TEORI PRODUKSI DALAM EKONOMI MANAJERIAL

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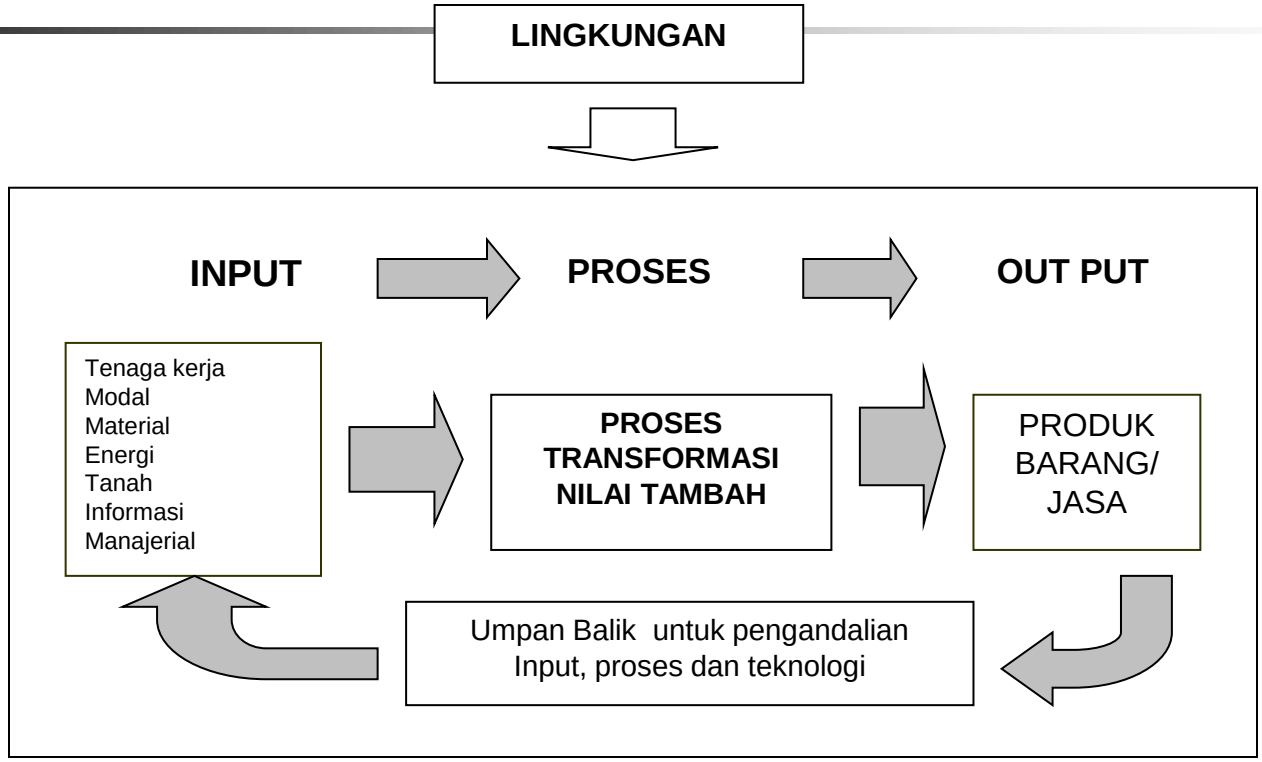
Skema Sistim Produksi



Sistim dalam proses produksi adalah sebuah perbaikan secara terus menerus (*continous improvement*)

- Dalam ekonomi manajerial, produksi adalah kunci utama sebuah aktivitas perusahaan yang perlu ditata secara terpadu dan berkelanjutan
- Sehingga proses produksi harus mampu menghasilkan output maksimum dan meninimumkan biaya
- Peranan ekonomi manajerial sangat kompleks dan signifikan dalam mengambil keputusan
- Muara dalam keputusan strategis adalah profit/ margin bagi korporasi untuk semua stakeholders dan kepuasan pelanggan, lewat produk yang berkualitas.
- Perkembangan teknologi modern mengharuskan perusahaan mengadopsi IT dalam sistim produksi modern, untuk mengejar efisiensi dan produktivitas input.

- Sistim produksi merupakan sistim integral yang mempunyai komponen struktural dan fungsional
- Proses transformasi nilai tambah dari input menjadi output dalam sistim produksi modern selalu melibatkan komponen struktural dan fungsional
- Karateristik produksi:
  - Mempunyai komponen-komponen
  - Mempunyai tujuan
  - Mempunyai aktivitas
  - Mempunyai mekanisme

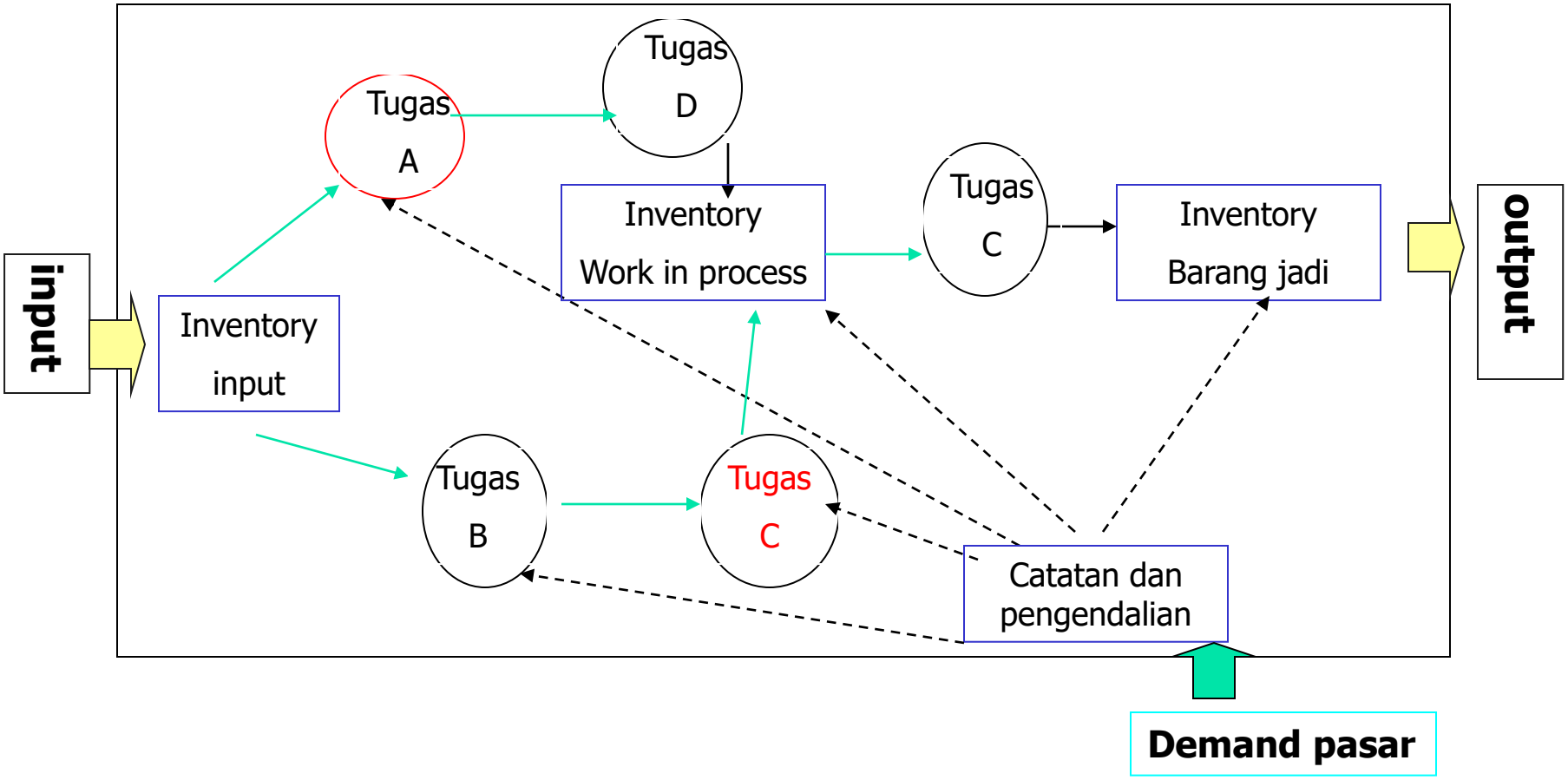
Sistim produksi jasa dan manufaktur

Sistim	Input	Output
Bank		
Rumah sakit		
Perguruan tinggi		
Maskapai penerbangan		
Manufakture		

Elemen sistim produksi

- Elemen input dalam sistim produksi
  - Input tetap *(fixed input)*
  - Input variabel *(variable input)*
- Jenis input :
  - Tenaga kerja
  - Modal , Material , Energi , Tanah, Informasi, Manajerial
- **Elemen proses sistim produksi**
  - Suatu proses dalam sistim produksi adalah integrasi sekuensial dari tenaga kerja, material, informasi, metode kerja dan mesin/ peralatan dalam satu lingkungan guna menghasilkan value added bagi product agar dapat dijual dengan harga kompetitif di pasar.

Aliran proses sistim produksi

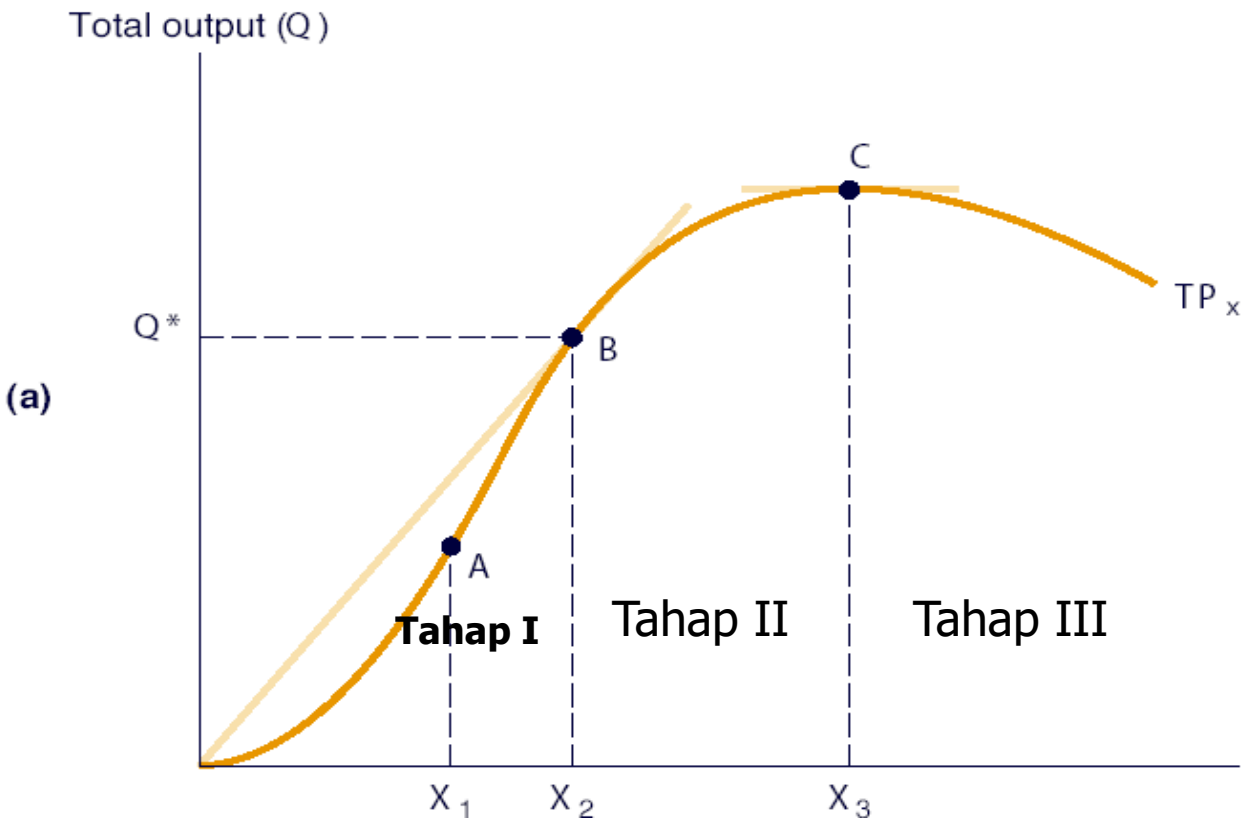


- Sistim produksi modern menganut falsafah Just in Time (JIT).
- Ada tiga kategori dalam aliran proses produksi modern:
  - Tugas (task)
  - Aliran (flow)
  - Penyimpanan (storage)
- Perbedaan antara tugas dan aliran adalah:
  - Aliran mengubah posisi barang
  - Tugas, mengubah kareteristik (memberi nilai tambah) pada barang dan jasa
- Dalam JIT sumber pemborosan adalah :
  - Pergerakan dan perpindahan
  - Penyimpanan

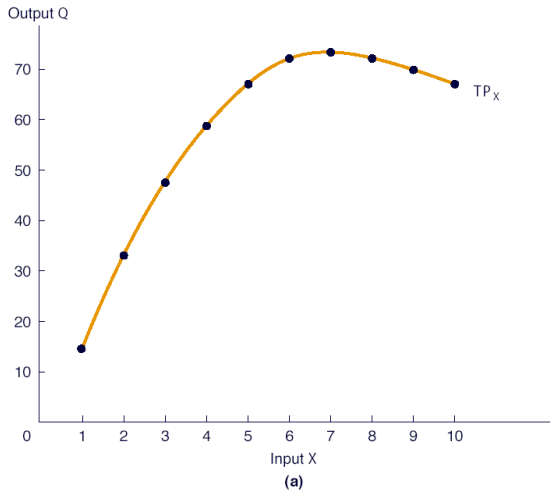
Konsep dasar teori produksi
Fungsi Produksi

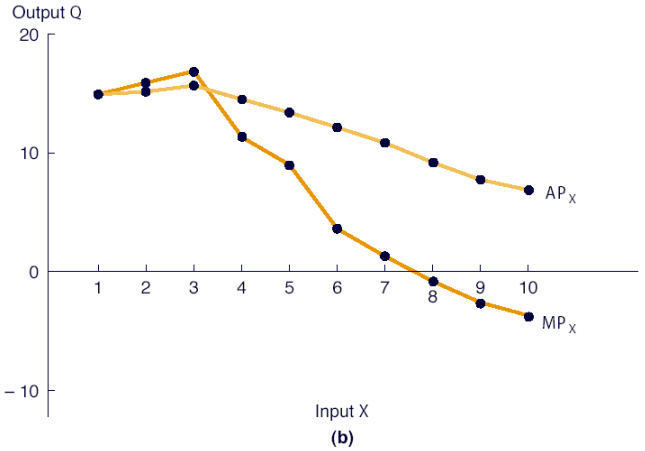
- Bentuk-bentuk Fungsi produksi
- Fungsi produksi ditentukan oleh teknologi, peralatan dan harga masukan.
- Fungsi produksi terpisah
- Fungsi produksi input tenaga kerja

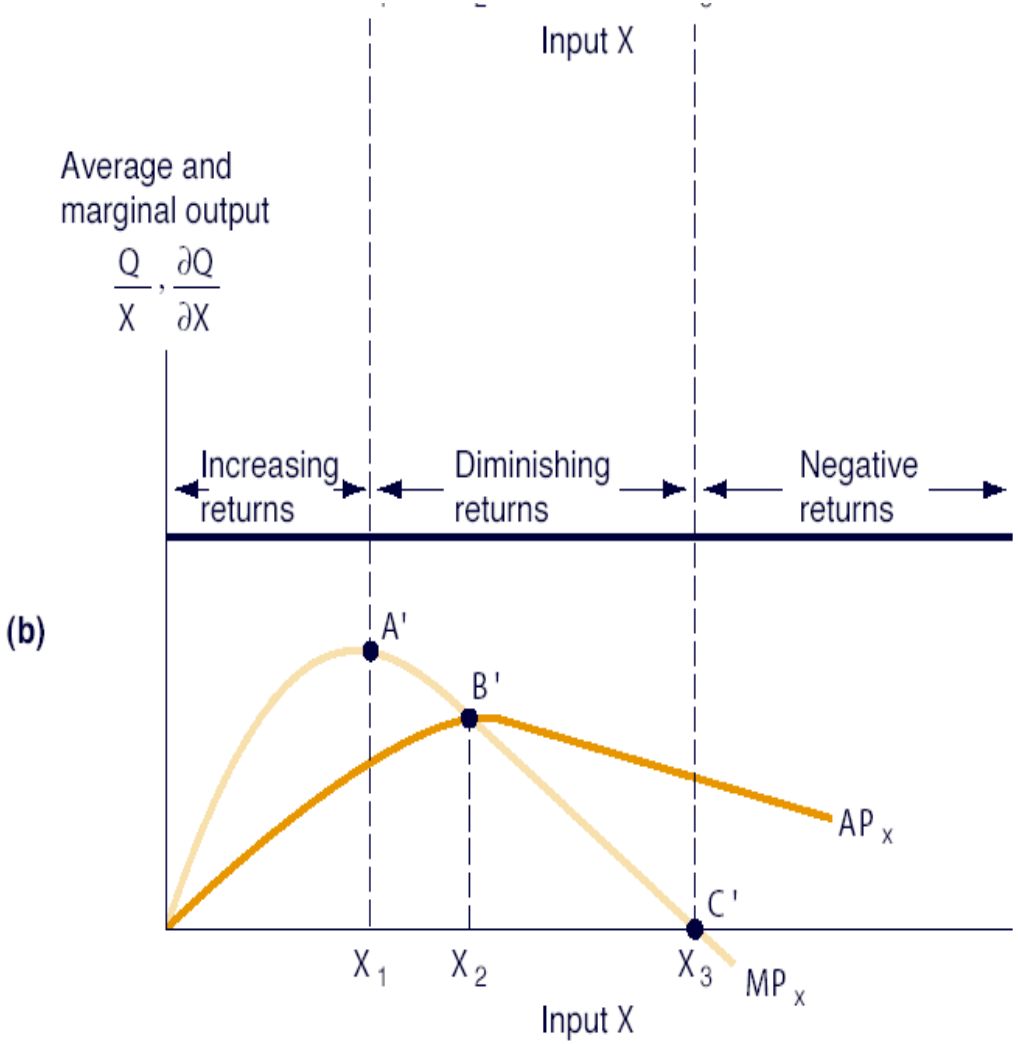
Fungsi produksi



Total Product
Marginal, and Average Product






Input X
Average and marginal output
$\frac{Q}{X}, \frac{\partial Q}{\partial X}$
Increasing returns
Diminishing returns
Negative returns
(b)
A'
B'
C'
AP_x
MP_x
X_1
X_2
X_3
Input X

Marginal Revenue Product and Optimal Employment

- Marginal Revenue Product
  - MRP_L is the revenue gain after all variable costs except labor costs.
  - $MRP_L = MP_L \times MR_Q = \Delta TR/\Delta L$.
- Optimal Level of a Single Input
  - Set $MRP_L = P_L$ to get optimal employment.
- Illustration of Optimal Employment

Returns to Scale and Returns to a Factor

- Returns to scale : mengukur pengaruh output akibat tambahan semua input.
- Returns to a factor : mengukur pengaruh output terhadap tambahan satu input.

Marginal Product

- Marginal product is the change in output caused by increasing input use.
- If $MP_X = \Delta Q/\Delta X > 0$, total product is rising.
- If $MP_X = \Delta Q/\Delta X < 0$, total product is falling (rare).

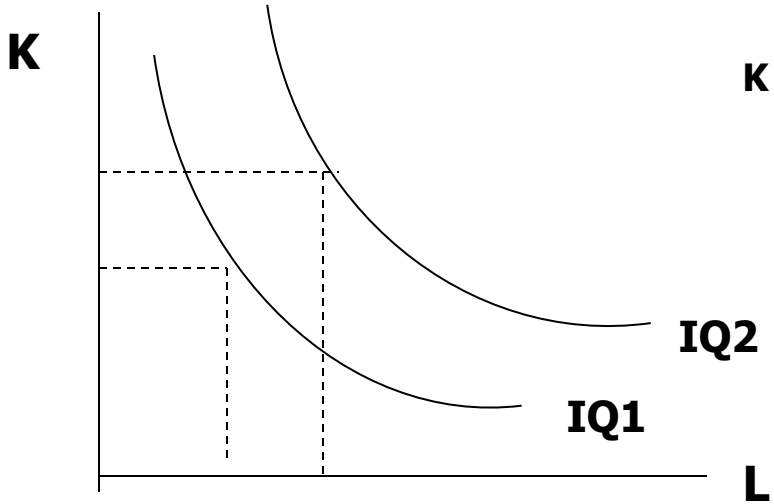
- Average product
  - $AP_X = Q/X$.

Law of Diminishing Returns to a Factor

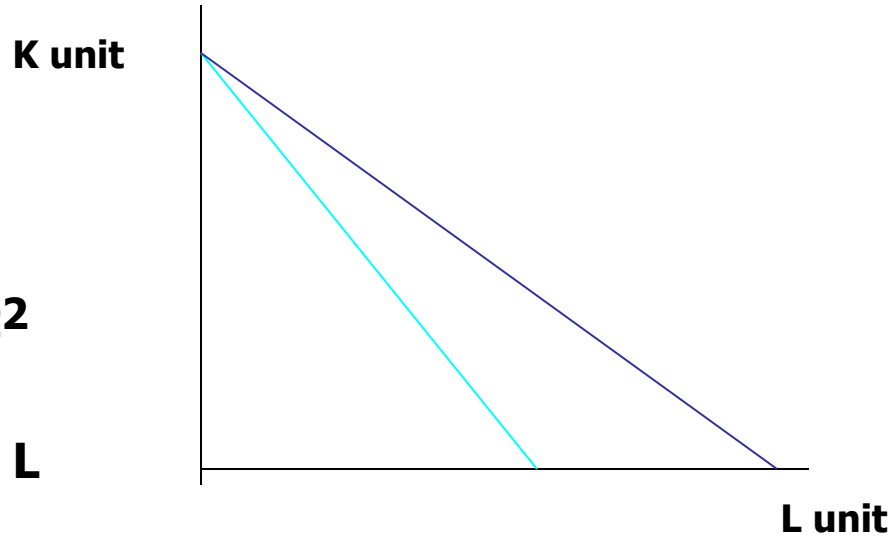
- Diminishing Returns to a Factor Concept
  - MP_X tends to diminish as X use grows.
  - If MP_X grew with use of X, there would be no limit to input usage.
  - $MP_X < 0$ implies irrational input use (rare).
- Illustration of Diminishing Returns to a Factor

Konsep produksi jangka panjang

Pendekatan isoquant dan isocost

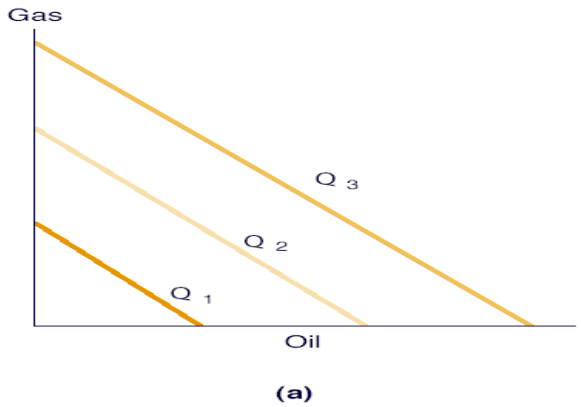


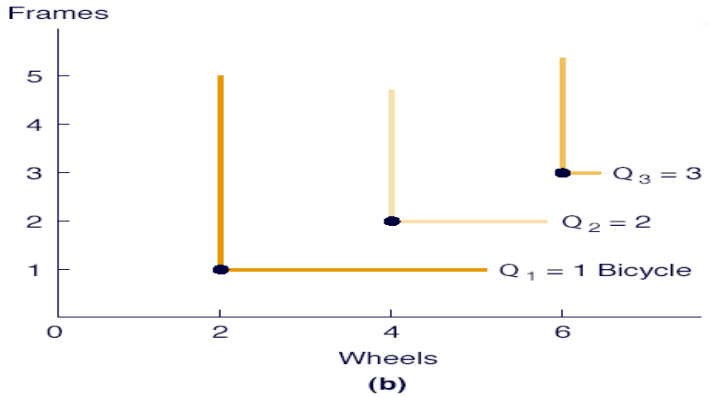
isoquant

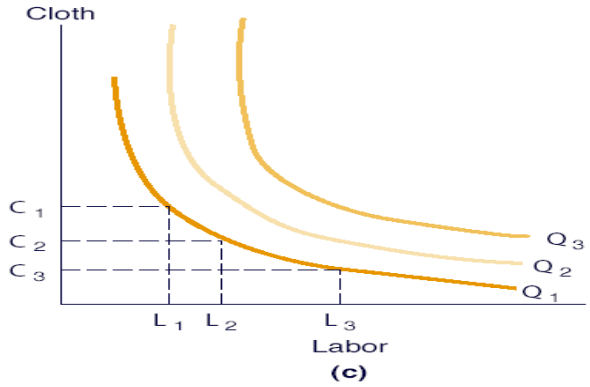


isocost

Jenis isoquant







Input Combination Choice

- Production Isoquants
  - Technical efficiency is least-cost production.
- Input Factor Substitution
  - Isoquant shape shows input substitutability.
  - C-shaped isoquants are common and imply imperfect substitutability.

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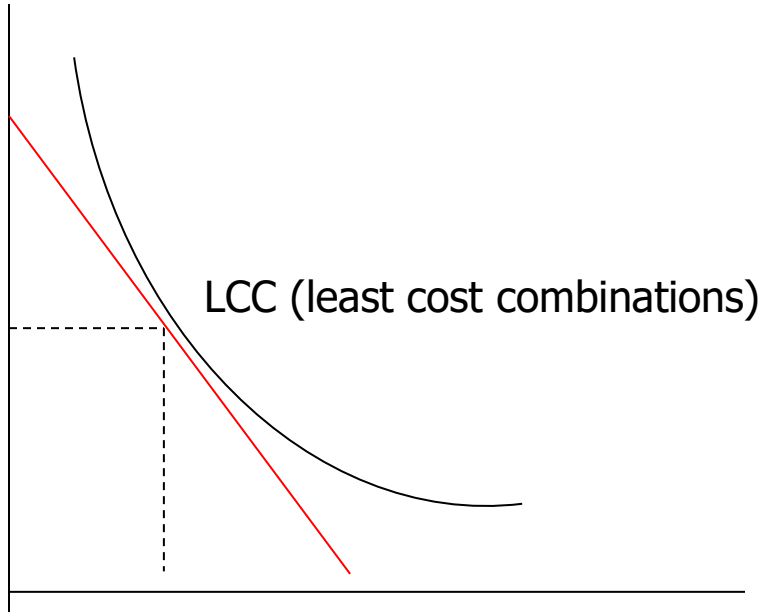
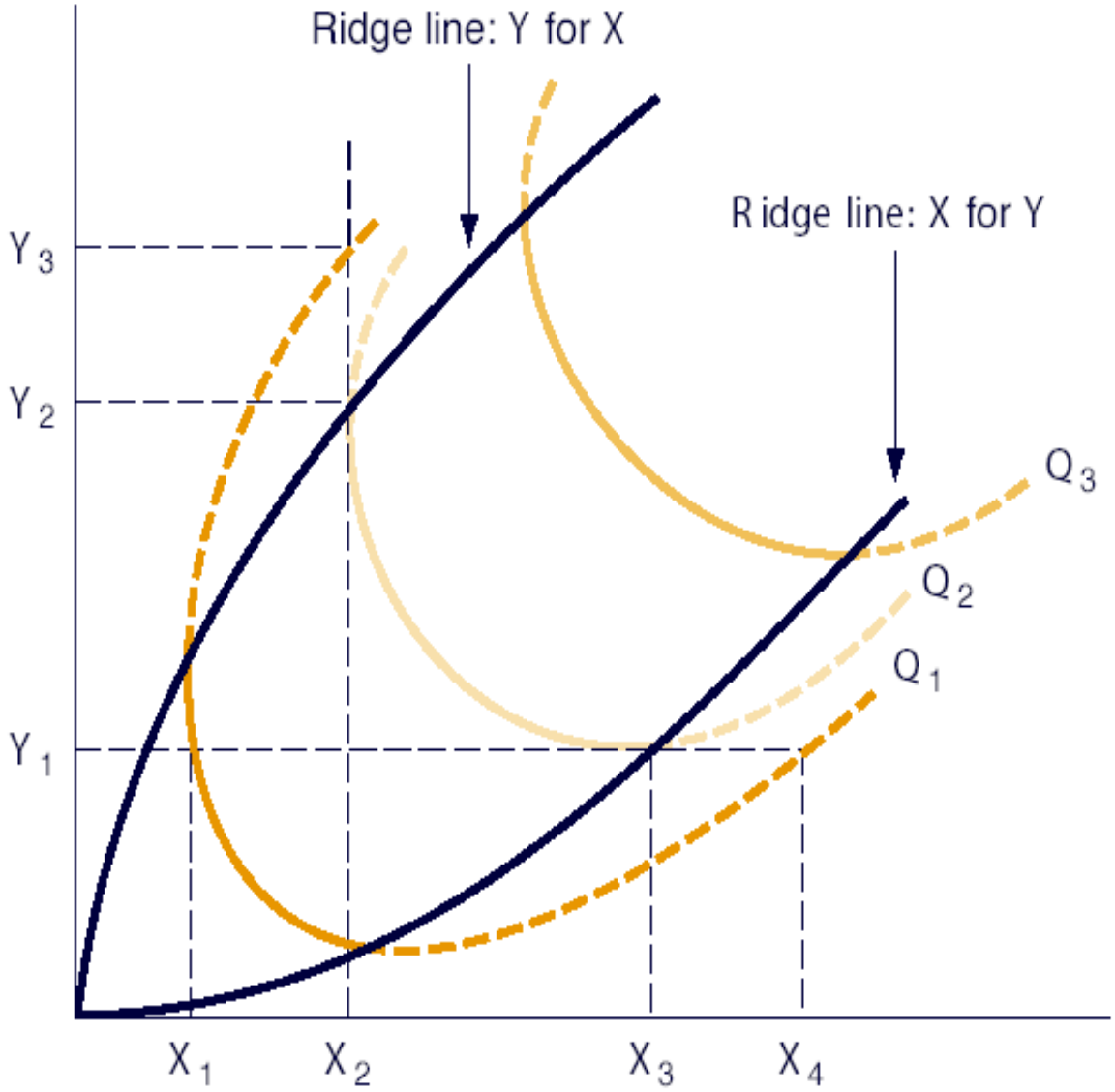
Keseimbangan produsen



- Slop IQ = Slop isocost
- MRTSXY=-MPX/MPY
- Rational Limits of Input Substitution
- MPX<0 or MPY<0 are never observed.


Ridge line: Y for X
Ridge line: X for Y
Y3
Y2
Y1
Q3
Q2
Q1
X1
X2
X3
X4

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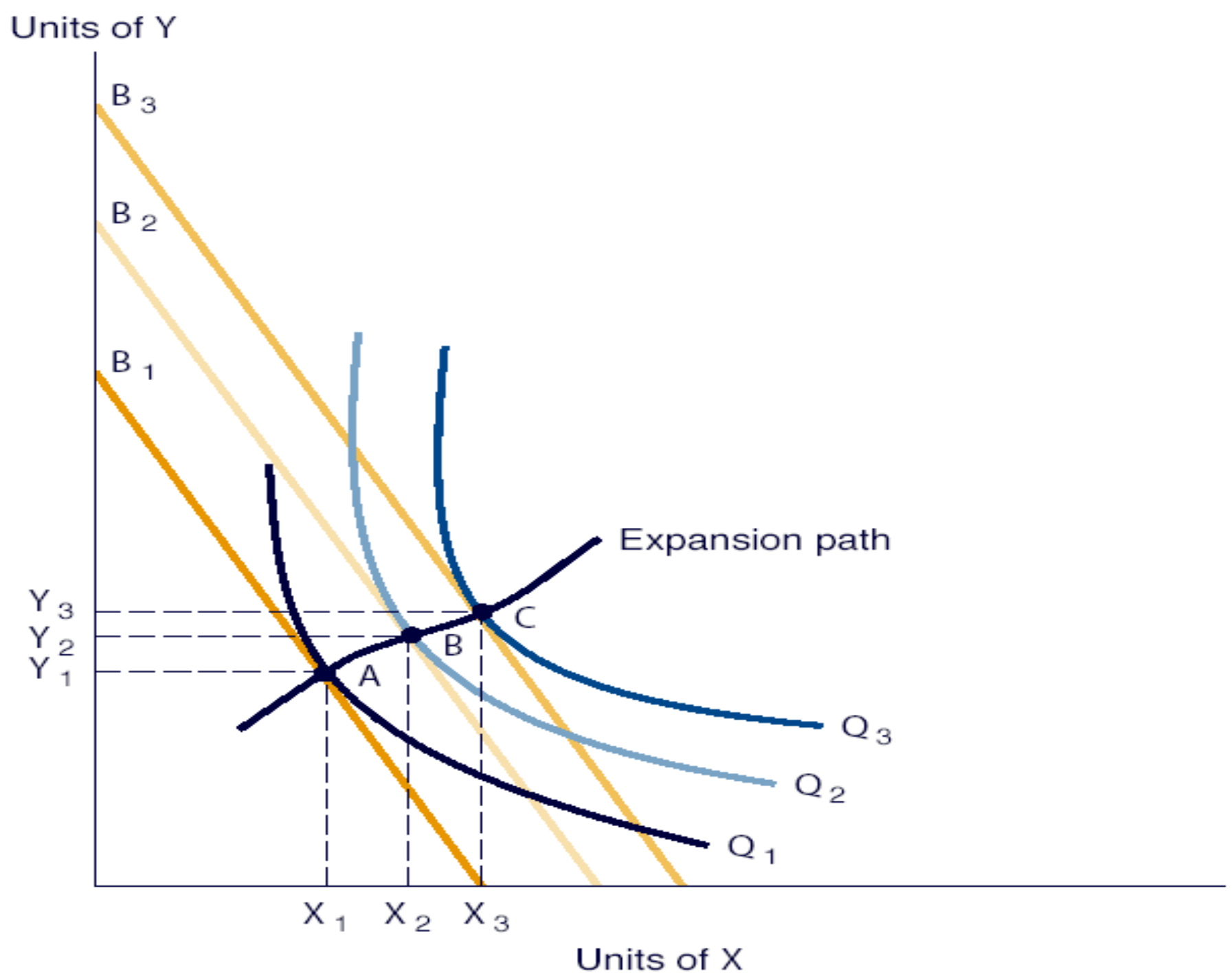
- Illustration of Optimal Employment

Optimal Combination of Multiple Inputs

- Budget Lines
  - Least-cost production occurs when $MP_X/P_X = MP_Y/P_Y$ and $P_X/P_Y = MP_X/MP_Y$
- Expansion Path
  - Shows efficient input combinations as output grows.
- Illustration of Optimal Input Proportions
  - Input proportions are optimal when no additional output could be produce for the same cost.
  - Optimal input proportions is a necessary but *not* sufficient condition for profit maximization.

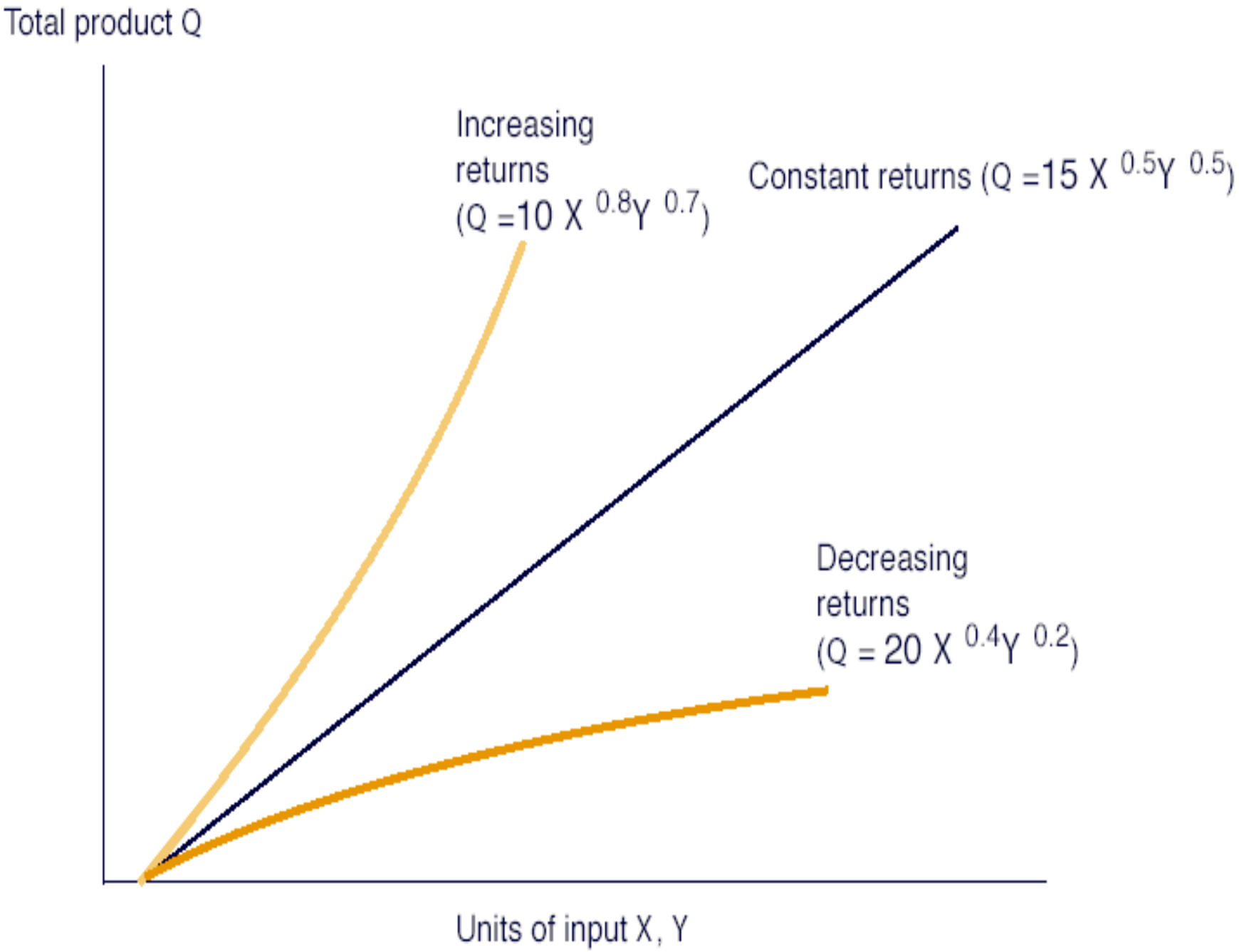

Units of Y
B 3
B 2
B 1
Expansion path
Y 3
Y 2
Y 1
C
B
A
Q 3
Q 2
Q 1
X 1
X 2
X 3
Units of X

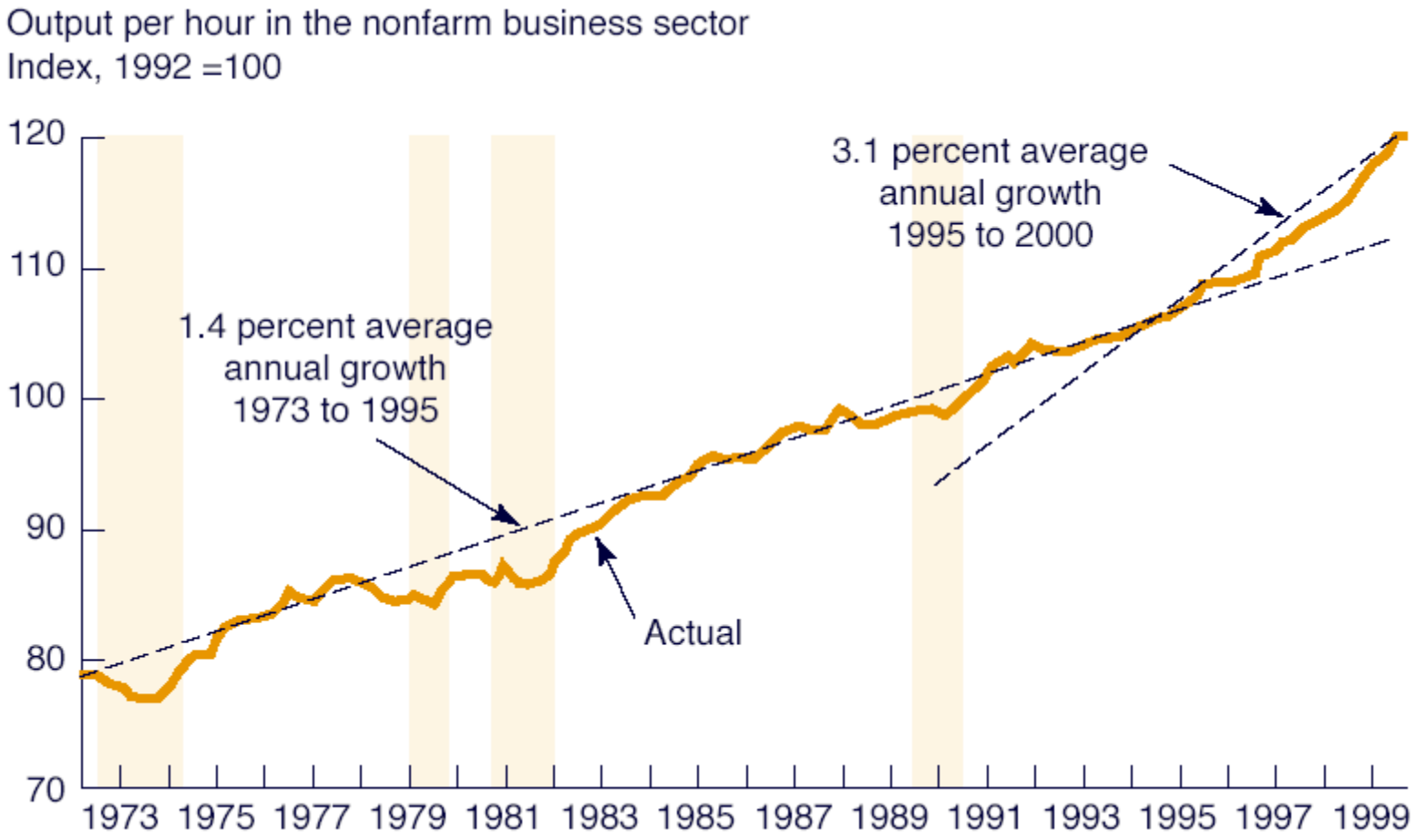
Optimal Levels of Multiple Inputs

- Optimal Employment and Profit Maximization
  - Profits are maximized when $MRP_X = P_X$ for all inputs.
  - Profit maximization requires optimal input proportions *plus* an optimal level of output.
- Illustration of Optimal Levels of Multiple Inputs

Returns to Scale

- Evaluating Returns to Scale
  - Returns to scale show the output effect of increasing all inputs.
- Output Elasticity and Returns to Scale
  - Output elasticity is $\varepsilon_Q = \Delta Q/Q \div \Delta X_i/X_i$ where X_i is *all* inputs (labor, capital, etc.)
    - $\varepsilon_Q > 1$ implies increasing returns.
    - $\varepsilon_Q = 1$ implies constant returns.
    - $\varepsilon_Q < 1$ implies decreasing returns.
- Returns to Scale Estimation


Total product Q
Increasing returns (Q =10 X 0.8Y 0.7)
Constant returns (Q =15 X 0.5Y 0.5)
Decreasing returns (Q = 20 X 0.4Y 0.2)
Units of input X, Y


Output per hour in the nonfarm business sector
Index, 1992 =100
120
110
100
90
80
70
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
3.1 percent average
annual growth
1995 to 2000
1.4 percent average
annual growth
1973 to 1995
Actual

The Relationship Between Inputs and Outputs

- The fundamental relationship is that between inputs and outputs - expressed as the ***production function***
- This can be examined at a number of levels
  - the economy as a whole
  - the industry
  - the firm
- A number of different mathematical forms can be used to model the relationship
  - Cobb-Douglas: $Q = aK^aL^b$
  - translog production function

The Cobb-Douglas Example

- $Q = aK^aL^b$: Where K= capital; L = Labour
- As each individual input (K,L) is increased, output increases, but at a decreasing rate - *the principle of diminishing returns - one of the most fundamental economic ideas*
- A production function identifies many different techniques within the same technology

The Cobb-Douglas Example

- $Q = aK^aL^b$: Where K= capital; L = Labour
- If (a+b) > 1; economies of scale
- If (a+b) < 1; diseconomies of scale
- If (a+b) = 1; constant returns to scale

How to Find the Cost Minimizing Way to Produce Each Level of Output?

- As a mathematical problem, for level of output Q*
  - minimise $TC=(w)(L)+(r)(K)$
  - subject to $Q^*=aK^aL^b$

- As a verbal explanation
  - the ratio of the wage rate to the cost of capital should be equal to the ratio of the marginal productivity of labour to the marginal productivity of capital: WHY?
  - because otherwise $1 could be moved from spending on one input to another and increase output without increasing cost

From Production Functions to Cost Curves

- Short run - some inputs are fixed. (K). The firm is restricted to a fixed set of plant and equipment
  - capacity utilisation decisions
- Long run - both inputs are variable. (K,L). The firm can choose the set of plant and equipment it wants
  - investment decisions

The fundamental problem

- What we need to know is:
- WHAT COST WOULD BE IF FIRMS WERE PRODUCING OUTPUT USING THE BEST SET OF PLANT AND EQUIPMENT FOR THE PURPOSE, USING THE CURRENT TECHNOLOGY AND AT CURRENT FACTOR PRICES, AND IF THEY ARE 100% EFFICIENT
- But we cannot observe that by looking at real firms

Engineering approach

- Ask consulting engineers to design facilities of different sizes and calculate cost
  - advantage is that it does involve estimating cost for current technology and best practice
  - disadvantage is that this approach takes no account of the MANAGERIAL factors which might cause scale economies

Explicit and Implicit Costs

- Costs may be either ***explicit*** or ***implicit***.

Total Cost	=	***explicit costs***	+	***implicit costs***

- ***Explicit costs*** result when a monetary payment is made.
- ***Implicit costs*** involve resources owned by the firm that do not involve a monetary payment.
  - *Examples:*
    - time spent by owner running the firm
    - the foregone normal rate of return on the owner's financial investment (***opportunity cost of equity capital***)

Accounting and Economic Profit

- ***Economic profit*** is total revenues minus total costs (including all opportunity costs).
  - ***Economic profit*** occurs only when the rate of return is above the normal market rate of return (the opportunity cost of capital).
    - Firms earning ***zero economic profit*** are earning exactly the ***market*** (normal) ***rate of return***.
- ***Accounting profit*** is total revenue minus the expenses of the firm over a time period.
  - often excludes implicit costs such the opportunity cost of equity capital
  - ***Accounting profit*** is generally greater than ***economic profit***.

Accounting versus Economic Profit

Total Revenue			
Sales (groceries)	$170,000		
Costs (Explicit)			
Groceries (wholesale)	$76,000		
Utilities	4,000	***Additional (implicit) costs***	
Taxes	6,000	Interest (personal investment)	$7,000
Advertising	2,000	Rent (owner's building)	18,000
Labor (employees)	12,000	Salary (owner's labor)	50,000
Total (explicit) costs	$100,000	***Total (implicit) costs***	$75,000
		Total Explicit and Implicit costs:	$175,000
Accounting Profit:	$70,000	***Economic Profit:***	-$5,000

To calculate ***accounting profit***, subtract the explicit costs from total revenue.

To calculate ***economic profit***, subtract both the explicit and implicit costs from total revenue.

Notice how economic profits are always less than the accounting profits (unless there are no implicit costs).

What does it mean for economic profits to be negative (as in this example) when accounting profits are positive?