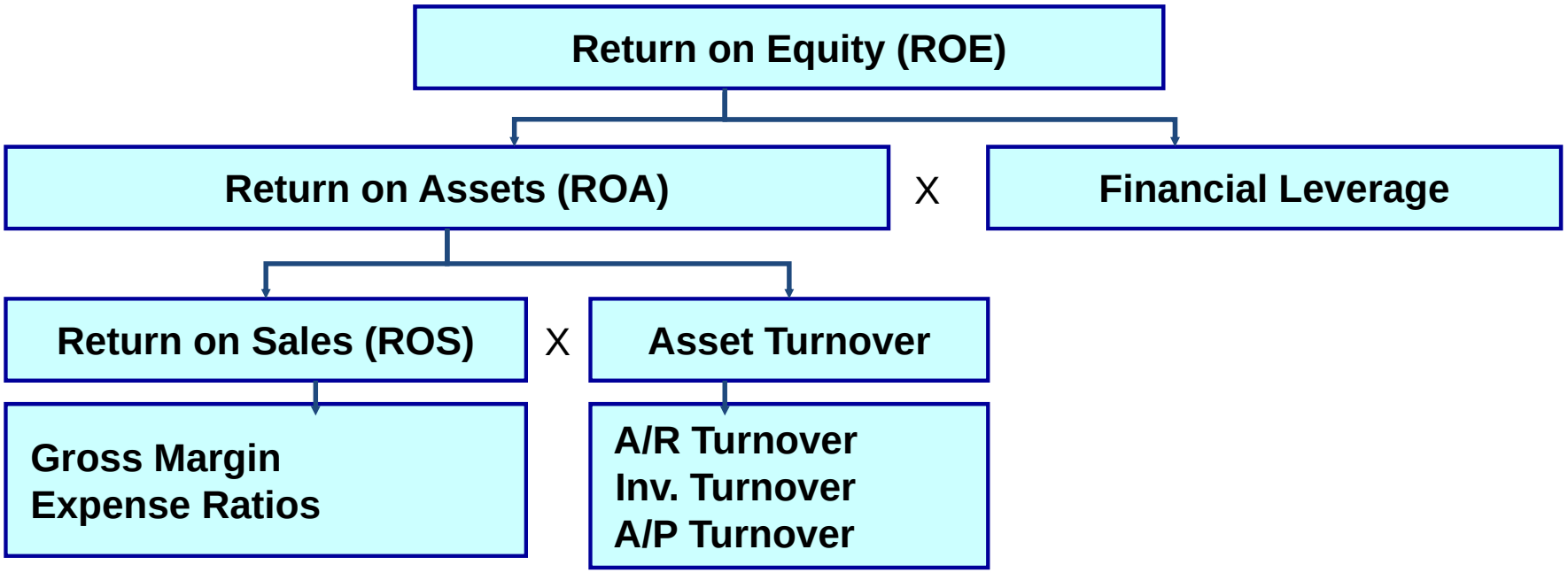
DuPont Ratio Analysis Framework



ROE = Net Income/Sales x Sales/Assets x Assets/Equity

= Profitability x Efficiency x Leverage

Wharton
University of Pennsylvania

Profit Margin Ratios

- What are the drivers of profitability?
  - Use Common Size income statement for most of these
- Gross Margin = (Sales - Cost of Goods Sold) / Sales
- SG&A-to-Sales = SG&A Expense / Sales
- Operating Margin = Operating Income / Sales
- Interest Expense-to-Sales = Interest Expense / Sales
- Effective Tax Rate = Income Taxes / Pre-tax Income

Key Ratios – Profit Margin Analysis

	12/31/2009	12/31/2010	12/31/2011
Gross margin	13.4%	15.5%	16.3%
SG&A to Sales	5.4%	5.4%	5.4%
Operating Margin	8.0%	10.1%	10.9%
Interest Expense to Sales	2.6%	2.8%	2.6%
Effective Tax Rate	37.8%	40.0%	40.0%

Gross Margin = (Sales - Cost of Goods Sold) / Sales

SG&A as a % of Sales = SG&A Expense / Sales

Operating Margin = Operating Income / Sales

Interest Expense as % of Sales = Interest Expense / Sales

Effective Tax Rate = Income Taxes / Pre-tax Income

Profit Margin Analysis Questions

- **Possible explanations for improvement in gross margin:**
  - **Reducing production costs while maintaining sales price**
    - **Did Plainview further automate its production?**
  - **Raising sales price while keeping costs constant**
    - **Did entry into new markets allow a higher mark-up?**

=> Search for confirming or disconfirming evidence of these explanations

=> Ask management to explain the source of the dramatic improvement in product mark-up

Asset Turnover Analysis

- Although Asset Turnover ratio was steady over the period, looking at the detailed components of the ratio may provide further insight into how Plainview managed its remarkable turn-around
- For example, dramatic increases in Sales are often accompanied by
  - Lower Inventory levels
    - Production can barely keep up with sales
  - Higher Accounts Receivable levels
    - Company has to extend credit to riskier customers to fuel sales growth

Asset Turnover Ratios

- How many times per year do we cycle through accounts?
  - Example: Inventory Turnover of 8 means that we build and sell Inventory 8 times per year, on average.
- Accounts Receivable Turnover = Sales / Average A/R
- Inventory Turnover = Cost of Goods Sold / Average Inventory
- Accounts Payable Turnover = Purchases / Average Accounts Payable
  - (Purchases = Ending Inventory + COGS – Beginning Inventory)
- Fixed Asset Turnover = Sales / Avg. Net PP&E

Key Ratios – Asset Turnover Analysis

	12/31/2009	12/31/2010	12/31/2011
Accounts Receivables Turnover	6.1	8.4	8.3
Inventory Turnover	4.5	4.2	3.5
Accounts Payable Turnover	6.6	12.3	11.0
Fixed asset turnover	3.3	3.1	3.1

Accounts Receivables Turnover = Sales / Avg. Accounts Receivable

Inventory Turnover = Cost of Goods Sold / Avg. Inventory

Accounts Payable Turnover = Purchases / Avg. Accounts Payable

(Purchases = Ending Inventory + COGS – Beginning Inventory)

Fixed Asset Turnover = Sales / Avg. Net Property, Plant and Equipment

Days Outstanding Ratios

- How many days, on average, are accounts outstanding?
  - Example: Days Inventory of 45 means that it takes 45 days, on average, from the time we start building Inventory until we sell it
- Days Receivable (Sales) Outstanding = 365 / A/R Turnover
- Days Inventory = 365 / Inventory Turnover
- Days Payable = 365 / A/P Turnover
- Net Trade Cycle = Days Receivable + Days Inventory - Days Payable
  - Net Trade Cycle represents the gap between cash outflows and cash inflows that we have to bridge with short-term borrowing

Key Ratios – Asset Turnover Analysis

	12/31/2009	12/31/2010	12/31/2011
Days Receivables	60.3	43.4	44.1
Days Inventory	81.7	86.6	105.1
Days Payable	55.1	29.7	33.2
Net Trade Cycle	86.9	100.3	116.0

Days Receivables = 365 * (Avg. Accounts Receivable / Sales)

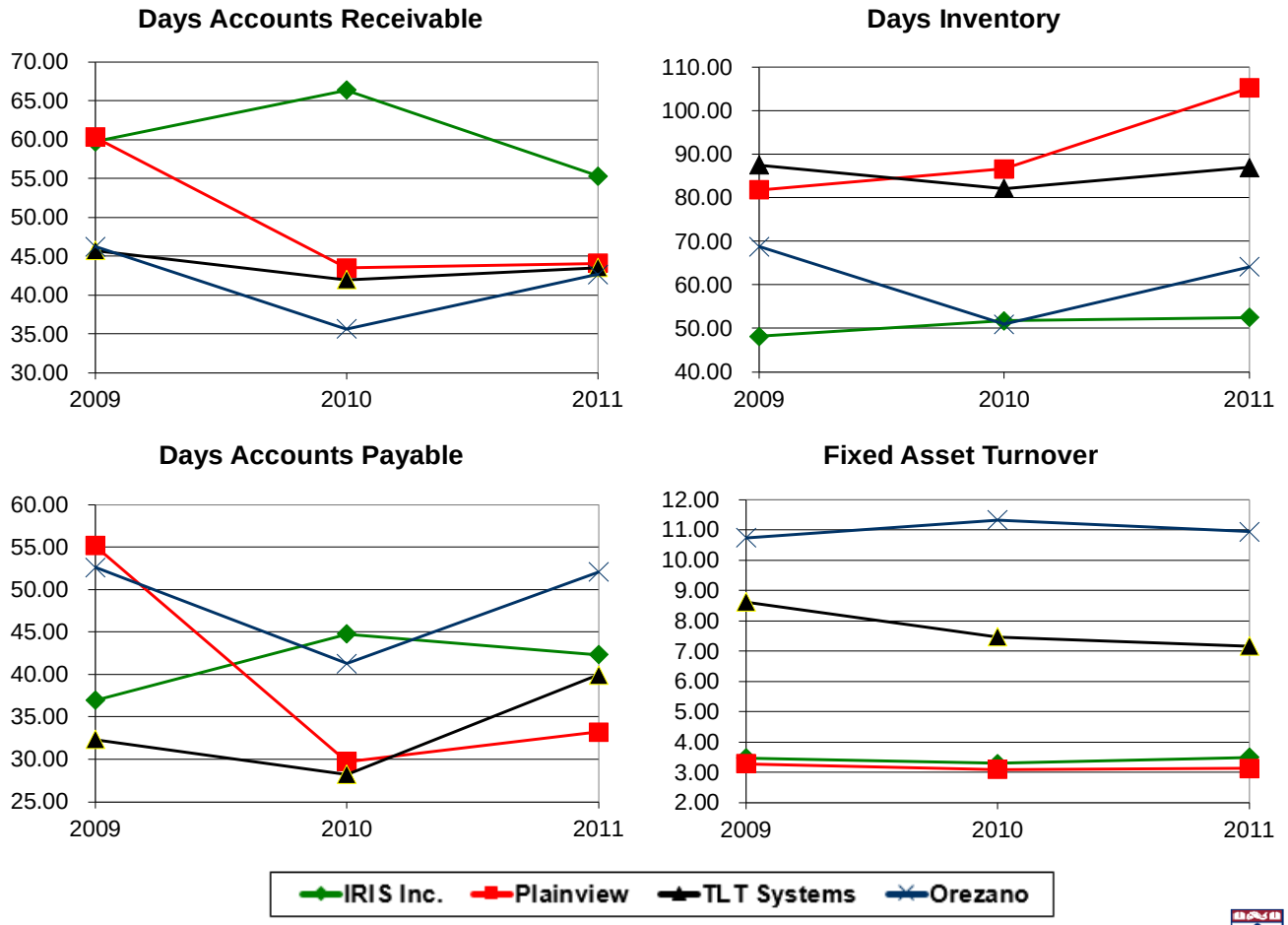
Days Inventory = 365 * (Avg. Inventory / Cost of Goods Sold)

Days Payable = 365 * (Avg. Accounts Payable / Purchases)

(Purchases = Ending Inventory + COGS – Beginning Inventory)

Net Trade Cycle = Days Receivable + Days Inventory - Days Payable

Cross-Sectional Comparisons – Asset Turnover



Conclusions from the DuPont Ratio Analysis

- **Overall, ratio analysis suggests:**
  - **Entry into new markets produces higher-margin sales with faster collections, but longer production times**
  - **But, how can they do this with 40%+ sales growth?**
  - **And why do they have volatile cash flows from operations?**