Transfer Pricing

Why Transfer Prices?

- Decentralized firms
- Decision-making power delegated to subunit-managers
- Intermediate products transferred from one subunit to another need to be priced

- Transfer prices need to help to achieve a company's strategies and to fit the organization structure

Properties of an optimal transfer pricing system

- Motivation of high level of management effort
- Promote high degree of subunit autonomy
- Facilitate performance evaluation for subunits

- **Goal congruence:**

  If a subunit manager bases his decisions on maximization of subunit profit this should at the same time maximize the firm‘s overall profit

Methods for transfer price determination

- Market-based transfer price
  - Publicly listed price of a similar product is used
- Cost-based transfer price
  - Variable production cost
  - Variable and fixed production cost
  - Full Cost
  - Cost + markup
- Negotiated transfer price
  - Subunits are free to negotiate the transfer price employed

Market-based transfer prices

- Using market-based transfer prices leads to optimal decisions if the following conditions are satisfied:
- Perfectly competitive market for the intermediate product
  - Homogenous product, subunit managers are unable to affect market price
- Interdependencies of subunits are minimal
  - We can clearly distinguish between division's costs
- No additional costs or benefits from buying or selling in the external market instead of transacting internally

Given these conditions and external trade is permitted market-based transfer prices are the *only* feasible transfer prices

Example 1

- Two divisions, division 1 produces intermediate product to be „sold“ to division 2
- Division 1:
  - Sales price intermediate product p_1=120
  - Variable Cost: c_1 = 90
- Division 2:
  - Sales price final product: p_2 = 200
  - Variable Cost: c_2 = 20 or c_2 = 40
- One time special order to division 2: Sell an additional unit for p =150, no capacity constraints

Example 1

Division 1	
Transfer price	120
Variable costs	(90)
Contribution margin special order	30

Division 2	c_2=20	c_2=40
Sales price	150	150
Variable costs	(20)	(40)
Transfer price	(120)	(120)
Contribution margin special order	10	(10)

Example 1

Corporation	c_2=20	c_2=40
Sales price	150	150
Variable costs division 1	(90)	(90)
Variable costs division 2	(20)	(40)
Contribution margin special order	40	20

- What about goal congruence in the example??
- Do divisions act in the best interest of the firm??

Extension of example 1: imperfect market

- Assumptions:
- If the intermediate product is sold at the market variable costs in division 1 increase from 90 to 106
- If the intermediate product is bought in the market division 2 variable costs increase from 40 to 50

Division 1	internal	external
Transfer price	120	120
Variable costs	(90)	(106)
Contribution margin special order	30	14

Extension of example 1: imperfect market

Division 2	internal	external
Sales price	150	150
Variable costs	(40)	(50)
Transfer price	(120)	(120)
Contribution margin special order	(10)	(20)

Corporation	internal	external
Sales price	150	150
Variable costs division 1	(90)	(106)
Variable costs division 2	(40)	(50)
Contribution margin special order	20	(6)

- What about goal congruence now??

Cost-based transfer prices

- Continuation of example 1:
- Division 1:
  - Variable cost: $c_1 = 90$
  - Fixed cost $f_1=20$
- Division 2:
  - Sales price final product: $p_2 = 200$
  - Variable cost: $c_2 = 20$
  - Market price for intermediate product: $p_1 = 120$
- Cost plus markup transfer price of 110 x 1.1= 121

Continuation of example 1

- Optimal strategy of division 2: Buy intermediate product in the external market and get a profit of:

  200-120-20=60 rather than 200-121-20=59

- Alternatives from the firm's perspective:

	Alt. 1: Internal transfer	Alt. 2: External transfer
Sales price	150	150
Variable cost division 1	(90)	0
Variable Cost division 2	(20)	(140)
Contribution margin special order	40	10

Assumption: Division 1 cannot sell intermediate product in the market

- What about goal congruence in this example??

Transfer-prices based on marginal cost

- The “Hirshleifer Model” (1956)
- If the divisions decide upon the number of units transferred, marginal costs are appropriate to achieve goal congruence

Example:

- Two Divisions, division 1 sells an intermediate product to division 2

Division 1: $C_1 = 20 + \frac{x^2}{2}$ Division 2: $C_2 = 2 + x$

$P(x) = 16 - x$

Hirshleifer-Model

- Benchmark solution for the firm:

$$\max_x \pi = P(x)x - C_1(x) - C_2(x)$$

$$\max_x \pi = (16 - x)x - 20 - \frac{x^2}{2} - 2 - x$$

solution: $x^* = 5$

$$\pi^*(x = 5) = 15.5$$

- If HQs could prescribe the quantity to be delivered it would choose

$x^* = 5$

- Marginal costs of division 1 at the *optimum:* $C_1' = x^* = 5$

Hirshleifer-Model

- Decentralized decisions:
- Division 1: $\max_x \pi_1 = Tx - C_1(x) = Tx - 20 - \frac{x^2}{2}$

F.O.C.: $T - x = 0$

- Division 2: $\max_x \pi_2 = P(x)x - Tx - C_2(x) = (16 - x)x - Tx - 2 - x$

F.O.C.: $15 - 2x - T = 0$

- To obtain x*=5 for both divisions we need to fix T=5

Discussion: Hirshleifer-Model

- How useful is the model in practice??
- Problem 1: asymmetric information
- For the model to work, HQs must dictate T=5
- Does HQs know the appropriate transfer price? (No)
- To learn the transfer price HQs has to solve the optimization problem itself
- If it does so, it can prescribe x=5 as well as T=5
- Problem 2: Marginal cost is inappropriate for performance evaluation: division 1 always incurs a loss

Dual Pricing

- Cost-based transfer prices rarely meet all criteria of a good transfer price (goal congruence, management effort, performance evaluation, subunit autonomy)
- Alternative: use different transfer prices for the divisions
- Problems:
  - Overall profit is not equal to the sum of the profit of the divisions anymore
  - Difficult to explain to subunit managers: Which price is the “correct” one???

Negotiated transfer prices

- Divisions determine the transfer price in a bargaining process
- Typically there is a feasible region of transfer prices that benefits both parties $T \in \{\underline{T}, \overline{T}\}$
- Where within this set will the transfer price be set?
- Depends crucially on the bargaining power of the divisions
- Costs and market prices are often starting points

- Negotiated transfer prices are likely to motivate the managers, are well suited for performance evaluation

Summary

- No transfer pricing method clearly dominates all others
- All methods have strengths and weaknesses – do not fulfill all criteria of optimal transfer pricing
- Additional problems occur if investment activities are decentralized as well
- Additional problems arise if tax considerations play a role
- Decentralized firms aim at setting transfer prices as a compromise that satisfies there needs best

True or False?

- Market price is the only price that a firm should use when transferring goods from one subunit to another subunit.
- Cost-based transfer pricing is a better method when the products being transferred are specialized in nature
- Tax considerations should play no part in determining a transfer price between international divisions of a firm.
- A firm using a cost-based transfer price will never have the selling division be able to achieve goal congruence.