

# Financial Planning and Forecasting

- **Forecasting sales**
- **Projecting the assets needed to support sales**
- **Projecting internally generated funds**
- **Projecting outside funds needed**
- **Deciding how to raise funds**
- **Seeing the effects of a plan on ratios**

## 2001 Balance Sheet (Millions of \$)

<b>Cash &amp; sec.</b>	<b>\$ 20</b>	<b>Accts. pay. &amp; accruals</b>	<b>\$ 100</b>
<b>Accounts rec.</b>	<b>240</b>	<b>Notes payable</b>	<b>100</b>
<b>Inventories</b>	<b>240</b>	<b>Total CL</b>	<b>\$ 200</b>
<b>Total CA</b>	<b>\$ 500</b>	<b>L-T debt</b>	<b>100</b>
<b>Net fixed assets</b>	<b>500</b>	<b>Common stock</b>	<b>500</b>
<b>Total assets</b>	<b><u>\$1,000</u></b>	<b>Retained earnings</b>	<b>200</b>
		<b>Total claims</b>	<b><u>\$1,000</u></b>

## 2001 Income Statement (Millions of \$)

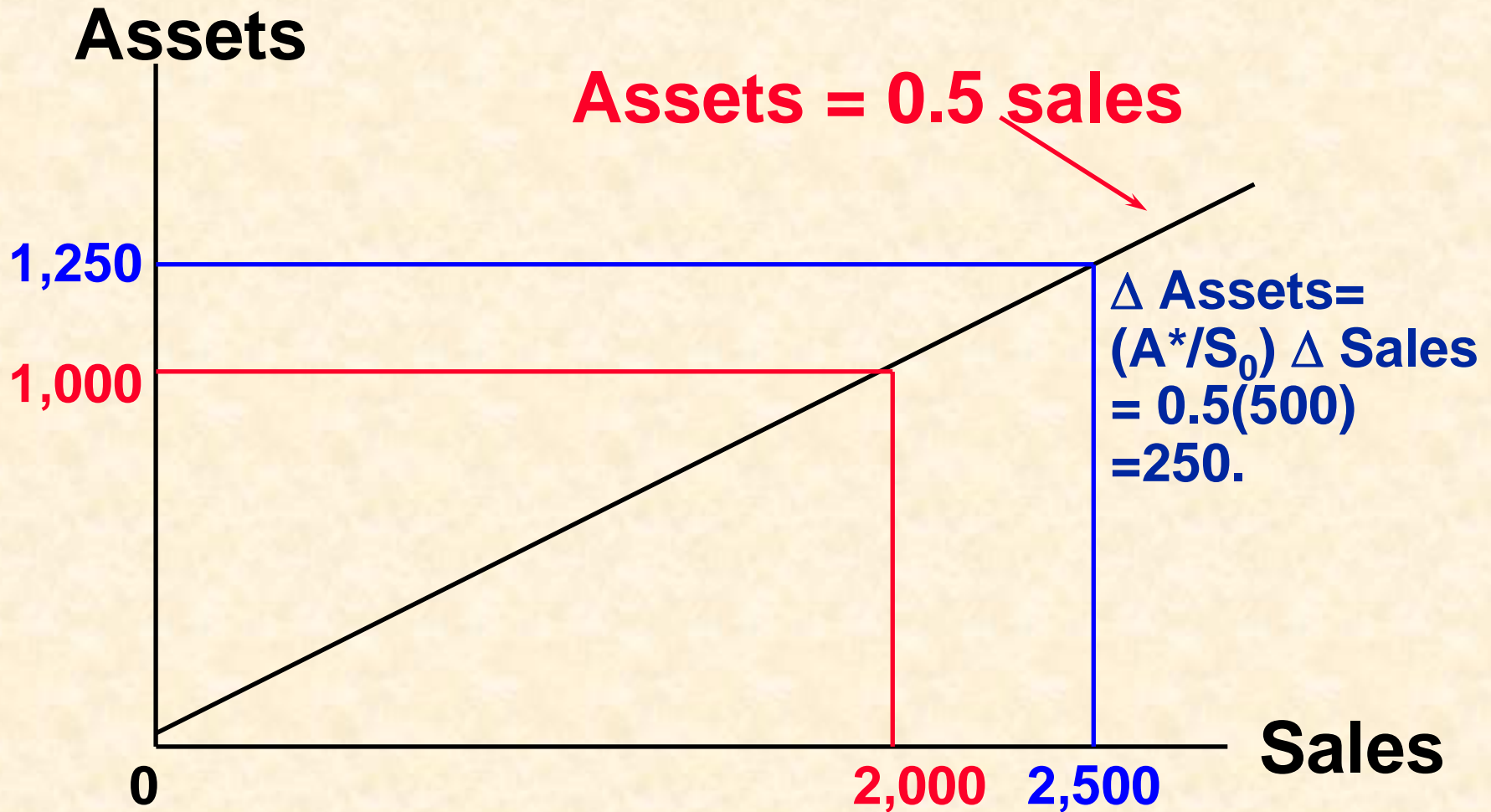
<b>Sales</b>	<b>\$2,000.00</b>
<b>Less: Var. costs (60%)</b>	<b>1,200.00</b>
<b>Fixed costs</b>	<b>700.00</b>
<b>EBIT</b>	<b>\$ 100.00</b>
<b>Interest</b>	<b>16.00</b>
<b>EBT</b>	<b>\$ 84.00</b>
<b>Taxes (40%)</b>	<b>33.60</b>
<b>Net income</b>	<b>\$ 50.40</b>
<b>Dividends (30%)</b>	<b>\$15.12</b>
<b>Add'n to RE</b>	<b>\$35.28</b>

## Key Ratios

	<u>NWC</u>	<u>Industry</u>	<u>Condition</u>
<b>BEP</b>	<b>10.00%</b>	<b>20.00%</b>	<b>Poor</b>
<b>Profit margin</b>	<b>2.52%</b>	<b>4.00%</b>	”
<b>ROE</b>	<b>7.20%</b>	<b>15.60%</b>	”
<b>DSO</b>	<b>43.80 days</b>	<b>32.00 days</b>	”
<b>Inv. turnover</b>	<b>8.33x</b>	<b>11.00x</b>	”
<b>F. A. turnover</b>	<b>4.00x</b>	<b>5.00x</b>	”
<b>T. A. turnover</b>	<b>2.00x</b>	<b>2.50x</b>	”
<b>Debt/assets</b>	<b>30.00%</b>	<b>36.00%</b>	<b>Good</b>
<b>TIE</b>	<b>6.25x</b>	<b>9.40x</b>	<b>Poor</b>
<b>Current ratio</b>	<b>2.50x</b>	<b>3.00x</b>	”
<b>Payout ratio</b>	<b>30.00%</b>	<b>30.00%</b>	<b>O. K.</b>

## Key Assumptions

- Operating at **full capacity** in 2001.
- Each type of asset grows **proportionally** with sales.
- Payables and accruals grow **proportionally** with sales.
- 2001 profit margin (2.52%) and payout (30%) **will be maintained**.
- Sales are expected to increase by \$500 million. ( **$\% \Delta S = 25\%$** )



$$A^*/S_0 = 1,000/2,000 = 0.5 = 1,250/2,500.$$

**Assets must increase by \$250 million.  
What is the AFN, based on the AFN  
equation?**

$$\begin{aligned} \text{AFN} &= (A^*/S_0)\Delta S - (L^*/S_0)\Delta S - M(S_1)(RR) \\ &= (\$1,000/\$2,000)(\$500) \\ &\quad - (\$100/\$2,000)(\$500) \\ &\quad - 0.0252(\$2,500)(0.7) \\ &= \mathbf{\$180.9 \text{ million}.} \end{aligned}$$

## Assumptions about How AFN Will Be Raised

- The payout ratio will remain at 30 percent ( $d = 30\%$ ;  $RR = 70\%$ ).
- No new common stock will be issued.
- Any external funds needed will be raised as debt, 50% notes payable and 50% L-T debt.

## 2002 Forecasted Income Statement

	<u>2001</u>	<u>Forecast Basis</u>	<u>2002 Forecast</u>
<b>Sales</b>	<b>\$2,000</b>	<b>1.25</b>	<b>\$2,500</b>
<b>Less: VC</b>	<b>1,200</b>	<b>0.60</b>	<b>1,500</b>
<b>FC</b>	<b>700</b>	<b>0.35</b>	<b>875</b>
<b>EBIT</b>	<b>\$ 100</b>		<b>\$ 125</b>
<b>Interest</b>	<b>16</b>	→	<b>16</b>
<b>EBT</b>	<b>\$ 84</b>		<b>\$ 109</b>
<b>Taxes (40%)</b>	<b>34</b>		<b>44</b>
<b>Net income</b>	<b><u>\$ 50</u></b>		<b><u>\$ 65</u></b>
 <b>Div. (30%)</b>	 <b>\$15</b>		 <b>\$19</b>
<b>Add'n to RE</b>	<b>\$35</b>		<b>\$46</b>

## 2002 Balance Sheet (Assets)

	<u>2001</u>	<b>Forecast Basis</b>	<u>1st Pass</u>
<b>Cash</b>	\$ 20	0.01	\$ 25
<b>Accts. rec.</b>	240	0.12	300
<b>Inventories</b>	240	0.12	300
<b>Total CA</b>	<u>\$ 500</u>		<u>\$ 625</u>
<b>Net FA</b>	<u>500</u>	0.25	<u>625</u>
<b>Total assets</b>	<u><u>\$1,000</u></u>		<u><u>\$1,250</u></u>

**At full capacity, so all assets must increase in proportion to sales.**

## 2002 Balance Sheet (Claims)

	<u>2001</u>	<b>Forecast Basis</b>	<u>1st Pass</u>
AP/accruals	\$ 100	0.05	\$ 125
Notes payable	<u>100</u>	→	<u>100</u>
Total CL	\$ 200		\$ 225
L-T debt	100	→	100
Common stk.	500	→	500
Ret.earnings	<u>200</u>	+46*	<u>246</u>
Total claims	<u><u>\$1,000</u></u>		<u><u>\$1,071</u></u>

\* From income statement.

## What is the additional financing needed (AFN)?

- Required increase in assets = \$ 250
- Spontaneous increase in liab. = \$ 25
- Increase in retained earnings = \$ 46
- Total AFN = \$ 179

NWC must have the assets to make forecasted sales. The balance sheet must balance. So, we must raise **\$179 externally**.

## How will the AFN be financed?

**Additional notes payable =**

$$0.5(\$179) = \$89.50$$

**Additional L-T debt =**

$$0.5(\$179) = \$89.50$$

**But this financing will add to interest expense, which will lower NI and retained earnings. We will generally ignore financing feedbacks.**

## 2002 2<sup>nd</sup> Pass Balance Sheet (Assets)

	<b>1st Pass</b>	<b>AFN</b>	<b>2nd Pass</b>
<b>Cash</b>	<b>\$ 25</b>	—————→	<b>\$ 25</b>
<b>Accts. rec.</b>	<b>300</b>	—————→	<b>300</b>
<b>Inventories</b>	<b>300</b>	—————→	<b>300</b>
<b>Total CA</b>	<b>\$ 625</b>	—————→	<b>\$ 625</b>
<b>Net FA</b>	<b>625</b>	—————→	<b>625</b>
<b>Total assets</b>	<b><u><u>\$1,250</u></u></b>	—————→	<b><u><u>\$1,250</u></u></b>

**No change in asset requirements.**

## 2002 2<sup>nd</sup> Pass Balance Sheet (Claims)

	<b>1st Pass</b>	<b>AFN</b>	<b>2nd Pass</b>
<b>AP/accruals</b>	<b>\$ 125</b>	—————→	<b>\$ 125</b>
<b>Notes payable</b>	<b>100</b>	<b>+89.5</b>	<b>190</b>
<b>Total CL</b>	<b>\$ 225</b>		<b>\$ 315</b>
<b>L-T debt</b>	<b>100</b>	<b>+89.5</b>	<b>189</b>
<b>Common stk.</b>	<b>500</b>	—————→	<b>500</b>
<b>Ret. earnings</b>	<b>246</b>	—————→	<b>246</b>
<b>Total claims</b>	<b><u><u>\$1,071</u></u></b>		<b><u><u>\$1,250</u></u></b>

**Equation AFN = \$181 vs. \$179.  
Why different?**

- **Equation method assumes a constant profit margin, a constant dividend payout, and a constant capital structure.**
- **Financial statement method is more flexible. More important, it allows different items to grow at different rates.**

## Ratios

	<u>2001</u>	<u>2002(E)</u>	<u>Industry</u>	
<b>BEP</b>	<b>10.00%</b>	<b>10.00%</b>	<b>20.00%</b>	<b>Poor</b>
<b>Profit margin</b>	<b>2.52%</b>	<b>2.62%</b>	<b>4.00%</b>	<b>"</b>
<b>ROE</b>	<b>7.20%</b>	<b>8.77%</b>	<b>15.60%</b>	<b>"</b>
<b>DSO (days)</b>	<b>43.80</b>	<b>43.80</b>	<b>32.00</b>	<b>"</b>
<b>Inv. turnover</b>	<b>8.33x</b>	<b>8.33x</b>	<b>11.00x</b>	<b>"</b>
<b>F. A. turnover</b>	<b>4.00x</b>	<b>4.00x</b>	<b>5.00x</b>	<b>"</b>
<b>T. A. turnover</b>	<b>2.00x</b>	<b>2.00x</b>	<b>2.50x</b>	<b>"</b>
<b>D/A ratio</b>	<b>30.00%</b>	<b>40.34%</b>	<b>36.00%</b>	<b>"</b>
<b>TIE</b>	<b>6.25x</b>	<b>7.81x</b>	<b>9.4x</b>	<b>"</b>
<b>Current ratio</b>	<b>2.50x</b>	<b>1.99x</b>	<b>3.00x</b>	<b>"</b>
<b>Payout ratio</b>	<b>30.00%</b>	<b>30.00%</b>	<b>30.00%</b>	<b>O. K.</b>

## What was the net investment in operating capital?

$$\begin{aligned}\text{Oper. cap.}_{2002} &= \text{NOWC} + \text{Net FA} \\ &= \$625 - \$125 + \$625 \\ &= \$1,125.\end{aligned}$$

$$\text{Oper. cap.}_{2001} = \$900.$$

$$\begin{aligned}\text{Net inv. in} \\ \text{oper. cap.} &= \$1,125 - \$900 = \mathbf{\$225}.\end{aligned}$$

## How much free cash flow was generated in 2002?

$$\begin{aligned}\text{FCF} &= \text{NOPAT} - \text{Net inv. in oper. cap.} \\ &= \text{EBIT} (1 - T) - \text{Net inv. in oper. cap.} \\ &= \$125 (0.6) - \$225 \\ &= \$75 - \$225 \\ &= \mathbf{-\$150.}\end{aligned}$$

**Suppose in 2001 fixed assets had been operated at only 75% of capacity.**

$$\begin{aligned}\text{Capacity Sales} &= \frac{\text{Actual sales}}{\% \text{ of capacity}} \\ &= \frac{\$2,000}{0.75} = \$2,667.\end{aligned}$$

**With the existing fixed assets, sales could be \$2,667. Since sales are forecasted at only \$2,500, **no new fixed assets are needed.****

## How would the excess capacity situation affect the 2002 AFN?

- The projected increase in fixed assets was \$125, the AFN would decrease by \$125.
- Since no new fixed assets will be needed, AFN will fall by \$125, to  
$$\$179 - \$125 = \$54.$$

**Q. If sales went up to \$3,000, not \$2,500, what would the F.A. requirement be?**

**A. Target ratio = FA/Capacity sales  
= 500/2,667 = 18.75%.**

**Have enough F.A. for sales up to \$2,667, but need F.A. for another \$333 of sales:**

$$\Delta FA = 0.1875(333) = \$62.4.$$

## How would excess capacity affect the forecasted ratios?

1. Sales wouldn't change but assets would be lower, so **turnovers** would be better.
2. Less new debt, hence lower interest, so **higher profits, EPS, ROE** (when financing feedbacks considered).
3. **Debt ratio, TIE** would improve.

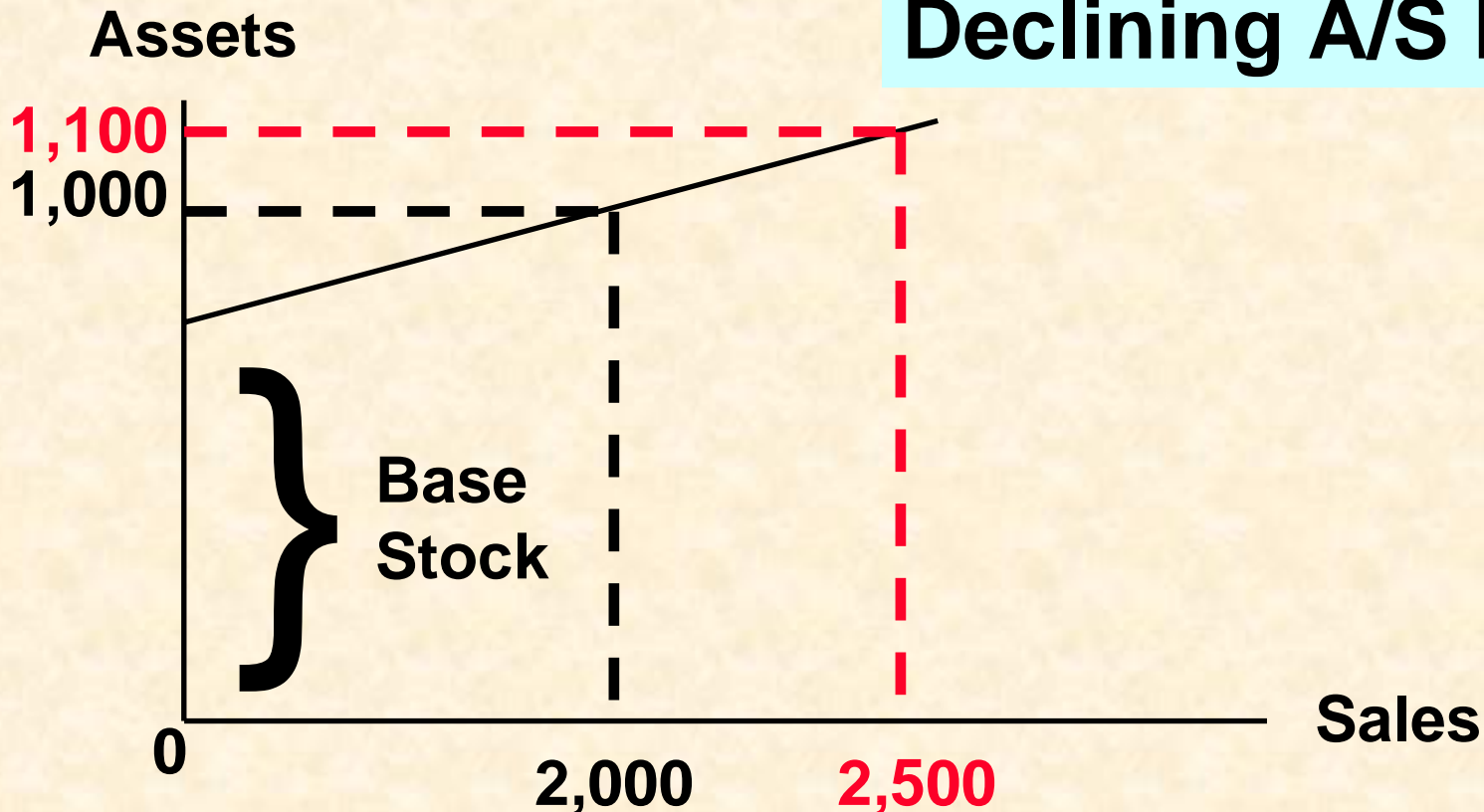
## 2002 Forecasted Ratios: $S_{02} = \$2,500$

	<u>% of 2001 Capacity</u>		<u>Industry</u>
	<u>100%</u>	<u>75%</u>	
<b>BEP</b>	<b>10.00%</b>	<b>11.11%</b>	<b>20.00%</b>
<b>Profit margin</b>	<b>2.62%</b>	<b>2.62%</b>	<b>4.00%</b>
<b>ROE</b>	<b>8.77%</b>	<b>8.77%</b>	<b>15.60%</b>
<b>DSO (days)</b>	<b>43.80</b>	<b>43.80</b>	<b>32.00</b>
<b>Inv. turnover</b>	<b>8.33x</b>	<b>8.33x</b>	<b>11.00x</b>
<b>F. A. turnover</b>	<b>4.00x</b>	<b>5.00x</b>	<b>5.00x</b>
<b>T. A. turnover</b>	<b>2.00x</b>	<b>2.22x</b>	<b>2.50x</b>
<b>D/A ratio</b>	<b>40.34%</b>	<b>33.71%</b>	<b>36.00%</b>
<b>TIE</b>	<b>7.81x</b>	<b>7.81x</b>	<b>9.40x</b>
<b>Current ratio</b>	<b>1.99x</b>	<b>2.48x</b>	<b>3.00x</b>

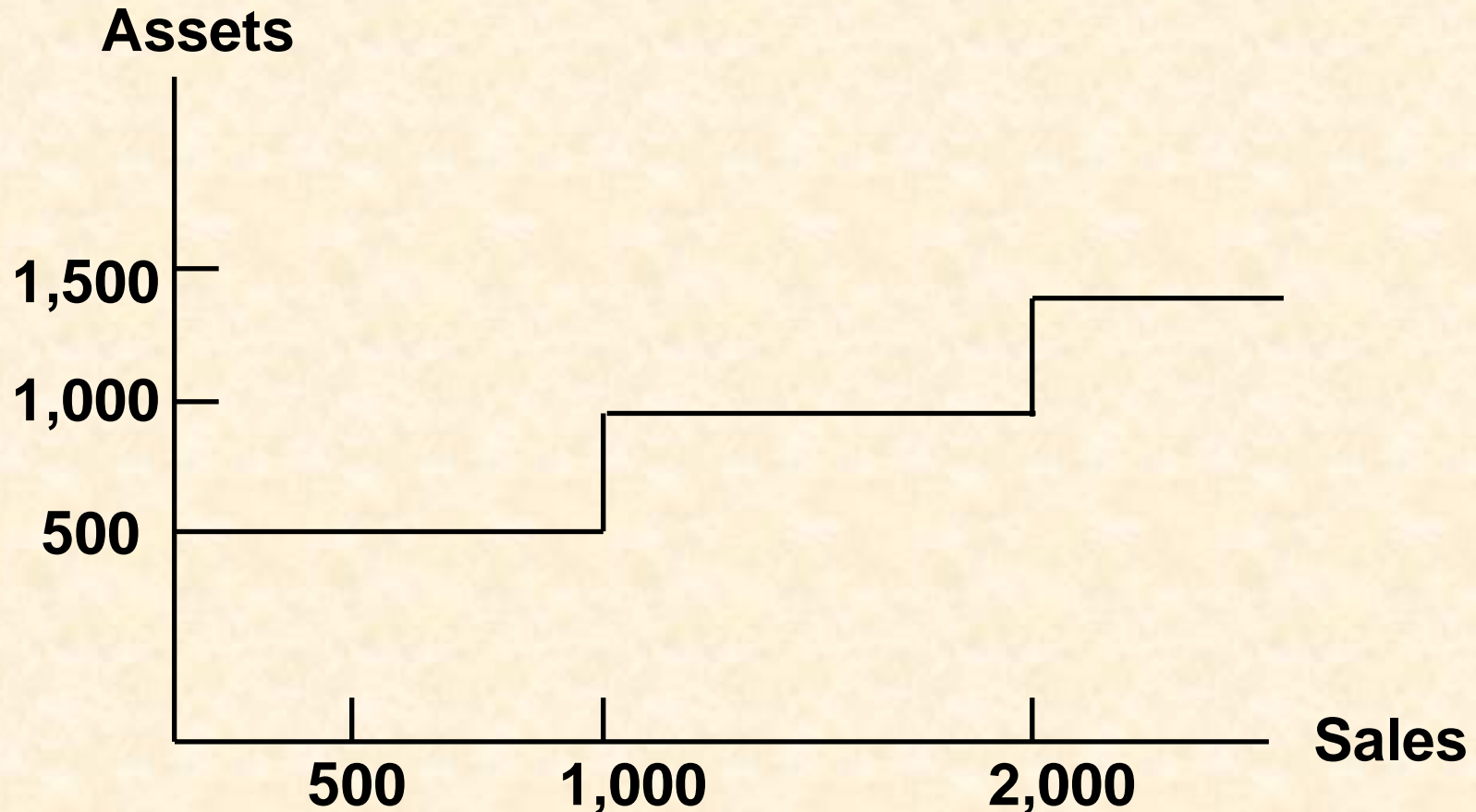
## How is NWC performing with regard to its receivables and inventories?

- DSO is **higher** than the industry average, and inventory turnover is **lower** than the industry average.
- Improvements here would lower current assets, reduce capital requirements, and **further improve** profitability and other ratios.

## Declining A/S Ratio



$1,000/2,000 = 0.5$ ;  $1,100/2,500 = 0.44$ . Declining ratio shows economies of scale. Going from  $S = 0$  to  $S = \$2,000$  requires \$1,000 of assets. Next \$500 of sales requires only \$100 of assets.

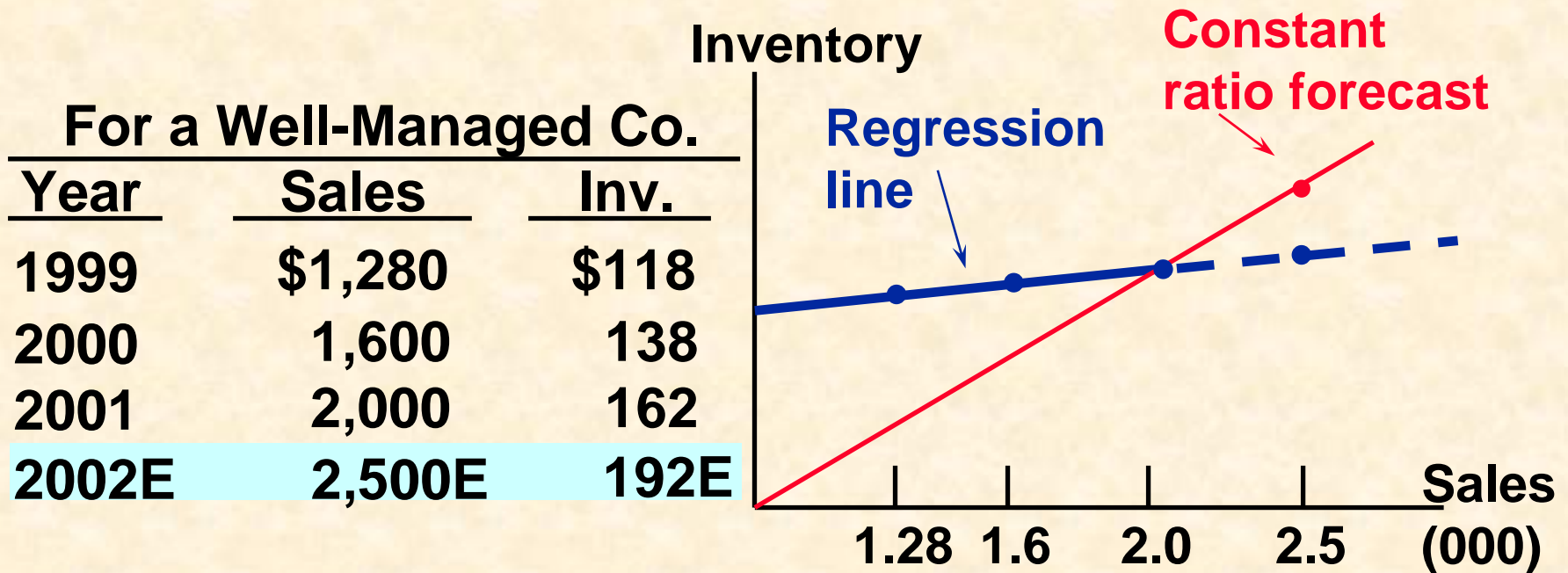


**A/S changes if assets are lumpy.  
Generally will have excess capacity, but  
eventually a small  $\Delta S$  leads to a large  $\Delta A$ .**

## Regression Analysis for Asset Forecasting

- **Get historical data on a good company, then fit a regression line to see how much a given sales increase will require in way of asset increase.**

## Example of Regression



**Constant ratio overestimates inventory required to go from  $S_1 = 2,000$  to  $S_2 = 2,500$ .**

## How would increases in these items affect the AFN?

- Higher dividend payout ratio?  
Increase AFN: Less retained earnings.
- Higher profit margin?  
Decrease AFN: Higher profits, more retained earnings.
- Higher capital intensity ratio,  $A^*/S_0$ ?  
Increase AFN: Need more assets for given sales increase.
- Pay suppliers in 60 days rather than 30 days?  
Decrease AFN: Trade creditors supply more capital, i.e.,  $L^*/S_0$  increases.

## **Summary: How different factors affect the AFN forecast.**

- **Excess capacity:**
  - **Existence lowers AFN.**
- **Base stocks of assets:**
  - **Leads to less-than-proportional asset increases.**
- **Economies of scale:**
  - **Also leads to less-than-proportional asset increases.**
- **Lumpy assets:**
  - **Leads to large periodic AFN requirements, recurring excess capacity.**