

Environmental Economics No.6

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Market Signals of Natural Resource Scarcity

The Demand for a Factor of Production: The Case of Natural Resources

shows the maximum prices producers are willing to pay

if what is available in the market is increased

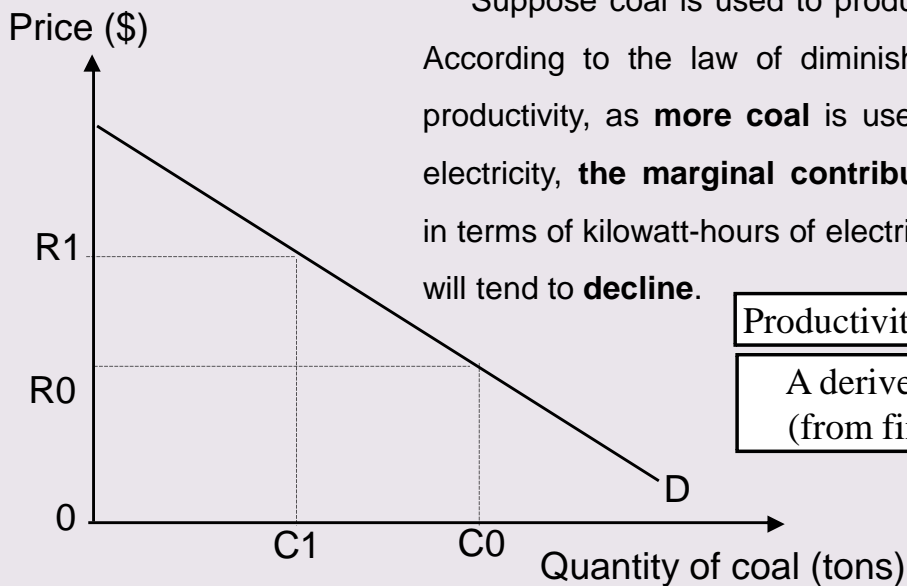
The price that producers are willing to pay falls

price is lowered to compensate for the decline in the productivity of the resource at the margin.

Inverse Relationship

Demand curve for a factor of production is negatively sloped

The Market Demand for Coal



Suppose coal is used to produce electricity. According to the law of diminishing marginal productivity, as **more coal** is used to produce electricity, **the marginal contribution of coal** in terms of kilowatt-hours of electricity produced will tend to **decline**.

Productivity, not Utility

A derived demand
(from final good)

The **price** of the final good one of the most important factors in determining the **demand** for (or value of) factors of production.

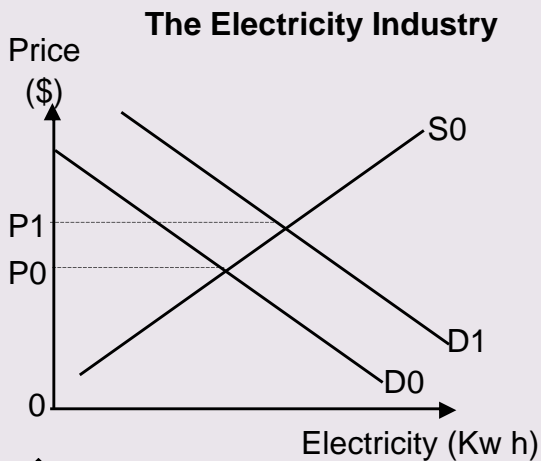


Coal → Electricity
(Intermediate) (Final product)



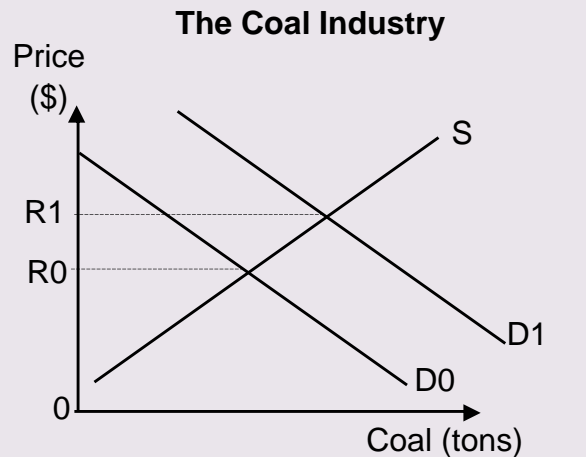
The higher the price of electricity, the higher the demand (price) for coal will be.

The higher productivity of coal, the higher the demand (price) for coal will be.



↑ Consumer Income

↑ Price for Electricity



A shift in the demand for coal

↑ price of coal

There are two other important factors that affect the demand for a factor of production:

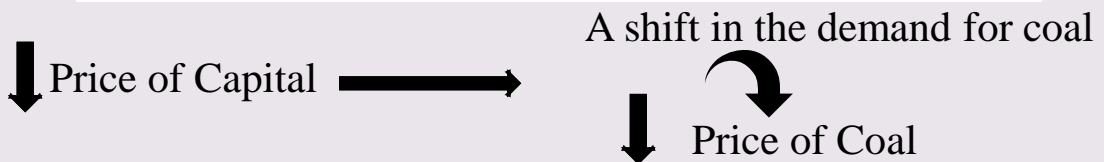
The prices of other factors of production.

Technology.

▶▶ **The prices of other factors of production.**

if capital and coal are considered as substitutes:

more capital reduced the energy required to produce a unit of electricity



▶▶ **Technology**

→ Its direct effect on the productivity of the resource

→ By enhancing the productivity of substitutes

→ Its direct effect on the productivity of the resource

Example, a technological change could enhance the productivity of coal in the production of electricity

➤ Efficient Combustion

A shift in the demand for coal



→ By enhancing the productivity of substitutes

Example, a new technology enhanced the relative productivity of natural gas in the production of electricity

A shift in the demand for coal



The Supply for a Factor of Production: The Case of Natural Resources

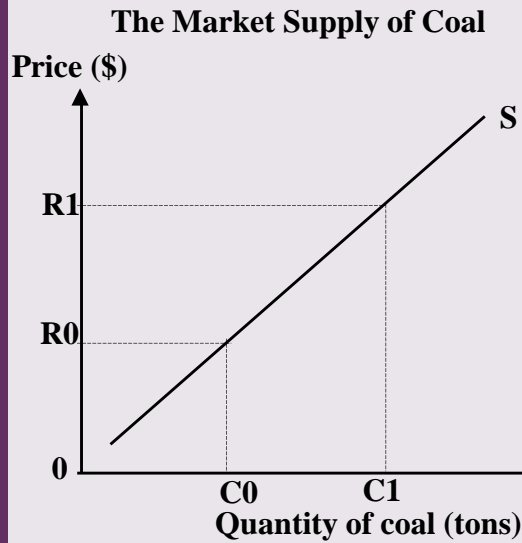
Factors of production are owned by households (consumers).

means of generating income

➤ used to purchase final goods and services

It is in the best interest of households to get the highest possible price for the resources they own.

But, what are the key variables affecting the supply?



- ✓ shows all possible **minimum** prices owners of coal mines are willing to accept for various amounts of coal
- ✓ positively sloped
- ✓ owners of coal mines need to cover the **costs** of extraction and transportation.
- ✓ If we assume that transportation cost is negligible, a positively sloped supply curve for coal therefore implies that **the extraction cost** for coal is **increasing**.

✓ The reason for an increasing extraction cost of coal:

➔ resources are not **uniformly distributed**, spatially and/or in terms of quality or grade of ore.

- The high-grade coal is found first
- lower-grade coal requires further processing

It is in the best interest of households to get the highest possible price for the resources they own.

But, what are the key variables affecting the supply?

✓ the factors affecting the supply of a natural resource can be divided into two broad categories:

➡ **One pertaining to nature**

➡ **Another pertaining to technology**

Nature

- **Nature plays a role in determining the availability of natural resources**
 - Puts an upper limit on the reproductive (regenerative) capacity
 - The supply of certain resources is finite

Technology

- **Technology affects the supply of natural resources in a variety of ways:**
 - Supply enhancement
 - Supply augmentation by means of conservation (preservation)- energy-saving technology
 - Technological innovation to find a substitute resource

Thank you