Extraction and disposal Cost

There exist two variables that increase the attractiveness of recycling:

1. The rising cost of virgin minerals
2. Waste disposal

By recovering and reintroducing materials into the system, recycling provides an alternative to virgin ores and reduces the waste disposal load.

\[
P_{VM} > P_{RM} \rightarrow Q^R
\]

The Composition of demand effect

As long as consumer bears the cost of disposal, they have additional incentive to return their used recyclable products to collection centers.
It is essential that a demand exists for the recycled product:

- Simply returning recycled products to the collection centers accomplishes little if they are simply dumped into a nearby landfill.
- The purity of the recycled products also plays a key role in explaining the strength of demand for them.

Recycling: A closer look

- Recycling has increased over time: For example Copper.
  - U.S.A (1910) 18% of the total production of refined copper. In 2001, 70%
Recycling: A closer look

Recycling is not cheap!, several types of costs are involved:

1. Transportation Cost
2. Processing Costs
3. Labor Costs
4. Produce its owns environmental consequences
Recycling and virgin ore depletion

- How does the efficient allocation of a recyclable resource compare with that of a nonrecyclable resource over time?

\[ MC_R < MC_{NR} \rightarrow \text{Market tends to rely on...?} \]

- Example: assume 100 units of a resource
- How much more of this resource was made available by recycling? For example \( a = 0.9 \) (recovery Rate)
General Principles

- When imports are of strategic importance in wartime situations and/or are supplied by a relative few foreign producers, they require special treatment.
- The appropriate policy response would be to establish a *tariff* on imports of the strategic material and use the proceeds to finance a stockpile.

Two important points related with a tariff:

1. The tariff would signal the social cost of the resource.
2. By using the tariff revenue to finance the stockpile.
Market Imperfections

- When the imports are critically important and come from risky sources, the market perceives a price ratio that fails to incorporate some of these social costs of imports.

- The treatment of waste by producers and consumers can lead to biases in the market balance between recycling and the use of virgin ores.

- **Disposal Cost and Efficiency:** We must be clear about the relationship of the marginal disposal cost to the efficient level of recycling.

  \[ \text{Suppose} : \$20 \text{ Recycle cost and } \$10 \text{ Product Price} \]

- Can we conclude that this is an inefficient recycling venture because it is losing money?
The Disposal Decision: Potentially recyclable resources can be divided into two types of scrap:

1. **Old Scrap**: Is recovered from products used by consumers.
2. **New Scrap**: Is composed of residual materials generated during production.

Reasons about why the market for new scrap will work efficiently and effectively:

1. Is most difficult to recycle old scrap than new scrap.
2. Since new scrap never leaves the factory it remains under complete control of the manufacturer.
Market Imperfections

- The market works inefficiently because the product users do not bear the full marginal social costs of disposing of their product.

- What happens with old scrap?
  - The market works inefficiently

- Suppose you have some small aluminum product that is no longer useful to you. The individuals have two alternatives:
  1. Recycle them [Transportation Cost]
  2. Toss Them into your trash [Disposal Cost]

- Efficient level or Recycling: $MC_P$, $MC_S$ and $MC_R$
Market Imperfections

- **Subsides on Raw Materials:** The subsidy is lowering the cost of extracting of these raw minerals.
- **Corrective public Policies:**
  1. The Old System of Financing Trash collection: Every household pay the same fee regardless of how much trash is produced.
  2. The New System of Financing Trash collection: Lower-income households pay only a flat fee since they don’t need to purchase stickers for additional disposal.
- Another suggestion for promoting recycling is the refundable deposit. Example: the recycling of aluminum beverage cans
- **Product Durability:** From Death of a Salesman, Willy Leman laments:
  "Once in my life I would like to own something outright before it is broken! I am always in a race with the junkyard! I just finish paying for the car and it is on its last legs. They time those things. They time them so when you have finally paid for them, they are used up."
Product Durability:

- Vance Packard identifies three possible types of product obsolescence:

1. **Functional obsolescence:** when a new product performs in a superior manner

2. **Fashion obsolescence:** consumers prefer a new product (taste)

3. **Durability Obsolescence:** the product no longer performs its function because of wear and tear.
Product Durability:

- We have to answer two questions:
  1. What is an efficient level of durability? Maximizes net benefits
  2. Will the market supply that level?
    - Demand: net benefit $> \text{level of durability}$
    - Supply: incentives to reduce product durability?

- The market process may not work efficiently in two cases:
  1. Consumers are not well informed about the differences in durability
  2. Firms could profit by producing a good with an inefficient low durability
Suppose a product can be produced using virgin materials at a marginal cost equal to \( MC_1 = 0.5q_1 \) or using recycled materials at a marginal cost \( MC_2 = 5 + 0.1q_2 \).

If the inverse demand function is \( P = 10 - 0.5(q_1 + q_2) \), how many units of the product would be produced with virgin ore and how many with recycled material?

If the inverse demand function is \( P = 20 - 0.5(q_1 + q_2) \), what would your answer be?