Innovation and Trade

Technology gap and the product-cycle hypothesis

The technology gap model

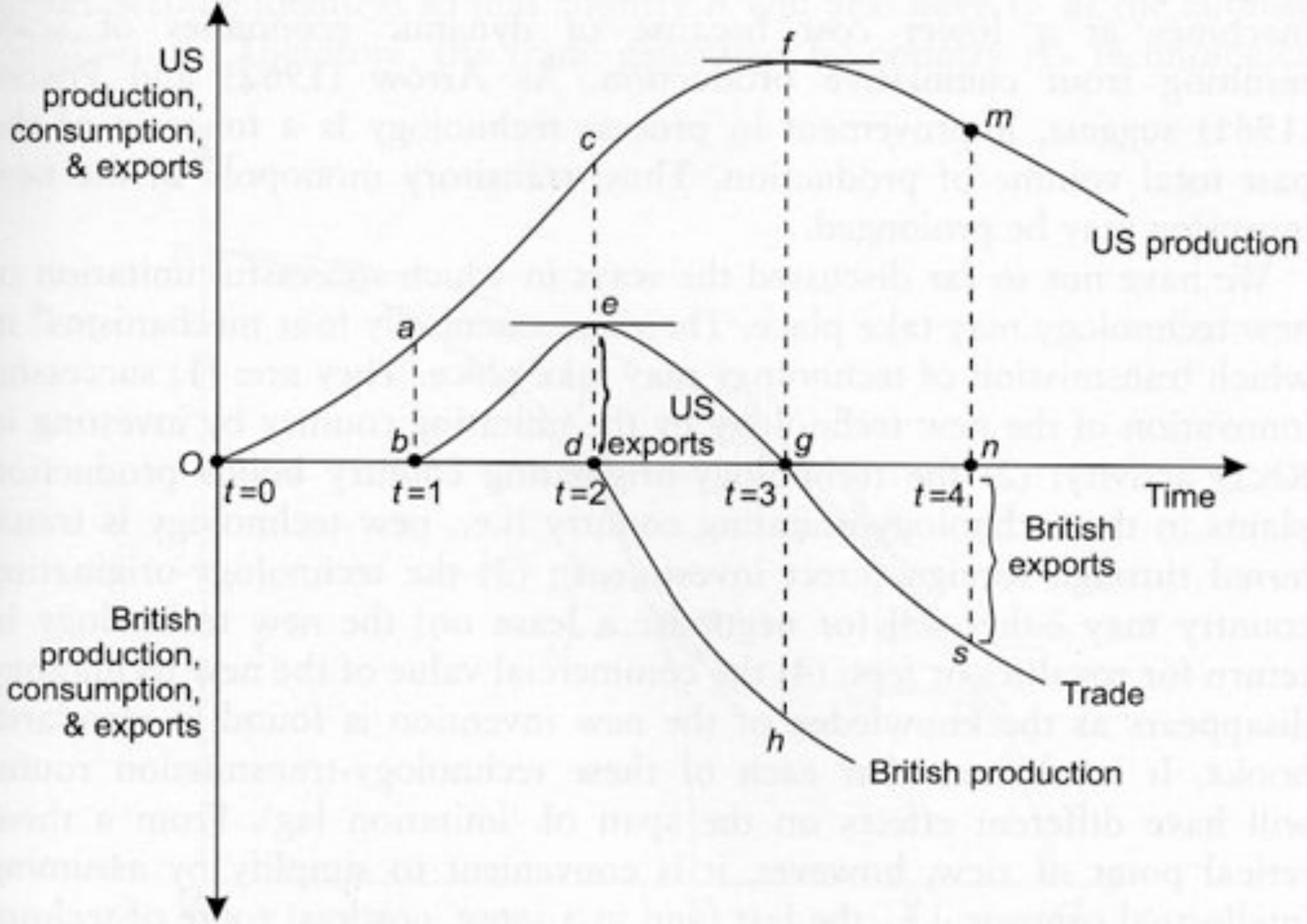
Posner (1961): international trade consists in a "temporary" trade between an innovative country (exporter country), in which a new product appears, and a follower country (importer country) that tries to imitate the new good

The innovation "gap" length depends on the economies of scale the innovation generates:

a) static economies of scale (factories dimensions)

b) dinamic economies of scale (learning by doing in production)

The analysis focuses on "absolute costs" (production costs)


US production, consumption, & exports
British production, consumption, & exports
f
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t=0
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British production

Channels of technology diffusion

1) R&D -> investments on research and development

2) direct transfers of technology (direct investments) and new factory building

3) trade of technology (patent licensing and royalties)

4) scientific knowledge at the basis of innovation becomes publicly available

The product cycle hypothesis

Every good goes through 3 stages:

1) the new product stage

2) the maturing product stage

3) the standardized product stage

Every stage presents 4 different elements:

a) production function

b) input

c) market form

d) international factor mobility

1) The new product stage

a) Production function (technology) is "unstable"

- New production technology are non still well defined –> learning stage
- External economy of scale are important

b) Knowledge is the main input

c) Market demand is unstable and its price elasticity is low

- Monopolistic rents are common
- Entrance barrier are high because the know-how needed for production is not "public" yet

d) Production is located in the innovator country

2) The maturing product stage

a) Production function (technology) becomes "stable"

-Firms may exploit internal economy of scale (firm dimension)

b) Capital intensity in production increases

-R&D is less important

-good management is essential

c) New firms enter the market and demand becomes more price elastic

d) Foreign delocalization of production is now convenient

3) The standardized product stage

a) Production process is now "standardized"

- Mass production in big firms

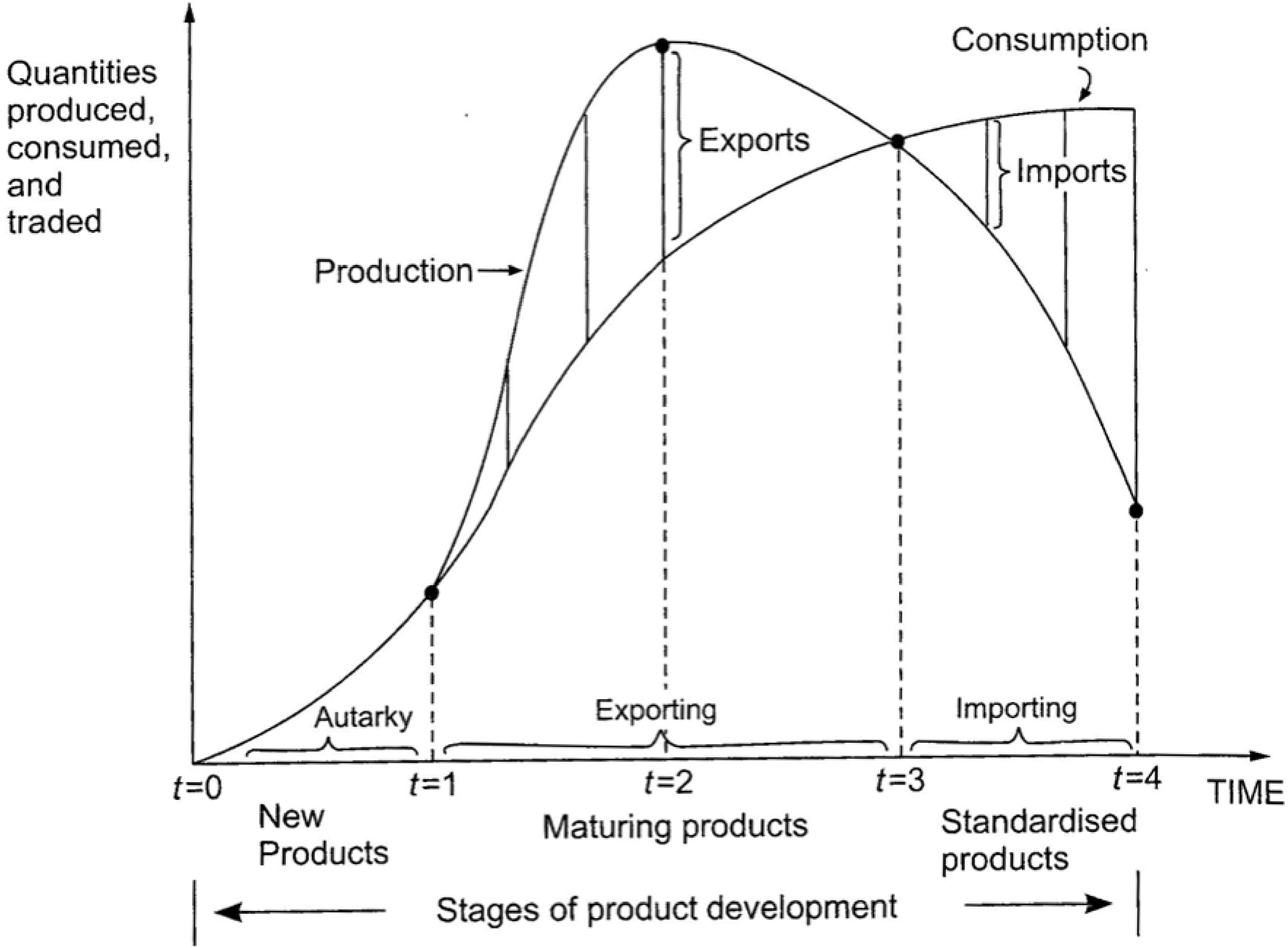
b) Fixed capital and unskilled workers are the main input

- labour cost is very important

c) The industry becomes more and more concentrated because of internal economy of scale ("bigger is better")

- consumers' demand is very price elastic

d) Production may be fully transferred to foreign countries (lower labour cost)


Quantities produced, consumed, and traded
Consumption
Exports
Imports
Production
Autarky
Exporting
Importing
t=0
t=1
t=2
t=3
t=4
TIME
New Products
Maturing products
Standardised products
Stages of product development