# Public Economics

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# 5- Taxation

## 5.1) Equity implications of taxation (Chapter 19 Gruber)

# PS 11: Taxation

**Ex.5)** To finance a new health insurance program, the government of Millonia imposes a new 2€ per hour payroll tax to be paid by employers.

a) What do you expect to happen to wages and the size of the workforce?

b) How will this answer change in markets where labor is inelastically demanded.

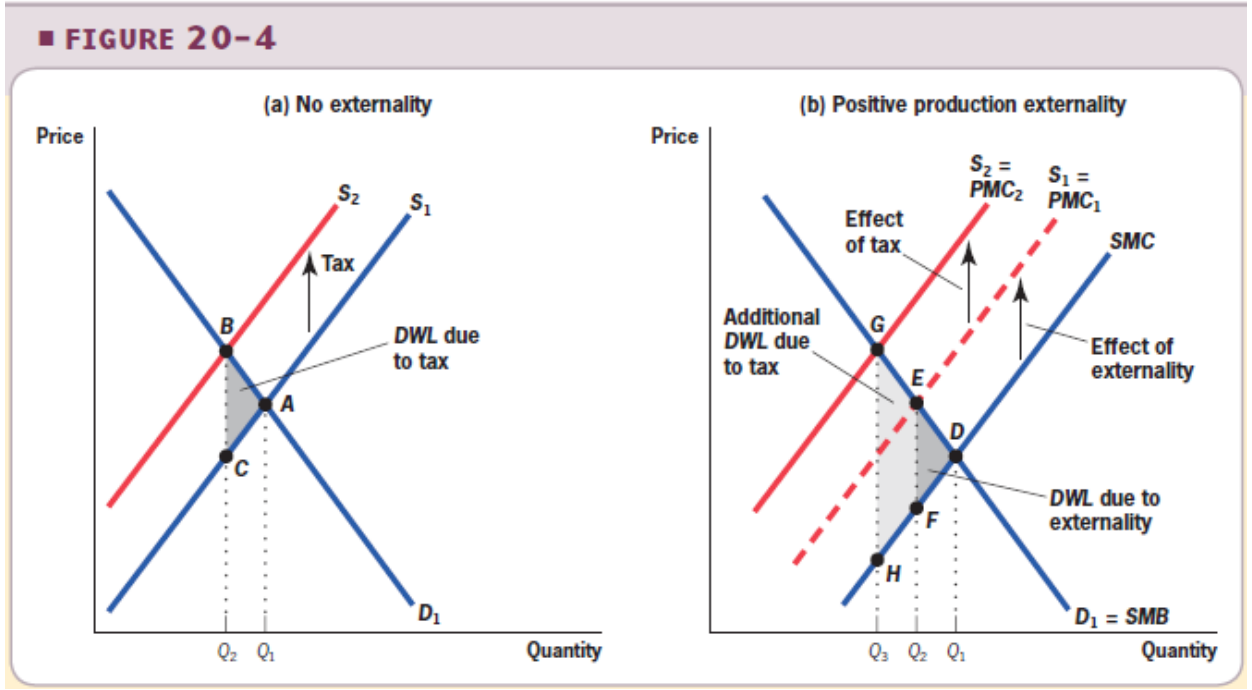
# 5- Taxation

## 5.2) Efficiency implications of taxation (Chapter 20 Gruber)

# Taxation – What is an efficient tax?

**Tax inefficiency**

- Surplus that is lost due to previously mutually beneficial trades that no longer take place after the tax is imposed – **DWL**
- **This happens because agents make inefficient choices to avoid taxation**
- **When is the DWL higher?**
  - 1) More elastic markets have higher DWL
  - 2) DWL is higher when there are already pre-existing distortions in a given market.

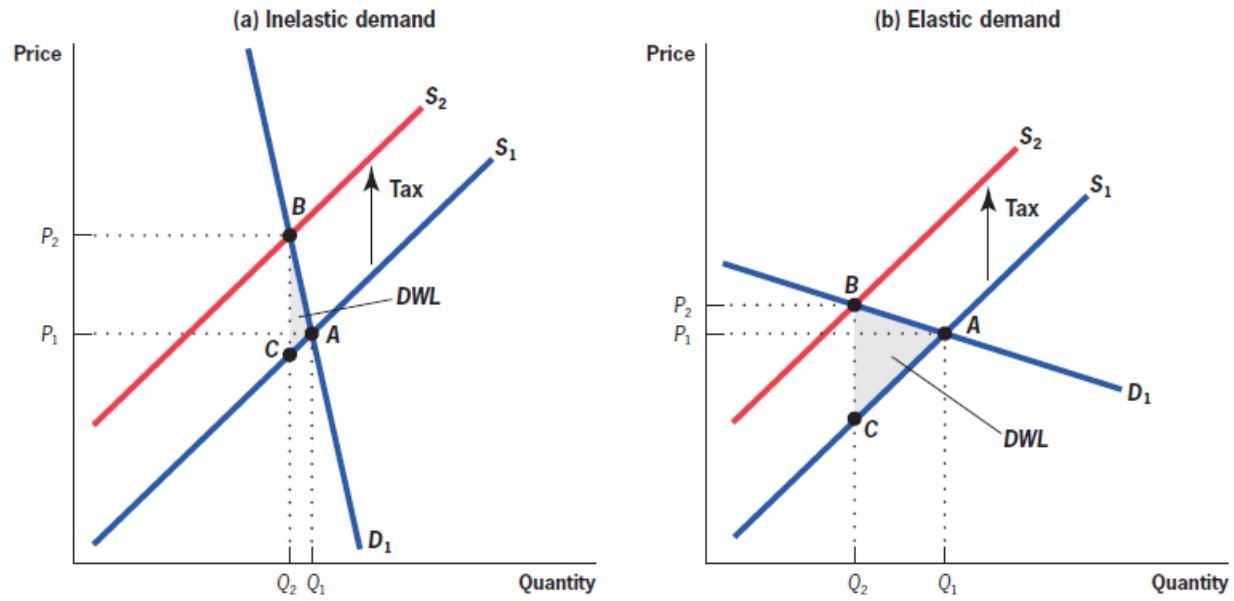


# PS 11: Taxation

**Ex.6)** The government of Washlovia wants to impose a tax on clothes dryers. In East Washlovia the demand elasticity for clothes dryers is -2.4, while in West Washlovia the demand elasticity is -1.7.

- Where will the tax inefficiency be greater? Explain

■ FIGURE 20-2




**Deadweight Loss Rises with Elasticities** • The deadweight loss of a given tax is smaller when the demand curve is less elastic, as in panel (a), than when it is more elastic, as in panel (b).

# Taxation – How to set optimal taxes?

**Optimal Taxation**

Problem:

$$\min \sum_{i}^{n} DWL_i \ \ s.t. \sum_{i}^{n} R_i = Revenue\ Goal$$

- Solution: **Ramsey Rule**

$$\frac{Marginal\ DWL_i}{Marginal\ Revenue_i} = \lambda$$

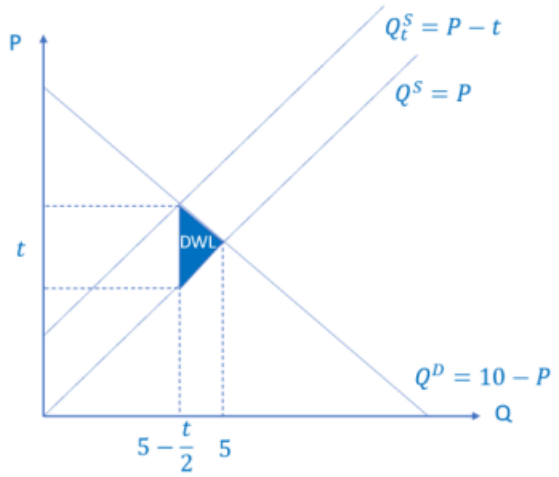
- Conclusion:
  - Set lower taxes on more elastic goods
  - Set lower taxes on a wider tax base rather than higher taxes in a narrower tax base
  - Optimality in terms of efficiency – equity concerns?

# Exam Fall' 23

IV (4.25 points)

In the market for apples, these are the demand and supply functions: $Q^D = 10 - P$ and $Q^s = P$. The government is considering implementing a tax $t$ to be paid by producers, for each unit of apples sold.

a. (1 point) Identify in a graph the deadweight loss of imposing a tax of $t$ in this market.




*Grading: 0.5 for the curves, 0.5 for the correct triangle.*

b. (1.25 points) Show that the Deadweight Loss of imposing a tax of $t$ in this market is given by $DWL = \frac{t^2}{4}$ and that the total revenue of the government is given by $R = 5t - \frac{t^2}{2}$.

As we can see in the plot above, $Q^D = Q^S \Rightarrow Q = 5$ and, since $Q_t^S = P - t$, $Q^D = Q_t^S \Rightarrow Q_t = 5 - \frac{t}{2}$.

$$DWL = \frac{t * \Delta Q}{2} = \frac{t * \left(5 - \left(5 - \frac{t}{2}\right)\right)}{2} = \frac{t^2}{4}$$

$$R = t * Q_t = t * \left(5 - \frac{t}{2}\right) = 5t - \frac{t^2}{2}$$

*Grading: 0.25 for finding $Q$ and $Q_t$, 0.5 for computing DWL, 0.5 for computing R.*

# Exam Fall' 23

c. (1.25 points) The government may also choose to tax the market of jewellery, which has the following functions: $DWL_J = \frac{t_J^2}{20}$ and $R_J = t_J - \frac{t_J^2}{10}$. If the government only cares about efficiency, which taxes, $t_A$ (on the market of apples) and $t_J$ (on the market of jewellery), will it impose if it wants to collect a total revenue of 15?

If efficiency is the government's only concern, then it solves:

$$\min \sum DWL = DWL_A + DWL_J \quad st. R_A + R_J = 15$$

To solve this problem, we use the Ramsey Rule:

$$\frac{MDWL_A}{MR_A} = \frac{MDWL_J}{MR_J} \Leftrightarrow \frac{\frac{2t_A}{4}}{5 - \frac{2t_A}{2}} = \frac{\frac{2t_J}{20}}{1 - \frac{2t_J}{10}} \Leftrightarrow t_A = t_J$$

Plugging into the constraint, we find the exact values of the taxes:

$$R_A + R_J = 15 \Leftrightarrow 5t_A - \frac{t_A^2}{2} + t_A - \frac{t_A^2}{10} = 15 \Leftrightarrow t_A = t_J = 5$$

*Grading: 0.25 for setting the problem, 0.25 for the Ramsey Rule, 0.5 for solving to find $t_A = t_J$, 0.25 for concluding $t_A = t_J = 5$.*

d. (0.75 points) If the government has fairness concerns as well, explain how your answer might change (with no additional calculations, max. 8 lines).

On fairness grounds, we may argue that jewellery are a luxury good, while apples are more of a necessity good. Lower income individuals likely spend a higher share of their income on apples than higher income individuals. Consequently, vertical equity (higher income individuals should pay proportionally higher taxes) will recommend increasing the tax rate on jewellery while decreasing it on apples.

*Grading: 0.5 for a well-structured fairness argument relating the nature of the goods to a concept of fairness (such as vertical equity), 0.25 for a recommendation on how the taxes should change.*

# 4- Social Insurance

## 4.3) Unemployment Insurance and Poverty-Alleviation Programs (Chapter 14 and 17, Gruber)

# Benefit Programs

**Unemployment Insurance (UI)**

- Program that brings **temporary benefits** to workers that are **laid off** by companies, and are looking for a job
- Benefits depends on past earnings

**Disability Insurance (DI)**

- Program that brings benefits to workers who have suffered a **disability that prevents them from working.**

**Workers' Compensation (WC)**

- State-mandated insurance, which firms usually buy from private insurers, that pays for medical costs and lost wages associated with an **on-the-job injury.**

# PS 10: Benefit Programs

**Ex.1)** Gruber (2000) found evidence that the elasticity of labour supply with respect to disability insurance (DI) benefits is considerably smaller than the estimates of the elasticity of unemployment durations with respect to UI benefits.

Why might moral hazard be less of an issue in the DI program than in the UI program?

- Moral hazard issues can arise due to i) informational asymmetry and ii) the beneficiary being able to control the triggering event (or the duration of the event).

- UI programs might suffer from moral hazard issues:
  - 1) Requirement to search for a new job is very difficult to monitor and enforce;
  - 2) Since the recipient determines the level of effort he puts in searching for a job, he has a large control over the duration of the unemployment spell.

- DI are less likely to suffer from such issues:
  - 1) While there is some informational asymmetry, it should not be significant as the disability must be certified by an informed state body;
  - 2) Since DI programs are often permanent, in such cases there is no moral hazard concerning duration of the event.

# Poverty Alleviation

**How is poverty measured?**

**Relative measures - At-risk-of-poverty rate:** share of people with a disposable income (after social transfers) below 60% of the national median disposable income (after social transfers). [EU - 15.5% in 2024]

**Absolute measures – Severe material and social deprivation rate:** share of people who cannot afford necessary and desirable items to lead an adequate life (e.g.: unable to afford a meal every second day, unable to keep their home adequately warm, not having two pairs of fitting shoes, ect…). [EU – 6.8% in 2023]

**Moral Hazard:** People might change their behavior to qualify for welfare programs

**Iron Triangle**: Cannot change benefit amount to simultaneously i) encourage work, ii) redistribute more income and iii) lower costs.

Possible solution to reduce Moral Hazard: using **Ordeal Mechanisms**

- **Making welfare programs more unattractive (e.g. longer waiting lines), there will be a self selection of the most needy**

# PS 10: Benefit Programs

**Ex.2)** Senator Ostrich suggests that "in order to end poverty, all we need to do is pay everyone making less than the poverty line the difference between what they are earning and the poverty line." Ostrich argues that, based on the set of people currently below the poverty line, this would cost $98 billion per year.

Why is Ostrich understating the costs of this program?

- There are **administrative costs** to the program – determine who is eligible, monitor eligibility and distribute the effects
- "Leaky bucket" cost – the government has to raise **distortionary** taxes in order to pay the program. If income taxes are raised, leisure becomes relatively cheaper – reduced hours worked and overall production
- Moral hazard cost – Availability of such benefits may induce **some people to work less to qualify for the benefit**, making the program more costly (and also reducing overall production)

# PS 10: Benefit Programs

**Ex.3)** An issue that arises when designing a welfare system is whether to make the benefits available to all low-income families with children (means-tested welfare program) or only to families headed by a single mother (categorical welfare program).

Explain the trade offs involved in this decision.

**Means-tested welfare program** (all low-income families with children):

- Advantage: Low income is potentially the best indicator of need;
- Disadvantage: Moral Hazard issues – some people might change their behaviour to qualify for benefits.

**Categorical welfare program** (families headed by a single mother):

- Advantage: Low Moral Hazard issues – people are unlikely to change their behaviour to qualify for benefits, thus not increasing the costs of the program;
- Disadvantage: Families who are in just as much or even more need of support might be left out

# 4- Social Insurance

## 4.4) Health Insurance (Chapter 15 Gruber)

# What is the optimal Health Insurance?

**Health insurance – Trade-off between moral hazard and risk protection**

- Insuring **minor and predictable** medical events carries a **low consumption smoothing** effect (crowding out) and **high moral hazard** issues;
- Insuring **major and unpredictable** medical events is greatly valued by **risk-averse individuals**, and individuals who are unable to self-insure.

**Optimal**:

- Individuals bear a **large share of medical costs** within some **affordable range;**
- Only fully insured against very large costs.

# PS 10: Health Insurance

**Ex.4)** Given that subsidized health care leads to increased health care usage, is this necessarily due to moral hazard? Explain.

**Part of the increase in usage may be due to moral hazard, but not all of it.**

**Income effect (not moral hazard):**

- Subsidized health care increases a person's real income and would increase expenditure on health care even in the absence of moral hazard;
- Some people may have sincerely needed the care without the insurance, but were unable to afford it.

**Substitution effect (moral hazard):**

- Insurance reduces the price of health care relative to other goods; people may purchase more units of covered health care and less of uncovered substitutes.

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