

An example of the Theorem of
the Second Best, and the
Principle of Targeting

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Some background

- See on-line lecture notes “*the effect of a tax*”.
- Explain what is meant by the “incidence of a tax”
- Show that in a *closed economy* (no trade) a tax on consumers has the same effect as a tax on producers. (Domestic supply = domestic demand)
- Relevance to “Polluter Pays Principal”.
- Both consumers and producers bear some of the “incidence” of the tax.
- Show how to represent the effects of a tax graphically.

Next

- In an open economy (with trade) consumer and producer taxes have different effects.
- Show how to illustrate effect of taxes and tariffs in a small open economy.

Elements of the example

- *See on-line lecture notes “Theorem of the Second Best”.*
- Each unit of production causes pollution damage equal to $\$g$. These damages are external to firm.
- (Remember: In a closed economy it does not matter whether a consumption or a production tax is used to correct distortion.)
- Suppose society does is NOT use optimal tax. The lack of optimal policy is a “distortion”.
- A trade restriction constitutes the second distortion.

Why this example is so special

- By assumption, there is a *fixed* relation between output and pollution, so the only way to reduce pollution is by reducing output. That is, there is no opportunity to reduce pollution per unit of output by changing production methods
- In this example, a tax on production is equivalent to a tax on pollution.
- In a closed economy, a tax on production and a tax on consumption have exactly the same effect.

Optimal policy in closed economy

- Optimal policy is to tax either consumption or production by $\$g$ per unit.
- Figure 1 (on-line notes, TSB) shows deadweight loss (DWL) = area A if no tax is used.

The optimal policy when trade is an option

- The optimal (“first best”) policy is to allow free trade (eliminate trade restriction) and tax production (= pollution) at a rate equal to damages ($\$g$ per unit of output).
- In an open economy, the consumption tax has no effect on pollution. The optimal policy requires a tax on production. Here the tax on producers and consumers yield completely different effects.

The effect of trade liberalization

- Suppose that under free trade the country is an exporter (i.e. world price is higher than autarchic price).
- Suppose that we begin with a “prohibitive” export tax (one that eliminates exports).
- We eliminate the export tax (i.e. move to free trade). Liberalizing trade, holding fixed the “environmental distortion” (the lack of optimal environmental tax) will:
 - i) decrease welfare if trade results in small increase in output (figure 2 notes)
 - ii) increase social welfare if trade results in large increase in output (figure 3 notes)

Effect of trade liberalization when optimal policy (production tax) is used

- The Principle of Targeting says that the optimal policy is to tax pollution (equivalent to a tax on production in this example).¹
- If the government uses the optimal pollution policy (production tax) then there is no environmental “distortion”. The level of pollution is optimal.
- Under the optimal pollution policy, the country always gains from trade liberalization. (figure 4 notes)
- Why is Theorem of Second Best irrelevant in this circumstance?

Second best policies

- Suppose that the first best policy (tax on production) is not available.
- Suppose the only politically feasible policy is a trade policy.
- Since the environmental goal is to reduce pollution (requiring a reduction in production), the *second best* policy is an export tax.

The punch-line

- Suppose that welfare under free trade is higher than welfare under autarchy, then the optimal policy is to use a *non-prohibitive* export tax, i.e. one that reduces but does not eliminate trade.
- In this case, a (possibly small) trade restriction is better than free trade (under the assumption that the first-best pollution tax cannot be used). See figure 5 of notes.
- Graph welfare gain as a function of export tax (Figure 6 of notes.)

Of course....

- The trade restriction is a second-best policy. The first best policy is to use a pollution tax and allow free trade.
- The “distortion” is associated with production, not directly with trade. Therefore, the Principal of Targeting tells us that the optimal policy targets production, not trade.
- The trade policy is an “indirect” and therefore second-best remedy to the environmental problem.