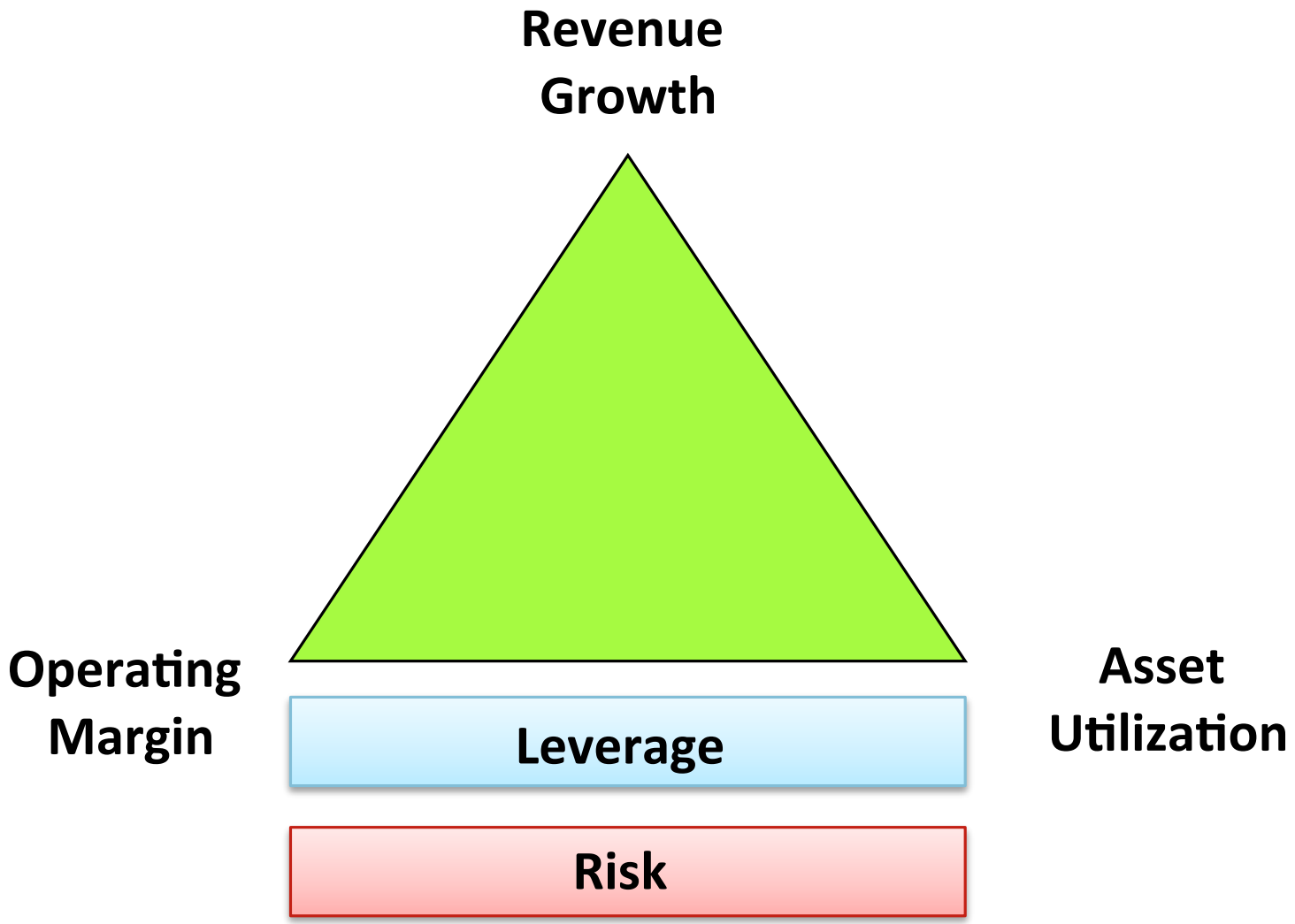
Projected, Relevant, Free Cash Flows

Supply Chain Finance Workshop

MIT Center for
Transportation & Logistics

Drivers of shareholder value



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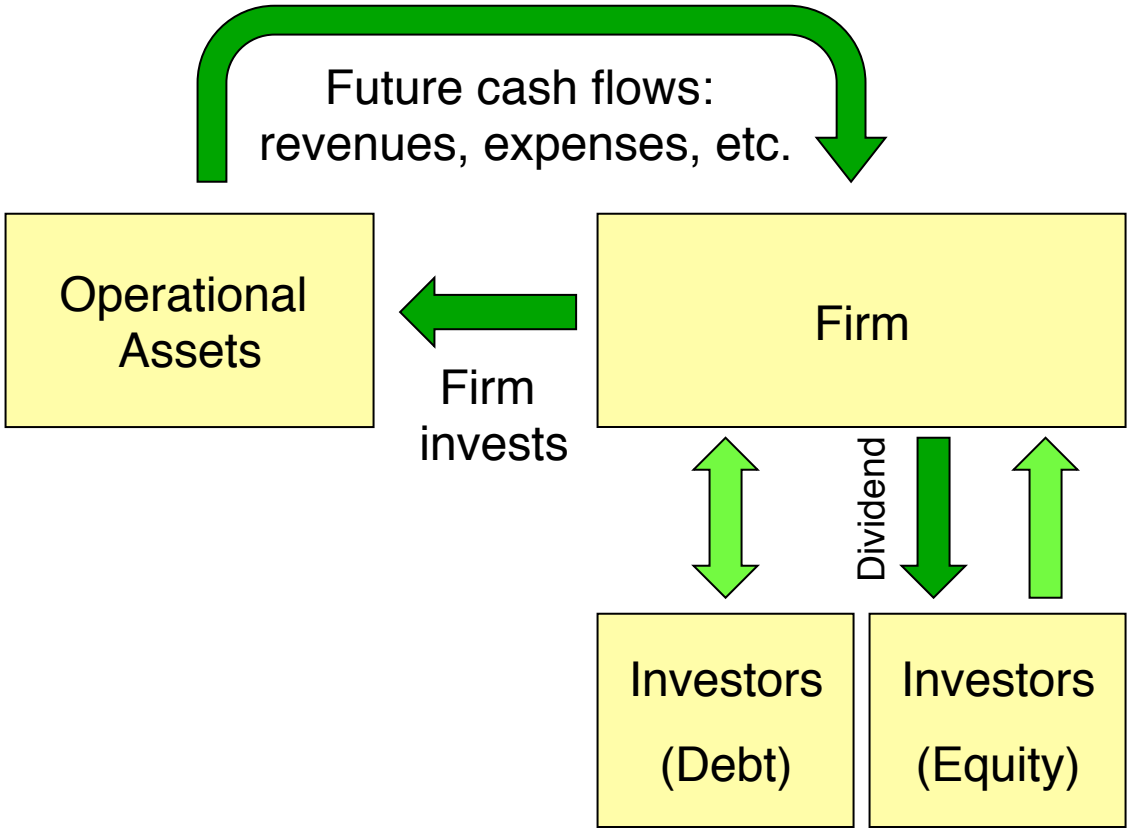
Finance and supply chain work together to create shareholder value



Operations / supply chain: use funds to generate returns

Finance: allocate funds

Finance: acquire funds

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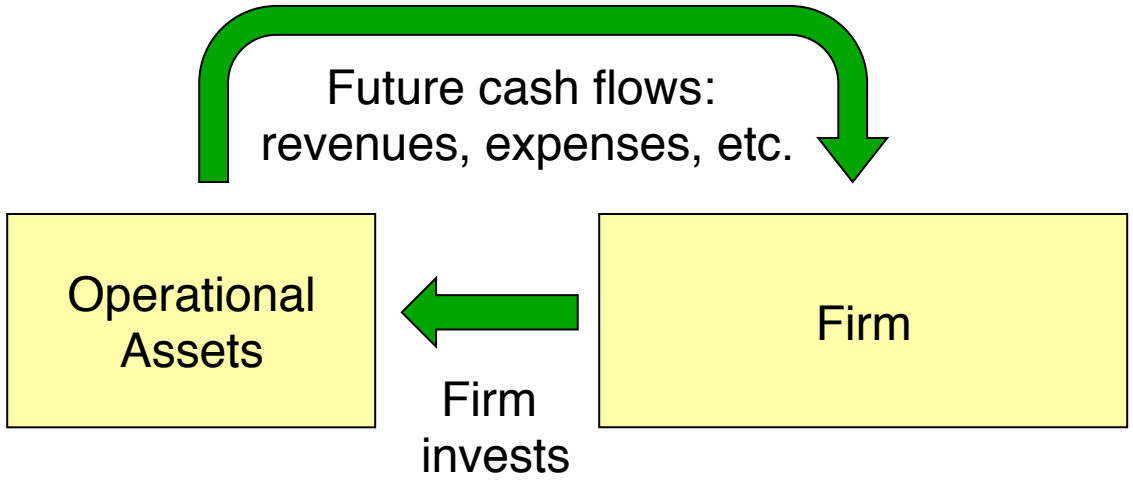
Investment evaluation

1. Estimate the relevant cash flows
2. Calculate a figure of merit for the investment
3. Compare the figure of merit to an acceptance criterion



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What is a relevant cash flow?

1. Cash Flow Principle:

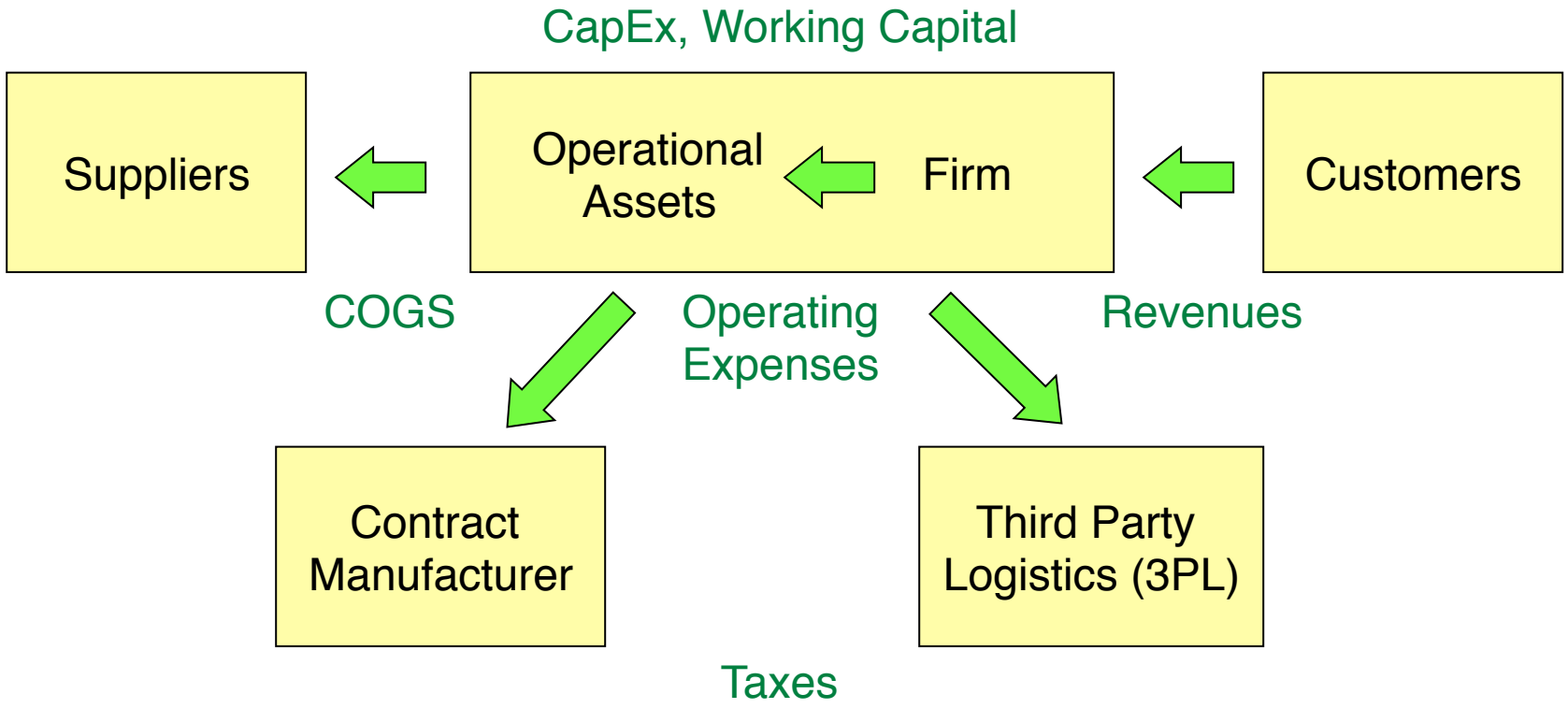
   only cash flows where *money moves* in or out of the firm are relevant

2. With-Without Principle:

   only cash flows that are different (incremental) *with* the investment than *without* the investment are relevant to the decision

Projected, relevant cash flows in the SC

Use incremental financial statements to capture the projected, relevant cash flows and calculate FCFs



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Incremental Income Statement

Revenue
Cost of goods sold (COGS)
GROSS INCOME
Operating expenses
OPERATING INCOME (EBITDA)
Depreciation & amortization
OPERATING INCOME (EBIT)
Interest expense
Other non-operating expenses/income
Income taxes
Extraordinary items
NET INCOME

Revenue
Cost of goods sold (COGS)
GROSS INCOME
Operating expenses
OPERATING INCOME (EBITDA)
Depreciation & amortization
OPERATING INCOME (EBIT)
Income taxes
Net Operating Profit After Taxes (NOPAT)

$$NOPAT_t = EBIT_t - TaxRate \times EBIT_t$$
$$= (1 - TaxRate) \times EBIT_t$$

Relevant cash flows from the Income Statement:

$$NOPAT_t + DA_t$$

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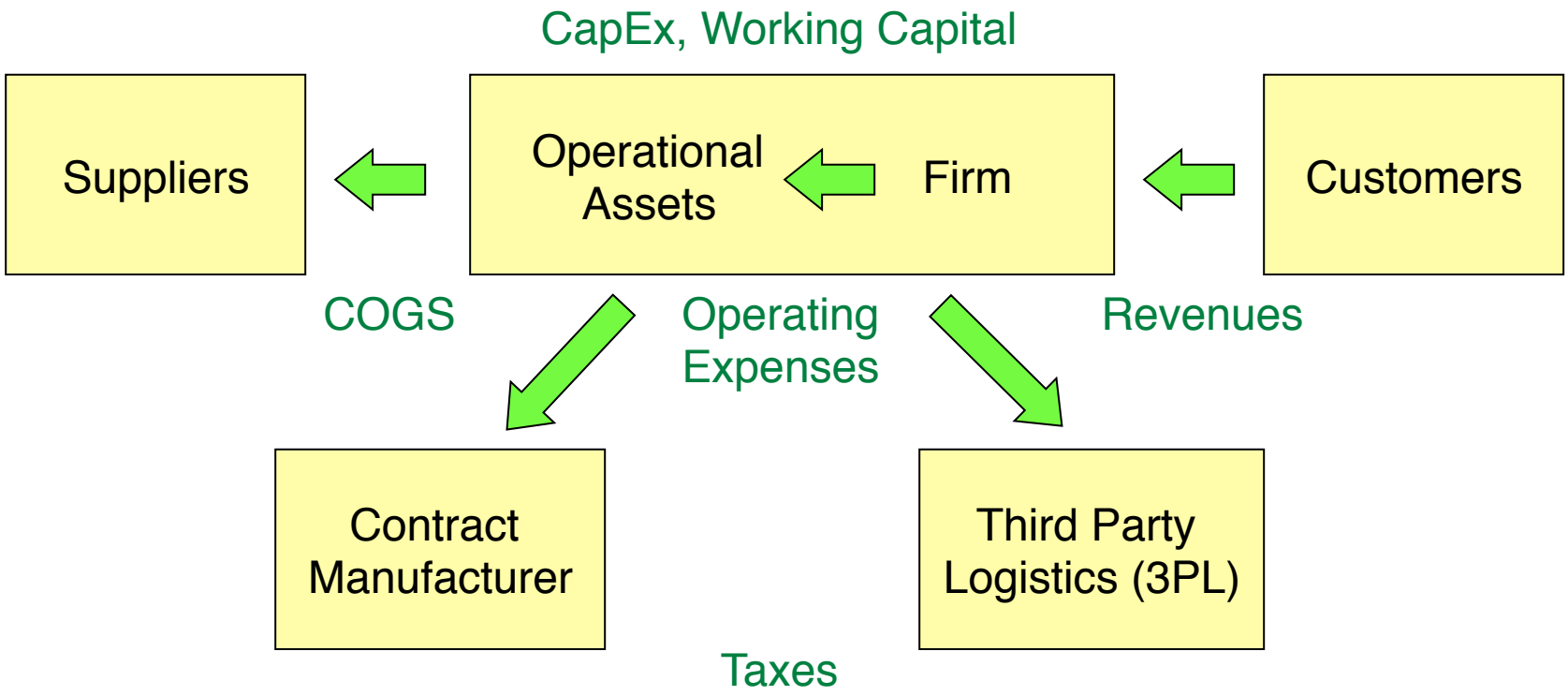
Incremental Balance Sheet



Relevant cash flows from the Balance Sheet:

$$CapEx_t, \Delta NetWorkingCapital_t$$

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Free cash flows

$$FCF_t = NOPAT_t + DA_t - CapEx_t - \Delta NetWorkingCapital_t$$

$$FCF_t = \left[(1 - TaxRate) \times EBIT_t\right] + DA_t - CapEx_t - \Delta NetWorkingCapital_t$$

Incremental Income Statement	Year 0	Year 1	Year 2	Year 3
Revenue				
- COGS				
= Gross Income				
- Operating Expenses				
= Operating Income (EBITDA)				
- Depreciation & Amortization				
= Operating Income (EBIT)				
- Income Tax				
= Net Operating Profit After Taxes (NOPAT)				
Adjustments				
+ Depreciation (not a cash flow)				
- Net Capital Expenditures				
- Net Working Capital Investment				
Free Cash Flow				

Example: White Nile

- White Nile, an online retailer, is considering a new warehouse for better home delivery service
- What are the relevant cash flows?
  - New warehouse and equipment (Cap Ex) 5,000,000
  - More sales from the better service (Revenue) 6,000,000
  - Warehouse labor (Operating Expense) 400,000
  - Lower transportation cost (Operating Expense) -200,000
  - More inventory (Working Capital) 600,000
  - COGS (gross margin is 25%) 4,500,000
  - Depreciation (10 years, straight line) 500,000
  - Salvage (book value after 3 years) 3,500,000
  - Income tax (30% of net income) TBC

Assume no inflation

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Incremental Income Statement	Year 0	Year 1	Year 2	Year 3
Revenue	$ -	$ 6,000	$ 6,000	$ 6,000
increased sales from better service		*$ 6,000*	*$ 6,000*	*$ 6,000*
- COGS	$ -	$ 4,500	$ 4,500	$ 4,500
increased COGS from those sales		*$ 4,500*	*$ 4,500*	*$ 4,500*
= Gross Income	$ -	$ 1,500	$ 1,500	$ 1,500
- Operating Expenses	$ -	$ 200	$ 200	$ 200
lower transportation cost		*$ (200)*	*$ (200)*	*$ (200)*
warehouse operations		*$ 400*	*$ 400*	*$ 400*
= Operating Income (EBITDA)	$ -	$ 1,300	$ 1,300	$ 1,300
- Depreciation & Amortization	$ -	$ 500	$ 500	$ 500
warehouse & equip depreciation		*$ 500*	*$ 500*	*$ 500*
line item (positive values)				
= Operating Income (EBIT)	$ -	$ 800	$ 800	$ 800
- Income Tax	$ -	$ 240	$ 240	$ 240
= Net Operating Profit After Taxes (NOPAT)	$ -	$ 560	$ 560	$ 560
Adjustments				
+ Depreciation (not a cash flow)		$ 500	$ 500	$ 500
- Net Capital Expenditures	$ 5,000	$ -	$ -	$ (3,500)
new warehouse & equipment	*$ 5,000*			
salvage warehouse & equipment				*$ (3,500)*
- Net Working Capital Investment	$ 600	$ -	$ -	$ (600)
+ Net Increase in Accounts Receivable				
+ Net Increase in Inventory	*$ 600*			*$ (600)*
- Net Increase in Accounts Payable				
Free Cash Flow	**$ (5,600)**	**$ 1,060**	**$ 1,060**	**$ 5,160**

Free cash flows for investment decisions

Why consolidate various line item cash flows from your investment/project into FCFs?

- An incremental Income Statement confounds various cash flows in a consistent way, e.g. revenue growth and margin growth
- It applies Income Tax once in an effective way
- Business professionals are accustomed to reading Income Statements
- Investor value is driven by free cash flows

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Supply chain cash flows

- It is important to describe your supply chain design in terms of cash flows
- The evaluation of your supply chain initiative (for internal budgets, by external investors) is based on the future free cash flows it creates
- It is challenging but critical to determine which cash flows are relevant
  - Cash must flow
  - Cash flows must be incremental (with or without)
- Consolidate the projected, relevant cash flows into free cash flows
  - FCFs effectively confound various line items in magnitude and timing
  - FCFs align with investor value creation and business professional practice
- Don't forget the balance sheet
  - Capital expenditures are infrequent but high magnitude
  - Net changes in working capital requirements from the previous period define critical cash flows in our supply chain designs (they often make or break it)
- This workshop does not make you an expert, but it enables you to
  - engage with accounting and finance colleagues to confirm your numbers
  - define the basis for investment/budget decisions

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