

The Data of Macroeconomics

Ryoichi Imai

What is GDP?

- GDP (Gross Domestic Product) is the sum of *value added* produced within the country.
- A hamburger is a final good, and the meat is an intermediate good. The GDP includes the value of final goods only.
- However, we can compute GDP by summing up the value added at each stage of production

Nominal and Real GDP

- Nominal GDP = the value of goods and services measured at *current* prices.
- Real GDP = the value of goods and services measured at a *constant set* of prices.

Nominal GDP of 2005 = \sum (2005 price \times 2005 quantity)

Real GDP of 2005 using 2000 price

$$= \sum (2000 \text{ price} \times 2005 \text{ quantity})$$

GDP Deflator

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}}$$

Components of GDP

- Consumption (C)
- Investment (I)
- Government Purchases (G)
- Net Exports (NX)
- $NX = \text{Exports (EX)} - \text{Imports (IM)}$
- GDP: $Y = C + I + G + NX$

Investment

- What looks like investment for an individual may not be investment for the economy as a whole.
- Investment does not include purchases that merely reallocate existing assets among different individuals.
- Creating new capital is investment in macroeconomics.

CPI (consumer price index)

- CPI is different from GDP deflator in the following three ways.
 1. CPI measures only goods and services purchased by *consumers*.
 2. CPI includes prices of *imported* goods and services.
 3. CPI assigns *fixed* weights to different goods. CPI is computed using a *fixed basket* of goods.

The Labor Market

- Labor Force = Number of Employed + Number of Unemployed

$$\text{Unemployment Rate} = \frac{\text{Number of Unemployed}}{\text{Labor Force}}$$

$$\text{Labor Force Participation Rate} = \frac{\text{Labor Force}}{\text{Working Age Population}}$$

National Income

Ryoichi Imai

Production

- The relationship between output and production factors is called “production function.”

Production Function :

$$Y = F(K, L)$$

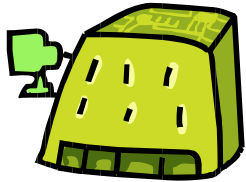
A production function has a constant returns to scale if,

$$zY = F(zK, zL)$$

for any positive number z .

Constant Returns to Scale

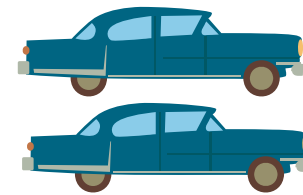
1 factory



100 workers



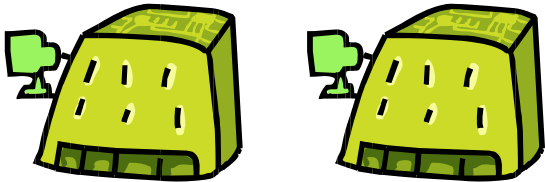
2000 cars / day



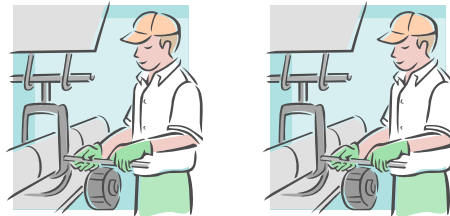
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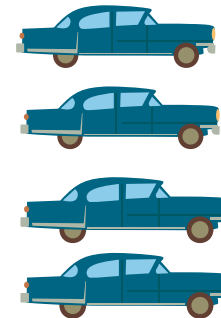
2 factories



200 workers



4000 cars / day



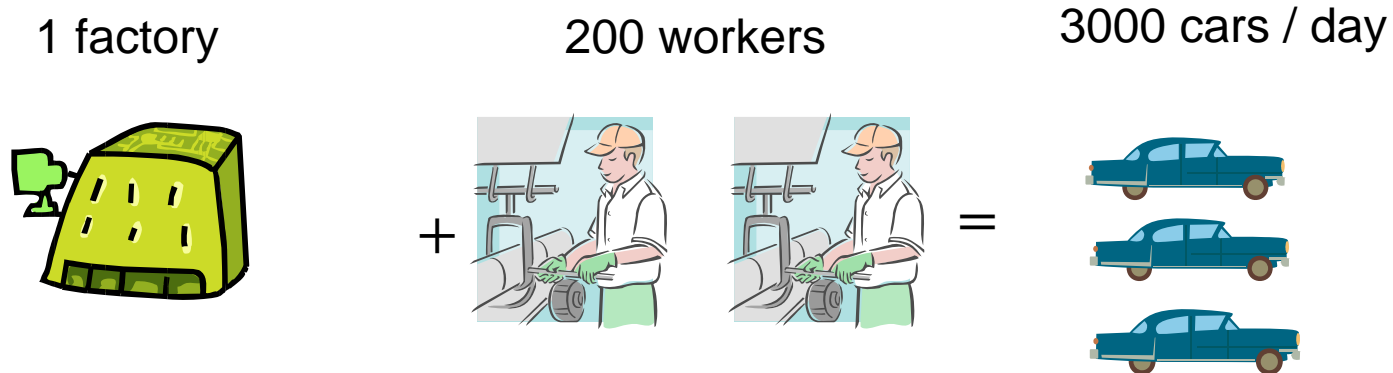
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Production Technology

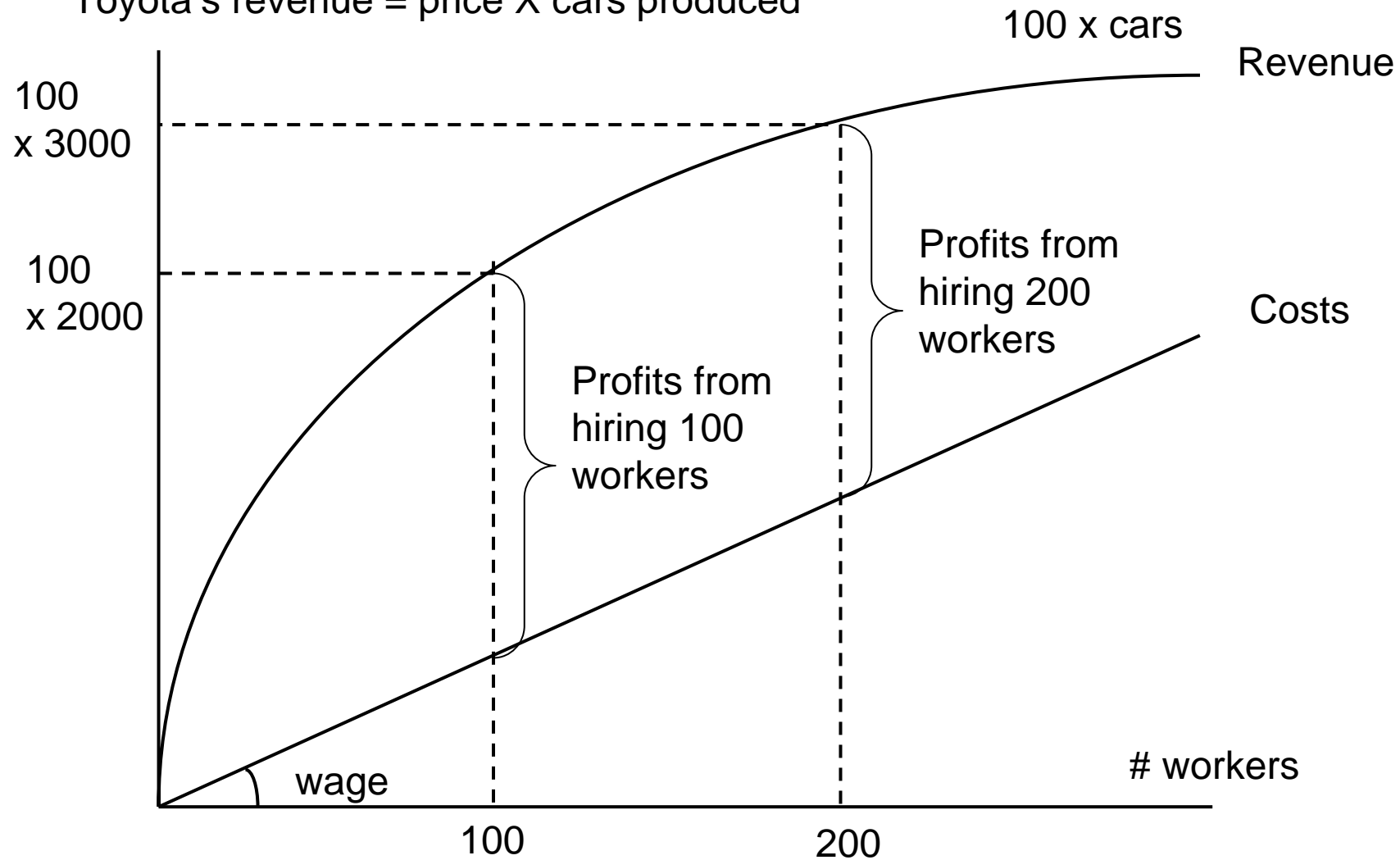
- If all the production factors are flexible to change, the production technology exhibits constant returns to scale (CRS).
- But, if some factors are fixed, the technology shows decreasing returns to the flexible inputs.

Decreasing Returns

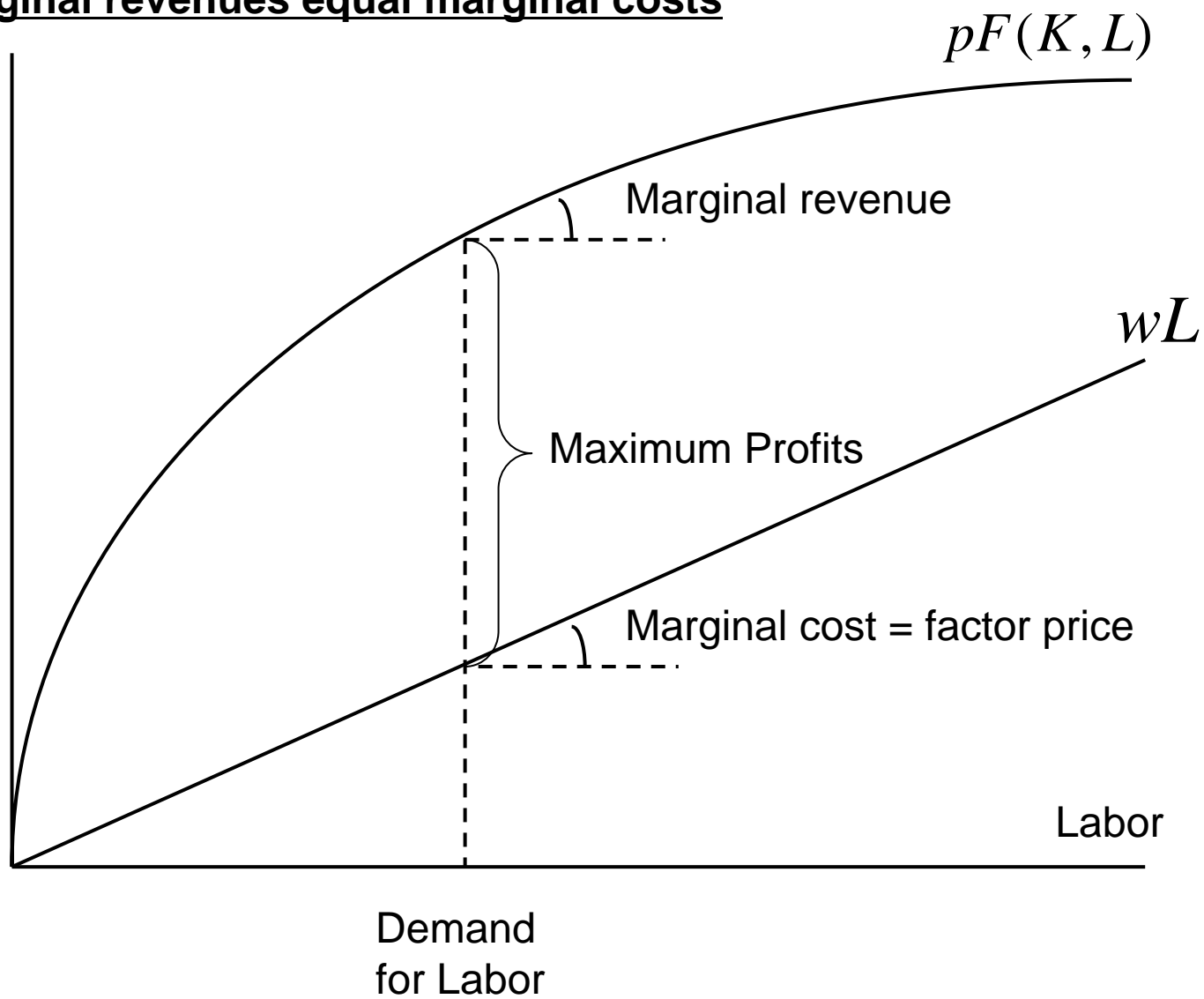


If there is a capacity constraint, production efficiency is limited by space, even though the company hires twice as many workers as before.

Toyota's revenue = price X cars produced



Marginal revenues equal marginal costs



Demand for Factors

- Firms employ each production factor as much as its marginal revenue equals the factor price.
- Marginal revenue = an increase of sales caused by hiring an additional unit of a production factor = slope of the revenue curve.
- Factor price = wage, rent = slope of the cost curve

Demand for Goods and Services

- Consumption is an increasing function of Disposable Income (= GDP - Tax) and may be a decreasing function of the real interest rate.

$$C = C(r) + c(Y - T)$$

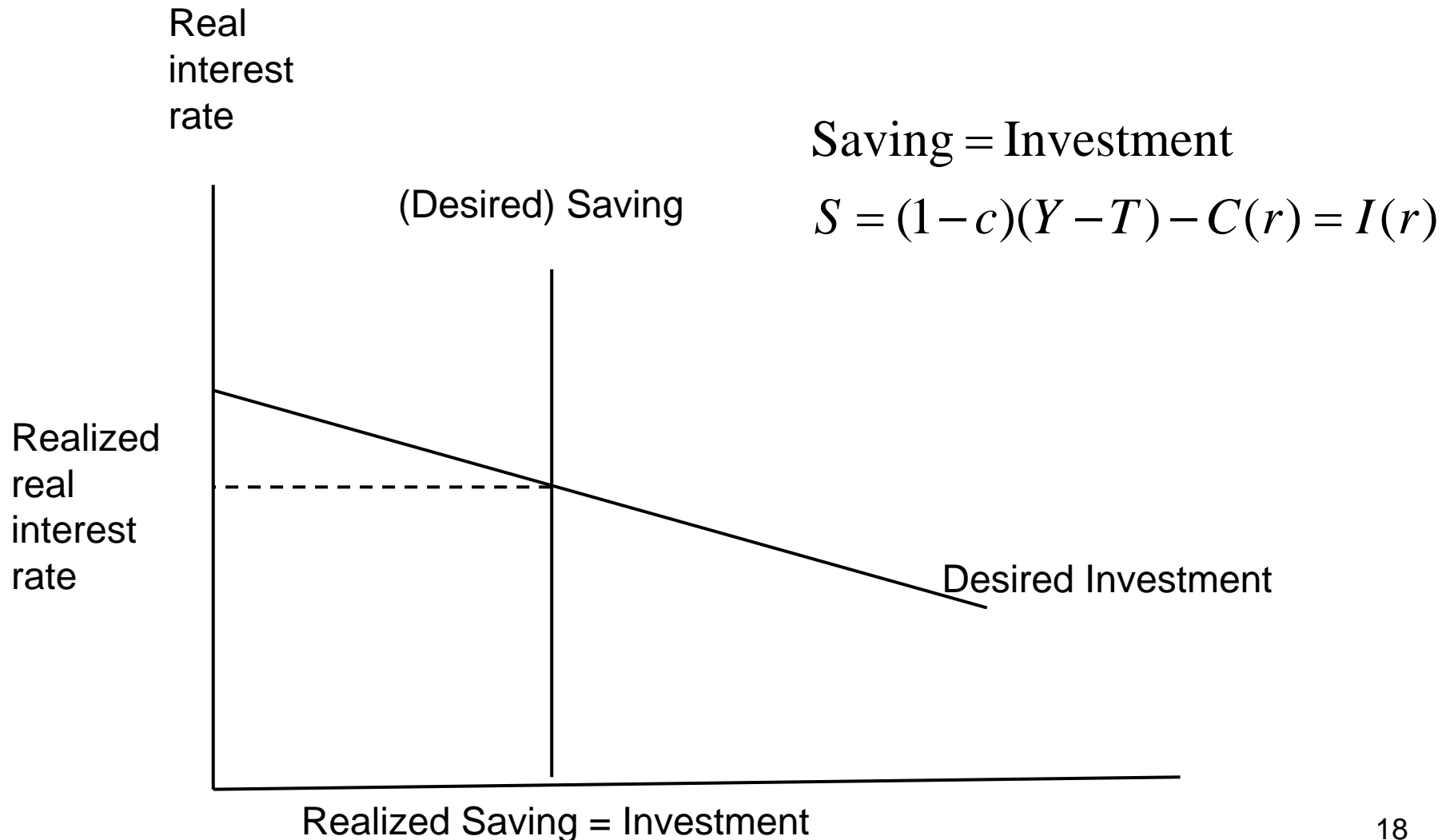
where c is the marginal propensity to consume.

Then the saving is obtained as

$$S = Y - T - C = (1 - c)(Y - T) - C(r)$$

- Investment is a decreasing function of (real) interest rate.

The Supply and Demand for Loanable Funds



Factors affecting Desired Saving

- Positive Factors
 - An Increases in GDP
 - A Tax Cut
 - A Pessimistic View for Future
- Negative Factors
 - A Decrease in GDP
 - A Tax Increase
 - An Optimistic View for Future

Factors affecting Desired Investment

- Positive Factors
 - An optimistic prospect for the productivity growth in the future.
- Negative Factors
 - A pessimistic prospect for the productivity growth in the future.

The Identification Problem

- We can observe only the realized savings and investments from economic data.
- But it is impossible to directly observe the saving or investment function.
- Therefore, we usually observe investment data that reveal no recognizable relation with the interest rates.