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Theory of Production

Dr. Madhumita Das



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Introduction

- Diminishing returns and marginal products refer to the response of output to an increase of a *single* input when all other inputs are held constant
- What would happen to wheat production if land, labor, water, and other inputs were increased by the same proportion?



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Production Function with Two Variable Inputs

- Producers being rational would use that combination of two inputs that is economically efficient
- The objective is to minimize cost of producing a given level of output, or maximize output at a given cost



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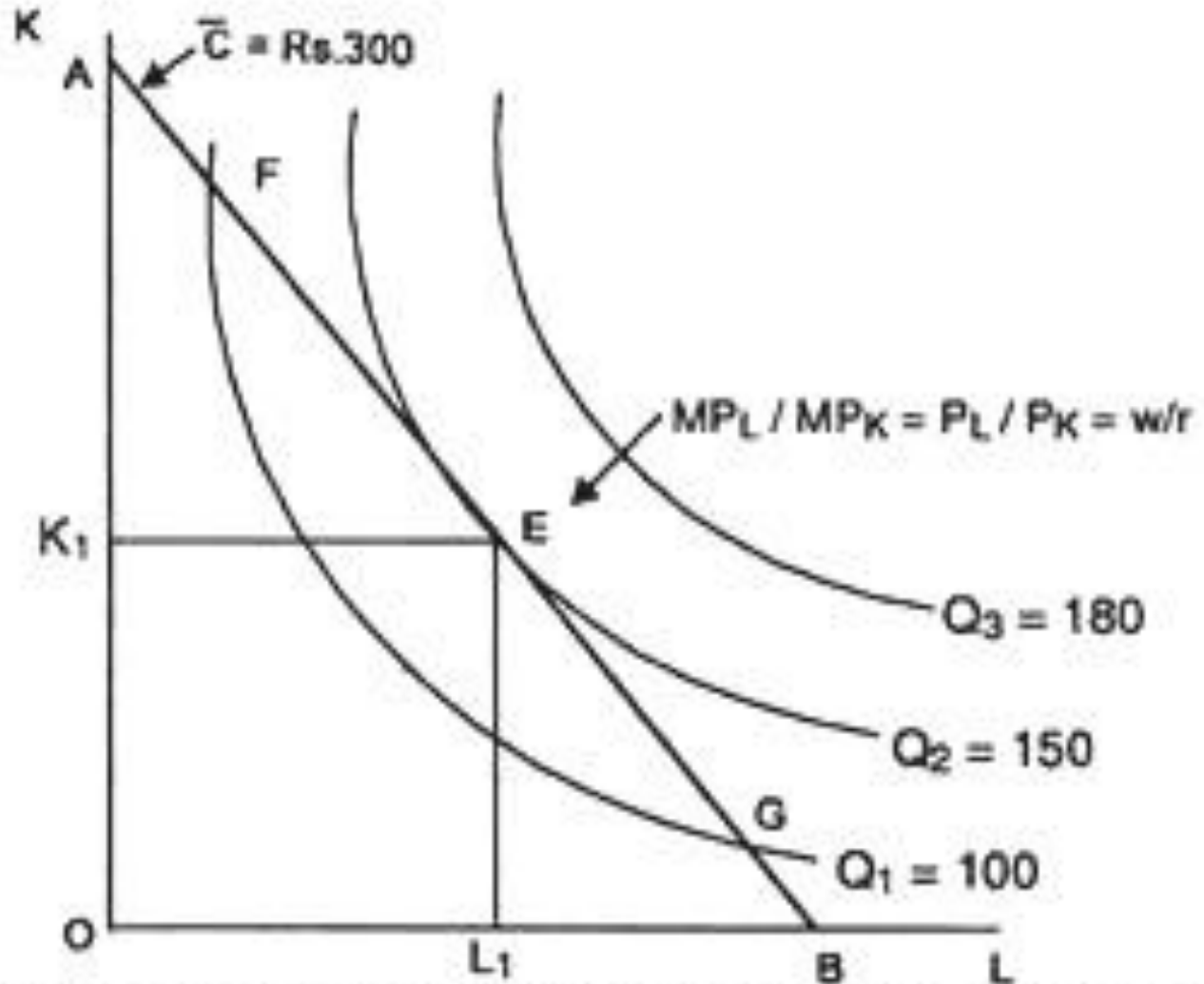


Fig. 3 : Production of maximum output with a fixed outlay



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Returns of Scale

➤ These questions refer to the *returns to scale*, or the effects of scale increases of inputs on the quantity produced

➤ Three important cases

Constant returns to scale

Increasing returns to scale

Decreasing returns to scale



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- **Constant returns to scale**-where a change in all inputs leads to a proportional change in output
- **Increasing returns to scale**- when an increase in all inputs leads to a more-than-proportional increase in the level of output
- **Decreasing returns to scale** occur when a balanced increase of all inputs leads to a less-than proportional increase in total output.



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Technological Change

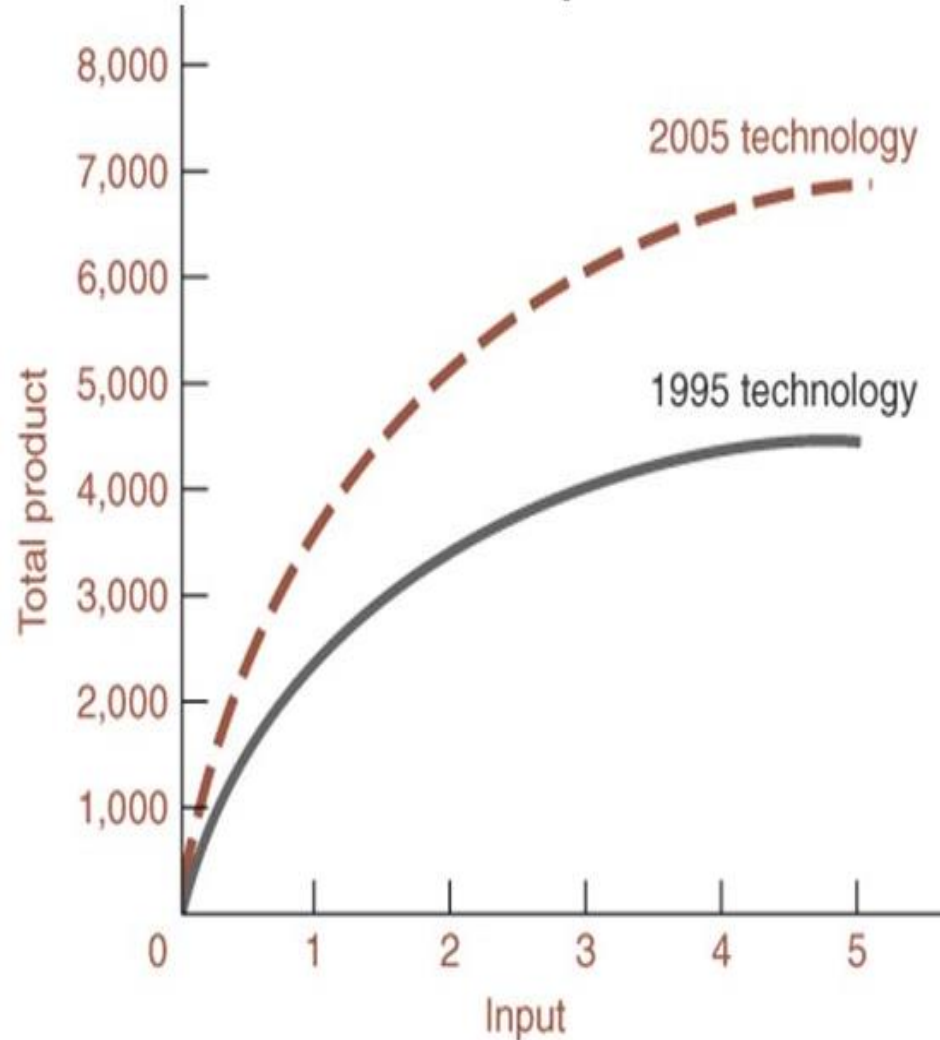
- *Process innovation*, which occurs when new engineering knowledge improves production techniques for existing products
- *Product innovation*, whereby new or improved products are introduced in the marketplace



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Technological Change Shifts Production Function Upward





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Productivity

- When output is growing faster than inputs, this represents **productivity growth**
- Productivity grows because of technological advances such as the process and product innovations
- Additionally, productivity grows because of economies of scale and scope



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- **Economies of scale** and mass production have been important elements of productivity growth since the Industrial Revolution
- **Economies of scope** occur when a number of different products can be produced more efficiently together than apart



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Happy Learning

