

# Multi-Period Excess Earnings Method

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**“In God we trust.  
All others must bring data.”**

-W. Edwards Deming

# Objectives

- Understand premise of MPEEM
- Identify assets for which MPEEM may apply
- Identify key assumptions and inputs
- Understand the attrition analysis
- Understand role of contributory assets
- Identify an appropriate discount rate
- Understand the purpose of the IRR/WACC/WARA reconciliation

# Premise

- Start with the income from all assets combined
- Peel back the income from all other assets leaving only income generated by the subject asset
- Value the residual or “excess” earnings
- Original model developed in the 1920s

# Applicable Assets

- PIGA: Primary income generating asset
- Dual PIGAs:

		Technology	
		Existing	New
Customers	Existing	Customers and/or Technology	Customers
	New	Technology	Goodwill

# Dual PIGAs

- Use of simultaneous MPEEMs should be avoided (SEC & TAF Working Group)
- Alternative valuation methods
  - Revenue/income split
  - Relief from royalty
  - Cost approach
  - With and without

# Key Assumptions and Inputs

- Projected revenue from acquired asset
- Attrition rate
- Profitability of the asset
- Contributory asset charges
- Life of the asset
- Discount rate

# Projected Revenue

- Base year revenue
- What growth rate to use: different than the consolidated growth rate?
- May require stratification (customer mix or product mix)



# Attrition

- Loss of customers over time
- Constant attrition rate method (CAM)
  - Likelihood of loss is independent of the age of the relationship
- Variable attrition rate method (VAM)
  - Likelihood of loss is age-dependent
  - More rigorous analysis
- Challenge: Data

# Attrition

- Factors that affect attrition
  - Length of relationship
  - Switching costs
  - Porter's Five Forces
    - Product/service differentiation; substitutes
    - Competitive rivalry
    - Barriers to entry
    - Customers' bargaining power
    - Suppliers' bargaining power

# Attrition

- Attrition rate considerations
  - Basis: dollars or number of customers?
  - Historical experience versus market participant expectations
- Grouping of customers
  - Age of relationship
  - Annual revenues
  - Type of product/service

# Attrition

- Attrition rate calculations – CAM

	Historical Revenue by Customer				
	TTM -4	TTM -3	TTM -2	TTM -1	TTM
Customer 1	\$ 1,000	\$ 1,100	\$ 1,210	\$ 500	
Customer 2		100	50		50
Customer 3	250	250	250		-
Customer 4			200	210	220
Customer 5	250	200	150	100	50
Customer 6				500	400
Customer 7	250	500	750	1,000	1,250
Customer 8		300	250	300	300
Customer 9	250	250	250	250	250
Customer 10			500	600	700
Total revenues	\$ 2,000	\$ 2,700	\$ 3,610	\$ 3,460	\$ 3,220
yr/yr growth		35.0%	33.7%	-4.2%	-6.9%
CAGR to 20x5	12.6%	6.0%	-5.6%	-6.9%	
Customer count	5	7	9	8	9

# Attrition

- Attrition rate calculations – CAM

	Retained # of Customers				
	TTM -4, -3	TTM -3, -2	TTM -2, -1	TTM -1, TTM	TTM -4, TTM
Customer 1	1	1	1	0	0
Customer 2	0	1	0	0	0
Customer 3	1	1	0	0	0
Customer 4	0	0	1	1	0
Customer 5	1	1	1	1	1
Customer 6	0	0	0	1	0
Customer 7	1	1	1	1	1
Customer 8	0	1	1	1	0
Customer 9	1	1	1	1	1
Customer 10	0	0	1	1	0
Total retained customers	<b>5</b>	7	7	7	<b>3</b>
% retained customers	100%	100%	78%	88%	<b>33%</b>
Compounded annual attrition rate					<b>12%</b>
Compounded annual retention rate					<b>88%</b>

# Attrition

- Attrition rate calculations – CAM

	Retained Customer Revenues				
	TTM -4, -3	TTM -3, -2	TTM -2, -1	TTM -1, TTM	TTM -4, TTM
Customer 1	\$ 1,000	\$ 1,100	\$ 1,210	\$ -	\$ -
Customer 2	-	100	-	-	-
Customer 3	250	250	-	-	-
Customer 4	-	-	200	210	-
Customer 5	250	200	150	100	50
Customer 6	-	-	-	500	-
Customer 7	250	500	750	1,000	1,250
Customer 8	-	300	250	300	-
Customer 9	250	250	250	250	250
Customer 10	-	-	500	600	-
<b>Total retained customers</b>	<b>\$ 2,000</b>	<b>\$ 2,700</b>	<b>\$ 3,310</b>	<b>\$ 2,960</b>	<b>\$ 1,550</b>
<i>% retained customer revenue</i>	100%	100%	92%	86%	<b>78%</b>
<i>Compounded annual attrition rate</i>					<b>6%</b>
<i>Compounded annual retention rate</i>					<b>94%</b>

# Attrition

- Attrition rate calculations – VAM
  - Exponential distributions
  - Weibull distributions
  - IOWA curves
  - Requires a significant amount of data to be valid

# Profitability of the Asset

- Realistically, rarely does the subject asset have the exact same profitability as the business enterprise
- New customer acquisition costs vs. existing customer retention costs
  - Marketing costs
  - Use of assets
  - Management attention



# Contributory Assets

- Typical contributory assets
  - Operating working capital
  - Tangible assets
  - Identifiable intangible assets
  - Workforce in place
- Contributory asset charges
  - Return of vs. return on assets
  - Loads the subject asset's income with cost for use of the other assets

# Contributory Assets

- Calculation of contributory asset charge

	TTM	TTM +1	TTM +2	TTM +3	TTM +4	TTM +5
Total projected revenue	\$ 3,220	\$ 3,542	\$ 3,808	\$ 3,998	\$ 4,198	\$ 4,324
yr/yr growth		10.0%	7.5%	5.0%	5.0%	3.0%
Acquired customer revenues	\$ 3,220	\$ 3,381	\$ 3,516	\$ 3,621	\$ 3,730	\$ 3,842
yr/yr growth		5.0%	4.0%	3.0%	3.0%	3.0%
Retained customers and revenue (mid year)		94.0%	82.7%	72.8%	64.1%	56.4%
Revenue from acquired customers		\$ 3,178	\$ 2,908	\$ 2,636	\$ 2,391	\$ 2,167
% of total revenue		89.7%	76.4%	65.9%	57.0%	50.1%
Fixed asset contributory charges (return on):						
Beginning balance		\$ 345	\$ 350	\$ 355	\$ 360	\$ 365
Capital expenditures		70	70	70	70	70
Economic depreciation		(65)	(65)	(65)	(65)	(65)
Ending balance		\$ 350	\$ 355	\$ 360	\$ 365	\$ 370
Average balance		\$ 348	\$ 353	\$ 358	\$ 363	\$ 368
Contributing asset cost of capital		5.0%	5.0%	5.0%	5.0%	5.0%
Return on 100% of contributing asset		\$ 17	\$ 18	\$ 18	\$ 18	\$ 18
% of contributing assets used by subject asset		89.7%	76.4%	65.9%	57.0%	50.1%
<b>Contributory asset charge</b>		<b>\$ 15</b>	<b>\$ 14</b>	<b>\$ 12</b>	<b>\$ 10</b>	<b>\$ 9</b>

# Contributory Assets

- Life of the asset – how many periods

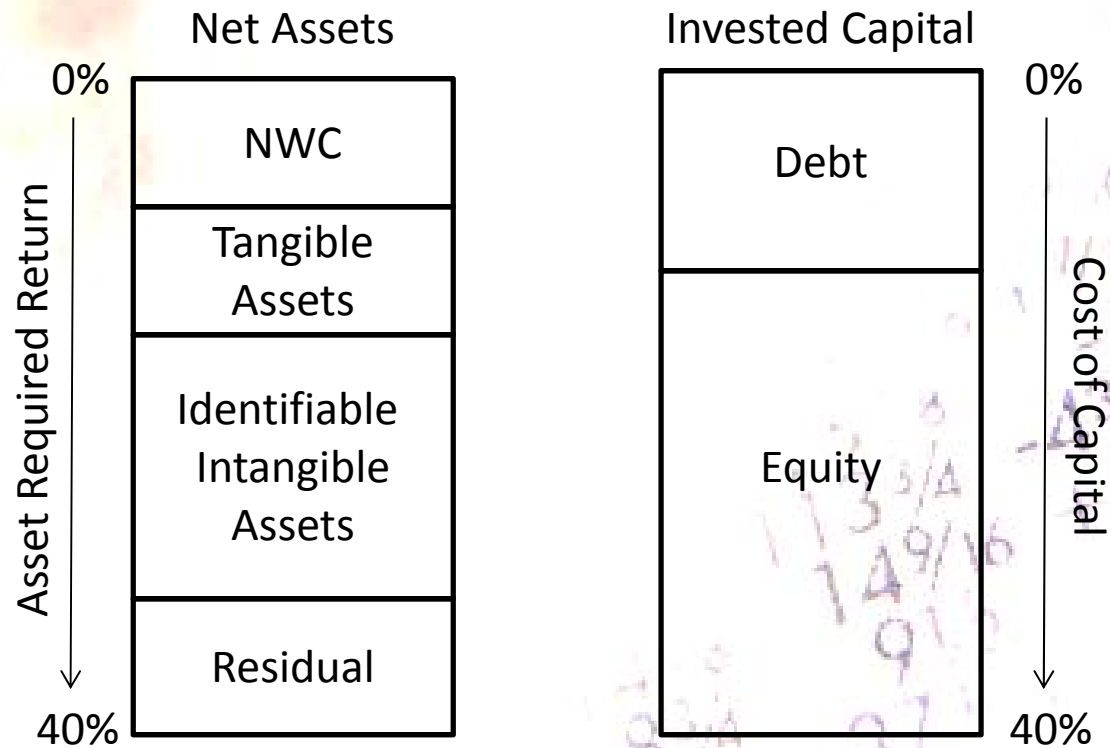
	Total Projected Revenue	Revenue from Acquired Customers	%
TTM +1	\$ 3,542	\$ 3,178	89.7%
TTM +2	3,808	2,908	76.4%
TTM +3	3,998	2,636	65.9%
TTM +4	4,198	2,391	57.0%
TTM +5	4,324	2,167	50.1%
TTM +6	4,454	1,963	44.1%
TTM +7	4,588	1,271	27.7%
TTM +8	4,726	1,015	21.5%
TTM +9	4,868	811	16.7%
TTM +10	5,014	646	12.9%
TTM +11	5,164	585	11.3%
<b>TTM +12</b>	<b>5,319</b>	<b>531</b>	<b>10.0%</b>
TTM +13	5,479	481	8.8%
TTM +14	5,643	437	7.7%
TTM +15	5,812	397	6.8%
TTM +16	5,986	360	6.0%
TTM +17	6,166	325	5.3%

# Discount Rate

- Earnings versus cash flow
- Asset/risk hierarchy

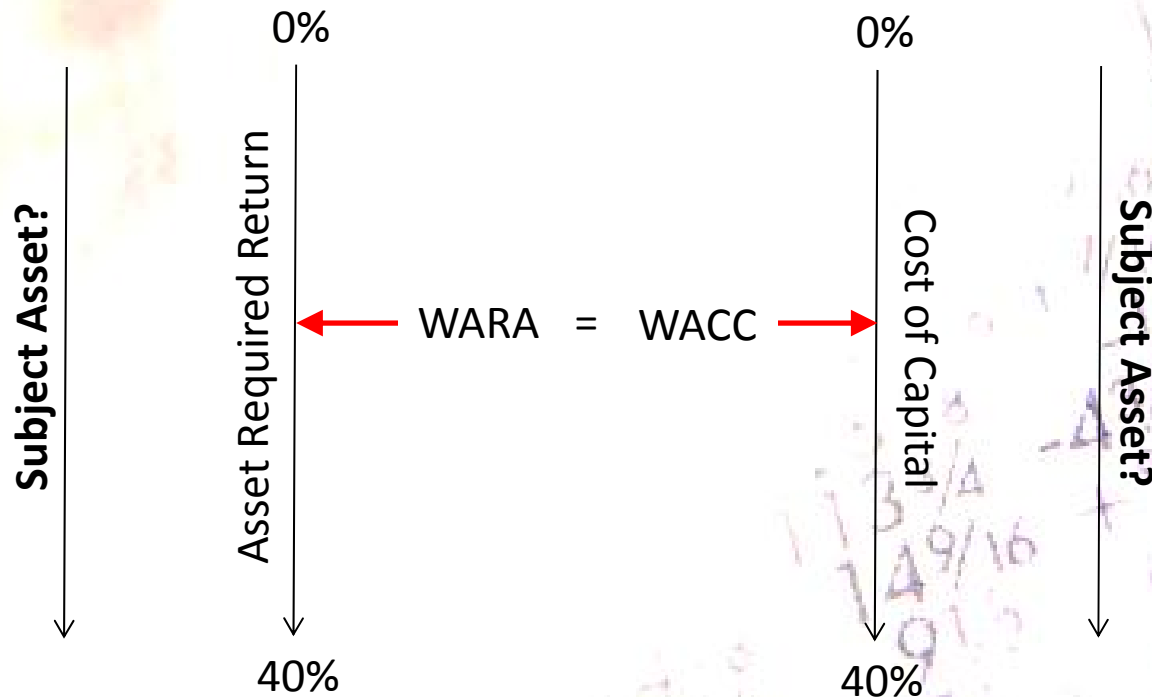
# Discount Rate

- Asset/Risk Hierarchy



# Discount Rate

- Asset/Risk Hierarchy



# Discount Rate

- Risk in the customer relationship asset
  - Low switching costs
  - Low product/service differentiation
  - Low barriers to entry
  - High customer purchasing power
  - Customer concentration
  - High competitive rivalry

# IRR/WACC/WARA Recon

- IRR Cash flows
- WACC Capital
- WARAs Assets
- Why is reconcillation important?
  - May highlight asset cost of capital issues
  - May highlight allocation issues



# IRR/WACC/WARA Reconciliation

- First reconcile IRR and WACC
  - IRR is rate that equates purchase consideration with the market participant's (MP) view of expected cash flows
  - WACC is MP's view of the subject company's WACC

# IRR/WACC/WARA Reconciliation

- If  $IRR > WACC$ 
  - Optimistic cash flows
  - Unique synergies in cash flows
  - Bargain purchase
  - Inadequate risk assessment in WACC
- If  $WACC > IRR$ 
  - Opposite to above

# IRR/WACC/WARA Reconciliation

- Fair (market) value:  $IRR = WACC = WARA$
- What happens when  $WARA < WACC$ ?
- What happens when  $WARA > WACC$ ?
- Reconciliation of IRR/WACC to WARA is iterative...

# IRR/WACC/WARA Reconciliation

	Fair (Market) Value	% of Total	Return on Asset	Weighted Return on Asset	
Operating working capital	\$ 500	12.0%	3.0%	0.36%	
Tangible assets	1,000	24.1%	8.0%	1.93%	
Customer relationships	1,500	36.1%	20.0%	7.22%	
Trade name	50	1.2%	20.0%	0.24%	
Workforce	100	2.4%	20.0%	0.48%	
Subtotal	3,150			10.23%	
			<b>SOLVE</b>		
Goodwill	1,000	24.1%	40.5%	9.77%	(20.00% - 10.23%)
Total assets	\$ 4,150	100.0%		20.00%	
				↑	
WACC = IRR				20.00%	
Cost of equity				25.00%	
Cost of debt				3.00%	

# IRR/WACC/WARA Reconciliation

	Fair (Market) Value	% of Total	Return on Asset	Weighted Return on Asset	
Operating working capital	\$ 500	12.0%	3.0%	0.36%	
Tangible assets	1,000	24.1%	8.0%	1.93%	
Customer relationships	1,500	36.1%	22.0%	7.94%	
Trade name	50	1.2%	20.0%	0.24%	
Workforce	100	2.4%	20.0%	0.48%	
Subtotal	3,150			10.95%	
			<b>SOLVE</b>		
Goodwill	1,000	24.1%	37.6%	9.75%	(20.00% - 10.95%)
Total assets	\$ 4,150	100.0%		20.00%	
				↑	
WACC = IRR				20.00%	
Cost of equity				25.00%	
Cost of debt				3.00%	

# Excess Earnings

		TTM +1	TTM +2	TTM +3	TTM +4	TTM +5
Total customer revenues		\$ 3,542	\$ 3,808	\$ 3,998	\$ 4,198	\$ 4,324
Acquired customer revenues		\$ 3,381	\$ 3,516	\$ 3,621	\$ 3,730	\$ 3,842
Retention rate	60.0%	80.0%	48.0%	28.8%	17.3%	10.4%
Revenue from acquired customers		\$ 2,705	\$ 1,688	\$ 1,043	\$ 645	\$ 400
% of total revenue		76.4%	44.3%	26.1%	15.4%	9.3%
Gross profit	15.0%	\$ 406	\$ 253	\$ 156	\$ 97	\$ 60
Operating costs	5.0%	(135)	(84)	(52)	(32)	(20)
Trade name	2.0%	(54)	(34)	(21)	(13)	(8)
Depreciation		(50)	(29)	(17)	(10)	(6)
EBIT		\$ 167	\$ 106	\$ 66	\$ 42	\$ 26
Taxes	40.0%	(67)	(42)	(26)	(17)	(10)
NOPAT		\$ 100	\$ 64	\$ 40	\$ 25	\$ 16
Contributory asset charges:						
Working capital		(10)	(6)	(4)	(2)	(1)
Fixed assets		(13)	(8)	(5)	(3)	(2)
Non-compete		(8)	(4)	-	-	-
Workforce		(5)	(3)	(2)	(1)	(1)
Excess earnings		\$ 64	\$ 43	\$ 29	\$ 19	\$ 12

# Resources

- Identification of Contributory Assets and Calculation of Economic Rents: Toolkit. The Appraisal Foundation, 2010.
- Best Practices for Valuations in Financial Reporting: Intangible Asset Working Group – Contributory Assets. The Appraisal Foundation, 2010.
- ASA BV301: Valuation of Intangible Assets. American Society of Appraisers.
- ASA BV302: Special Topics in the Valuation of Intangible Assets. American Society of Appraisers.

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- Identify key assumptions and inputs
- Understand the attrition analysis
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- Understand the purpose of the IRR/WACC/WARA reconciliation



# MPEEM QUESTIONS?

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