

## Cost Allocation II – Death Spirals

- 15.501/516 **Accounting**
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## Allocation of Indirect Costs of a Cost Center to Departments

- Assume the following:
- IT Department costs \$100,000/month
  - 5 Departments have equal access to IT services
  - Current allocation is \$20,000/month to each



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### Allocation of Indirect Costs of a Cost Center to Departments

Dept.	Outside Cost	Charge	Result
A	\$ 18,000	\$ 20,000	Unhappy, wants out
B	\$ 22,000	\$ 20,000	Happy
C	\$ 30,000	\$ 20,000	Happy
D	\$ 30,000	\$ 20,000	Happy
E	\$ 30,000	\$ 20,000	Happy
Total	\$130,000	\$100,000	



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### Allocation of Indirect Costs of a Cost Center to Departments

Dept.	Outside Cost	Charge 1 <sup>st</sup> Iteration	Charge 2 <sup>nd</sup> Iteration	Charge 3 <sup>rd</sup> Iteration	Charge 4 <sup>th</sup> Iteration
A	\$ 18,000	\$ 20,000	exits		
B	22,000	20,000	25,000	exits	
C	30,000	20,000	25,000	33,333	exits
D	30,000	20,000	25,000	33,333	exits
E	30,000	20,000	25,000	33,333	exits
Total	\$130,000	\$100,000	\$100,000	\$100,000	???

This is a “death spiral” -- a positive feedback loop.



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### Allocation of Indirect Costs of a Cost Center to Departments

Dept.	Outside Cost	Charge
A	\$ 18,000	\$ 20,000
B	\$ 22,000	\$ 20,000
C	\$ 30,000	\$ 20,000
D	\$ 30,000	\$ 20,000
E	\$ 30,000	\$ 20,000
Total	\$130,000	\$100,000

➤ Why might departments C, D, and E have a higher outside cost than department A? Should they pay more for IT services than A?



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## Allocating Costs to Departments - General Points -

- Charge cost center costs to departments based on % of cost center products they use, so that these departments properly incorporate cost center costs in their decisions.
- Under-charging some departments for cost center use implies that these under-charged departments are be “subsidized” by other departments using the cost center
- When a cost center is not operating at capacity, allocation of the cost center’s overhead costs may result in allocated costs exceeding the cost of outside alternatives. Thus departments purchase products from external parties.
  - ➔ Result in the firm overpaying for products.



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## The Issue of Joint Costs

- A joint cost is incurred to produce two or more outputs from the same input.
- Consider a firm that produces fillets, drumsticks and wings from chickens.
- The chicken and the initial processing of separating it into various parts costs \$2.00



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## Joint costs - Split-Off Point

- **Split off point:** the point beyond which *further* processing has to take place for fillets, drumsticks and wings before they can be sold.

- Assume following data

	<u>Price</u>	<u>Further Processing Cost</u>	<u>NRV*</u>
Fillets	2.40	(0.80)	1.60
Drumsticks	0.80	(0.04)	0.76
Wings	0.30	(0.16)	0.14

\*Net Realizable Value



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### Joint Costs – How To Allocate?

➤ By weight seems appropriate

➤ Weight in oz

	<u>Total</u>	<u>Fillets</u>	<u>Drumsticks</u>	<u>Wings</u>
Weight	32	16	12	4
%age weight	100%	50%	37.5%	12.5%
Allocated				
Cost	2.00	1.00	0.75	0.25



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### Net Profits With Joint Cost Allocation

➤ With weight-based allocation,

	<u>NRV</u>	<u>Joint costs allocated</u>	<u>Net Profit</u>
Fillets	1.60	(1.00)	0.60
Drumsticks	0.76	(0.75)	0.01
Wings	<u>0.14</u>	<u>(0.25)</u>	(0.11)
	<u>2.50</u>	<u>(2.00)</u>	

➤ If input/output prices and yields are fixed, then it appears optimal to drop wings



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### Joint Costs – How To Allocate II?

➤ Drop wings

➤ Redistribute joint costs by weight across fillets and drumsticks

➤ Weight in oz

	<u>Total</u>	<u>Fillets</u>	<u>Drumsticks</u>
Weight	28	16	12
%age weight	100%	57%	43%
Allocated			
Cost	2.00	1.14	0.86



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## Joint Cost Allocation – Death Spiral?

- With weight-based allocation,

	<u>NRV</u>	<u>Joint costs allocated</u>	<u>Net Profit</u>
Fillets	1.60	(1.14)	0.46
Drumsticks	0.76	(0.86)	(0.10)

- If input/output prices and yields are fixed, then it appears optimal to drop drumsticks
- With only fillets, joint cost allocation is easy!

	<u>NRV</u>	<u>Joint costs allocated</u>	<u>Net Profit</u>
Fillets	1.60	(2.00)	(0.40)

- If input/output prices and yields are fixed, then it now appears optimal to drop fillets!



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## Joints Costs & NRV

- Allocate by proportion of NRV

	<u>Total</u>	<u>Fillets</u>	<u>Drumsticks</u>	<u>Wings</u>
NRV	2.50	1.60	0.76	0.14
%age NRV	100%	64%	30.4%	5.6%
Allocated				
Cost	2.00	1.28	0.61	0.11

- With above allocation,

	<u>NRV</u>	<u>Joint costs allocated</u>	<u>Net Profit</u>
Fillets	1.60	(1.28)	0.32
Drumsticks	0.76	(0.61)	0.15
Wings	0.14	(0.11)	0.03



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## Joint Costs & NRV

- Proportion of NRV (Net Realizable Value) is the *only correct way* to allocate joint costs

- Why?

- Once the joints costs are incurred, the company is going to have fillets, drumsticks and wings *anyway*.
- As long as the profit margins on each of those products are positive, the joint costs are essentially irrelevant in deciding the relative profitability of product lines.



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## Summary

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- Death Spirals result not just from overhead allocations, but from cost-of-raw-material allocations as well
  
- In most or at least many cases, there are credible alternate allocation methods to avoid death spirals.
  - Eg, joint costs should be allocated using NRVs
  
- But one has to be careful!



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