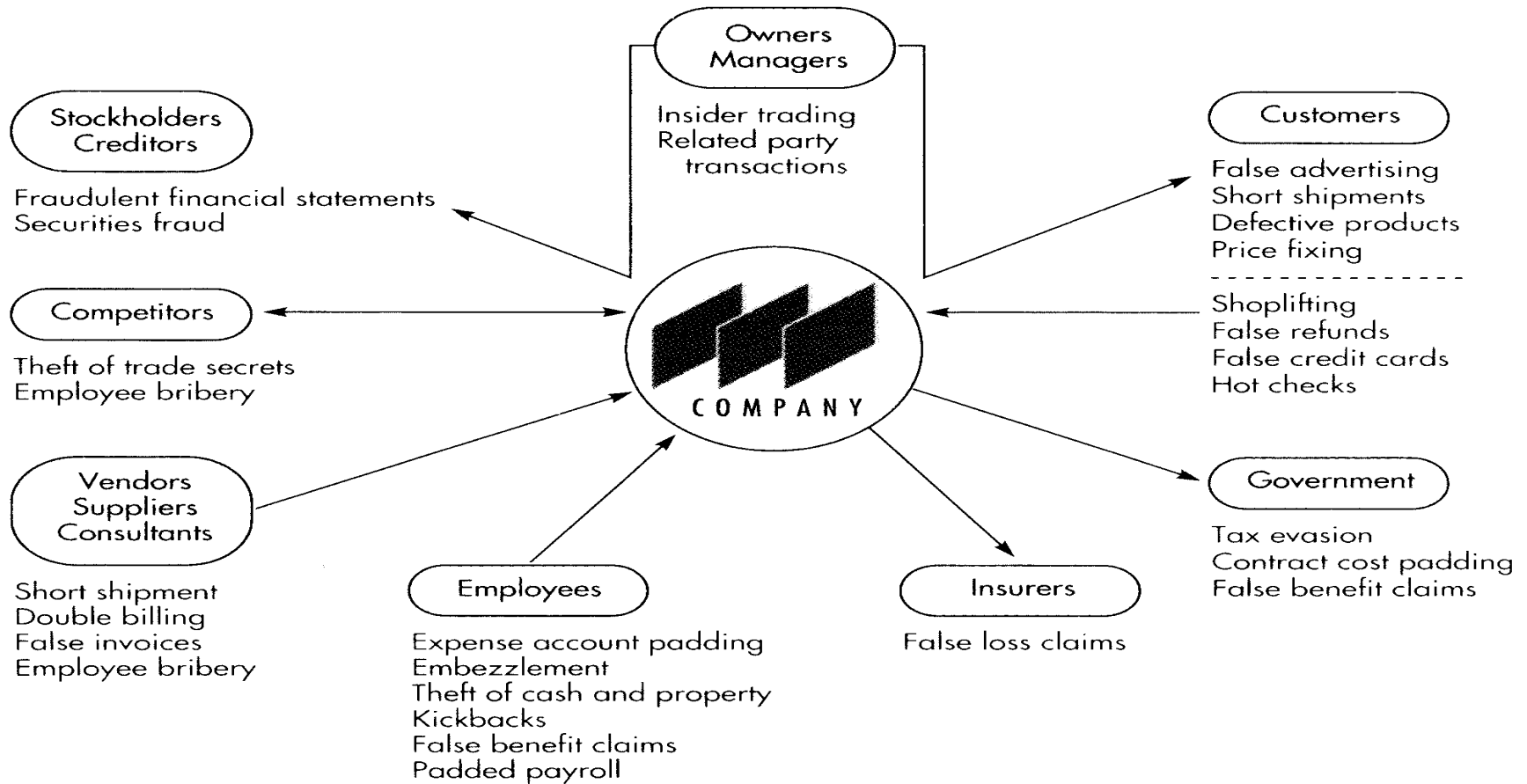


# Statistical Thinking For Data Science And Analytics

## The Role of the Auditor and Detecting Fraud

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# Overview



# Financial Statements: Errors, Frauds and Illegal Acts

- **Errors** are *unintentional* misstatements or omissions of amounts or disclosures in financial statements.
- **Management Fraud** is *intentional* misstatements or omissions of amounts or disclosures in financial statements.
- **Direct-effect illegal acts** are violations of laws or government regulations by the company or its management or employees that produce *direct* and material effects on *dollar amounts in financial statements*.
  - "Illegal acts" (far-removed) are violations of laws and regulations that are far removed from financial statement effects (for example, violations relating to insider securities trading, occupational health and safety, food and drug administration, environmental protection, and equal employment opportunity).

## Exhibit 2

# Considering the Risk of Fraud (SAS 99)

**Step 1: Audit team discussion  
("brainstorming")**

**Step 2: Identify information necessary  
to assess fraud risk factors**

**Step 3: a. Identify and  
b. Assess fraud risk factors**

**Step 4: Respond to risk assessment**

**Step 5: Evaluate audit evidence**

**Step 6: Communicate fraud matters**

**Step 7: Document fraud matters**

- Gather information to identify risks.
- Identify risks.
- Assess risks taking into account entity's programs and controls.
- Respond to results of assessment.

## Step 1:

### Audit team discussion (“brainstorming”)

- Required procedure
- Objectives
  - Gain understanding of
    - Previous experiences with client
    - How a fraud might be perpetrated and concealed in the entity
    - Procedures that might detect fraud
  - Set proper tone for engagement
- Discussions should be ongoing throughout the engagement

## Step 2:

# Obtain Information to Identify Risks

- Inquiries
  - Management
  - Audit committee
  - Internal auditors
  - Others
- Planning analytical procedures
  - Net income to cash flows (total accruals to total assets)
  - Days sales in receivables
  - Gross margin
  - Asset quality index (non current assets- p,p&e to total assets)
  - Sales growth index

## Step 3a:

# Identify Risk Factors Related to Fraudulent Financial Reporting

- Management's characteristics and influence
- Industry conditions
- Operating characteristics and financial stability

## Risk Factors:

# Management's Characteristics and Influence

- Management has a motivation to engage in fraudulent reporting.
- Management decisions are dominated by an individual or a small group.
- Management fails to display an appropriate attitude about internal control.
- Managers' attitudes are very aggressive toward financial reporting.
- Managers place too much emphasis on earnings projections.
- Nonfinancial management participates excessively in the selection of accounting principles or determination of estimates.
- The company has a high turnover of senior management.
- The company has a known history of violations.
- Managers and employees tend to be evasive when responding to auditors' inquiries.
- Managers engage in frequent disputes with auditors.

## Risk Factors:

### Industry conditions

- Company profits lag the industry.
- New requirements are passed that could impair stability or profitability.
- The company's market is saturated due to fierce competition.
- The company's industry is declining.
- The company's industry is changing rapidly.

## Risk Factors:

### Operating Characteristics

- A weak internal control environment prevails.
- The company is not able to generate sufficient cash flows to ensure that it is a going concern.
- There is pressure to obtain capital.
- The company operates in a tax haven jurisdiction.
- The company has many difficult accounting measurement and presentation issues.
- The company has significant transactions or balances that are difficult to audit.
- The company has significant and unusual related-party transactions.
- Company accounting personnel are lax or inexperienced in their duties.

## Step 3b:

### Assess Fraud Risks

- Type of risk
- Significance of risk
- Likelihood of risk
- Pervasiveness of risk
- Assess controls and programs

## Required Risk Assessments

- Presume that improper revenue recognition is a fraud risk.
- Identify risks of management override of controls.
  - Examine journal entries and other adjustments.
  - Review accounting estimates for biases.
  - Evaluate business rationale for significant unusual transactions.

## Step 4:

# Respond to Assessed Risks

- Overall effect on audit
  - Assignment of personnel
  - Choice of accounting principles
  - Predictability of auditing procedures
  - Examination of journal entries and other adjustments
  - Retrospective review of prior year accounting estimates
- Extended procedures
  - Surprise inventory counts
  - Contract confirmations

## More Examples of Extended Procedures

- Count the petty cash twice in one day.
- Investigate suppliers/vendors.
- Investigate customers.
- Examine endorsements on canceled checks.
- Add up the accounts receivable summary.
- Audit general journal entries.
- Match payroll to life and medical insurance deductions.
- Match payroll to social security numbers.
- Match payroll with addresses.
- Retrieve customer checks.
- Use marked coins and currency.
- Measure deposit lag time.
- Examine documents.
- Inquire, ask questions.
- Covert surveillance.
- Horizontal and vertical analysis.
- Net worth analysis.
- Expenditure analysis.

## Step 5:

### Evaluate Audit Evidence

- Discrepancies in the accounting records.
- Conflicting or missing evidential matter.
- Problematic or unusual relationships between the auditor and management.
- Results from substantive of final review stage analytical procedures.
- Vague, implausible or inconsistent responses to inquiries.

## Step 6:

### Communicate Fraud Matters

- *SAS 99*: Evidence that fraud may exist must be communicated to appropriate level of management.
- Sarbanes Oxley: Significant deficiencies must be communicated to those charged with governance.
- Any fraud committed by management (no matter how small) is material.

## Step 7:

### Document Fraud Matters

- Discussion of engagement personnel.
- Procedures to identify and assess risk.
- Specific risks identified and auditor response.
- If revenue recognition not a risk—explain why.
- Results of procedures regarding management override.
- Other conditions causing auditors to believe additional procedures are required.
- Communication to management, audit committee, etc.

## Illegal Acts

- **Illegal acts** are violations of laws or government regulations by the company or its management or employees.
  - **Direct-effect illegal acts** produce **direct** and **material** effects on the financial statements (e.g., income tax evasion).
  - **Indirect-effect illegal acts** are **far removed** from financial statement (e.g., violations relating to insider securities trading, occupational health and safety, food and drug administration, environmental protection, and equal employment opportunity).

## Red Flags of Potential Illegal Acts

- Unauthorized transactions.
- Government investigations.
- Regulatory reports of violations.
- Payments to consultants, affiliates, or employees for unspecified services.
- Excessive sales commissions and agents' fees.
- Unusually large cash payments.
- Unexplained payments to government officials.
- Failure to file tax returns or to pay duties and fees.

## Exhibit 3

# Auditor Responsibility for Detecting Errors, Frauds, and Illegal Acts

	Responsible for Detection?		Must Communicate Findings?	
	Material	Immaterial	Material	Immaterial
Errors	Yes	No	Yes (Audit Committee)	No
Fraud	Yes	No	Yes (Audit Committee)	Yes (One level above)
Illegal Acts	Yes (Direct Effect)	No	Yes (Audit Committee)	Yes (One level above)

## The AUDIT RISK MODEL (ARM)

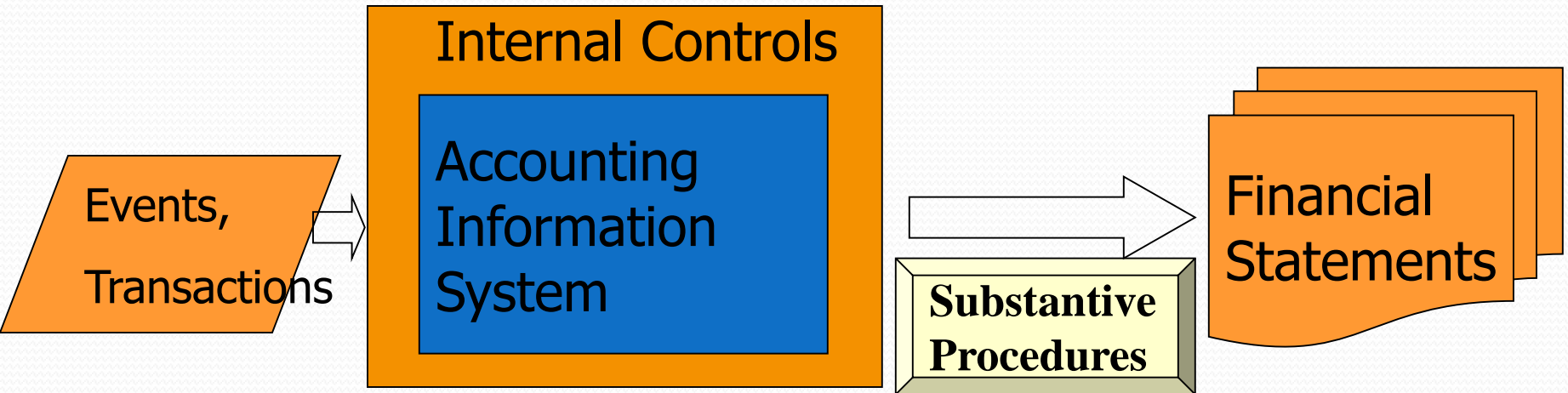
- **Audit risk (AR)** is the risk (likelihood) that the auditor may unknowingly **fail to modify the opinion** on financial statements that are **materially misstated** (e.g., an unqualified opinion on misstated financial statements.)
- The AUDIT RISK MODEL decomposes overall audit risk into three components: inherent risk (IR), control risk (CR), and detection risk (DR):

$$AR = IR \times CR \times DR$$

(IR x CR = Risk of Material Misstatement (RMM))

# Exhibit 4

## Inherent, Control and Detection Risk



### **INHERENT RISK**

The likelihood that, in the absence of internal controls, an error or fraud will enter the accounting information system

### **CONTROL RISK**

The likelihood that an error or fraud will not get caught by the client's internal controls.

### **DETECTION RISK**

The likelihood that an error or fraud will not be caught by the auditor's procedures.

### **AUDIT RISK**

The likelihood that an error or fraud will occur, and not get caught by either the internal controls or auditor's procedures.

**Risk of Material Misstatement (RMM)**

## ARM Concepts

- The auditor cannot affect inherent risk or control risk. The auditor can only ASSESS them.
- The auditor can only affect detection risk—generally by examining more evidence.
- Detection risk is inversely related to control risk and inherent risk.
- Detection risk is inversely related to competence and reliability of evidence.

# Inherent Risk

- **Inherent Risk (IR)** is the likelihood that, **in the absence of internal controls**, a material misstatement could occur. In other words, it is a measure of the **susceptibility of an account to misstatement**.
- Factors affecting account inherent risk include:
  - Dollar size of the account
  - Liquidity
  - Volume of transactions
  - Complexity of the transactions
    - New accounting pronouncements
  - Subjective estimates

# Other Factors Affecting Overall Inherent Risk

- Competition
- Economy
- Nature of Industry
- Management Style
- Leverage

## Inherent Risk:

### General Categories of Errors and Frauds

- Invalid transactions are recorded.
- Valid transactions are omitted from the accounts.
- Unauthorized transactions are executed and recorded.
- Transaction amounts are inaccurate.
- Transactions are classified in the wrong accounts.
- Transaction accounting and posting is incorrect.
- Transactions are recorded in the wrong period.

# Inherent Risk:

## General Categories of Errors and Frauds

	<b>Error Examples</b>	<b>Fraud Examples</b>
Invalid transactions are recorded	A computer malfunction causes a sales transaction to be recorded twice	Fictitious sales are recorded and charged to nonexistent customers
Valid transactions are omitted from the accounts	Shipments to customers are never recorded because of problems in the company's information processing system	Shipments are made to an employee's friend and purposely never recorded
Unauthorized transactions are executed and recorded	A customer's order is not approved for credit yet the goods are shipped, billed, and charged to the customer without requiring payment in advance	Unauthorized purchases are made and shipped to an employee's house
Transaction amounts are inaccurate	An employee calculates depreciation incorrectly	A company "short ships" a shipment to a customer and bills the customer for the full amount ordered
Transactions are classified in the wrong accounts	Sales to a subsidiary company are recorded as sales to outsiders instead of intercompany sales or the amount is charged to the wrong customer account receivable record	A loan to the company's CEO (not permitted under Sarbanes-Oxley) is classified as an account receivable to conceal the transaction
Transaction accounting and posting are incorrect	Sales are posted in total to the accounts receivable control account, but some are not posted to individual customer account records	Capital leases are accounted for as operating leases in order to keep related liabilities off the balance sheet
Transactions are recorded in the wrong period	The company fails to record a shipment that was sent by a supplier FOB shipping point in December, but the shipment was not received (or recorded) until January	Shipments made in January (of the next fiscal year) are backdated and recorded as sales in December

## Control Risk

- **Control Risk (CR)** is the likelihood that a material misstatement would **not be caught by the client's internal controls.**
- Factors affecting control risk include:
  - The environment in which the company operates (its “control environment”).
  - The existence (or lack thereof) and effectiveness of control procedures.
  - Monitoring activities (audit committee, internal audit function, etc.).

## Detection Risk

- **Detection risk (DR)** is the risk that a material misstatement would **not be caught by audit procedures.**
- Factors affecting detection risk include:
  - Nature, timing, and extent of audit procedures
  - Sampling risk
    - Risk of choosing an unrepresentative sample.
  - Nonsampling risk
    - Risk that the auditor may reach inappropriate conclusions based upon available evidence.

# Detection Risk and the Nature, Timing, and Extent of Audit Procedures

	<i>Lower Detection Risk</i>	<i>Higher Detection Risk</i>
Nature	More effective tests.	Less effective tests.
Timing	Testing performed at year-end.	Testing can be performed at Interim.
Extent	More tests.	Fewer tests.

## Example of the Audit Risk Model

- AR = .05 (set by firm)
  - IR = .90 (nature of account)
  - CR = .70 (assessed by auditor)
  - DR = .08 [ $.05 / (.90 \times .70)$ ]  
= .08
- Low
  - High
  - Medium High
  - Low

# Exhibit 3.8

## Matrix Approach to Detection Risk Determination

		Control Risk		
		Low	Moderate	High
Inherent Risk	Low	High Detection Risk	Moderate to High Detection Risk	Moderate Detection Risk
	Moderate	Moderate to High Detection Risk	Moderate Detection Risk	Low to Moderate Detection Risk
	High	Moderate Detection Risk	Low to Moderate Detection Risk	Low Detection Risk

## More Examples

AR	IR	CR	DR?
.05	1.0	.50	.10
.05	.50	.05	2.0?
Low	Moderate	Moderate	Low
Very Low	Low	High	Medium

# Materiality

- **Materiality** refers to an amount (or transaction) that would **influence the decisions of users** (i.e., an amount (or event) that would make a difference). The emphasis is on user, rather than management or the audit team.
- Materiality Criteria:


<u>Quantitative Criteria:</u>	<u>Qualitative Criteria</u>
<ul style="list-style-type: none"><li>• Absolute size</li><li>• Relative size</li><li>• Cumulative effects</li></ul>	<ul style="list-style-type: none"><li>• Nature of the item or issue</li><li>• Circumstances</li><li>• Uncertainty</li></ul>
- Ultimately, materiality is a matter of **professional judgment**.

# Exhibit 3.9

## Materiality Table

<i>Larger of Client Total Revenues or Total Assets is ...</i>						
<u>Over</u>	<u>But not Over</u>	<u>Planning Materiality</u>		<u>Factor</u>	<u>X</u>	<u>Excess Over</u>
\$0	\$30 thousand	\$0	+	.0593	X	\$0
30 thousand	100 thousand	1,780	+	.0312	X	30 thousand
100 thousand	300 thousand	3,960	+	.0215	X	100 thousand
300 thousand	1 million	8,260	+	.0145	X	300 thousand
1 million	3 million	18,400	+	.00995	X	1 million
3 million	10 million	38,300	+	.00674	X	3 million
10 million	30 million	85,500	+	.00461	X	10 million
30 million	100 million	178,000	+	.00312	X	30 million
100 million	300 million	396,000	+	.00215	X	100 million
300 million	1 billion	826,000	+	.00145	X	300 million
1 billion	3 billion	1,840,000	+	.000995	X	1 billion
3 billion	10 billion	3,830,000	+	.000674	X	3 billion
10 billion	30 billion	8,550,000	+	.000461	X	10 billion
30 billion	100 billion	17,800,000	+	.000312	X	30 billion
100 billion	300 billion	39,600,000	+	.000215	X	100 billion
300 billion	...	82,600,000	+	.000148	X	300 billion

Source: AICPA Audit Sampling Guide, AICPA (New York, New York), 2001.

# General Audit Procedures

- Inspection of records and documents
  - Vouching
  - Tracing
  - Scanning
- Inspection of tangible assets
- Observation
- Inquiry
- Confirmation
- Recalculation
- Reperformance
- Analytical Procedures

# Vouching/Tracing

Q: Did all recorded sales actually occur?



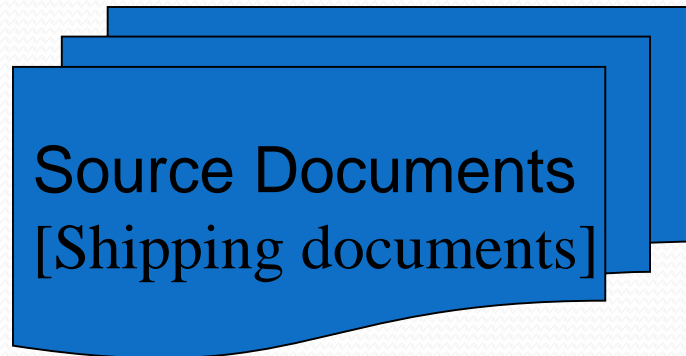
Vouching

(Existence or Occurrence)



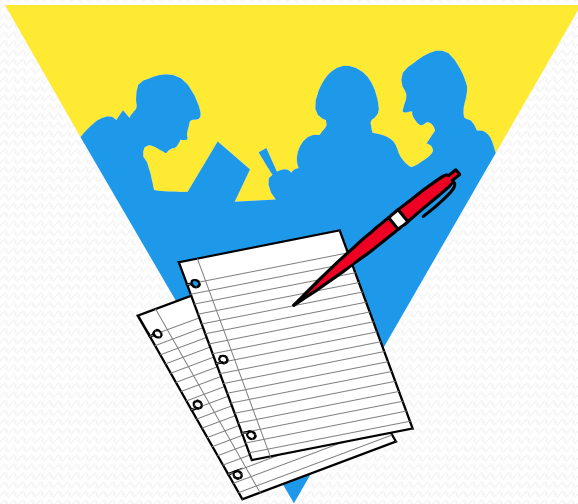
Tracing

(Completeness)



Q: Were all sales recorded?

# Audit Programs



- A list of the audit procedures the auditors need to perform to gather sufficient appropriate evidence on which to base their opinion on the financial statements.
- Each audit program is based, in part, on the output of Audit Risk Model.
- Generally one for each major cycle or group of related accounts.
  - Revenue and collection (Chapter 7)
  - Acquisition and expenditure (Chapter 8)
  - Production (Chapter 9)
  - Financing and investing (Chapter 10)
- Signed off as procedures are performed.

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