

OM and Finance Interface

Chapter 5

Learning Objectives

- ◆ Return On Invested Capital (ROIC)
- ◆ Linking operational decisions to ROIC

PAUL DOWNS

CABINETMAKERS



Paul Downs started making furniture in 1986, in a small shop in Manayunk. Over the years, his business outgrew 4 other shops and is now operating a 33,000 square foot shop (see below) in Bridgeport, PA.

Much of our work is residential, but we also do a lot of office furniture, including desks and conference tables. We complete 125 commissions per year, consisting of about 500 separate pieces of furniture.

A handwritten signature in black ink that reads "Paul Downs". The signature is written in a cursive style.

PAUL DOWNS



Production facility

Machines valued about \$350k,
depreciation \$60k p.a.

Overall facility is utilized at
100% right now

Rent: \$150k for show rooms and factory

Indirect costs: Marketing (\$100k, \$180k management, \$60k finish (quality control))

Inventory: \$50,000 WIP and \$20,000 raw material on average at any time

Prepayments: Suppliers need to be paid 1 month before receiving the wood.

PAUL DOWNS

Work force

12 cabinet makers

Each works about 220 days and 8h/day

Each makes \$20 per hour



A worker needs about 40 hours per unit of furniture

Work in cells

Spend about 15% of time on set-ups (build fixtures / program machines)

Labor utilization around 90% (idle time resulting from waiting)

End Product

Average price is \$3000 per unit

Requires 30kg of wood

Wood costs about \$10 per kg

25% scraped, especially during cutting



Customer pays 50% down and gets her furniture 3 months later

Return On Invested Capital (ROIC)

ROIC=Return / Invested Capital

or,

$$\text{ROIC} = \text{Return / Revenue} * \text{Revenue / Invested Capital}$$

$$\begin{aligned} \frac{\text{Return}}{\text{Revenue}} &= \frac{\text{Revenue}}{\text{Revenue}} - \frac{\text{Fixed Costs}}{\text{Revenue}} - \frac{\text{Flow Rate x Variable Costs}}{\text{Revenue}} \\ &= 1 - \frac{\text{Fixed Costs}}{\text{Flow rate x Price}} - \frac{\text{Flow Rate x Variable Costs}}{\text{Flow rate x Price}} \\ &= 1 - \frac{\text{Fixed Costs}}{\text{Flow rate x Price}} - \frac{\text{Variable Costs}}{\text{Price}} \end{aligned}$$

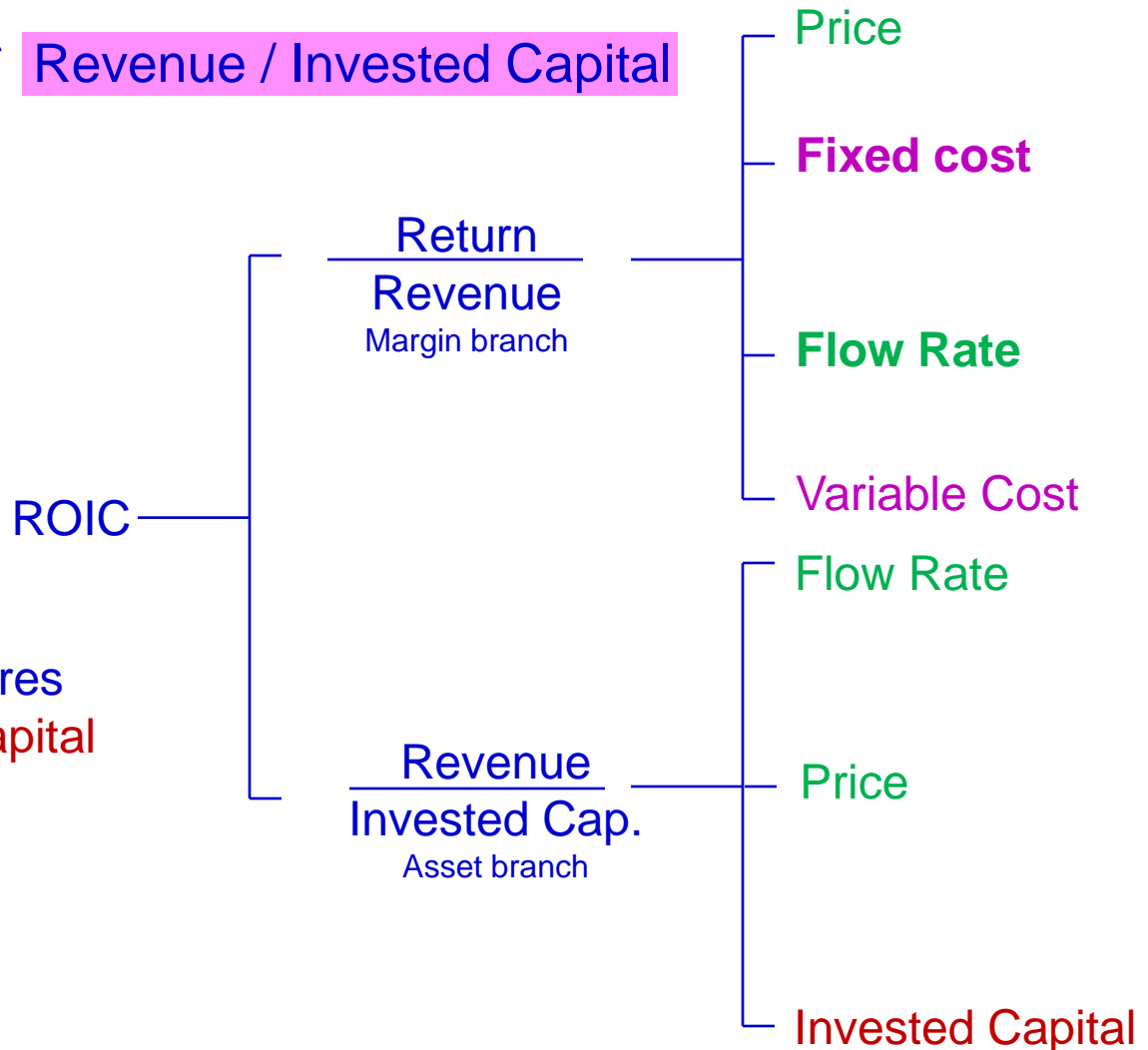
$$\frac{\text{Revenue}}{\text{Invested Capital}} = \frac{\text{Flow Rate x Price}}{\text{Invested Capital}}$$

Return On Invested Capital (ROIC)

$$\text{ROIC} = \text{Return / Revenue} * \text{Revenue / Invested Capital}$$

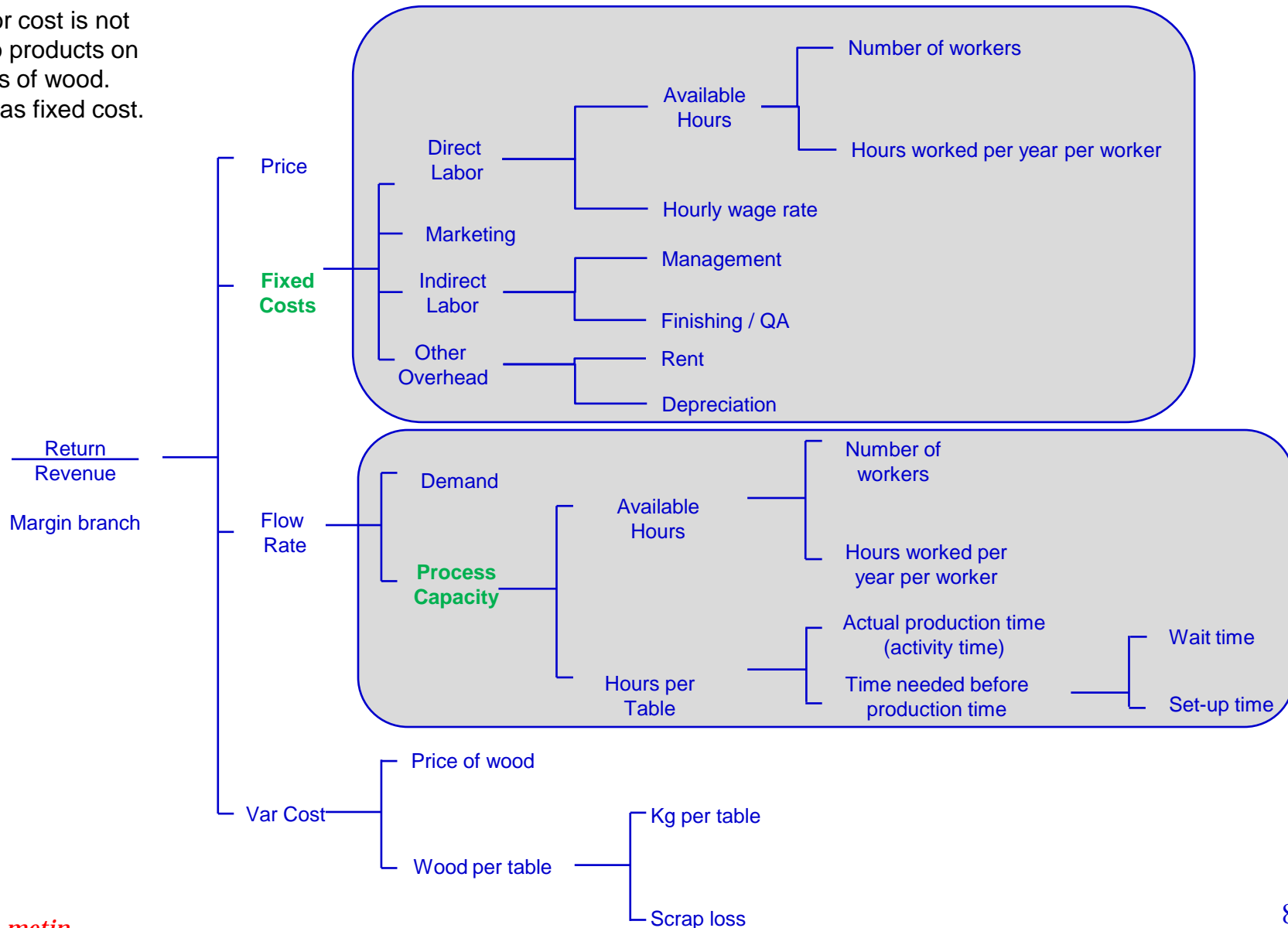
Return / Revenue requires
 Price, Fixed costs,
 Flow rate, Variable cost

Revenue / Invested capital requires
 Price, Flow rate, Invested Capital

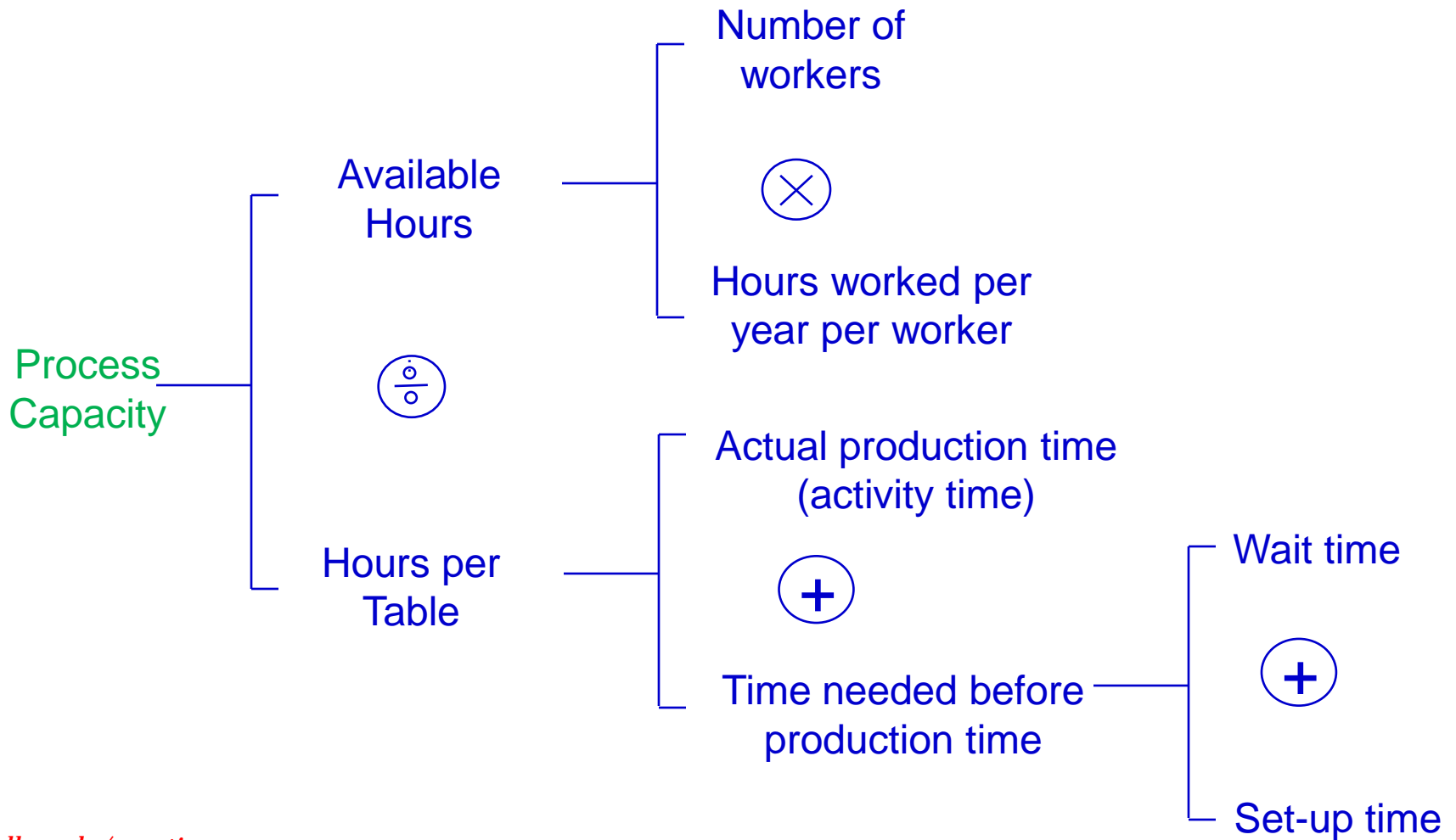


Developing Margin Branch of ROIC

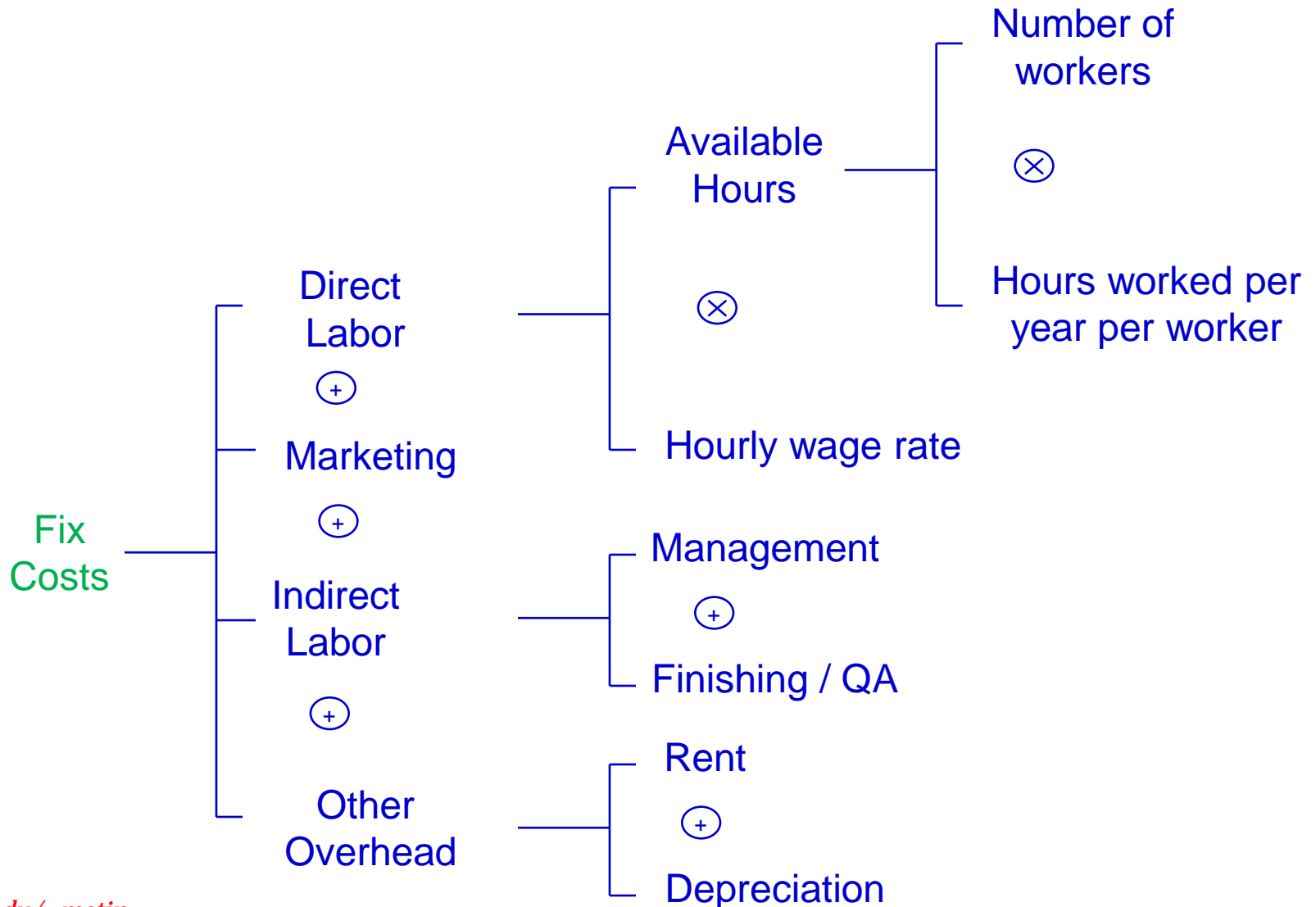
Direct labor cost is not allocated to products on the basis of wood. It is treated as fixed cost.



Flow rate=Min{Demand, Process Capacity}

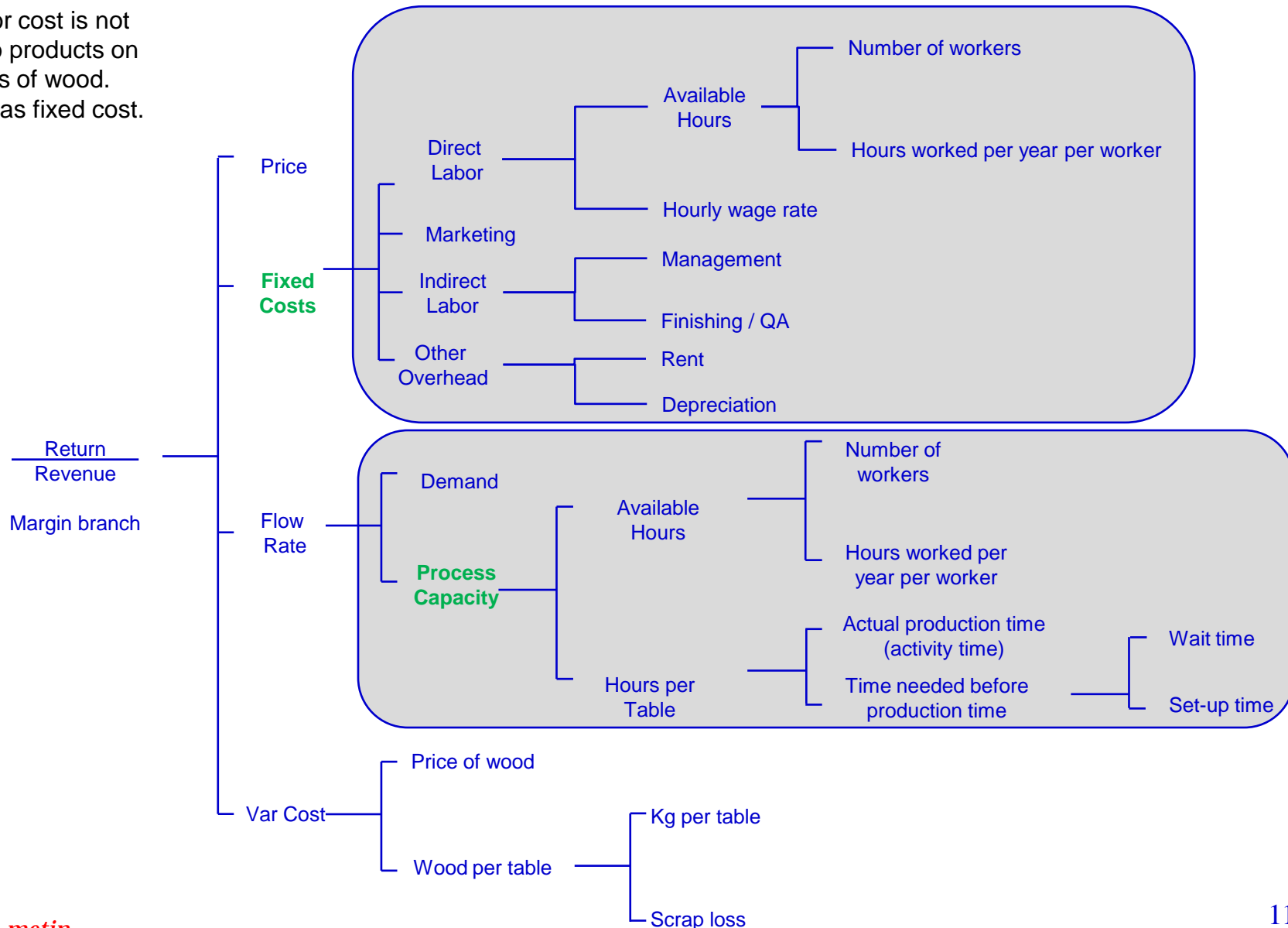


Fixed Costs

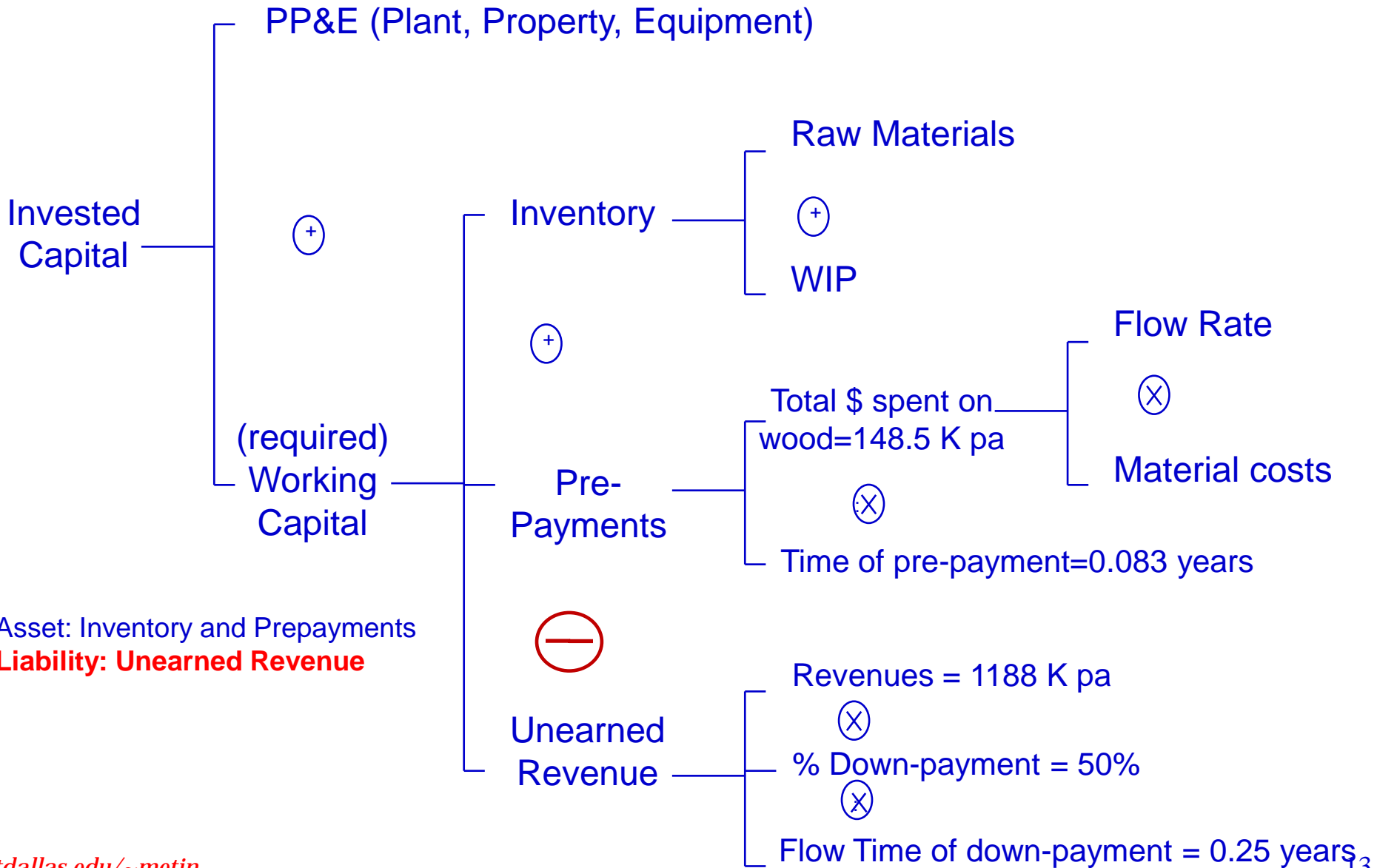


Developing Margin Branch of ROIC

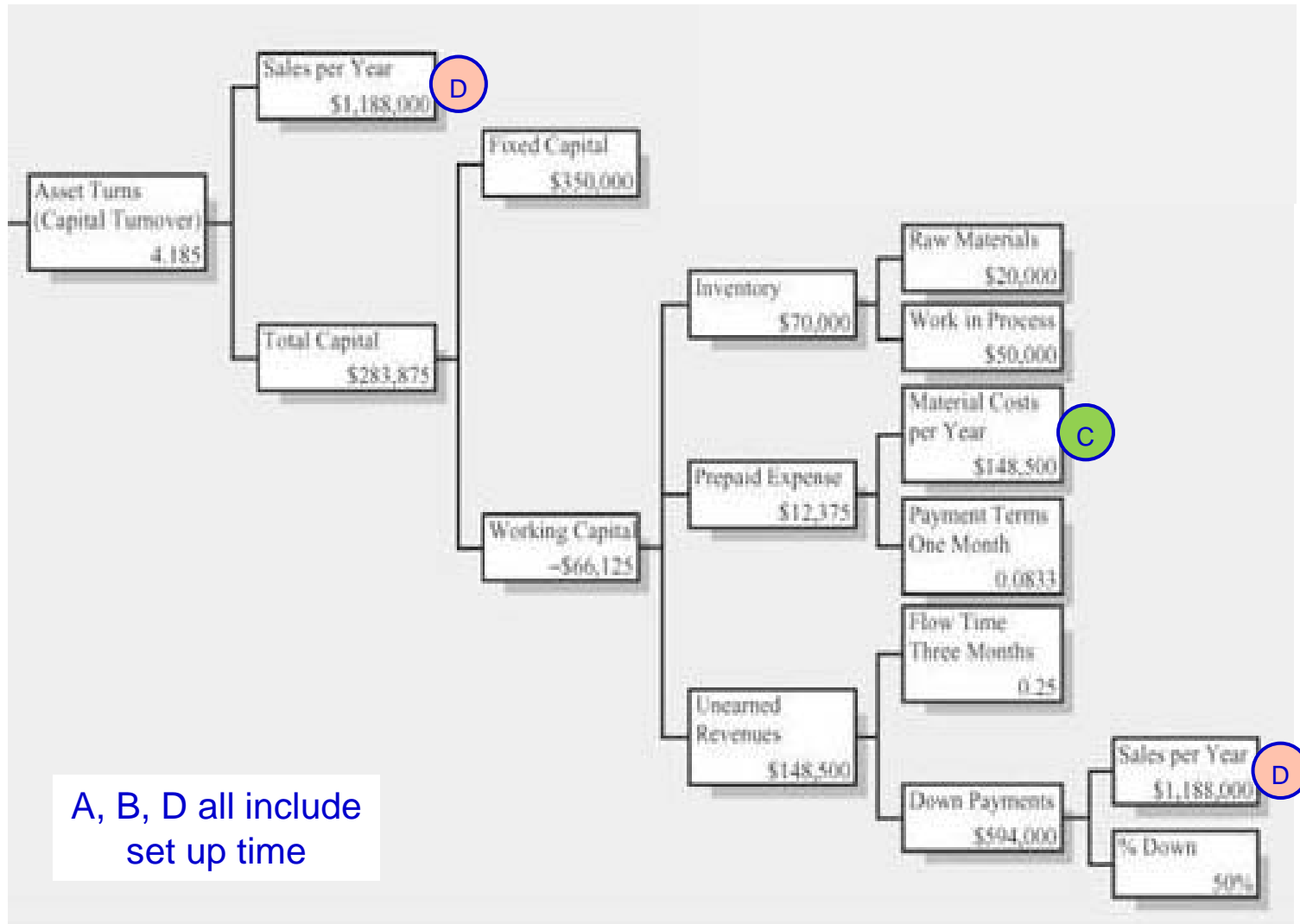
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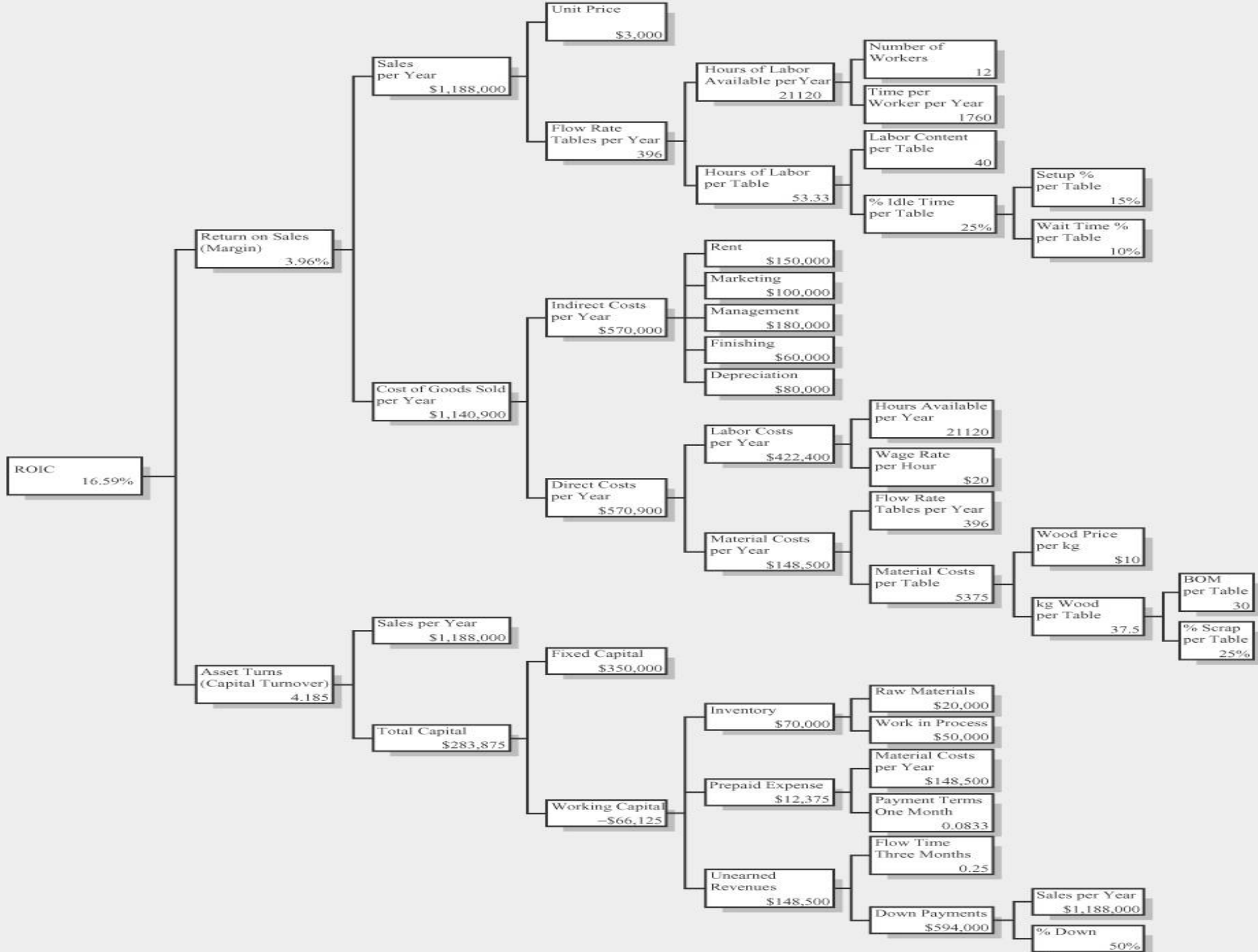
Invested Capital



ROIC - Asset Branch



A, B, D all include set up time



ROIC 16.59%

Return on Sales (Margin) 3.96%

Asset Turns (Capital Turnover) 4.185

Sales per Year \$1,188,000
1,267,200

Cost of Goods Sold per Year \$1,140,900

Sales per Year \$1,188,000

Total Capital \$283,875

Unit Price \$3,000

Flow Rate Tables per Year 396
422.4

Indirect Costs per Year \$570,000

Direct Costs per Year \$570,900

Fixed Capital \$350,000

Hours of Labor Available per Year 21120

Hours of Labor per Table 53.33
 $= \frac{40}{1-0.25} = 53.33$
 $= \frac{40}{0.75} = 53.33$
 $= \frac{40}{0.75} = 53.33$
 ~~$= \frac{40}{0.25} = 160$~~
 ~~$= \frac{40}{0.25} = 160$~~

Rent \$150,000
Marketing \$100,000
Management \$180,000
Finishing \$60,000
Depreciation \$80,000

Labor Costs per Year \$422,400

Material Costs per Year \$148,500

Inventory \$70,000

Prepaid Expense \$12,375

Uncarned Revenues \$148,500

Number of Workers 12

Time per Worker per Year 1760

Labor Content per Table 40

% Idle Time per Table 25%

Setup % per Table 15%

Wait Time % per Table 10%

Hours Available per Year 21120

Wage Rate per Hour \$20

Flow Rate Tables per Year 396

Material Costs per Table \$375

Wood Price per kg \$10

kg Wood per Table 37.5

BOM per Table 30

% Scrap per Table 25%

Raw Materials \$20,000

Work in Process \$50,000

Material Costs per Year \$148,500

Payment Terms One Month 0.0833
 $= \frac{1}{12}$

Flow Time Three Months 0.25
 $= \frac{3}{12} = \frac{1}{4}$ years.

Sales per Year \$1,188,000

Down Payments \$594,000
% Down 50%

Fixed Costs

10%

20%

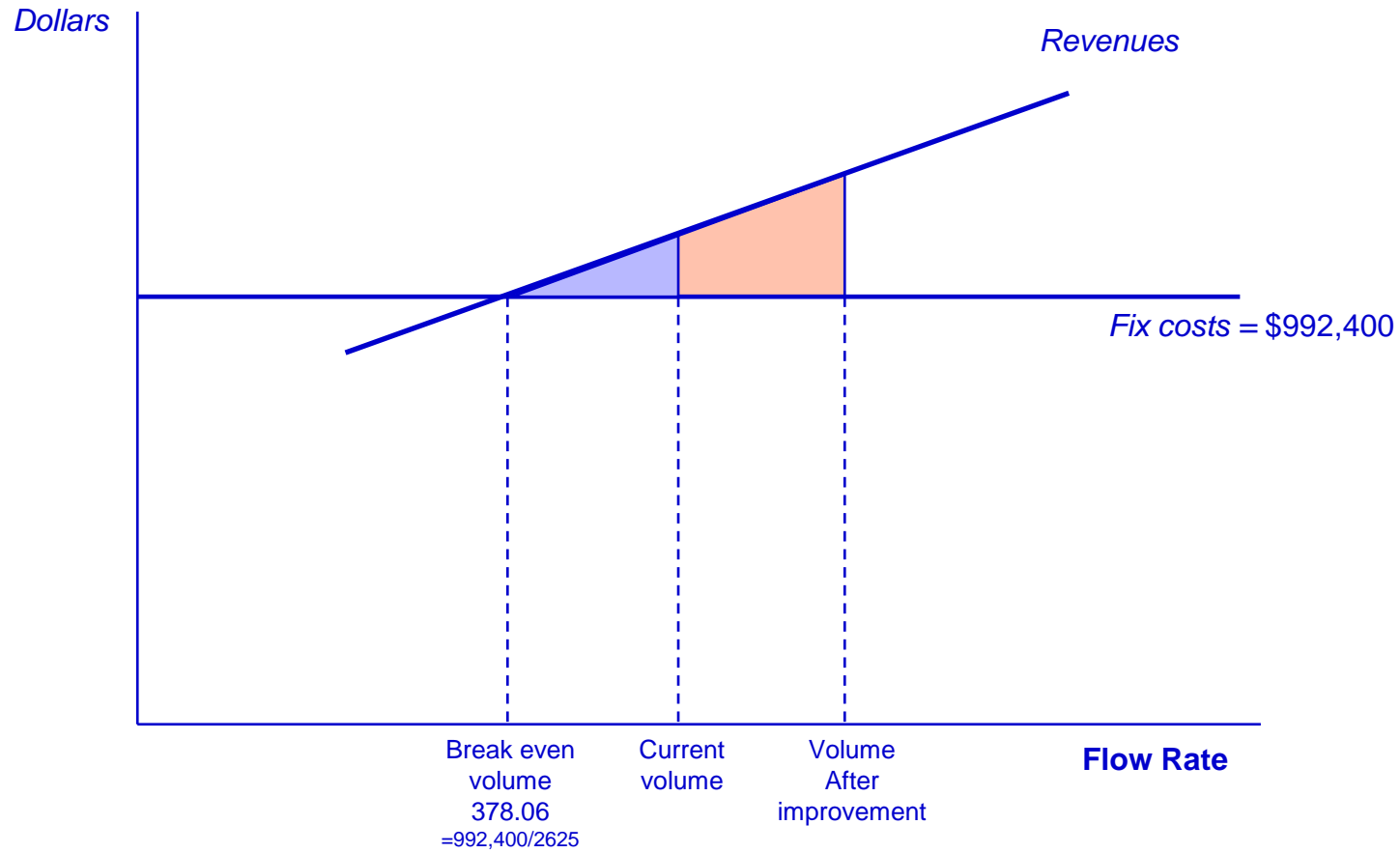
$= \frac{1}{12}$

$= \frac{3}{12} = \frac{1}{4}$ years.

50%

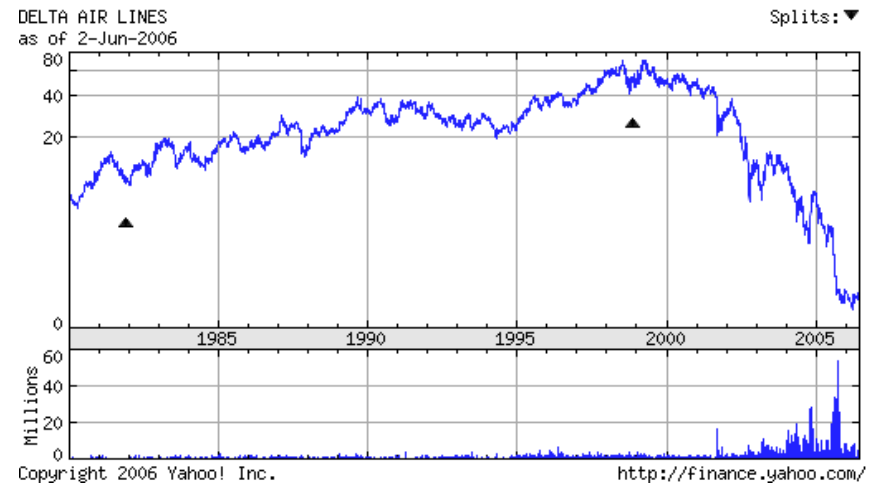
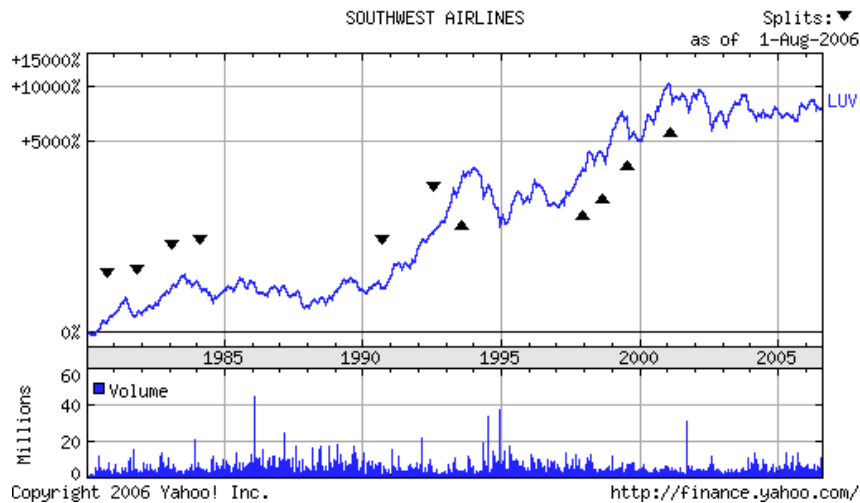
After Break Even Point

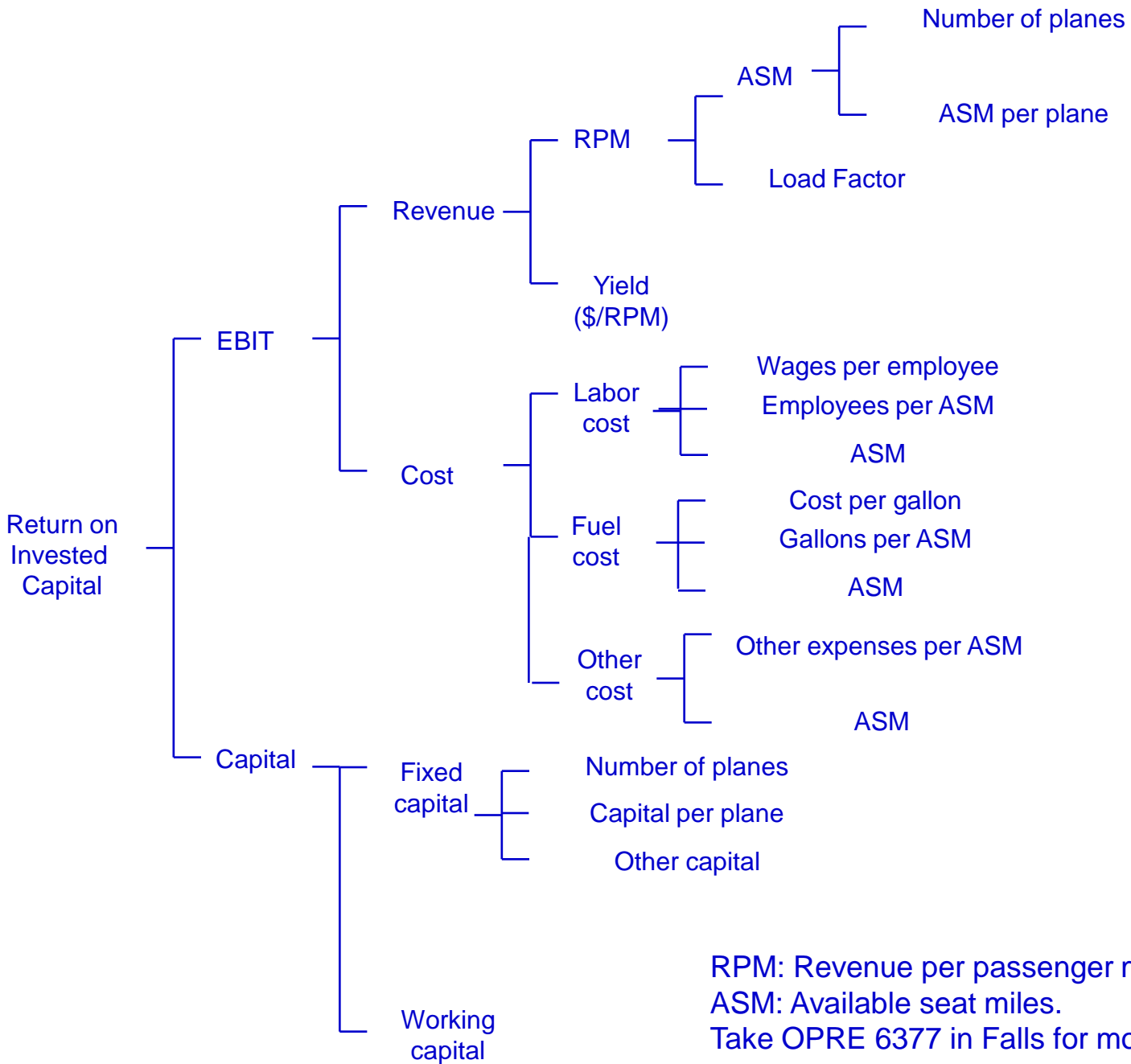
Margin=Price-Variable cost



Paul Downs price is \$3000 and variable cost is \$375. Post break-even margin is \$2625.

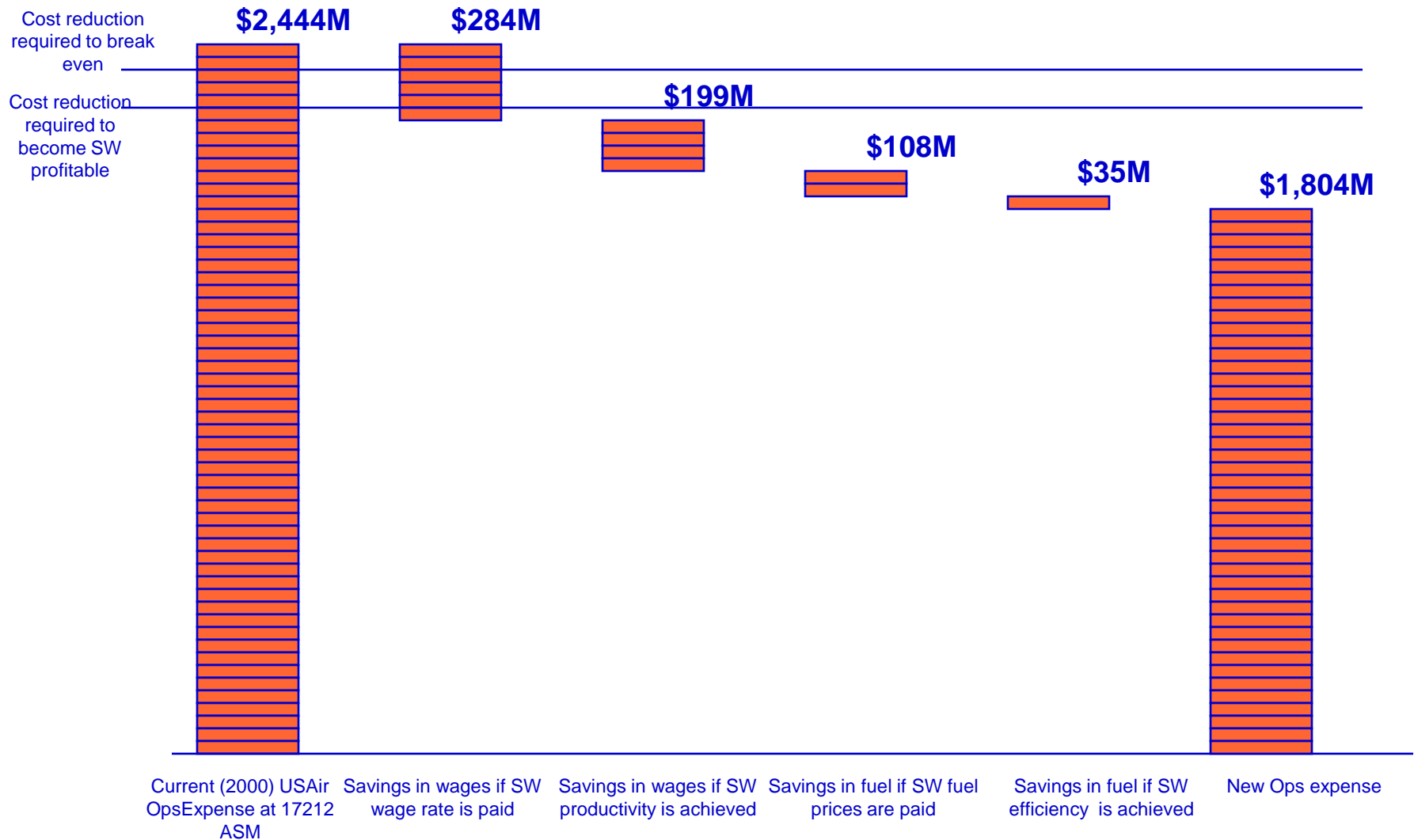
Southwest and Other Airlines (Delta or US Airways)





RPM: Revenue per passenger miles.
 ASM: Available seat miles.
 Take OPRE 6377 in Falls for more.

Southwest and Other Airlines (Delta or US Airways)



OM-Finance Interface:

WalMart's Supplier Alliance Program (SAP)



Invoice paid by WalMart in 60-90 days

Factoring: Invoice is sold to a factor (any bank) by the supplier.

- ◆ Supplier immediately receives cash that is less than the face value of the invoice.
- ◆ If the supplier's credit rating is low, the supplier receives less cash.
 - ◆ The debtor (WalMart) pays the factor.
- ◆ Supplier does not need WalMart approval for factoring.

SAP: Invoice is sold to a Walmart's partner bank (Wells Fargo or Citigroup) by an approved supplier.

- ◆ Supplier receives cash in 10-15 days that is about the face value of the invoice.
- ◆ WalMart's high (AA) credit rating pulls up the amount of money the supplier receives.

WalMart program started on Nov 2, 2009. Before that, CIT, provider of credit to small and mid size suppliers, declared bankruptcy. Similar program is in place at Kohl's since July 2009. KOHL's SAP is offered to 41% of suppliers, 11% signed on since then.

OM – Finance and OM - Accounting Interface

- ◆ Operating capital / credit restrictions
- ◆ Timing of the advances from customer and to supplier
- ◆ Commodities and risk in prices; forward contracts
- ◆ Bankruptcy, insolvency risks (own and partners)
- ◆ Repercussions from mergers and acquisitions

- ◆ Cost, time (and carbon footprint) data from accounting
- ◆ Cost allocation to decided
 - ◆ Accounting allocates
 - ◆ OM decides
 - ◆ Can we decide without allocating?

Summary

- ◆ Return On Invested Capital (ROIC)
- ◆ Linking operational decisions to ROIC