Midterm Review (Chapter 1 –9)

Chapter 1:

What Economics Is All About

- **Scarcity**: the limited nature of society's resources
- **Economics**: the study of how society manages its scarce resources, *e.g.*
  - how people decide what to buy,
    how much to work, save, and spend
  - how firms decide how much to produce,
    how many workers to hire
  - how society decides how to divide its resources between
    national defence, consumer goods, protecting the environment,
    and other needs

HOW PEOPLE MAKE DECISIONS

- Society faces an important tradeoff:
  efficiency vs. equality
- **Efficiency**: when society gets the most from its scarce resources
- **Equity**: when prosperity is distributed uniformly among society's members
- Tradeoff: To achieve greater equality,
  could redistribute income from wealthy to poor.
  But this reduces incentive to work and produce, shrinks the size of the economic "pie."
- Making decisions requires comparing the costs and benefits of alternative choices.
- The **opportunity cost** of any item is
  whatever must be given up to obtain it.
- It is the relevant cost for decision making
- *Examples:*
  The opportunity cost of…
- …going to college for a year is not just the tuition, books, and fees, but also the foregone wages.
- …seeing a movie is not just the price of the ticket,
  but the value of the time you spend in the cinema

HOW PEOPLE INTERACT

- Rather than being self-sufficient,
  people can specialize in producing one good or service and exchange it for other goods.
- Countries also benefit from trade & specialization:
  - Get a better price abroad for goods they produce
  - Buy other goods more cheaply from abroad than could be produced at home
- The invisible hand works through the price system:

- The interaction of buyers and sellers determines prices.
- Each price reflects the good's value to buyers and the cost of producing the good.
- Prices guide self-interested households and firms to make decisions that, in many cases, maximize society's economic well-being.

HOW THE ECONOMY AS A WHOLE WORKS

- Huge variation in living standards across countries and over time:
  - Average income in rich countries is more than ten times average income in poor countries.
  - The Canadian standard of living today is about eight times larger than 100 years ago.
- The most important determinant of living standards: **productivity**, the amount of goods and services produced from each hour of a worker's time.
- Productivity depends on the equipment, skills, and technology available to workers.
- Other factors (*e.g.,* labour unions, competition from abroad) have far less impact on living standards.
- In the short-run (1 – 2 years), many economic policies push inflation and unemployment in opposite directions.
- Other factors can make this tradeoff more or less favourable, but the tradeoff is always present.

Chapter 2:

The Economist as Scientist

- Economists play two roles:

1. Scientists: try to explain the world
2. Policy advisors: try to improve it

- In the first, economists employ the **scientific method**, the dispassionate development and testing of theories about how the world works.

Assumptions & Models

- Assumptions simplify the complex world, make it easier to understand.
- Example: To study international trade, assume two countries and two goods. Unrealistic, but simple to learn and

gives useful insights about the real world.

- **Model:** a highly simplified representation of

a more complicated reality.
Economists use models to study economic issues.

Our First Model:

The Circular-Flow Diagram

- The **Circular-Flow Diagram**: a visual model of the economy, shows how dollars flow through markets among households and firms
- Two types of "actors":
  - households
  - firms
- Two markets:
  - the market for goods and services
  - the market for "factors of production"

Our Second Model:

The Production Possibilities Frontier

- The **Production Possibilities Frontier (PPF)**:
  a graph that shows the combinations of
  two goods the economy can possibly produce given the available resources and the available technology
- Example:
  - Two goods: computers and wheat
  - One resource: labour (measured in hours)
  - Economy has 50,000 labour hours per month available for production.

Microeconomics and Macroeconomics

- **Microeconomics** is the study of how households and firms make decisions and how they interact in markets.
- **Macroeconomics** is the study of economy-wide phenomena, including inflation, unemployment, and economic growth.
- These two branches of economics are closely intertwined, yet distinct – they address different questions.

The Economist as Policy Advisor

- As scientists, economists make
  positive statements,
  which attempt to describe the world as it is.
- As policy advisors, economists make
  normative statements,
  which attempt to prescribe how the world should be.
- Positive statements can be confirmed or refuted,
  normative statements cannot.
- The Govt of Canada, like other governments, relies on the advice of economists. Many government agencies and departments, including

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Chapter 3:

Interdependence

-Every day you rely on many people from around the world, most of whom you've never met, to provide you with the goods and services you enjoy.

- One of the Ten Principles from Chapter 1:
  Trade can make everyone better off.
- We now learn why people – and nations – choose to be interdependent, and how they can gain from trade.

Our Example

- Two countries: Canada and Japan
- Two goods: computers and wheat
- One resource: labour, measured in hours
- We will look at how much of both goods each country produces and consumes
  - if the country chooses to be self-sufficient
  - if it trades with the other country

Consumption With and Without Trade

- Without trade,
  - Canadian consumers get 250 computers and 2500 tons wheat.
  - Japanese consumers get 120 computers and 600 tons wheat.
- We will compare consumption without trade to consumption with trade.
- First, we need to see how much of each good is produced and traded by the two countries.

Two Measures of the Cost of a Good

- Two countries can gain from trade when each specializes in the good it produces at lowest cost.
- Absolute advantage measures the cost of a good in terms of the inputs required to produce it.
- Recall:
  Another measure of cost is *opportunity cost.*
- In our example, the opportunity cost of a computer is the amount of wheat that could be produced using the labour needed to produce one computer.

Opportunity Cost and Comparative Advantage

- **Comparative advantage**: the ability to produce a good at a lower opportunity cost than another producer
- Which country has the comparative advantage in computers?
- To answer this, must determine the opp. cost of a computer in each country.

Comparative Advantage and Trade

- Gains from trade arise from comparative advantage (differences in opportunity costs).
- When each country specializes in the good(s) in which it has a comparative advantage, total production in all countries is higher, the world's "economic pie" is bigger, and all countries can gain from trade.
- The same applies to individual producers (like the farmer and the rancher) specializing in different goods and trading with each other.

Chapter 4:

Comparative Advantage and Trade

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Demand

- The **quantity demanded** of any good is the amount of the good that buyers are willing and able to purchase.
- **Law of demand**: the claim that the quantity demanded of a good falls when the price of the good rises, other things equal

Market Demand versus Individual Demand

- The quantity demanded in the market is the sum of the quantities demanded by all buyers at each price.
- Suppose Helen and Ken are the only two buyers in the Latte market. ($\boldsymbol{Q^d}$ = quantity demanded)

Demand Curve Shifters

- The demand curve shows how price affects quantity demanded, *other things being equal*.
- These "other things" are non-price determinants of demand (*i.e.,* things that determine buyers' demand for a good, other than the good's price).
- Changes in them shift the ***D*** curve…

Market Supply versus Individual Supply

- The quantity supplied in the market is the sum of the quantities supplied by all sellers at each price.
- Suppose Starbucks and Jitters are the only two sellers in this market. ($\boldsymbol{Q^s}$ = quantity supplied)

Supply Curve Shifters

- The supply curve shows how price affects quantity supplied, *other things being equal*.
- These "other things" are non-price determinants of supply.
- Changes in them shift the ***S*** curve…

Supply Curve Shifters: Input Prices

- Examples of input prices: wages, prices of raw materials.
- A fall in input prices makes production more profitable at each output price, so firms supply a larger quantity at each price, and the ***S*** curve shifts to the right.

Supply Curve Shifters: Technology

- Technology determines how much inputs are required to produce a unit of output.
- A cost-saving technological improvement has the same effect as a fall in input prices, shifts ***S*** curve to the right.

Supply Curve Shifters: # of Sellers

- An increase in the number of sellers increases the quantity supplied at each price,
  shifts ***S*** curve to the right.

Terms for Shift vs. Movement Along Curve

- **Change in supply:** a shift in the ***S*** curve
  occurs when a non-price determinant of supply changes (like technology or costs)
- **Change in the quantity supplied:**
  a movement along a fixed ***S*** curve
  occurs when ***P*** changes
- **Change in demand:** a shift in the ***D*** curve
  occurs when a non-price determinant of demand changes (like income or # of buyers)
- **Change in the quantity demanded:**
  a movement along a fixed ***D*** curve
  occurs when ***P*** changes

SUMMARY:

- A competitive market has many buyers and sellers, each of whom has little or no influence
  on the market price.
- Economists use the supply and demand model to analyze competitive markets.
- The downward-sloping demand curve reflects the Law of Demand, which states that the quantity buyers demand of a good depends negatively on the good's price.
- Besides price, demand depends on buyers' incomes, tastes, expectations, the prices of substitutes and complements, and number of buyers. If one of these factors changes, the ***D*** curve shifts.
- The upward-sloping supply curve reflects the Law of Supply, which states that the quantity sellers supply depends positively on the good's price.
- Other determinants of supply include input prices, technology, expectations, and the # of sellers. Changes in these factors shift the ***S*** curve.

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curve.

- The intersection of ***S*** and ***D*** curves determines the market equilibrium. At the equilibrium price, quantity supplied equals quantity demanded.
- If the market price is above equilibrium,
  a surplus results, which causes the price to fall.
  If the market price is below equilibrium,
  a shortage results, causing the price to rise.
- We can use the supply-demand diagram to analyze the effects of any event on a market:
  First, determine whether the event shifts one or both curves. Second, determine the direction of the shifts. Third, compare the new equilibrium to the initial one.
- In market economies, prices are the signals that guide economic decisions and allocate scarce resources.

Chapter 5:

Elasticity

- Basic idea:
  Elasticity measures how much one variable responds to changes in another variable.
  - One type of elasticity measures how much demand for your websites will fall if you raise your price.
- Definition:
  Elasticity is a numerical measure of the responsiveness of Q^d or Q^s to one of its determinants.

Price Elasticity of Demand

- **Price elasticity of demand** measures how much Q^d responds to a change in ***P***.
- Price elasticity of demand equals
- Along a ***D*** curve, ***P*** and ***Q*** move in opposite directions, which would make price elasticity negative. We will drop the minus sign and report all price elasticities as
  positive numbers.

What determines price elasticity?
To learn the determinants of price elasticity, we look at a series of examples.

Each compares two common goods.
In each example:

- Suppose the prices of both goods rise by 20%.
- The good for which Q^d falls the most (in percent) has the highest price elasticity of demand.
  Which good is it? Why?
- What lesson does the example teach us about the determinants of the price elasticity of demand?

Example 1:
Breakfast cereal vs. Sunscreen

- The prices of both of these goods rise by 20%.
  For which good does $\boldsymbol{Q^d}$ drop the most? Why?
  - Breakfast cereal has close substitutes
    (*e.g.*, pancakes, Eggo waffles, leftover pizza),
    so buyers can easily switch if the price rises.
  - Sunscreen has no close substitutes,
    so consumers would probably not
    buy much less if its price rises.
- Lesson: ***Price elasticity is higher when close substitutes are available.***

The Determinants of Price Elasticity:
A Summary
The price elasticity of demand depends on:

- the extent to which close substitutes are available
- whether the good is a necessity or a luxury
- how broadly or narrowly the good is defined
- the time horizon – elasticity is higher in the long run than the short run

The Variety of Demand Curves

- The price elasticity of demand is closely related to the slope of the demand curve.
- Rule of thumb:
  The flatter the curve, the bigger the elasticity.
  The steeper the curve, the smaller the elasticity.
- Five different classifications of ***D*** curves….

The Determinants of Supply Elasticity

- The more easily sellers can change the quantity they produce, the greater the price elasticity of supply.
  - Example: Supply of beachfront property is harder to vary and thus less elastic than
    supply of new cars.
- For many goods, price elasticity of supply
  is greater in the long run than in the short run,
  because firms can build new factories,
  or new firms may be able to enter the market.

SUMMARY:

- Elasticity measures the responsiveness of
  $\boldsymbol{Q^d}$ or $\boldsymbol{Q^s}$ to one of its determinants.
- Price elasticity of demand equals percentage change in $\boldsymbol{Q^d}$ divided by percentage change in ***P***.
  When it's less than one, demand is "inelastic." When greater than one, demand is "elastic."
- When demand is inelastic, total revenue rises when price rises. When

demand is elastic, total revenue falls when price rises.

- The income elasticity of demand measures how much quantity demanded responds to changes in buyers' incomes.
- The cross-price elasticity of demand measures how much demand for one good responds to changes in the price of another good.

Chapter 6:

Government Policies That Alter the Private Market Outcome

- Price controls
  - **Price ceiling**: a legal maximum on the price of a good or service *Example: rent control*
  - **Price floor**: a legal minimum on the price of a good or service *Example: minimum wage*
- Taxes
  - The govt can make buyers or sellers pay a specific amount on each unit bought/sold.

How Price Ceilings Affect Market Outcomes
In the long run, supply and demand is more price-elastic. So, the shortage is larger.

Shortages and Rationing

- With a shortage, sellers must ration the goods among buyers.
- Some rationing mechanisms: (1) Long lines
  (2) Discrimination according to sellers' biases
- These mechanisms are often unfair, and inefficient: the goods do not necessarily go to the buyers who value them most highly.
- In contrast, when prices are not controlled, the rationing mechanism is efficient (the goods go to the buyers that value them most highly) and impersonal (and thus fair).

Evaluating Price Controls

- Recall one of the Ten Principles from Chapter 1:
  Markets are usually a good way to organize economic activity.

Taxes

- The govt levies taxes on many goods & services to raise revenue to pay for national defense, public schools, etc.
- The govt can make buyers or sellers pay the tax.
- The tax can be a % of the good's price, or a specific amount for each unit sold.
  - For simplicity, we analyze per-unit taxes only.

CONCLUSION: Government Policies and the Allocation of Resources

- Each of the policies in this chapter affects the allocation of society's resources.
  - *Example 1:* A tax on pizza reduces eq'm ***Q***.
  - With less production of pizza, resources (workers, ovens, cheese) will become available to other industries.
  - *Example 2:* A binding minimum wage causes a surplus of workers, a waste of resources.
- So, it's important for policymakers to apply such policies very carefully.

SUMMARY:

- A price ceiling is a legal maximum on the price of a good. An example is rent control. If the price ceiling is below the eq'm price, it is binding and causes a shortage.
- A price floor is a legal minimum on the price of a good. An example is the minimum wage. If the price floor is above the eq'm price, it is binding
  and causes a surplus. The labour surplus caused by the minimum wage is unemployment.
- A tax on a good places a wedge between the price buyers pay and the price sellers receive, and causes the eq'm quantity to fall, whether the tax is imposed on buyers or sellers.
- The incidence of a tax is the division of the burden of the tax between buyers and sellers, and does not depend on whether the tax is imposed on buyers or sellers.
- The incidence of the tax depends on the price elasticities of supply and demand.

Chapter 7:

Welfare Economics

- Recall, the **allocation of resources** refers to:
  - how much of each good is produced
  - which producers produce it
  - which consumers consume it
- **Welfare economics** studies <u>how</u> the allocation of resources affects economic well-being.
- First, we look at the well-being of consumers.

Willingness to Pay (WTP)

A buyer's **willingness to pay** for a good is the maximum amount the buyer will pay for that good.

WTP measures how much the buyer values the good.

Consumer Surplus (CS)

Consumer surplus is the amount a buyer is willing to pay minus the amount the buyer actually pays:

CS = WTP – ***P***

About the Staircase Shape…
This ***D*** curve looks like a staircase with 4 steps – one per buyer.

CS with Lots of Buyers & a Smooth D Curve
At ***Q*** = 5(thousand), the marginal buyer is willing to pay $50 for pair of shoes.
Suppose ***P*** = $30.
Then his consumer surplus = $20.

CS with Lots of Buyers & a Smooth D Curve
CS is the area b/w ***P*** and the ***D*** curve, from 0 to ***Q***.
Recall: area of
a triangle equals
½ x base x height
Height =
$60 – 30 = $30.
So,
CS = ½ x 15 x $30
= $225.

How a Higher Price Reduces CS
If ***P*** rises to $40,
CS = ½ x 10 x $20
= $100.
Two reasons for the fall in CS.

Cost and the Supply Curve

- **Cost** is the value of everything a seller must give up to produce a good (*i.e.*, opportunity cost).
- Includes cost of all resources used to produce good, including value of the seller's time.
- Example: Costs of 3 sellers in the lawn-cutting business.

CS, PS, and Total Surplus
CS = (value to buyers) – (amount paid by buyers)
= buyers' gains from participating in the market
PS = (amount received by sellers) – (cost to sellers)
= sellers' gains from participating in the market
Total surplus = CS + PS
= total gains from trade in a market
= (value to buyers) – (cost to sellers)

The Market's Allocation of Resources

- In a market economy, the allocation of resources is decentralized, determined by the interactions of many self-interested buyers and sellers.
- Is the market's allocation of resources desirable? Or would a different allocation of resources make society better off?
- To answer this, we use total surplus as a measure of society's well-being, and we consider whether the market's allocation is *efficient*. (Policymakers also care about *equality*, though are focus here is on efficiency.)

Efficiency

An allocation of resources is **efficient** if it maximizes total surplus. Efficiency means:

- The goods are consumed by the buyers who value them most highly.
- The goods are produced by the producers with the lowest costs.
- Raising or lowering the quantity of a good would not increase total surplus.

SUMARY:

- This chapter used welfare economics to demonstrate one of the Ten Principles:
  Markets are usually a good way to organize economic activity.
- Important note:
  We derived these lessons assuming perfectly competitive markets.
- In other conditions we will study in later chapters, the market may fail to allocate resources efficiently…
- Such market failures occur when:
- a buyer or seller has *market power* – the ability to affect the market price.
- transactions have side effects, called *externalities*, that affect bystanders. (example: pollution)
- We'll use welfare economics to see how public policy may improve on the market outcome in such cases.
- Despite the possibility of market failure, the analysis in this chapter applies in many markets, and the invisible hand remains extremely important.
- To measure of society's well-being, we use total surplus, the sum of consumer and producer surplus.
- Efficiency means that total surplus is maximized, that the goods are produced by sellers with lowest cost, and that they are consumed by buyers who most value them.
- Under perfect competition, the market outcome is efficient. Altering it

would reduce total surplus.

Chapter 8

A tax
-drives a wedge between the price buyers pay and the price sellers receive.
- raises the price buyers pay and lowers the price sellers receive.
- reduces the quantity bought & sold.

- These effects are the same whether the tax is imposed on buyers or sellers, so we do not make this distinction in this chapter.

The Effects of a Tax

- Next, we apply welfare economics to measure the gains and losses from a tax.
- We determine consumer surplus (CS), producer surplus (PS), tax revenue, and total surplus with and without the tax.
- Tax revenue can fund beneficial services (*e.g.*, education, roads, police) so we include it in total surplus.

What Determines the Size of the DWL?

- Which goods or services should govt tax to raise the revenue it needs?
- One answer: those with the smallest DWL.
- When is the DWL small vs. large? Turns out it depends on the price elasticities of supply and demand.
- Recall: The price elasticity of demand (or supply) measures how much $\boldsymbol{Q^D}$ (or $\boldsymbol{Q^S}$) changes when $\boldsymbol{P}$ changes.

How Big Should the Government Be?

- A bigger government provides more services, but requires higher taxes, which cause DWLs.
- The larger the DWL from taxation, the greater the argument for smaller government.
- The tax on labour income is especially important; it's the biggest source of govt revenue.
- For the typical worker, the ***marginal tax rate*** (the tax on the last dollar of earnings) is about 40%.
- How big is the DWL from this tax? It depends on elasticity….

How Big Should the Government Be?

- If labour supply is inelastic, then this DWL is small.
- Some economists believe labour supply is inelastic, arguing that most workers work
  full-time regardless of the wage.
- Other economists believe labour taxes are highly distorting because some groups of workers have elastic supply and can respond to incentives:
- Many workers can adjust their hours,
  e.g., by working overtime.
- Many families have a 2nd earner with discretion over whether and how much to work.
- Many elderly choose when to retire based on the wage they earn.
- Some people work in the "underground economy" to evade high taxes.

SUMMARY:

- A tax on a good reduces the welfare of buyers and sellers. This welfare loss usually exceeds the revenue the tax raises for the govt.
- The fall in total surplus (consumer surplus, producer surplus, and tax revenue) is called the deadweight loss (DWL) of the tax.
- A tax has a DWL because it causes consumers to buy less and producers to sell less, thus shrinking the market below the level that maximizes total surplus.
- The price elasticities of demand and supply measure how much buyers and sellers respond to price changes. Therefore, higher elasticities imply higher DWLs.
- An increase in the size of a tax causes the DWL to rise even more.
- An increase in the size of a tax causes revenue to rise at first, but eventually revenue falls because the tax reduces the size of the market.

Chapter 9

The World Price and
Comparative Advantage

- P_W = the **world price** of a good,
  the price that prevails in world markets
- P_D = domestic price without trade
- If $P_D < P_W$,
  - country has comparative advantage in the good
  - under free trade, country exports the good
- If $P_D > P_W$,
  - country does not have comparative advantage
  - under free trade, country imports the good

The Small Economy Assumption

- A small economy is a **price taker** in world markets: Its actions have

no effect on $\boldsymbol{P_W}$.

- Canada suits the definition of a small economy.
- When a small economy engages in free trade, $\boldsymbol{P_W}$ is the only relevant price:
  - No seller would accept less than $\boldsymbol{P_W}$, since she could sell the good for $\boldsymbol{P_W}$ in world markets.
  - No buyer would pay more than $\boldsymbol{P_W}$, since he could buy the good for $\boldsymbol{P_W}$ in world markets.

Other Benefits of International Trade

- Consumers enjoy increased variety of goods.
- Producers sell to a larger market, may achieve lower costs by producing on a larger scale.
- Competition from abroad may reduce market power of domestic firms, which would increase total welfare.
- Trade enhances the flow of ideas, facilitates the spread of technology around the world.

Then Why All the Opposition to Trade

- Recall one of the Ten Principles from Chapter 1:
  Trade can make everyone better off.
- The winners from trade could compensate the losers and still be better off.
- Yet, such compensation rarely occurs.
- The losses are often highly concentrated among a small group of people, who feel them acutely.

The gains are often spread thinly over many people, who may not see how trade benefits them.

- Hence, the losers have more incentive to organize and lobby for restrictions on trade.

Import Quotas:
Another Way to Restrict Trade

- An **import quota** is a quantitative limit on imports of a good.
- Mostly has the same effects as a tariff:
  - Raises price, reduces quantity of imports.
  - Reduces buyers' welfare.
  - Increases sellers' welfare.
- A tariff creates revenue for the govt. A quota creates profits for the foreign producers of the imported goods, who can sell them at higher price.
- Or, govt could auction licenses to import to capture this profit as revenue. Usually it does not.

Trade Agreements

- A country can liberalize trade with
  - unilateral reductions in trade restrictions
  - multilateral agreements with other nations
- Examples of trade agreements:
  - North American Free Trade Agreement (NAFTA), 1993
  - General Agreement on Tariffs and Trade (GATT), ongoing
- World Trade Organization (WTO), est. 1995, enforces trade agreements, resolves disputes

SUMMARY:

- A country will export a good if the world price of the good is higher than the domestic price without trade. Trade raises producer surplus, reduces consumer surplus, and raises total surplus.
- A country will import a good if the world price is lower than the domestic price without trade. Trade lowers producer surplus but raises consumer and total surplus.
- A tariff benefits producers and generates revenue for the govt, but the losses to consumers exceed these gains.
- Common arguments for restricting trade include: protecting jobs, defending national security, helping infant industries, preventing unfair competition, and responding to foreign trade restrictions. Some of these arguments have merit in some cases, but economists believe free trade is usually the better policy.

Chapter 10:

Introduction

- Self-interested buyers and sellers neglect the external costs or benefits of their actions, so the market outcome is not efficient.
- Another principle from Chapter 1:
  Governments can sometimes improve market outcomes.
  In presence of externalities, public policy can improve efficiency.

Examples of Negative Externalities

- Air pollution from a factory
- The neighbour's barking dog
- Noise pollution from construction projects
- Health risk to others from second-hand smoke

"Internalizing the Externality"

- **Internalizing the externality**: altering incentives so that people

take account of the external effects of their actions

- In our example, the $1/gallon tax on sellers makes sellers' costs = social costs.
- When market participants must pay social costs, market eq'm = social optimum.

(Imposing the tax on buyers would achieve the same outcome; market ***Q*** would equal optimal ***Q***

Examples of Positive Externalities

- Being vaccinated against contagious diseases protects not only you, but people who visit the salad bar or produce section after you.
- R&D creates knowledge others can use.
- People going to college raise the population's education level, which reduces crime and improves government.

Public Policies Toward Externalities

Two approaches:

- **Command-and-control policies** regulate behaviour directly. Examples:
  - limits on quantity of pollution emitted
  - requirements that firms adopt a particular technology to reduce emissions
- **Market-based policies** provide incentives so that private decision-makers will choose to solve the problem on their own. Examples:
  - corrective taxes and subsidies
  - tradable pollution permits

Corrective Taxes & Subsidies

- **Corrective tax**: a tax designed to induce private decision-makers to take account of the social costs that arise from a negative externality
- Also called **Pigovian taxes** after Arthur Pigou (1877-1959).
- The ideal corrective tax = external cost
- For activities with positive externalities, ideal corrective subsidy = external benefit

Corrective Taxes vs. Regulations

- Different firms have different costs of pollution abatement.
- Efficient outcome: Firms with the lowest abatement costs reduce pollution the most.
- A pollution tax is efficient:
  - Firms with low abatement costs will reduce pollution to reduce their tax burden.
  - Firms with high abatement costs have greater willingness to pay

tax.

- In contrast, a regulation requiring all firms to reduce pollution by a specific amount not efficient.

Example of a Corrective Tax: The Gas Tax
The gas tax targets three negative externalities:

- Congestion
  The more you drive, the more you contribute to congestion.
- Accidents
  Larger vehicles cause more damage in an accident.
- Pollution
  Burning fossil fuels produces greenhouse gases.

Why Private Solutions Do Not Always Work

1. Transaction costs:
The costs parties incur in the process of agreeing to and following through on a bargain.
These costs may make it impossible to reach a mutually beneficial agreement.

2. Stubbornness:
Even if a beneficial agreement is possible, each party may hold out for a better deal.

3. Coordination problems:
If # of parties is very large, coordinating them may be costly, difficult, or impossible.

SUMMARY:

- An externality occurs when a market transaction affects a third party. If the transaction yields negative externalities (*e.g.*, pollution), the market quantity exceeds the socially optimal quantity.
  If the externality is positive (*e.g.*, technology spillovers), the market quantity falls short of the social optimum.
- Sometimes, people can solve externalities on their own. The Coase theorem states that the private market can reach the socially optimal allocation of resources as long as people can bargain without cost. In practice, bargaining is often costly or difficult, and the Coase theorem does not apply.
- The government can attempt to remedy the problem. It can internalize the externality using corrective taxes. It can issue permits to polluters and establish a market where permits can be traded. Such policies often protect the environment at a lower cost to society than direct regulation.

Chapter 11

Introduction

- We consume many goods without paying:
  parks, national defense, clean air & water.
- When goods have no prices, the market forces that normally allocate resources are absent.
- The private market may fail to provide the socially efficient quantity of such goods.
- One of the Ten Principles from Chapter 1:
  Governments can sometimes improve market outcomes.

Important Characteristics of Goods

- A good is **excludable** if a person can be prevented from using it.
  - *Excludable*: burritos, wireless internet access
  - *Not excludable*: FM radio signals, national defense
- A good is **rival in consumption** if one person's use of it diminishes others' use.
  - *Rival*: burritos
  - *Not rival*:
    An MP3 file of Tom Waits' latest single

The Different Kinds of Goods
Private goods: excludable, rival in consumption
Example: food
Public goods: not excludable, not rival
Example: national defense
Common resources: rival but not excludable
Example: fish in the ocean
Natural monopolies: excludable but not rival
Example: cable TV

The Different Kinds of Goods

- This chapter focuses on public goods and common resources.
- For both, externalities arise because something of value has no price attached to it.
- So, private decisions about consumption and production can lead to an inefficient outcome.
- Public policy can potentially raise economic well-being.

Public Goods

- Public goods are difficult for private markets to provide because of the *free-rider problem*.
- **Free rider**: a person who receives the benefit of a good but avoids paying for it
  - If good is not excludable, people have incentive to be free riders, because firms cannot prevent non-payers from consuming the good.

- Result: The good is not produced, even if buyers collectively value the good higher than the cost of providing it.

Public Goods

- If the benefit of a public good exceeds the cost of providing it, govt should provide the good and pay for it with a tax on people who benefit.
- Problem: Measuring the benefit is usually difficult.
- **Cost-benefit analysis**: a study that compares the costs and benefits of providing a public good
- Cost-benefit analyses are imprecise, so the efficient provision of public goods is more difficult than that of private goods.

Common Resources

- Like public goods, common resources are not excludable.
  - Cannot prevent free riders from using
  - Little incentive for firms to provide
  - Role for govt: seeing that they are provided
- Additional problem with common resources: rival in consumption
  - Each person's use reduces others' ability to use
  - Role for govt: ensuring they are not overused

The Tragedy of the Commons

- A parable that illustrates why common resources get used more than is socially desirable.
- Setting: a medieval town where sheep graze on common land.
- As the population grows, the # of sheep grows.
- The amount of land is fixed, the grass begins to disappear from overgrazing.
- The private incentives (using the land for free) outweigh the social incentives (using it carefully).
- Result: People can no longer raise sheep.

SUMMARY:

- A good is excludable if someone can be prevented from using it. A good is rival in consumption if one person's use reduces others' ability to use the same unit of the good.
- Markets work best for private goods, which are excludable and rival in consumption. Markets do not work well for other types of goods.
- Public goods, such as national defense and fundamental knowledge, are neither excludable nor rival in consumption.

- Because people do not have to pay to use them, they have an incentive to free ride, and firms have no incentive to provide them.
- Therefore, the government provides public goods, using cost-benefit analysis to determine how much to provide.
- Common resources are rival in consumption but not excludable. Examples include common grazing land, clean air, and congested roads.
- People can use common resources without paying, so they tend to overuse them.
  Therefore, governments try to limit the use of common resources.

Chapter 12:

Introduction

- One of the Ten Principles from Chapter 1:
  A government can sometimes improve market outcomes.
  - Providing public goods
  - Regulating use of common resources
  - Remedying the effects of externalities
- To perform its many functions,
  the govt raises revenue through taxation.

A Financial Overview of Canadian Governments

- Federalist structure
  - Political power divided between federal government and provincial governments
  - Federal government has the greater power
  - Local and municipal governments are granted powers by the provincial government
- Federal government responsibilities
  - Matters of national interest: national defence and foreign policy, international trade, competition policy, criminal law and money and banking
  - Delivery of some national social programs, e.g., Employment Insurance (EI) and Canadian Pension Plan (CPP).
  - Has unlimited taxing powers
- Provincial government responsibilities
  - Health care, education, welfare, natural resources within their boundaries, and civil law
  - Extensive taxing powers, but less than federal government
  - Account for more than half of activities by the public sector in Canada

The Federal Government

- Personal Income Taxes

- The marginal tax rate is the tax rate applied to each additional dollar of income.
- Higher-income individuals pay a larger percentage of their income in taxes.

Provincial/Territorial and Local Governments: Receipts

- Provincial and Local governments collect more than 50% of taxes in the economy
  - *Transfers from the federal government*
  - *Personal income taxes*
  - *General sales taxes*
  - *Excise taxes*
  - *Property taxes*
  - *Corporate income taxes*
  - *Health premiums and payroll taxes*

Taxes and Efficiency

- Policymakers have two objectives in designing a tax system…
  - Efficiency
  - Equity
- One tax system is more efficient than another if it raises the same amount of revenue at a smaller cost to taxpayers.
- The costs to taxpayers include:
  - the tax payment itself
  - deadweight losses
  - administrative burden

Deadweight Losses

- One of the Ten Principles:
  People respond to incentives.
- Recall from Chapter 8:
  Taxes distort incentives, cause people to allocate resources according to tax incentives rather than true costs and benefits.
- The result: a deadweight loss.
  The fall in taxpayers' well-being exceeds the revenue the govt collects.

Administrative Burden

- Includes the time and money people spend to comply with tax laws
- Encourages the expenditure of resources on legal tax avoidance
  - *e.g.*, hiring accountants to exploit "loopholes" to reduce one's tax burden
- Is a type of deadweight loss
- Could be reduced if the tax code were simplified but would require removing loopholes, politically difficult

Lump-Sum Taxes

- A **lump-sum tax** is the same for every person
- Example: lump-sum tax = $4000/person

Taxes and Equity

- Another goal of tax policy:
  equity – distributing the burden of taxes "fairly."
- Agreeing on what is "fair" is much harder than agreeing on what is "efficient."
- Yet, there are several principles people apply
  to evaluate the equity of a tax system.

The Benefits Principle

- **Benefits principle**: the idea that people should pay taxes based on the benefits they receive from govt services
- Tries to make public goods similar to private goods – the more you use, the more you pay
- Example: Gasoline taxes
  - Amount of tax paid is related to
    how much a person uses public roads

The Ability-To-Pay Principle

- **Ability-to-pay principle**: the idea that taxes should be levied on a person according to how well that person can shoulder the burden
- Suggests that all taxpayers should make an "equal sacrifice"
- Recognizes that the magnitude of the sacrifice depends not just on the tax payment, but on the person's income and other circumstances
  - a $10,000 tax bill is a bigger sacrifice for a
    poor person than a rich person

Three Tax Systems

- **Proportional tax**:
  Taxpayers pay the same fraction of income, regardless of income
- **Regressive tax**:
  High-income taxpayers pay a smaller fraction of their income than low-income taxpayers
- **Progressive tax**:
  High-income taxpayers pay a larger fraction of their income than low-income taxpayers

Tax Incidence and Tax Equity

- Recall: The person who bears the burden is not always the person who gets the tax bill.
- Example: A tax on fur coats
  - May appear to be vertically equitable
  - But furs are a luxury with very elastic demand

        - The tax shifts demand away from furs, hurting the people who produce furs (who probably are not rich)
    - Lesson: When evaluating tax equity, must take tax incidence into account.

SUMMARY:

- The Canadian government raises revenue using various taxes. The most important tax for the federal and provincial governments is the personal income tax.
- Equity and efficiency are the two most important goals of the tax system.
- The efficiency of a tax system refers to the costs it imposes on the taxpayers.
- The equity of a tax system concerns whether the tax burden is distributed fairly among the population.
- According to the benefits principle, it is fair for people to pay taxes based on the benefits they receive from the government.
- According to the ability-to-pay principle, it is fair for people to pay taxes on their capability to handle the financial burden.
- The distribution of tax burdens is not the same as the distribution of tax bills.
- Much of the debate over tax policy arises because people give different weights to the two goals of efficiency and equity.