) Operations:										
Net Income/(Loss)	1,024,000	1,440,000	1,255,000	1,695,000	6,175,000	4,112,000	5,420,000	6,280,000	2,757,000	
COGS Depreciation (trucks)	16,000	-	-	-	-	-	-	-	-	
Depreciation	3,982,000	4,353,000	4,570,000	5,124,000	5,216,000	5,467,000	5,214,000	5,778,000	6,681,000	
Amortization	455,000	576,000	658,000	799,000	276,000	284,000	302,000	274,000	329,000	
(Increase)/Decrease in Accounts Receivable	(911,000)	677,000	(925,000)	(494,000)	81,000	(615,000)	(1,289,000)	674,000	108,000	
(Increase)/Decrease in Inventory	(2,064,000)	(1,424,000)	(1,352,000)	(479,000)	(1,087,000)	(1,399,000)	(2,037,000)	(2,285,000)	(2,672,000)	
(Increase)/Decrease in Other Current Assets	(319,000)	(39,000)	(406,000)	(209,000)	76,000	(28,000)	(520,000)	81,000	(1,114,000)	
(Increase)/Decrease in Other Non-Current Assets	96,000	748,000	(1,773,000)	1,156,000	(472,000)	(11,040,000)	(2,400,000)	(624,000)	(321,000)	
Increase/(Decrease) in Current Liabilities	3,011,000	5,446,000	2,993,000	1,105,000	1,511,000	344,000	5,769,000	7,038,000	5,707,000	
Increase/(Decrease) in Long-Term Liabilities	-	-	-	-	-	-	-	-	-	
Increase/(Decrease) in Other Liabilities	(446,000)	986,000	351,000	552,000	652,000	375,000	476,000	(224,000)	230,000	
Total Cash Provided by (Used for) Operations:	4,844,000	12,763,000	5,371,000	9,249,000	12,428,000	(2,500,000)	10,935,000	16,992,000	11,705,000	
Cash Provided by (Used for) Investing Activities:										
Net (Additions to)/Disposal of Fixed Assets - Net	(5,052,000)	(10,339,000)	(11,593,000)	(9,631,000)	(1,732,000)	4,116,000	(5,848,000)	(14,791,000)	(10,143,000)	
Net (Additions to)/Disposal of Intangible Assets - Net	(2,543,000)	(2,060,000)	(3,670,000)	(432,000)	(10,000)	(5,469,000)	(6,348,000)	(5,662,000)	(6,510,000)	
Total Cash Provided by (Used for) Investing Activities:	(7,595,000)	(12,399,000)	(15,263,000)	(10,063,000)	(1,742,000)	(1,353,000)	(12,196,000)	(20,453,000)	(16,653,000)	
Cash Provided by (Used for) Financing Activities:										
Net Additions to/(Reductions in) Notes Payable	882,000	2,750,000	8,795,000	2,715,000	(9,145,000)	9,607,000	1,847,000	4,594,000	15,760,000	
Net Investment in/(Distribution of) Preferred Stock Series A-2	-	-	-	-	-	9,500,000	-	-	(9,500,000)	
Net Investment in/(Distribution of) Preferred Stock Series B	-	-	-	-	-	7,000,000	-	-	-	
Net Investment in/(Distribution of) Common Stock Class C	-	-	-	-	-	905,000	(92,000)	-	-	
Net Investment in/(Distribution of) Common Stock Class D	-	-	-	-	-	12,000,000	-	-	-	
Net Investment in/(Distribution of) Common Stock, no par value	-	-	-	-	-	(100,000)	-	-	-	
Minority Interests in Other Entities	-	-	-	-	-	-	-	-	-	
Net Investment in/(Distribution of) Add'l Paid-In Capital	113,000	158,000	61,000	245,000	(65,000)	(4,814,000)	-	-	79,000	
Net Investment in/(Distribution of) Investment Valuation Allowanc	1,950,000	133,000	(720,000)	(487,000)	(229,000)	91,000	227,000	430,000	556,000	
Net Investment in/(Distribution of) Retained Earnings	-	-	-	-	-	(8,715,000)	(26,675,000)	(2,403,000)	1,240,000	
Net Investment in/(Distribution of) Common Dividend Paid	-	-	-	-	-	-	(540,000)	(180,000)	360,000	
Net Investment in/(Distribution of) Preferred Dividend Paid	-	-	-	-	-	(2,582,000)	1,592,000	(330,000)	768,000	
Net Investment in/(Distribution of) Stock Redemptions	-	-	-	-	-	(39,234,000)	39,221,000	(230,000)	(357,000)	
Net Investment in/(Distribution of) Quasi Reorganization Adjustme	-	-	-	-	-	16,449,000	(16,449,000)	-	-	
Net Investment in/(Distribution of) Net Income	-	-	-	-	-	4,112,000	1,308,000	860,000	(3,523,000)	
Total Cash Provided by (Used for) Financing Activities:	2,945,000	3,041,000	8,136,000	2,473,000	(9,439,000)	4,219,000	439,000	2,741,000	5,383,000	
Total Increase/(Decrease) in Cash	194,000	3,405,000	(1,756,000)	1,659,000	1,247,000	366,000	(822,000)	(720,000)	435,000	
Cash Balance at Beginning of Year	**5,498,000**	**5,692,000**	**9,097,000**	**7,341,000**	**9,000,000**	**10,247,000**	**10,613,000**	**9,791,000**	**9,071,000**	
Cash Balance at End of Year	**5,692,000**	**9,097,000**	**7,341,000**	**9,000,000**	**10,247,000**	**10,613,000**	**9,791,000**	**9,071,000**	**9,506,000**	

The company was obviously steadily growing and appeared profitable. However, forensic accounting techniques identified anomalies that enabled forensic operators to ferret out discrepancies. The first technique highlighted is CRO (Cash Realized from Operations).

1. CRO (Cash Realized from Operations):

This comparison measures the correlation between net income and cash from operations, thus comparing accrual net income (or loss) with cash net income (or loss). It is self-evident that accrual net income and cash net income should be rather closely correlated— discrepancies suggest earnings manipulation. This comparison identifies inordinate timing differences between accrual accounting and cash accounting and thus identifies potential earnings manipulation.

Earnings manipulation is a relatively simple task in accrual-based financial statements—earnings are overstated by overstating accruals, accounts receivable accruals representing one of the most obvious sources.

For example, a company reporting $1 million in accounts receivable should expect to receive $1 million in cash for those receivables subject, of course, to nominal write-offs, adjustments, late payments, and related refinements. To overstate earnings by $100,000 it is only necessary to book $1.1 million in accounts receivable.

The company's reporting for that year will have overstated both net income and accounts receivable by $100,000. Therefore, operating cash should increase by $1 million but the $100,000 will never be realized in cash.

Naturally, the $100,000 discrepancy must eventually be removed from the books. If the overstatement occurred for only one year, $100,000 could be removed gradually over successive years by write-offs and other adjustments. However, once earnings manipulation begins, it tends to continue, thus compounding the difficulty of removal and the likelihood of impact to other accounts. Therefore, techniques such as CRO identify the accrual versus cash discrepancies in company financial statements.

The amounts used in the CRO calculation are taken from the income statement and cash flow statement, respectively. The expectation is that the components of this index will demonstrate a strong correlation. In other words, as earnings go up or down, operating cash should move in the same direction.

The calculation consists of comparing operating cash to net income for each reporting period as indicated in the following formula. Ordinarily, the relationship of operating cash to net income for any given company should be relatively constant, explainable changes such as acquisitions, accounting changes, and related matters notwithstanding. Therefore, significant changes in the relationship absent an explanation indicate potential manipulation.

The calculation is indicated in the following formula:

$$\frac{Operating\ Cash\ Flow_{cy}}{Net\ Income_{cy}}$$

where: cy = current year

The simplest and most effective means to examine and illustrate the relationship consists of graphing CRO and net income on a dual-axis chart as shown below. See Exhibit 49A–4.

Exhibit 49A–4

ABC, Inc. - CRO
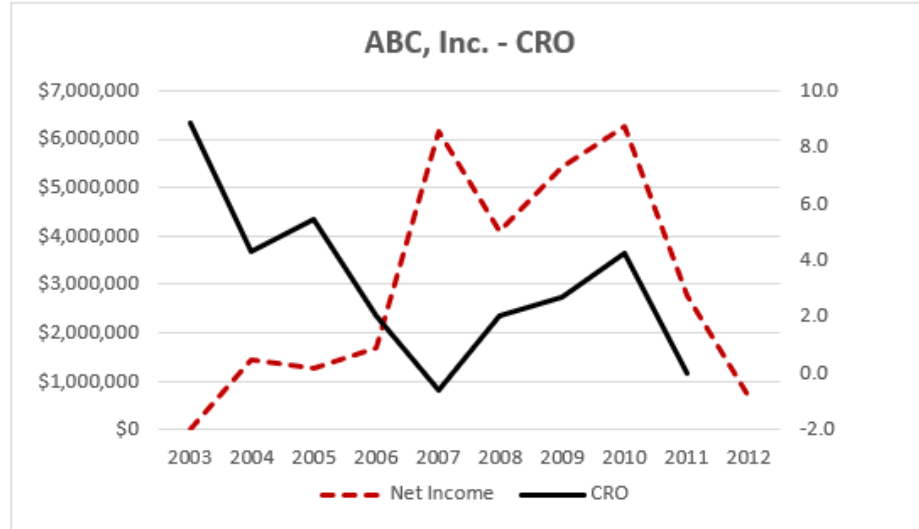
The two measurements depict dramatic discrepancies. First, reported net income is generally increasing (particularly for the 2006–2010 period), thus operating cash should likewise increase.

However, the CRO index is rapidly decreasing (particularly for the 2004–2008 period). Additionally, the "crossover" year (where the CRO index changed direction) 2007, tells a forensic operator precisely where to begin directing attention. More significantly, reported net income for the 2007–2010 period effectively suggests "record earnings" for the company despite much lower CRO measures for the same time period, with 2008 illustrating a negative CRO.

The company's CFO manipulated earnings for the 2007–2008 period to meet debt covenant requirements that he structured to enable him to acquire company stock.

The next technique highlighted is AQI (Asset Quality Index) and employs a period-to-period trend comparison.

2. AQI (Asset Quality Index):

The CFO responsible for the audited financials manipulated earnings for the 2007–2008 period and it was determined that he had "cooked the books" in order to benefit from earnings. His manipulation is reflected in the change for 2008 because he was manipulating inventory to overstate net income. The auditors had conducted significant testing on inventory every year but failed to discern the CFO's manipulation of inventory to overstate earnings.

The first forensic test typically applied in such circumstances, i.e. AQI is indicated below.

This index measures the relationship of non-current assets (other than property, plant, and equipment) to total assets for the current year in comparison to the prior year. In effect, the index measures changes in asset realization, that is, lower realization suggests higher risk and vice versa.

Therefore, an AQI greater than 1.0 (as a general benchmark, companies and industries may vary according to their respective characteristics) indicates a decline in asset realization, alerting the forensic operator to drill down into the respective fiscal period to test for earnings manipulation.

Another way to think about this is to recall that balance sheets consist of three types of assets, that is, current assets, long-term assets, and other assets. The farther "down" assets are reported on the balance sheet, the less reliable and less liquid their eventual realization into cash will be. For example, accounts receivable is a current asset that should result in cash in 30 days or so, depending on terms. Delivery trucks are long-term assets that indirectly generate cash by permitting products to be delivered. Finally, other assets (which are very long term in nature) contain categories, such as goodwill, that is typically related to a specific transaction but only tangentially relates to generated cash.

The distinction among assets is often characterized by referring to long-term assets as "hard" assets and other assets as "soft" assets. Hard assets may consist of equipment, automobiles, buildings, and related tangible items. Conversely, soft assets may consist of goodwill, deferrals, and other intangible items. The calculation is indicated in the following formula.

$$1 - \left(Current\ Assets_{cy} + PPE_{cy}/\ Total\ Assets_{cy}\right)/1 - \\ \left(Current\ Assets_{cy} +\ PPE_{cy-1}/\ Total\ Assets_{cy-1}\right)$$

where: cy = current year
py = prior year

The simplest and most effective means to examine and illustrate the relationship consists of graphing AQI in comparison to the benchmark as shown below. See Exhibit 49A–5.

Exhibit 49A–5
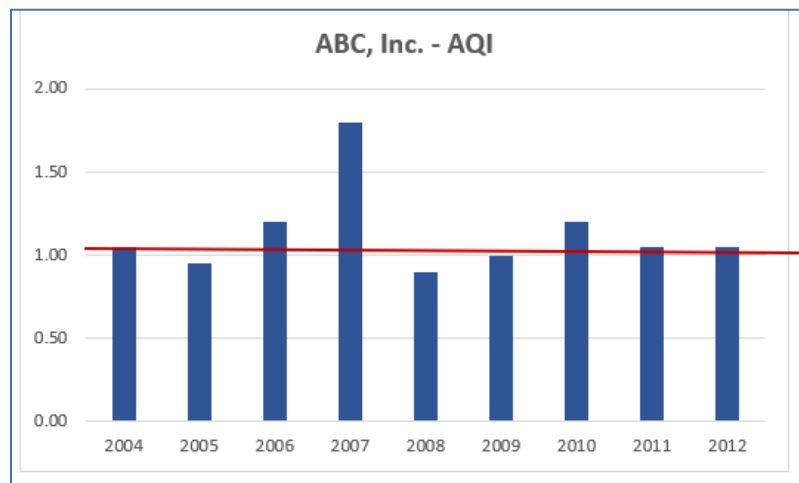
The measurements are relatively close to the benchmark for all years except for 2007. Small differences are not concerning. However, the magnitude of the difference in 2007 suggests that further investigation is warranted for that year. In ABC, Inc.'s case, the earnings were manipulated in 2007 and the rebooking of assets was reported in 2008.

The next technique highlighted is the Dechow–Dichev Accrual Quality and employs a period-to-period trend comparison.

3. Dechow–Dichev Accrual Quality

Professors Patricia Dechow and Ilia Dichev[6] defined accrual quality as the extent to which accruals map into cash flow realizations and linked accrual quality to earnings persistence.

The measurement combines the change in working capital and cash flow from operations for the current year and computes the relationship to total assets. They define the difference between operating cash flow and working capital as "earnings before long-term accruals." This effectively isolates near-term accruals in comparison to net income, which should demonstrate a relatively stable relationship.

The calculation is indicated in the following formula.

$$\frac{Operating\ Cash\ Flow\ cy\ +\ \Delta\ Working\ Captial\ cy}{(Total\ Asset\ cy\ +\ Total\ Assets\ py\ /\ 2}$$

where: cy = current year
py = prior year

The simplest and most effective means to examine and illustrate the relationship consists of graphing the Dechow–Dichev index in comparison to net income is shown in Exhibit 49A–6.

Exhibit 49A–6
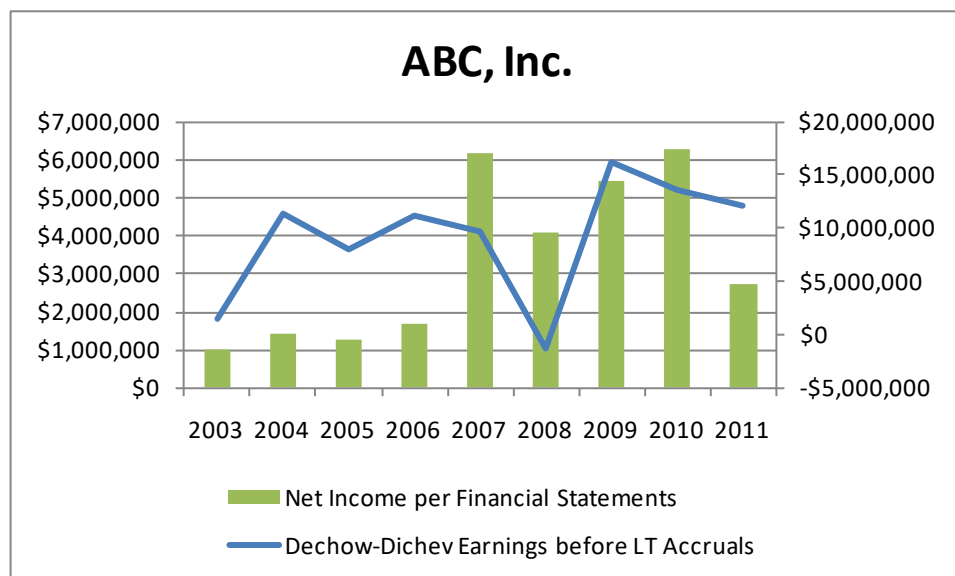
[6] Patricia M. Dechow and Ilia D. Dichev, "The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors," The Accounting Review, Vol. 77 (American Accounting Association, 2002), pp. 35–59.

The measurements for ABC, Inc. are relatively stable for 2003–2006. However, 2007 exhibits a stable relationship for earnings before long-term accruals despite a dramatic increase in reported net income. The disparity indicates potential earnings manipulation and merits further investigation.

The next technique highlighted is Lev–Thiagarajan 12 Signals and employs a period-to-period trend comparison.

4. Lev–Thiagarajan 12 Signals

Baruch Lev, and S. Ramu Thiagarajan[7] identified a set of 12 financial variables (also referred to as signals or fundamentals) claimed by analysts to be useful in security valuation. Their study supported the value relevance of these signals, particularly when evaluated in light of the macroeconomic conditions present during the period evaluated as well as the link between the identified signals and persistence (quality and growth) of reported earnings.

They scored each signal, assigning one point each for positive, negative, and neutral. Consequently, the higher negative scores suggest earnings manipulation. Their method compares each year to the preceding year. Therefore, a significant negative score in a given year warrants investigation.

- The signals are defined below and presented in the following exhibit.
- **Inventory** – Percentage change in inventory less the percentage change in sales. Disproportionate inventory increases (i.e., index is a positive number) are considered a negative signal as it can indicate holding of inventory which is often associated with earnings management such as production smoothing.
- **Accounts Receivable** – Percentage change in accounts receivable less the percentage change in sales. Disproportionate accounts receivable increases (i.e., index is a positive number) is considered a negative signal. It may suggest the recording of unrealized revenues as sales or credit extensions which will impact future earnings persistence.
- **Capital Expenditures and Research and Development Expenditures**– Percentage change in industry benchmarks less the percentage change in the firm's expenditures. Disproportionate decreases relative to the benchmarks are considered a negative signal.
- **Gross Margi**n – Percentage change in gross margin less the percentage change in sales. A decrease in gross margin relative to sales (i.e. index is negative) is considered a negative signal. Erosion of a firm's margins has a negative impact on the long-term performance of the firm.
- **Selling and Administrative Expen**ses – Percentage change in selling and administrative expenses less the percentage change in sales. Most administrative costs are approximately fixed. A disproportionate increase (i.e. index is a positive number), suggests a loss of cost controls or an unusual sales effort.
- **Provision for Doubtful Receivables** – This is also commonly referred to as Allowance for Doubtful Accounts. It is measured as the percentage change in gross accounts

7 Baruch Lev, and S. Ramu Thiagarajan, "Fundamental Information Analysis," Journal of Accounting Research, Vol. 31 (2), Autumn 1993.

receivable less the percentage change in the provision for doubtful receivables. Positive values of this measure are perceived as a negative signal. Firms with inadequate provisions for doubtful receivables are expected to suffer future earnings decreases.

- **Effective Tax Rate** – Computes the portion of net earnings attributable to the effective tax rate change (not caused by statutory tax rate changes). An unusual decrease in the effective tax rate is generally considered a negative signal (index is negative number).
- **Order Backlog** – Percentage change in sales less the percentage change in order backlog. A decrease in order backlog relative to sales (index is a positive number) is considered a negative signal. It may suggest that unrealized sales were recorded or that the demand for the firm's products is decreasing which has a negative impact on future performance.
- **Labor Cost** – Percentage change in sales per employee. Decreases in sales per employee (index is a positive number) is a negative signal. This measurement is used instead of earnings per employee as in a year of restructuring; the labor cost is often increased. Removing the cost impacts provides insight of the future potential benefits of a restructuring.
- **LIFO Earnings** – When input prices are increasing, LIFO earnings are regarded as more sustainable or closer to economic earnings than FIFO earnings since LIFO cost of sales is a closer approximation of current (replacement cost) than FIFO cost of sales. The use of the LIFO inventory method is considered a positive signal. However, in instances where inventory turns over very quickly, such as monthly, this may not be a factor as LIFO and FIFO cost of sales would essentially be the same.
- **Audit Qualification** – A qualified, disclaimed, or adverse audit opinion sends a negative message to investors and is therefore considered a negative signal.

A chart summarizing the signals for ABC, Inc. is found in Exhibit 49A–7 and a graph illustrating the signals is shown in Exhibit 49A–8.

Exhibit 49A–7

12 Signals	Summary of Signals								
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Inventory	1	1	1	1	-1	-1	-1	-1	-1
A/R	-1	1	-1	1	1	-1	-1	1	1
Cap Exp	0	0	0	0	-1	1	-1	-1	0
R&D Exp	0	0	0	0	0	0	0	0	0
GM	1	1	1	1	1	1	1	1	1
S&A Exp	1	-1	-1	-1	-1	-1	-1	-1	-1
Doubt Rec	1	-1	-1	-1	-1	-1	-1	-1	-1
Eff Tax	1	1	-1	1	-1	1	-1	1	-1
Order Back	1	1	1	-1	-1	-1	-1	-1	1
Labor Force	1	1	-1	1	-1	1	-1	1	1
LIFO Earn	-1	-1	-1	-1	-1	-1	-1	-1	-1
Audit Qual	1	1	1	1	1	1	1	1	1
Positive	8	7	4	6	3	5	2	5	6
Negative	-2	-3	-6	-4	-8	-6	-9	-6	-5
N/A	2	2	2	2	1	1	1	1	1

Exhibit 49A–8
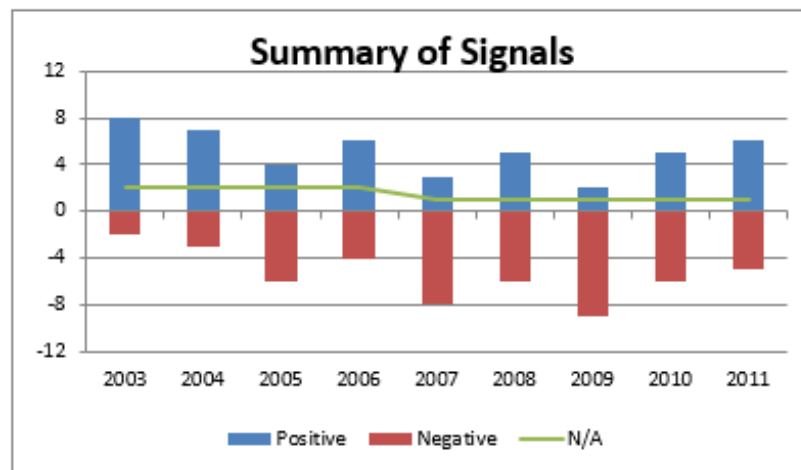
As the visuals illustrate, the negative signals are the highest in the years 2007 and 2009 which each have a commensurate number of negative signals. The most dramatic trend change occurred in 2007, thus warranting further investigation due to potential for earnings manipulation.

The final technique highlighted is Piotroski's F-Score and scoring trend comparison.

5. Piotroski's F-Score

Joseph Piotroski[8] reasoned that because value stocks are troubled companies by definition, many are financially distressed and won't have the financial resources to recover. In considering whether he could improve the performance of a value portfolio by throwing out the financially weakest stocks, he devised a simple nine-criterion stock-scoring system for evaluating a stock's financial strength that could be determined using data solely from financial statements. One point was awarded for each test that a stock passed. Piotroski classed any stocks that scored eight or nine points as being the strongest stocks.

His findings were that these strong stocks, as a group, outperformed a portfolio of all value stocks by 7.5% annually over a 20-year test period. Piotroski also found that weak stocks, scoring two points or fewer, were five times more likely to either go bankrupt or delist due to financial problems.

Although ABC, Inc. is not a public company, since the source of the data comes from financial statements and does not require any market values, it can be applied to private company financial statements. The chart displayed in Exhibit 49A–9 explains the individual criteria and ABC's points in each category.

The nine categories are defined below.

- **Net Income** – Net income, the bottom-line after-tax profits, is the simplest measure of profitability. Score 1 if the latest year's net income is positive; otherwise, a zero. The score for ABC, Inc. is 0.

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8 Joseph Piotroski, "Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers," Journal of Accounting Research, Vol 38 (2000), pp. 1-41.

- **Operating Cash Flow** – Cash flow is arguably a better profitability measure than net income. Cash flow measures the money that actually moved into or out of a company's bank account; Score 1 point if the latest year's operating cash flow is positive, otherwise, a zero.

  The score for ABC, Inc. is 0.

- **Return on Assets (ROA)** – Earnings quality – Many experts compare net income to operating cash flow to detect potential accounting manipulations. Cash flow normally exceeds net income because depreciation and other non-cash expenses reduce income, but not cash flow; Score 1 point if the latest year's operating cash flow exceeds the current year's net income, otherwise, a zero.

  The score for ABC, Inc. is 0.

- **Quality of Earnings** – Warns of Accounting Tricks. Score 1 if last year's operating cash flow exceeds net income, otherwise, a zero.

  The score for ABC, Inc. is 0.

- **Long-Term Debt (LTD) vs. Assets** – Is Debt decreasing? Score 1 if the ratio of long-term debt to assets is down from the year-ago value, otherwise, a zero. (If LTD is zero but assets are increasing, score 1 anyway.)

  The score for ABC, Inc. is 0.

- **Current Ratio (CR)** – Measures increasing working capital. Score 1 if CR has increased from the prior year, otherwise, a zero.

  The score for ABC, Inc. is 0.

- **Shares Outstanding** – A Measure of potential dilution. Score 1 if the number of shares outstanding is no greater than the year-ago figure, otherwise, a zero.

  The score for ABC, Inc. is n/a.

- **Gross Margin (GM)** – A measure of improving competitive position. Score 1 if full-year GM exceeds the prior-year GM, otherwise, a zero.

  The score for ABC, Inc. is 1 and 0 for 2007 and 2008, respectively.

- **Asset Turnover** – Measures productivity. Score 1 if the percentage increase in sales exceeds the percentage increase in total assets, otherwise, a zero.

  The score for ABC, Inc. is 0.

- **Overall F-Score** – The overall F-Score is made up of a combination of the above factors to arrive at a composite score. Scores higher than 8–9 points suggest a stronger stock and 0–2 points suggest the weakest stocks.

  The score for ABC, Inc. is 0.

ABC's aggregate score is 2 indicating a very weak financial position as indicated below.

Exhibit 49A–9

Category	Description and Scoring	Score
Net Income	Positive net income - Net income, the bottom line after-tax profits, is the simplest measure of profitability. Score 1 if the latest year's net income is positive; otherwise, a zero.	0
Operating Cash Flow	Cash flow is arguably a better profitability measure than net income. Cash flow measures the money that actually moved into or out of a company's bank account; Score 1 point if the latest year's operating cash flow is positive, otherwise, a zero.	0
Return on Assets (ROA)	Earnings quality - Many experts compare net income to operating cash flow to detect potential accounting manipulations. Cash flow normally exceeds net income because depreciation and other non-cash expenses reduce income, but not cash flow; Score 1 point if the latest year's operating cash flow exceeds the current year's net income, otherwise, a zero.	1
Quality of Earnings	Warns of Accounting Tricks. Score 1 if last year's operating cash flow exceeds net income, otherwise, a zero.	0
Long-Term Debt(LTD) vs. Assets	Is Debt decreasing? Score 1 if the ratio of long-term debt to assets is down from the year-ago value, otherwise, a zero. (If LTD is zero but assets are increasing, score 1 anyway.)	0
Current Ratio (CR)	Measures increasing working capital. Score 1 if CR has increased from the prior year, otherwise, a zero.	1
Shares Outstanding	A Measure of potential dilution. Score 1 if the number of shares outstanding is no greater than the year-ago figure, otherwise, a zero.	n/a
Gross Margin (GM)	A measure of improving competitive position. Score 1 if full-year GM exceeds the prior-year GM, otherwise, a zero.	0
Asset Turnover	Measures productivity. Score 1 if the percentage increase in sales exceeds the percentage increase in total assets, otherwise, a zero.	0
	Total	2

Scoring
8-9 points - strongest
3-8 - middle
0-2 weakest

Joseph Piotroski reasoned that because value stocks are troubled companies by definition, many are financially distressed and won't have the financial resources to recover. Pondering on whether he could improve the performance of a value portfolio by throwing out the financially weakest stocks, he devised a simple nine-criteria stock-scoring system for evaluating a stock's financial strength that could be determined using data solely from financial statements.

One point was awarded for each test that a stock passed. Piotroski classed any stocks that scored eight or nine points as being the strongest stocks. His findings were that these strong stocks as a group outperformed a portfolio of all value stocks by 7.5% annually over a 20-year test period. Piotroski also found that weak stocks, scoring two points or fewer, were five times more likely to either go bankrupt or delist due to financial problems.

Forensic conclusion

Two different types of forensic analyses i.e. ratio disparity and indices have been presented, discussed, and applied to ABC, Inc. Although they were developed by several different authorities for many different purposes, their application is the same—they can be used to test for earnings manipulation. And, if manipulation is indicated they can be used to substantiate its likelihood, thus supporting subsequent actions.

Perhaps most importantly, the indicators told the forensic operators *where* to look within each of the fiscal years. This information demonstrates the extraordinary power of the dozens of forensic indices because they can direct attention to when and where further investigation is required, thus saving significant time and money that can be wasted in random "pick and shovel" and "hunt and peck" exercises.

About the Contributing Author

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Mr. Dorrell is a founding partner of **financialforensics** with more than 50 years of professional practice in valuation, forensics, and disputes. He has authored/co-authored many publications including *Financial Forensics Body of Knowledge*, co-authored with Gregory A. Gadawski(Hoboken, NJ: John Wiley & Sons, Inc., 2012) and Chapter 12, "Forensic Intelligence: People & Money Tools to Prosecute Fraud, Corruption and Earnings Management," co-authored with Gregory A. Gadawski *United States Attorneys' Bulletin*, Vol. 60 (2) (United States Department of Justice, Executive Office for United States Attorneys, Office of Legal Education, Mar. 2012).